

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

VOLUME TWO

- Appendices, Data & Glossary

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

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GLOSSARY:

Cotting

Cotting is a matting of the wool which is caused by the combined effects of seasonal reduction in wool growth and the stress of lambing. These factors weaken the wool fibre and cause it to break. The fibres are then able to move and interlock, resulting in what is termed cotting. The condition is accentuated by late shearing. Cotted fleeces have to be 'opened' before they can be processed.

Micron

The fibre diameter of wool is measured in microns. A micron is equivalent to one-thousandth of a millimetre.

Scouring

Wool that is cleaned for dirt, sweat and grease is referred to as scoured wool. The wool is passed through a series of tubs containing a mix of hot water and detergent, before being dried in a hot oven. Approximately 79% of wool exported from New Zealand is scoured. Clean weight refers to the wool weight after scouring. It is the preferred measure as it represents the amount of fibre which is available for use in manufacturing. The clean weight is approximately 75% of the greasy weight.

Second Shears

This refers to the type of wool that is derived from sheep shorn twice a year or three times in two years.

Skirtings

Stained, dusty or contaminated wool removed from the fleece after shearing and sold separately from the body wool.

Slipe

Slipe wools are basically wools that have been removed from sheepskins.

Tops

A combed continuous length of carded (straightened) wool used in the production of worsted yarns.

Worsted Yarns

Worsted wool is the most-involved yarn-making system in which full-length wools of good style are used. The wool is first carded (straightened) into a sliver (continuous length) from which the short fibres are combed (fibres laid parallel). When the yarns are spun from the sliver, a strong twist is imparted to them. This makes them firmer, smoother, and less bulky than woollen yarns. Worsted yarns are used mainly in woven and knitted apparel fabrics. Semi-worsted yarns refer to yarns in which the slivers have not been combed, and hence are cheaper.

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NEWS CLIPPINGS:

THE NEW ZEALAND WOOL BOARD'S WITHDRAWAL FROM THE WOOL AUCTION SYSTEM

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<i>Wool sale called off in face of uncertainty:</i> New Zealand Herald, 6 February, 1991	A.2
<i>Wool industry faces worst recession for 25 years:</i> Evening Post, 11 February, 1991	A.3
<i>Canberra sparks wool price crisis:</i> New Zealand Herald, 12 February, 1991	A.4
<i>Wool producers await auctions for price verdict:</i> Evening Post, 13 February, 1991	A.5
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Wool prices slump despite board boost

NZPA

Wellington

New Zealand wool prices tumbled 6.4 per cent yesterday in the first auction since Australia announced it was cutting its floor price by 20 per cent.

The Christchurch sale was propped up by the Wool Board, which bid on 85 per cent of the offering and purchased 50 per cent.

The board said the market indicator price fell from 550c a kg to 515c and 50 per cent of the wool on offer sold at below minimum prices.

The board said it would supplement these prices back to the grower at an average of 17c a kg or a total of \$167,000. This will be the first time since 1985 the board has supplemented prices.

The chief executive of the board, Mr Grant Sinclair, said yesterday's price was relatively good, given the circumstances.

But it was still too early to determine the full impact of the Australian floor-price cut announced on Wednesday. New levels for each type of wool were still being set.

The board's stockpile now stood at 438,000 bales and Mr Sinclair said it was quite likely that it would climb to 500,000 bales by the end of the season.

With the lack of certainty, markets

would remain unsettled and most buyers were going to sit on the sidelines, he said.

Grower organisations around the world would have to continue to be very active in supporting the market until confidence and stability were restored.

Fortunately, this was a quiet time of the year — and through July and August relatively little wool was sold.

Christchurch, with 12,000 bales on offer, was the first of six auctions scheduled between now and the end of the season on June 30. The sale, due to have taken place on Thursday, was postponed because of uncertainty over the Australian moves.

The next wool sale will be held at Napier on Friday.

Meanwhile, dairy farmers will be cutting back their budgets for the coming milking season with the Dairy Board announcement yesterday of an advance price of \$4 a kg — and a prediction that a final payout would be less than \$5 a kg.

The chairman of the Dairy Board, Mr Dryden Spring, said yesterday that the dairy industry was in a sound state but had to be realistic about an uncertain export market.

"Indications are for certainly less than \$5 for the whole of this coming season and I advise farmers to budget on what the board is advancing at any particular time."

Wool sale called off in face of uncertainty

By GLENYS CHRISTIAN

The Wool Board has postponed the Friday sale and suspended minimum prices for wool sold privately as the market faces its severest test this season.

The board chairman, Mr Pat Morrison, said the decision was unavoidable following uncertainty created by a decision of the Australian Wool Corporation to suspend its sales for three weeks. He also blamed the move on "the economic destabilisation and recessionary environment resulting from the Gulf crisis."

"We regret having to take this action, but factors well beyond the Wool Board's control have left us with no choice."

The 16,000 bales of wool which were to be offered for sale in

Christchurch on Friday will now be put up for auction on Thursday next week.

The board has faced falling prices since its two largest customers in the 1988-1989 season, China and the Soviet Union, withdrew from the market.

Buyer resistance to high prices for Australian fine wools and resulting uncertainty over market support measures has meant the board has had to take an active role at auction all season.

At last Friday's wool sale in Christchurch the board bought 54 per cent of the wool on offer and paid an average supplement to farmers of 89c a kilogram on \$9 per cent of the clip.

The market indicator which measures an average price of different wool sold was 395c a kilogram, compared with 493c at the start of the season.

The board has bought close to

650,000 bales of wool and spent nearly \$50 million in supplements to bring farmers' returns up to minimum price levels.

Mr Morrison said the temporary suspension of supplementary payments on wool sold privately was necessary to stop a move away from future auction sales.

Wool exporters would have access to the board's stocks at prices paid at last week's sale which would allow them to fulfil outstanding contracts.

Mr Michael Moss, the chairman of the council of wool exporters, said the move was not unexpected.

"The international scene is rather holding its breath until an Australian decision is made," he said.

Exporters hoped that their sales would not be affected if the situation was resolved quickly.

There has been strong specula-

tion that the Australian Wool Corporation may abandon its minimum price scheme altogether as its stockpile nears five million bales.

Mr Richard Davison, the chairman of Federated Farmers meat and wool section, said that if the Australians dithered over a decision, further wool sales might have to be postponed.

"New Zealand is the junior partner to Australia and effectively we do have to follow them," he said.

The Wool Board had stockpiled one-third of the annual wool production and used around half of its reserves put aside to supplement wool prices.

However if the Australians decided to lower the floor price or remove price support altogether the Wool Board would be forced to follow prices down.

Wool industry faces worst recession for 25 years

By MICHAEL HANNAH

New Zealand could be hovering over its worst wool recession in more than 25 years, with severe effects likely on the general economy, according to wool industry leaders.

They say the billion dollar export industry faces its toughest period since the late 1960s as Australia is expected to take moves that will depress prices further.

Cabinet has been kept informed of developments, but has not yet been asked to provide relief, Wool Board chief executive Grant Sinclair said today. Market prices, lately around 425c a kilo clean, have been consistently below the board's minimum price of 485c this season, forcing the Wool Board to pay out \$88 million this season propping up farmers' incomes.

The downturn has been sparked by the loss of markets in the Soviet Union and China over the last year, but has picked up momentum with speculation Australia will scrap its reserve price scheme. The outbreak of the Gulf War has further dried up demand for wool.

"The basic engine room of the economy is in very poor shape," Dr Sinclair said.

The Australian Cabinet is expected to decide today the fate of the reserve price scheme. Whatever action it takes — reducing or scrapping the scheme altogether — industry sources here say it will have an immediate effect on New Zealand.

"Most likely there would have to be some change in New Zealand as well," Dr Sinclair said. This was despite the fact Australian wool was predominantly fine and New Zealand wool coarse. There was still

some linkage in prices between grades and a drop in fine wool prices would flow through to New Zealand grades.

Dr Sinclair said many sheep farmers were working at break-even or loss levels.

"This is the toughest period since the late '60s. In many people's eyes it probably exceeds the recession back then. It's fair to say general people aren't aware of how bad it is."

The Wool Board suspended last week's Napier and Christchurch sales and rescheduled them to Thursday this week. But at the previous sale, demand was so low the board had to buy 60 percent of offerings — compared with sales before mid-January, when 85 percent of offerings were cleared.

"Since mid-January we've moved from difficult and tough to even tougher.

Canberra sparks wool price crisis

The New Zealand Wool Board is today expected to suspend its minimum wool price scheme in the wake of a decision by the Australian Government to suspend its scheme.

The board, which held a crisis session for five hours last night, will meet again today before making any announcement.

The Australian decision would mean enormous losses in New Zealand, both for individual farmers and in overseas earnings, the Prime Minister, Mr Bolger, said.

Self-funding

But even before Australia announced it was removing its wool floor price to avert a deepening depression in that industry, Mr Bolger was ruling out the chance of state assistance for New Zealand farmers.

Unlike the Australians — who have offered a \$NZ1040 million package to see farmers through to the end of this season — Mr Bolger said the New Zealand Wool Board was in a "stand alone" position.

Asked at his regular Monday press conference — held before the Australian move had been made public — if the Government was prepared to stand by and watch the New Zealand wool industry collapse, Mr Bolger said: "I don't think it's in the Crown's hands."

Official confirmation that the Australian Government had suspended its reserve price scheme came later in the afternoon from the Minister of Agriculture, Mr Falloon.

The Australian Minister for Primary Industries and Energy, Mr Kerin, had explained the scheme was suspended until June 30 and any further such schemes would have to be self-funding and conservatively priced, Mr Falloon said.

The Wool Board had immediately asked the Government for some assistance, in the form of a grant to meet the difference between the market price and the minimum price it originally set for the season, the minister said.

But he held little hope of there being any grant.

"I would take their submission and review it, but, in order to remove any uncertainties in the market, it is fair to say I don't believe the Government will subsidise the wool industry."

Challenge

Mr Falloon said he believed the board was viable. "They can survive quite happily with their stocks."

However, he added, the board would have "considerable difficulty" in continuing its minimum price scheme or with any intervention price.

"That's the challenge for them."

The Wool Board had made its request for a grant after it knew about the Aus-

From GERALDINE JOHNS
in Wellington

tralian decision and subsequent package "on the basis that if it was good enough for the Australian growers, it was good enough for them," Mr Falloon said.

Although not disclosing the size of the grant sought, Mr Falloon said it was "very open-ended."

"And that is the danger. There is a very real risk that if the Government topped up the market, or even if the board topped up the market — if it could, with its own money — there

would be further depression of wool market prices."

The Australian move would undoubtedly have a major impact on New Zealand, Mr Falloon said, because the Australian farmers set a benchmark system.

The declining Australian market had already had an effect on New Zealand prices. "When they moved from 880c, which was their previous minimum price, their market just went

down, and our market went down with it.

"The New Zealand wool price has slipped by about 200c clean for ordinary cross-bred wool since the beginning of the season, a drop of around 30 per cent."

If the Wool Board announces it is dropping its minimum price system today, it will mean the end of a scheme that has been in place in New Zealand since 1945.

The New Zealand wool export industry ranks as one of the top five earners in New Zealand.

Wool producers await auctions for price verdict

By ROGER FOLEY

Wool producers won't know the full extent of their plight until the international trade gives its verdict next week at auctions in Napier and Christchurch.

The New Zealand Wool Board yesterday suspended its minimum-price scheme following a similar move in Australia.

The New Zealand move followed advice from a consortium of bankers against continuing the scheme until the end of the season. It has caught out a large number of wool producers who now have to sell on an unsupported market this season.

Wool Board chairman Pat Morrison said this was "rough justice" and not the sort of decision the board liked taking.

To remain "bankable," he said the board could not draw on its funds any further at this stage. The funds it had were either tied up in stock it had already brought or had borrowed against.

The board began the season in July guaranteeing farmers an average of 485 cents a kilogram for their wool. Last month the market price was 395 cents.

The board had reckoned on having to buy about 15 percent of the wool offered this season but over the last three to four weeks it had had to buy more than 50 percent of the offerings.

Its stockpile was now 648,000 bales.

The board blamed the move in Australia and the general uncertainty in the international wool market for forcing its hand. It accepted that the impact on some growers and families and the rural communities would be serious.

Those especially vulnerable would be the 15 percent of farmers who spend 35 percent of their gross revenue on inter-

est payments. Twenty-four percent of all meat and wool farmers were now expected to make a loss this year.

Mr Morrison was not prepared to say what the new wool price might be at auction next week. Federated Farmers president Owen Jennings said it could halve to \$2-\$2.50.

Mr Morrison said the reality was that with China and the Soviet Union virtually out of the market — they used to take up to 40 percent of the New Zealand clip — there was not a "home" for all New Zealand's wool. "We would have liked to have had the finances to have continued the [support] scheme until the end of the season until hopefully either the Soviet Union or China, or both, came back into the market."

Mr Morrison made it clear, though, that the board's bankers were not prepared to bankroll board activities any further.

He also said the board had asked the Government on Monday night for the same sort of assistance the Australian Government has promised its wool producers until the end of their season, but the response had not been encouraging.

Mr Morrison was not prepared to speculate on the future of the suspended minimum price scheme.

"That is a matter we will have to discuss as a board and with grower representatives between now and the end of June."

● The Council of Wool Exporters said the Wool Board and its Australian counterpart had done "irreparable damage" to their credibility, by abandoning their price support schemes.

"Losses by exporters and overseas customers on existing contracts and stocks will run into many millions of dollars," said council president Michael Mosa.

Farmers threaten to withhold grower levy

Farmers angry over the Wool Board's suspension of the minimum price scheme have threatened not to pay the 1991-92 season 6 percent grower levy.

Federated Farmers meat and wool section chairman Dick Davison said today he could understand their anger but believed there should be a debate on the future role of the Wool Board.

An angry Otago farmer told Radio New Zealand he would not pay the levy in protest at the board's overnight decision to follow the Australian suspension of the minimum price scheme. This meant a number of wool growers would have to sell their products on an unsupported market while others had already benefited from a subsidy.

Wool Board chairman Pat Morrison acknowledged yesterday that this was a case of "rough justice".

Mr Davison said the fact some farmers received price support from the board and others not was grossly unfair. "We are trying to develop some way to provide support. It could be a delayed payment, even an IOU. Some system [to help those who have missed out] will have to be developed." Mr Davison said growers should remember the board had served them well and should not try and to "throw the baby out with the bathwater."

"We have to look at the structures within the board and the International Wool Secretariat."

Wool disaster

PREDICTIONS THAT the wool market would bottom out in the early part of 1991 came chillingly true this week, in a way that no-one really predicted. The sudden decision by Australia to scrap its wool floor price pulled the plug on the world wool market and will lead inevitably to a marked drop in prices. The Australians obviously misread the market situation, particularly the length of time it would take for Russia and China to resume buying, and also overestimated their ability to support the market, expecting a reversal of the decline in demand and price before their 700c (NZ\$80c) floor price became unsustainable. The New Zealand Wool Board adopted a different and more realistic approach, intervening in the market to buy wool at levels that still enabled the trade to take a considerable amount. Whereas the Australian Wool Board ended up with a stockpile representing about 80% of its clip, New Zealand's stockpile is more like 40%, at 648,000 bales — incidentally still not quite as much as in 1967-68, when 700,000 bales were in store. The New Zealand board's stance was appreciated by the wool trade as one that brought stability to market prices, while attempting to obtain maximum sale clearances.

Ironically, New Zealand may well be hit harder by the Australian Wool Board's unfortunate misjudgements than the Australians. Farmers here, while not overly happy at the crossbred wool prices, at least were reasonably well insulated by the minimum price level, but now are likely to face a considerable drop in income. The New Zealand Wool Board, faced with the probability of a slump in market prices, simply does not have the resources to continue to intervene in the market or to prop up returns to farmers through the minimum price scheme and has been forced to cancel both operations. The most upsetting aspect for farmers who have not sold their wool is that they will get nothing back out of the supplementation fund that they themselves helped to create, whereas many of those who sold

earlier in the season have received some supplementation.

The average supplement paid out over the season so far is said to be about 66 cents a kilogram, but estimated to be 90 to 95 cents at recent sales. It is a sure bet that actual returns to farmers for crossbred wool will be at least that much lower, but the full effect of the Australian action on prices is difficult to predict and it will remain to be seen at coming auctions what the trade is prepared to pay. Fortunately for Otago's fine-wool farmers, the peak of the season is past, but, because their wool is in a similar micron range to much of the Australian clip, a hefty discount in price will undoubtedly occur. There is no doubt though that the Australian action will also affect crossbred prices, because they usually move in concert with the finer wools and because the sheer volume of surplus wool is so large.

For southern farmers, many of whom have had a rough time over the past few years, the situation is disastrous. The MAF Farm Monitoring Report for December 1990 already predicts losses for the majority of South and West Otago plains and downlands type properties for this financial year and the wool slump will exacerbate the situation. On a 3000 stock unit farm a drop of \$1 in wool price can mean a fall of \$15,000 or more in income. If half of Otago's farmers still have not sold their wool the effect on the province's cash flow could be in excess of \$30 million — a sobering thought for all of us.

As for the long-term future of floor-price schemes, intervention and minimum prices, there will be some soul-searching among farm leaders on both sides of the Tasman. There is a strong feeling among some in Otago that, in the long run, it is better to meet the market than to create artificial barriers. That feeling will gather momentum from now on. Certainly there will be some hard questions being asked about the continuation of the Wool Board levy and the role of the board itself, especially at a time when so many will miss out on the benefits of supplementary payments.

Hard times for wool producers

With the security blanket of price-smoothing schemes suspended in both Australia and New Zealand, sheepfarmers are understandably enraged. Producing in the expectation of reasonable or at least guaranteed sales created a false sense of safety at odds with the boom and bust nature of the real marketplace. The Australian Wool Corporation and the New Zealand Wool Board, for all their well-meaning intervention, proved to be flimsy bulwarks against the pressure of world events. The huge impact of the withdrawal of the Soviet and Chinese markets may have been withstood, but the addition of war in the Gulf was too much. The dramatic Australian suspension of the minimum price scheme left the New Zealand Wool Board, pressured by its bankers, no option but to follow. Unfortunately for New Zealand farmers, there is no cushioning deal with the Government here to match that in Australia where producers can still hope for assistance to the end of the season.

There will be nothing forthcoming from New Zealand's stretched public coffers. Agriculture Minister John Falloon has had a word with financiers and reassures farmers they will not be forced off their land because of falling wool prices. His efforts may not sound convincing to those 15 percent of sheepfarmers who, unwisely, spend 35 percent of their income paying interest and now will be stretched even more. Banks are unlikely to have unlimited patience and farmers cannot be assured that prices will in-

crease quickly. The chances are that the centrally controlled economies of Russia and China will eventually extend again to buying New Zealand wool, but timing is impossible to predict. The war must end, but there is no timetable for it.

While New Zealand farmers rage against the Wool Board, the Wool Board has reason to feel aggrieved with its Australian counterpart. The Australian Wool Corporation and Australia's Primary Industry Minister John Kerin strenuously campaigned to create a secure atmosphere by reiterating in December that the \$7 a kilogram floor price would be maintained until July 1992. At an International Wool Textile Organisation meeting late last year Mr Kerin assured European manufacturers the price was embodied in Commonwealth legislation. That legislation can, and will, be changed. The New Zealand Wool Board, hearing what they and all farmers wanted to hear, had no defences against the sudden turnaround.

A drop in the price of wool is almost certain. How far it will drop, and for how long, considering the huge national stockpiles of the main wool producing countries, is unpredictable. Farmers, whose before-tax profit even before the crisis was projected to be 34 percent down, might now have a 50 percent drop in their incomes. The exported wool clip, worth more than \$1.3 billion last year, may go below \$1 billion this year. The whole community, as Mr Falloon predicts, will share in the pain.

Wool prices fall 15pc at auction

By ROGER FOLEY

Wool prices plunged about 15 percent today at the first auctions held since the Wool Board suspended its minimum price scheme on February 12.

The fall may have been worse had more wool been available for sale.

Auctions were held in Napier and Christchurch.

Wool Board market support sales group manager Jim Bengé said about 42 percent of the wool offered at Napier was passed in when their reserve prices were not met. The figure was more than 50 percent for the South Island.

The board withdrew 6 to 8 percent of its wool before the sale.

Mr Bengé could not say what the reserve price levels were at this stage. Nor could he say who were the main buyers, though Western Europe, Japan and India had been active in the market.

On early figures available it appeared the average market indicator had dropped about 15 percent to 340 cents a kilogram since the last auction on February 1.

Mr Bengé cautioned that this

was a rough figure.

Growers in New Zealand and Australia have been holding their breath to see what impact the suspension of the minimum price schemes on both sides of the Tasman would have on the market.

Mr Bengé said the price paid for fleece wool with a good colour was down 5 to 7.5 percent today. Good average wool not so well presented was down 7.5 to 10 percent in the South Island and 10 to 15 percent in the North Island.

Good coloured second shear was down 2.5 to 5 percent in the South Island and 5 to 5.5 percent in the North. Poorer quality was down 7.5 to 12 percent.

Lambswool was down 12.5 to 15 percent.

Mr Bengé said the prices would have dropped a lot further had such a large number of offerings not been passed in.

Wool Board grower services manager Lance Wiggins warned farmers earlier this week to set realistic reserves and not give their wool away for their own viability and the reputation of New Zealand.

The board suspended its minimum price scheme on February 12 following a similar move in Australia.

Why intervention was bad for wool

By RODNEY HIDE

The Australian Government's decision last month to suspend its wool price support scheme delivered a sharp blow to New Zealand. There is every indication that the pain will cut deep and long. The drop in sheep farmers' income will ripple right through the economy.

Coming to terms with such economic grief perhaps involves gaining an understanding of its cause. Everyone knows that the Australians did something to upset the wool market but they are not so sure quite what. There's a suspicion abroad that the Aussies have done to us the economic equivalent of an underarm bowl and a stiff arm tackle all in the one hit.

The true cause is not at all malevolent. And the problem was not the decision to suspend the price support scheme, but rather the decision to operate one in the first instance. All this was made plain late last year in a Centre for Independent Studies policy monograph titled *Unravelling Intervention* in the Wool Industry. The monograph was written by Dr Alistair Watson, an Australian agricultural economist.

The Australian Reserve Price Scheme (RPS) was designed to stabilise wool prices. Wool was to be bought when it was cheap and sold when it was dear. If successful, the scheme would smooth prices by raising them when they were low and lowering them when they were high. The basis of the scheme was a minimum or "reserve" price at which the Australian Wool Corporation (AWC) bought wool that was not bought at auction.

The Reserve Price Scheme was a form of speculation. To be successful, it had to establish a price that would balance consumption in the long run. The obvious danger was that the price would be set too high, in which case stocks would accumulate until capital was exhausted, and stocks would have to be disposed of at lower prices.

Until recently, the RPS appeared to work well. It was helped along by a reasonably stable world demand for wool from 1974 to 1986. Also, until 1985 cereal prices were good, so reducing the production of wool.

Things went wrong with a boom in prices in 1987 and 1988. The AWC took the increase to be permanent and increased the reserve price by 70 percent over two years: from the "market indicator," or weighted average price, of A508 cents per clean kilogram in 1986-87, to 645c in 1987-88 and then 870c in 1988-89.

Unfortunately, the boom didn't last. High prices induced farmers to produce more wool, especially as there was a slump in grain prices. High prices also induced manufacturers to blend and substitute other fibres for wool, thereby contracting demand. The contraction

was made all the worse by the political and economic difficulties of the USSR, China and Poland.

To maintain prices against increased production and contracting demand, the AWC had to buy wool — lots of it. The accumulation began in the middle of 1989 and stocks grew rapidly. The AWC currently holds 4.7 million bales of wool stock — almost a year's production.

The buying and storing of wool cost the AWC dearly. A price stabilisation fund was maintained out of a tax of 25 percent on each farmer's wool clip. Even with the income from one bale to four, the buy-up and storage quickly depleted the AWC's fund.

It started to borrow around the end of 1989, and, backed by government, it borrowed apace. The corporation's debt now stands at more than \$A2.8 billion, or \$A48,000 for every wool property in Australia. Interest and storage charges are estimated at \$A500 million a year.

Something had to give. In a move unpopular with wool growers, Primary Industry Minister John Kerin dropped the reserve price last July from \$A8.70 to \$A7.00. Unfortunately, the drop proved too little too late. Notwithstanding Mr Kerin's assurances, buyers stayed out of the market waiting for the inevitable collapse.

They didn't have to wait long. On February 10 the Australian Government scrapped the scheme. To keep it going would have required taxpayers to guarantee an ever-increasing debt. Market forces will now set the price until the end of the season.

The collapse of the Australian RPS meant that the New Zealand Wool Board could no longer supplement woolgrowers' incomes, nor could it continue to support prices by buying wool at auction.

The Wool Board itself has stockpiles of 650,000 bales and its debt of \$264 million exceeds its reserves of \$249 million. New Zealand wool growers now also sell into a free market.

All attempts to stabilise prices by buying and selling run into the very same problem that collapsed the schemes both sides of the Tasman. The problem is that future prices cannot be forecast reliably. This makes it impossible to establish a price that will balance production and consumption in the long run. If the price is set too low, it has little effect. If it is set too high, stocks will accumulate.

It is also politically easier to lift reserve prices rather than drop them. Sooner or later, the reserve price will get out of kilter with what is sustainable. Catastrophic collapse is then inevitable.

Rodney Hide is an economics lecturer at Lincoln University and a research associate for the Centre of Independent Studies. His editorial is based on a recent Centre book entitled *Unravelling Intervention in the Wool Industry*.

APPENDIX B:

EXPANDED DISCUSSION AND NOTATION FOR MASSELL'S (1969) MODEL

A: LINEAR ANALYSIS:

Consider a single market in which demand and supply are described by the linear relations¹:

$$D(P_t) = A - aP_t + u_t \quad a \geq 0 \quad (\text{B.1a})$$

$$S(P_t) = B + bP_t + v_t \quad b \geq 0 \quad (\text{B.1b})$$

where:

D_t = demand

S_t = Supply

P_t = short-run equilibrium price

u_t, v_t = additive stochastic disturbances, which are assumed to be independently distributed over time and to have zero means and finite variances, σ_u^2 and σ_v^2 , respectively and to have zero covariance *i.e.* random shifts in the demand and supply schedules are independent of one another.

In the absence of price stabilisation, the short-run equilibrium price will be:

$$P_t = (u_t - v_t + A - B)(a + b) \quad (\text{B.2a})$$

while the equilibrium quantity traded will be:

$$D(P_t) = S(P_t) = \frac{Ba + bA}{a + b} + \frac{av_t + bu_t}{a + b} \quad (\text{B.2b})$$

Suppose now that a stabilisation authority establishes a buffer stock, being willing to buy or sell the commodity at a price P_s , at which the nonstochastic components of demand and supply are equal. That is, it sets P_s where:

$$E(D_t) = E(S_t) \quad (\text{B.3})$$

¹ This analysis is direct from Turnovsky, 1978.

so that, on the average, the market balances. In order to maintain this price, the authority must continually trade an amount:

$$x_t = v_t - u_t \quad (\text{B.4})$$

the expected value of which is zero². Hence the buffer stock will be self-liquidating, in the sense that the expected size of the buffer stock will remain constant over time. Taking expected values of (B.1) and equating, yields³:

$$P_s = (\Lambda - B)/(a + b) = E(P_t) \quad (\text{B.5})$$

with the corresponding quantities:

$$D(P_s) = \frac{Ba + b\Lambda}{a + b} + u_t \quad (\text{B.6a})$$

$$S(P_s) = \frac{Ba + bA}{a + b} + v_t \quad (\text{B.6b})$$

Thus comparing (B.5) with the expected value of (B.2a), it follows that in this case the self-liquidating buffer stock implies that the price is stabilised at its arithmetic mean.

Measuring producers' welfare by producers' surplus (profit), their welfare in the absence of price stabilisation, when the random price P_t prevails, is:

² It is also important to note that the net revenue of the stabilising authorities is $(u_t - v_t)P_s$, the expected value of which is zero, implying that they can expect to break even.

³ Note that in this case the self-liquidating buffer stock implies that the price is stabilised at its mean. This result is a consequence of the linearity of the model and does not apply to the more general non-linear model (see Turnovsky, 1978).

$$\pi_t = \int_{P(0)}^{P_t} S(P') dP'$$

where $P(0)$ denotes the supply price at zero output. Likewise, profit at the stabilised price P_s is given by:

$$\pi_s = \int_{P(0)}^{P_s} S(P') dP'$$

so that the difference in producers' welfare in the two cases is simply:

$$G_p = \pi_s - \pi_t = \int_{P_t}^{P_s} S(P') dP' \quad (B.7)$$

Substituting the linear supply function (B.1b), (B.7) integrates to:

$$\begin{aligned} G_p &= \frac{1}{2}(P_s - P_t)[S(P_t) + S(P_s)] \\ &= -\frac{1}{2} \left[\frac{u_t - v_t}{a + b} \right] \left[\frac{2(Ba + bA)}{a + b} + \frac{(2a + b)v_t + bu_t}{a + b} \right] \end{aligned} \quad (B.8)$$

Similarly, measuring consumers' welfare by consumers' surplus, their difference in welfare becomes:

$$G_c = \frac{1}{2} (P_t - P_s)[D(P_t) + D(P_s)] \quad (B.9)$$

Furthermore, assuming that the total welfare can be adequately measured by the sum of the producer's and consumer's surplus:

$$G = G_p + G_c = \frac{1}{2} (P_s - P_i)[S(P_s) - D(P_s)] \quad (\text{B.10})$$

The expected gains from stabilisation to producers, consumers, and the two groups together are obtained by taking expected values of (B.8), (B.9), and (B.10) respectively, yielding:

$$E(G_p) = \frac{-b\sigma_u^2 + (2a + b)\sigma_v^2}{2(a + b)^2} \quad (\text{B.11a})$$

$$E(G_c) = \frac{(2b + a)\sigma_u^2 - a\sigma_v^2}{2(a + b)^2} \quad (\text{B.11b})$$

$$E(G) = \frac{(\sigma_u^2 + \sigma_v^2)}{2(a + b)} > 0 \quad (\text{B.11c})$$

Equations (B.11a,b,c) immediately yield most of Massell's principal conclusions:

1. Producers lose (gain) from price stabilisation if the source of price instability is random shifts in demand (supply);
2. Consumers lose (gain) from price stabilisation if the source of price instability is random shifts in supply (demand);
3. Where both demand and supply are random, the gains to each group are indeterminate and depend upon the relative sizes of the variances σ_u^2 and σ_v^2 , and upon the slopes of the demand and supply curves;
4. The total gains from stabilisation are always positive, with the gainers being able to compensate the losers.

Note also that the gains or losses are strictly proportional to the variances σ_u^2 and σ_v^2 . If the demand or supply curve becomes infinitely elastic, the gains from

stabilisation tend to zero. Finally, these results all depend crucially on the linearity of the model and the additivity of the stochastic disturbances.

B: NON-LINEAR ANALYSIS

Consider a market in which demand and supply are described by the following:

$$D = ud(P) \quad d' < 0, u \geq 0 \quad (\text{B.12a})$$

$$S = vs(P) \quad s' > 0, v \geq 0 \quad (\text{B.12b})$$

where:

D = demand

S = supply

P = price

u, v = stochastic disturbances with means \bar{u} and \bar{v} , respectively, and having finite second moments.

Turnovsky suggests that, in general, $P_s \neq E(P)$, so that the stabilised price at which the buffer stock is self-liquidating is *not* the arithmetic mean price. Indeed, one cannot infer anything about whether $P_s \geq E(P)$. For example, if the functions d and s are linear in P , then $P_s \leq E(P)$ if the only disturbances are in supply; while if the disturbances are in demand, this inequality is reversed.

The distribution of welfare gains from price stabilisation where the random disturbances are multiplicative, differ in several significant respects from those of the linear model, where additive disturbances are assumed. The most important general difference is that the desirability of price stabilisation for either consumers or producers does not depend on the source of the price instability, as it does in the additive case, but only upon the shapes of the deterministic components of the demand and supply curves. If one group benefits from having price stabilised, it will do so whether the random price arises from stochastic disturbances in demand or in

supply.

As in the linear model, stabilisation leads to an overall welfare gain⁴ unless either demand or supply is perfectly elastic. However, the allocation of these benefits between consumers and producers is much more indeterminate than before. Broadly speaking, producers again from having either demand and/or supply disturbances stabilised if demand elastic and supply inelastic, while they lose in the reverse situation. Similarly consumers tend to gain if supply is elastic and demand is inelastic, and be worse off other wise.

Source: Turnovsky, S.J. The Distribution of Welfare Gains from Price Stabilisation: A Survey of Some Theoretical Issues *In*. Stabilising World Commodity Markets. Adams, F.G. & Kleins A. (Ed.s) Lexington:D.C. Heath & Co, 1978.

⁴ See Turnovsky (1978) p. 128-131 for a further discussion on welfare transfers according to the way producers develop price expectations

APPENDIX C:

EXPANDED DISCUSSION AND NOTATION FOR POWELL & CAMPBELL'S (1962) MODEL

Two Year Transactions Cycle:

Let the demand curve for wool in year t ($t = 0, 1, 2, \dots, s$) be of the form:

$$q_t = k_t p_t^{-n_t} \quad (C.1)$$

where k_t is a constant, specific to year t , which determines the level of the demand curve in that year.

Thus if π_0 is the price in the year 0 when stocks are acquired, then:

$$\pi_0 = [q_0 (1 - r_0) / k_0]^{1/n_0}$$

But by (C.1),

$$(q_0/k_0)^{1/n_0} = p_0;$$

hence:

$$\pi_0 = p_0(1 - r_0)^{1/n_0} \quad (C.2)$$

From equation 2.6 trading profits, T_0 , are given by:

$$\begin{aligned} T_0 &= D_1 - K_0 - 2F - V_0 - m_0 \\ &= r_0 q_0 \pi_1 - r_0 q_0 \pi_0 - 2F - (g + a)r_0 q_0 - Br_0 q_0 \pi_0 \end{aligned} \quad (C.3)$$

To find the minimum π_1^* which must be realised if the Wool Authority is to avoid trading losses, the right-hand side of the equation (C.3) is set to zero, and solved for π_1 , thus obtaining:

$$\pi_1^* = \pi_0(1+B) + g + a + 2F/(r_0 q_0) \quad (C.4)$$

In year 1, the price would have been p_1 if stocks $r_0 q_0$ had not been liquidated. Under the simplifying assumption that the wool clips q_0 and q_1 are of the same size, then π_1 is given by:

$$\pi_1 = [q_1(1 + r_0)/k_1]^{1/n_1}$$

But by (C.1), $(q_1/k_1)^{1/n_1} = p_1$, so that:

$$p_1 = \pi_1 / (1 + r_0)^{1/n_1} \quad (C.5)$$

Thus if:

$$p_1^* = \pi_1^* / (1 + r_0)^{1/n_1} \quad (C.6)$$

p_1^* can be interpreted as the minimum free-market price which would have to prevail in year 1 in the absence of the scheme to ensure that a trading loss is avoided on the purchase of stocks in year 0. For a specified set of assumptions about q_0 , π_0 , r_0 , n_0 and n_1 , the hidden returns $(K_0 - H_0 - L_0)$ can be computed on the assumption that the break-even price π_1^* is actually realised.

Six-Year Transaction Cycle:

Let q_0 be the production of wool in each of the six years, π_0 be the price realised during year 0 in which the stocks $r_0 q_0$ are purchased, and $\hat{\pi}$ be the price in each of the years 1 through 5, during which one-fifth of the stocks is disposed of annually. In this case trading profits for the six year cycle, \hat{T}_0 will be given by:

$$\hat{T}_0 = \sum_{t=1}^5 D_t - 6F - \pi_0 r_0 q_0 - \sum_{j=1}^5 j(r_0 q_0 / 5)g - a r_0 q_0 - \pi_0 r_0 q_0 \sum_{j=1}^5 ((1 + B)^j - 1) / 5$$

where the fourth and fifth terms on the right-hand side are variable costs, and the last term represents the sum of interest charges calculated separately on each one-fifth of the stocks. The last term reduces to $-((1 + B)[(1 + B)^5 - 1] / (5B) - 1) \pi_0 r_0 q_0$

Thus substituting $\hat{\pi} r_0 q_0 / 5$ for D_t and simplifying:

$$T_0 = \hat{\pi} r_0 q_0 - 6F - r_0 q_0 (3g + a) - \pi_0 r_0 q_0 (1 + B)[(1 + B)^5 - 1] / (5B) \quad (C.7)$$

Setting (C.7) equal to zero and solving for $\hat{\pi}$, we obtain:

$$\hat{\pi}^* = \pi_0 (1 + B)[(1 + B)^5 - 1]/(5B) + 3g + a + 6F/(r_0 q_0) \quad (C.8)$$

The net returns \hat{N}_0 to the scheme for the six-year cycle will be:

$$\begin{aligned} \hat{N}_0 &= R'_1 + \sum_{t=1}^5 R'_t + K_0 - R_0 - \sum_{t=1}^5 R_t + T_0 \\ &= \pi_0 q_0 + 5\hat{\pi} q_0 - p_0 q_0 - 5\hat{p} q_0 + T_0 \end{aligned}$$

where $p = \pi (1 + r_0/5)^{-1/\hat{n}}$ would have been the free market price in each of the years 1 through 5 if there had been no liquidation of stocks, with \hat{n} the elasticity of demand in each of these years. Substituting for \hat{T}_0 from (C.7) and simplifying:

$$\begin{aligned} \hat{N}_0 &= q_0 [\pi_0 \{1 - r_0(1+B)((1+B)^5 - 1)/(5B) - (1-r_0)^{1/\hat{n}_0}\} \\ &\quad + \hat{\pi} \{5(1 - (1 + r_0/5)^{-\hat{n}}) + r_0\} - r_0(3g+a)] - 6F \end{aligned} \quad (C.9)$$

The above formulae can be generalised to the case where stocks are bought in an initial year 0, and disposed of in equal annual quantities over s years of stable demand. It is only necessary to substitute s for 5, $(s + 1)$ for 6, and $(s + 1)/2$ for 3 in equations (C.8) and (C.9) above.

Table C.1 gives some idea of the effect of a longer disposal period. The gains and losses shown in the table occur on the assumption that stocks of wool are liquidated at a steady rate over a five-year period during which time the demand curve does not change. The only other difference from the assumptions made for Tables 2.3 and 2.4 is that the selling price is substantially higher (65.5 pence *cf.* 57.0 pence) to compensate for the increased interest charges arising from the longer storage period.

TABLE C.1:

Hidden Gains and Losses from the Floor-Price Scheme
(expressed in millions of Australian £)
Six-Year Transactions Cycle: 5% of the clip acquired

E _p d during selling period	Elasticity of Demand (E _p d) during the Purchase Period							
	-0.5	-0.7	-0.9	-1.0	-1.1	-1.5	-3.0	-10.0
-0.5	-11.0	-19.6	-24.5	-26.2	-27.6	-31.5	-36.8	-40.6
-0.7	1.2	-7.4	-12.3	-14.0	-15.5	-19.3	-24.7	-28.4
-0.9	7.9	-0.7	-5.6	-7.3	-8.8	-12.6	-17.9	-21.7
-1.0	10.3	1.7	-3.2	-5.0	-6.4	-10.2	-15.6	-19.4
-1.1	12.2	3.6	-1.3	-3.1	-4.5	-8.3	-13.7	-17.5
-1.5	17.3	8.7	3.8	2.1	0.6	-3.2	-8.6	-12.4
-3.0	24.3	15.7	10.8	9.1	7.6	3.8	-1.5	-5.3
-10.0	29.2	20.6	15.7	14.0	12.5	8.7	3.4	-0.5

Notation:

p_t Average price of Australian wool in year t , in the absence of a buffer-stock scheme, *i.e.* the free-market price.

π_t Average price of wool in any year t during which the Wool Authority operates on the open market. If the year t is one during which stocks are accumulated, π_t is the floor price.

q_t Output of wool in year t .

r_t The proportion of the clip acquired by the Wool Authority in the year t ; defined for years in which stocks are acquired.

R_t Revenue accruing from the sale of wool under free market conditions in year t :

$$R_t = p_t q_t$$

R'_t Revenue realised on commercial sales of wool in year t :

$$\begin{aligned} R'_t &= \pi_t(1-r)q_t \text{ in a year of stock accumulation,} \\ &= \pi_t q_t \text{ in a year of stock disposal.} \end{aligned}$$

D_t Revenue realised on the sale of stocks by the Wool Authority in year t ; defined only for those years in which such sales occur:

$$D_t = \pi_t w_t$$

K_t Money paid out by the Wool Authority in year t to acquire stocks; defined only for those years of stock accumulation:

$$K_t = \pi_t r q_t$$

T_t Trading profit associated with the purchase of stocks in year t ; defined only for years of stock accumulation.

H_t Loss of revenue from commercial sales of the current year's clip in year t ; defined only for those years which stocks are acquired:

$$H_t = (R_t - R')$$

A negative value of H_t implies a gain.

L_t Loss of revenue on the wool clip in year $t+1$ due to the depressing effect of disposal operations on the price during that year; defined for years immediately antecedent to disposal operations:

$$L_t = (R_{t+1} - R'_{t+1})$$

n_t Price elasticity of demand for Australian wool in year t .

B Rate of interest charged on the working capital used in the buffer-stock scheme.

m_t Interest charged on the capital invested in wool stocks:

$$m_t = Br q_t \pi_t$$

F Fixed handling and administrative costs per annum.

- g Handling costs per lb. of wool per annum. These mainly represent charges for insurance and storage.
- a Handling costs per lb. which are independent of the period of storage. They mainly represent freight charges and commission on the resale of stocks.
- V_t Variable handling costs incurred on stocks acquired in year t :

$$V_t = (g + a)r_t q_t$$

in the case of two year transactions.

- N_t Net returns from the scheme, associated with the purchase of stocks of greasy wool in the year t ; defined only for years in which purchases are made.
- w_t Physical volume of stocks sold in year t :

$$w_t = r_{t-1} q_{t-1}$$

Source: Powell, A. & Campbell, K.O. Revenue Implications of a Buffer-Stock Scheme With An Uncertain Demand Schedule. Economic Record, September, 1962, p. 383-385.

APPENDIX D:

DESIRABLE PROPERTIES OF REGRESSION ESTIMATORS

DESIRABLE PROPERTIES OF REGRESSION ESTIMATORS.

There are four desirable properties of regression estimators commonly identified; Unbiasedness, efficiency, minimum mean squared errors and consistency.

A) Unbiasedness

$\hat{\beta}$ is said to be an unbiased estimator if the mean value of $\hat{\beta}$ is equivalent to the true value.

$$E(\hat{\beta}) = \beta$$

B) Efficiency

$\hat{\beta}$ is said to be an efficient unbiased estimator if, for a given sample size, the variance of $\hat{\beta}$ is smaller than the variance of any other unbiased estimator.

C) Minimum Mean Squared Error (MSE).

This criterion takes account both the bias and the variance of the estimator.

$$MSE = [\text{Bias}(\hat{\beta})]^2 + \text{Var}(\hat{\beta})$$

D) Consistency

$\hat{\beta}$ is said to be a consistent estimator of β if the probability limit of $\hat{\beta}$ is β . In other words, a consistent estimator is one in which the probability distribution of an estimate collapses to the true value as the sample size gets larger.

$$\lim_{n \rightarrow \infty} \text{Prob}(|\hat{\beta} - \beta| < \epsilon) = 1$$

APPENDIX E:

DETAILS OF KEY STUDIES USING THE PROBABILITY APPROACH TO PURCHASE INTENTIONS

KEY STUDIES USING SUBJECTIVE PROBABILITIES FOR PURCHASE INTENTIONS:

Author (s)	Country	Forecast Horizon (months)	Purchase probability Scale Type	Item of Expenditure	Sample Size	Comments
Bilkey, 1953	U.S.A.	not specified	Net-valences _a	Consumer durables, food	63	This work was a pilot study investigating the existance of any relationship between peoples 'psychic tensions' regarding particular items and their purchase of those items. The conclusion reached, while hazy, showed that such a relationship existed, although further research was required. Nevertheless, it established a theoretical framework for further studies.
Byrnes, 1964	U.S.A.	6	not specified	Automobiles	192	Described as the <i>Detroit Experiment</i> . The first real attempt at developing a survey of subjective purchase probabilities. The resultant distribution was tri-modal with peaks at 0, 5 & 10 although the mid peak was thought to relate to the use of 'fifty-fifty' as the adjective. According to the author, the responses constitute unbiased estimates of the true <i>ex-ante</i> purchase probability of the sample.

Ferber & Piskie, 1965	U.S.A.	3	Plan-o-meter (see Fig. 4.4)	9 Durables 3 Home maint. 2 Vacation & Education	250	Described as the <i>Consumer Savings Project</i> . This study provided only partial support for the use of subjective probabilities in obtaining data on consumer buying intentions. The type of scale used also lead to a heavy concentration of responses at the extremes of the distribution.
Juster, 1966	U.S.A.	6, 12 & 24	Juster Scale (see Fig 4.6)	Household durables and Automobiles	800	Described as the <i>Q.S.I. Experiment</i> . Based on the lessons learnt in the analysis of the Detroit Experiment respondents were given practice and an explanation of the procedure as well as being asked to consider fewer purchase periods. A scale change was also included with quantitative explanations and qualitative adjectives at each point. The results showed that purchase probabilities are better predictors of purchase rates than buying intentions. In addition, the approach was able to successfully classify non-intenders into more homogenous sub-groups. The purchase probability approach helped to explain twice the actual variance in the purchase of automobiles and selected durables as a purchase intent approach.

Gruber, 1970	U.S.A.	none specified	Juster Scale	16 new food product concepts	400	Gruber's study looked primarily at the correlation between purchase intent and purchase probabilities. The high degree of correlation between the two as well as an increased distribution of response data was interpreted as showing that the expanded purchase probability scale had greater predictive accuracy for lower-priced and non-durable items. No follow-up study was conducted to establish actual purchase behaviour.
Clawson, 1971	U.S.A.	3	Juster Scale	Frequently purchased items: travel, savings-investments & recreation.	176 ^b	The average purchase probabilities appeared to be reasonably reliable predictors of actual purchase rates for a variety of products and services over a 3 month period, particularly for automobiles. However, there were differences in the accuracy of prediction of purchase rates within specified probability levels for specific products and services.
Gabor & Granger, 1972	U.K.	12	Juster Scale	Automobiles and household durables.	548	The major conclusion reached was that unpredicted purchases bore a strong relationship to the purpose of purchase, whether for replacement or new purchase.

Pickering & Isherwood, 1974	U.K.	3, 6 & 12	A 0-10 scale with adjectives at extremes. ^c	18 durables	386	The major finding of this study was that purchase probability statements were likely to be more informative than dichotomous statements of buying intentions. However, they also found that low and high probability values may convey different types of information and that this may vary according to the nature of the product and its ownership level.
Roshwalb, 1975	U.S.A.	weekend	11 point scale, with no descriptions	Half hour car trip during a weekend	20	Roshwalb set out to show that the elicitation of subjective probabilities was difficult given that respondents often did not know how to calculate even simple estimates. An alternative approach was introduced in which respondents were asked to estimate, using the same scale, how sure they were of their estimate. This provided a 'weighting' or adjustment to the estimates. These adjusted estimates were then aggregated into groups according to the 'fold-over' technique.
Morrison, 1979	U.S.A.	6, 12 & 24	Juster Scale	Automobiles & 6 household durables.	800	Morrison's work was aimed mainly at providing a 3 level model for collecting, analyzing and interpreting Intentions data. He used Juster's (1966) data to validate his model. The main result was that 6 month automobile purchase intentions were not good, but 12 month intentions data fitted the six month purchase data well.

Ptacek & Ross, 1979	U.S.A.	not specified	Juster Scale?	6 new food items	100 ^d	This study sought to compare between purchase intention and purchase probability to establish leniency error ^e . When nondiscriminators were eliminated, leniency error was effectively reduced from both scales.
Mullet & Karson, 1985	U.S.A.	not specified	Distribution derived from known diary probabilities.	2 beer brands	600	The authors assumed that it was possible to derive, from diary information, conditional probabilities that a respondent who responds with a given intention using a <i>k-point scale</i> will actually purchase. The result is the development of estimators of the actual probabilities of purchase and standard errors.
Dobbs, 1986	N.Z.	to year 2000	Juster Scale	9 industry trends	13	This study used the Juster scale in conjunction with the delphi technique to forecast trends in the N.Z. advertising industry.
Gan <i>et al</i> , 1987	N.Z.	3 & 6	Juster Scale	Durables, services & FMCG's	98	This study concluded that the 11 point purchase probability scale was a better predictor of future purchase rates than the traditional 5 point purchase intentions scale. In general, both scales were less successful in predicting purchases of durables than purchases of services or FMCG's.

Day, 1987	N.Z.	6	(i) 'Original' Juster Scale (ii) Juster scale with no description	New/used car Electrical goods Shares/Debentures Accommodation Restaurant meal Music Movie visit Paperback book	1209	Day sought to compare the predictive accuracy of two versions of the purchase probability scale using self-completion mail questionnaires. One version was the original Juster scale while the second omitted the verbal probability descriptions. The results showed that the original scale yielded slightly more accurate purchase predictions. The results were however, subject to high levels of non-response.
Hamilton-Gibbs, 1989	N.Z.	1	Juster Scale	7 Frequently purchased items.	66	This study sought to compare the predictive ability of the 11 point purchase probability scale and a constant sum method to predict consumers rate of purchase of FPI's. The results showed that the Juster scale under-predicted purchases while the constant sum scale over-predicted purchases. Overall, the constant sum method predicted rates of purchase for 5 of the 7 items, although " <i>...it is possible that the differences were due to chance</i> " (p. 30).
Young, 1990	N.Z.	3	Juster Scale	Toothpaste	100	The study concluded a strong relationship between predicted and actual purchase for a new product. For those who had received a mail box sample, this predictive ability was stronger.

U, 1991	N.Z.	1	Juster Scale	Campbells soup Coca-Cola Tasti Fruit-Splits	323	This study had the objective of predicting the purchase of 3 branded products at various prices. Of the three tested, only purchase predictions for Coca-Cola were accurate. The test for Tasti Fruit-splits (a new product) had to be abandoned due to distribution problems, while the predictive ability of the soup was highly inaccurate, possibly due to brand and variety confusion.
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NOTES:

- a Bilkey developed a scale using Lewinian vector psychology. Essentially, this proposition states that the basis for consumer choice is an internal psychic conflict between a person's attraction toward (positive valances) certain attributes of the item and their repulsion against (negative valances) other attributes regarding the good, including its cost. Using a 100 point 'thermometer' scale, respondents were asked "how strong is your *desire* for the (good)?" and "How strong is your *desire* to avoid the expense which the (good) would entail?". A net valance statistic is derived. A positive net valance is regarded as an indication of a likelihood to purchase and *vice versa*.
- b A multi-stage probability sample of 299 households was surveyed in June, 1969. A second survey of 327 respondents was conducted in September, 1969. This second interview consisted of 176 reinterviews with individuals who had previously been contacted, and 151 first-time interviews.
- c The scale was marked with 'no chance' at 0 and 'completely certain' at 10. No other descriptions were marked on the card. Respondents were however, shown a card that read "A score of 8 would mean that you were 80% certain, a score of 1 that you were 10% certain and so on".
- d Fifty respondents were asked their degree of commitment to purchase using a standard intentions scale, while the remaining 50 were asked their probability of purchase.
- e Leniency error refers to the error when different consumers use a scale differently in an overall way. Some consumers may, for example give relatively high ratings (positive leniency) while others give relatively low ratings (negative leniency).

APPENDIX F:

PANEL RECRUITMENT PROCEDURE

INTRODUCTION:

" Good Morning/ Afternoon."

" My name is Eric Assendelft and I'm from the Marketing Department at Massey University. I am currently undertaking a study on the way woolbuyers react to different prices at auction in New Zealand. I will be surveying a number of prominent woolbuyers over this season and next season in order to get a better understanding of their purchase behaviour."

" The results of the research will allow me to estimate a demand curve for wool which can then be used in assessing the role of the New Zealand Wool Board."

" The research will consider a number of aspects associated with the way you develop expectations about various factors in the wool market. I will first ask a series of questions on what you think may happen in the wool market over the next month and then for the next two months. I will then invite you to work through a series of questions looking at your reaction to various price changes for different categories of wool."

" The research, which involves a personal visit from me, should only take up half an hour of your time every month."

" I would like to stress to you that all the information obtained from this interview will remain confidential to me only and that your participation is completely voluntary".

"Are you willing to participate in this study?"

IF NO, CLOSE WITH THANKS.

IF YES, ENROL PANEL MEMBER.

NAME:

COMPANY:

ADDRESS:

.....

APPENDIX G:

EXPLANATORY CARD

SHOW CARD A

QUESTIONNAIRE EXPLANATION:

" Before we start, I would like to spend a little of your time explaining the interviewing procedure for the next section of the questionnaire. The interviewing procedure makes use of four items."

SHOW CARD E1 to E7

" The first item is a card like this with a range of typical wool purchase quantities that could possibly be made by a company of your size. These quantity levels are all based on a four week period only. There are such seven cards labelled E1 to E7 that you could possibly use, each with different quantities:"

- E1 - up to 60 bales per month*
- E2 - up to 120 bales per month*
- E3 - up to 600 bales per month*
- E4 - up to 1200 bales per month*
- E5 - up to 6000 bales per month*
- E6 - up to 24,000 bales per month*
- E7 - up to 60,000 bales per month*

SHOW CARD B

" I also have here a card with probability statements arranged on a scale a bit like a thermometer. This card helps by allowing you to specify probability levels."

" There are also a deck of flip cards with price levels related to a specific wool grade. I would like you to assume that the price that is quoted in cents per kg C.O.F. is the price that you could purchase wool at for the whole four week period."

" The final component used in the questioning procedure are these 10 counters. Each counter represents one-tenth probability and you must use all ten in your purchase forecasts."

*" I will ask you to indicate how likely you are to purchase **AT MOST** a particular quantity of wool for a particular price over the next month. For example, you would use 1 counter to represent a 1 in 10 chance (i.e. a 'very slight' chance) or 9 counters to represent a 9 in 10 chance (i.e. an 'almost sure' chance)."*

*" You must however, use all ten counters. You should start from the quantity levels which you consider to be the **MAXIMUM** that you would purchase that month at that price. In other words, you should have at least 1 counter on the **maximum** quantity of bales you think there is even a 1 in 10 chance of purchasing in the next 4 weeks."*

" The question I would like you to think about therefore, is assuming all other factors are constant, what would be the probabilities of purchasing specified maximum quantities of bales of wool per month at a particular price?"

" To help you through the questioning process, I would like you to work through this hypothetical example:"

SHOW CARD C

*" Assume that the price for medium wool, that is wool between 29 to 32 microns, (e.g. 28F2W) is assumed to be **\$5.40 per kilogram**. That is, all medium wool could be purchased at this price over the four week period."*

" The 'typical' quantity levels bought by this hypothetical buyer may typically range from nothing (0 bales) through to an upper limit of about 110 bales per month. The buyer indicates that there is a 'fairly good possibility' (i.e. a 5 in 10 chance) that he will purchase at most 50 bales of medium wool given a price of \$5.40 per kg. Five (5) counters are therefore, placed on the 50 bales row. In other words, on five out of ten visits to the auction over the next month the buyer expects to buy at the most 50 bales of wool for \$5.40."

" The buyer thinks there is also 'some possibility' (i.e. a 3 in 10 chance) that he will purchase at most, 60 bales at \$5.40. Three (3) counters are then placed on the 60 bales row. Once again, on three out of ten visits to the auction over the next month he expects to purchase at most 60 bales of wool."

" The remaining two (2) counters are placed on the 70 bales row. (i.e. a 'slight possibility' or a 2 in 10 chance of buying at most 70 bales at \$5.40)."

" Do you have any questions on this procedure?"

IF YES, REPEAT EXERCISE.

IF NO, PROCEED.

EXAMPLE DISTRIBUTION : 28F2W at \$5.40/kg

0 to 110 Bales per month

No. of Bales	Probability of Purchase (Chances out of 10)									
	1/10	2/10	3/10	4/10	5/10	6/10	7/10	8/10	9/10	10/10
0	1	2	3	4	5	6	7	8	9	10
10 (Q1)	1	2	3	4	5	6	7	8	9	10
20 (Q2)	1	2	3	4	5	6	7	8	9	10
30 (Q3)	1	2	3	4	5	6	7	8	9	10
40 (Q4)	1	2	3	4	5	6	7	8	9	10
50 (Q5)	1 ●	2 ●	3 ●	4 ●	5 ●	6	7	8	9	10
60 (Q6)	1 ●	2 ●	3 ●	4	5	6	7	8	9	10
70 (Q7)	1 ●	2 ●	3	4	5	6	7	8	9	10
80 (Q8)	1	2	3	4	5	6	7	8	9	10
90 (Q9)	1	2	3	4	5	6	7	8	9	10
100 (Q10)	1	2	3	4	5	6	7	8	9	10
110 (Q11)	1	2	3	4	5	6	7	8	9	10

APPENDIX H:

QUESTIONNAIRES

QUESTIONNAIRE:

- PART A: EXPECTATIONS QUESTIONNAIRE H.2
- PART B: PROBABILITY ELICITATION QUESTIONNAIRE . . . H.10

ADDITIONAL QUESTIONNAIRES:

- DEMOGRAPHICS QUESTIONNAIRE (*June, 1993*) H.15
- VERIFICATION QUESTIONS (*June, 1993*) H.24

PART A: EXPECTATIONS QUESTIONNAIRE

This questionnaire was used in conjunction with the monthly expectations data collection process from October, 1991 to June 1993. The objective of the questions was to orientate the respondent to the four week period ahead, before they considered their purchase quantity expectations (Part B). In the first four surveys (October, 1991 to January, 1992) three qualitative questions relating to the amount of wool available to purchase, total amount of wool purchased and movements in the USD/NZD exchange rate were asked. From February 1992 to July 1992, a fourth qualitative question regarding expectations about the New Zealand Wool Board's full indicator price was added. A fifth general open-ended question on factors which may change expected buying levels over the next four weeks was also asked. From October, 1992 onwards (Survey No. 9) additional questions related to the following month in comparison to the current month were added, as well as a question for the point estimate of the New Zealand Wool Board's indicator price at the end of the period. Details of the methodology development are outlined in Section 5.6, Chapter Five, Volume One.

COMPANY NAME: _____

DATE OF SURVEY: ____/____/____

QUESTIONNAIRE #: _____

CONFIDENTIAL

QUESTIONNAIRE ON ESTIMATING

THE DEMAND CURVE FOR WOOL

USING THE JUSTER SCALE

DEPARTMENT OF MARKETING

MASSEY UNIVERSITY

DECEMBER 1992

INTERVIEW PROCEDURE:

" As I mentioned earlier, there are two parts to the interview process. The first part is a series of general questions relating to your opinions on factors in the wool market over the next month and then the next two months."

" The second part of the interview concerns a set of twenty-five price scenarios which I would like you to work through."

" I would like you to remember at all times that there is no right or wrong answer. I am interested only in your opinions."

HAND RESPONDENT COPY OF PART A:

" Could you please circle the appropriate responses to the questions for Part A of the interview?"

ALLOW RESPONDENT SUFFICIENT TIME TO FILL OUT QUESTIONNAIRE.

First, I would like you to answer some general questions about the wool market over the next FOUR weeks...

Q.1. " ...Thinking first about the amount of **total wool available** to purchase at auction over the next 4 weeks, do you think that it will be ...

- | | |
|-------------------------|---|
| ...substantially higher | 1 |
| ...a little higher | 2 |
| ...about the same | 3 |
| ...a little lower | 4 |
| ...substantially lower | 5 |

...than the amount offered at auction at the same time last year?"

Q.2. " Do you think that the **total amount of wool purchased** by buyers at the auction over the next 4 weeks, will be..

- | | |
|-------------------------|---|
| ...substantially higher | 1 |
| ...a little higher | 2 |
| ...about the same | 3 |
| ...a little lower | 4 |
| ...substantially lower | 5 |

...than the purchases made at the same time last year?"

Q.3. " Thinking now about the exchange rate, do you expect the \$ U.S. vis-a-vis the New Zealand dollar to...

- | | |
|------------------------|---------------|
| ...go up | 1 |
| ...stay about the same | 2 } GO TO Q.4 |
| ...go down | 3 |

...over the next four weeks?

Q.3.(b)

" If you expect it to go up, will it...

- | | |
|--------------------|---|
| ...go up a little? | 1 |
| ...go up a lot? | 2 |

" If you expect it to go down, will it...

- | | |
|----------------------|---|
| ...go down a little? | 3 |
| ...go down a lot? | 4 |

Q.4. Do you expect the N.Z. Wool Board's full indicator price for wool to...

- | | | |
|------------------------|---|--------------------|
| ...go up | 1 | |
| ...stay about the same | 2 | } GO TO Q.5 |
| ...go down | 3 | |
- ...over the next four weeks?

Q.4.(b)

" If you expect it to go up, will it...

- | | |
|--------------------|---|
| ...go up a little? | 1 |
| ...go up a lot? | 2 |

" If you expect it to go down, will it...

- | | |
|----------------------|---|
| ...go down a little? | 3 |
| ...go down a lot? | 4 |

Q.5. What do you think the Wool Board's indicator price will be, in cents, at the end of December?

_____ c/Kg. (*Current indicator = 449 c/Kg*)

Q.6. What factors, if any, are causing you some uncertainty and which may lead you to significantly change your expected buying levels of wool over the next 4 weeks?

Q.7. "Thinking now about the **NEXT 2 MONTHS** , do you think that the quantity of wool purchased by **your company** at auction in **January** will be...

- | | |
|-------------------------|---|
| ...substantially higher | 1 |
| ...a little higher | 2 |
| ...about the same | 3 |
| ...a little lower | 4 |
| ...substantially lower | 5 |

...than the purchases made by you in **December?**"

Q.8. " Do you think that the quantity of wool being offered at auction in **January** will be...

- | | |
|-------------------------|---|
| ...substantially higher | 1 |
| ...a little higher | 2 |
| ...about the same | 3 |
| ...a little lower | 4 |
| ...substantially lower | 5 |

...than the quantity of wool offered at auction for **December?**"

Q.9. " Do you think that the stockholdings of wool held by your company at the end of **January** will be...

- | | |
|-------------------------|---|
| ...substantially higher | 1 |
| ...a little higher | 2 |
| ...about the same | 3 |
| ...a little lower | 4 |
| ...substantially lower | 5 |

...than the level of stocks held by you at the end of **December?**"

Q.10. " Thinking now about the N.Z. Wool Boards' indicator price for wool, do you expect this indicator price at the end of **January** will be...

- | | |
|-------------------------|---|
| ...substantially higher | 1 |
| ...a little higher | 2 |
| ...about the same | 3 |
| ...a little lower | 4 |
| ...substantially lower | 5 |

...than the indicator price at the end of **December?**"

PART B:

PROBABILITY ELICITATION QUESTIONNAIRE

This questionnaire was used in the monthly expectations data collection process from October, 1991 to June 1993. The questionnaire was pre-tested using post-graduate students from Massey University. Furthermore, colleagues within the department reviewed the questionnaire to ensure clarity and consistency of questions. The initial questionnaires were modified slightly as a result of feedback from the panel respondents. The questionnaire makes use of a purchase probability showcard (Appendix L), a data recording sheet (Appendix I), seven showcards for respondents specification of quantity forecasts (Appendix K), and 10 plastic counters. Details of the methodology development are outlined in Section 5.6, Chapter Five, Volume One.

PART B: PURCHASE PROBABILITY QUESTIONS:

" I would now like to ask you some questions regarding **your intentions** to purchase various quantities of wool over the **NEXT 4 WEEKS** at various prices."

" We will run through twenty five questions in total and I would like you to consider **all the things** that may be likely to affect your purchases of wool at these particular prices."

" First, choose a show card from E1 to E7 that you think will cover the possible purchase quantities for the next four weeks."

" You should use this card and the probability statements card (SHOW CARD B) together to work out how many counters you should place on the maximum quantities you would buy."

" Remember, if you think that there is only a very slight possibility of buying **at most that quantity at that price** you should put 1 counter on that row. If you are uncertain as to what your exact intentions would be, choose an answer as close to '0' or '10' as you think is appropriate."

" In all cases the sum of the probabilities that you give must add up to 1". (*i.e.* all 10 counters must be used)

" Finally, you should remember that there is no right or wrong answer, only what you think is most likely."

" The first series of five questions relates to fine wool only. By fine wool, I mean any wool 24 microns or less, something like 22F1W."

QUESTION 1

" Imagine that the price of fine wools being offered at auction is 635 cents/kg C.O.F."

" Please place the counters on the showcard to show the prospects of purchasing the total number of bales of fine wools at 635 cents/kg over the next 4 weeks?".

RECORD PROBABILITY LEVELS AND SHOW CARD NO. ON DATA SHEET.

QUESTION 2

" Now imagine that the price of fine wools being offered at auction increases to 710 cents/kg C.O.F."

" If necessary, please rearrange the counters on the showcard to show the prospects of purchasing bales of fine wools at 710 cents/kg over the next 4 weeks?".

RECORD PROBABILITY LEVELS AND SHOW CARD NO. ON DATA SHEET.

QUESTION 3

" Now imagine that the price of fine wools being offered at auction increases to 745 cents/kg C.O.F."

" If necessary, please rearrange the counters on the showcard to show the prospects of purchasing bales of fine wools at 745 cents/kg over the next 4 weeks?".

RECORD PROBABILITY LEVELS AND SHOW CARD NO. ON DATA SHEET.

QUESTION 4

" Now imagine that the price of fine wools being offered at auction increases to 780 cents/kg C.O.F."

" If necessary, please rearrange the counters on the showcard to show the prospects of purchasing bales of fine wools at 780 cents/kg over the next 4 weeks?".

RECORD PROBABILITY LEVELS AND SHOW CARD NO. ON DATA SHEET.

QUESTION 5

" Now imagine that the price of fine wools being offered at auction increases to 855 cents/kg C.O.F."

" If necessary, please rearrange the counters on the showcard to show the prospects of purchasing bales of fine wools at 855 cents/kg over the next 4 weeks?".

RECORD PROBABILITY LEVELS AND SHOW CARD NO. ON DATA SHEET.

" The next series of five questions relates to **fine-medium wool only**. By fine-medium wool, I mean any wool between 25 and 28 microns, something like 25F1W."

QUESTION 6

" Imagine that the price of fine-medium wools being offered at auction is 530 cents/kg C.O.F."

" Please place the counters on the showcard to show the prospects of purchasing the total number of bales of fine-medium wools at 530 cents/kg over the next 4 weeks?"

RECORD PROBABILITY LEVELS AND SHOW CARD NO. ON DATA SHEET.

QUESTION 7

" Now imagine that the price of fine-medium wools being offered at auction increases to 590 cents/kg C.O.F."

" If necessary, please rearrange the counters on the showcard to show the prospects of purchasing bales of fine-medium wools at 590 cents/kg over the next 4 weeks?"

RECORD PROBABILITY LEVELS AND SHOW CARD NO. ON DATA SHEET.

QUESTION 8

" Now imagine that the price of fine-medium wools being offered at auction increases to 620 cents/kg C.O.F."

" If necessary, please rearrange the counters on the showcard to show the prospects of purchasing bales of fine-medium wools at 620 cents/kg over the next 4 weeks?".

RECORD PROBABILITY LEVELS AND SHOW CARD NO. ON DATA SHEET.

QUESTION 9

" Now imagine that the price of fine-medium wools being offered at auction increases to 650 cents/kg C.O.F."

" If necessary, please rearrange the counters on the showcard to show the prospects of purchasing bales of fine-medium wools at 650 cents/kg over the next 4 weeks?".

RECORD PROBABILITY LEVELS AND SHOW CARD NO. ON DATA SHEET.

QUESTION 10

" Now imagine that the price of fine-medium wools being offered at auction increases to 710 cents/kg C.O.F."

" If necessary, please rearrange the counters on the showcard to show the prospects of purchasing bales of fine-medium wools at 710 cents/kg over the next 4 weeks?".

RECORD PROBABILITY LEVELS AND SHOW CARD NO. ON DATA SHEET.

" The third series of five questions relates to medium wool only. By medium wool, I mean any wool between 29 and 32 microns, something like 29F2W."

QUESTION 11

" Imagine that the price of medium wools being offered at auction is 525 cents/kg C.O.F."

" Please place the counters on the showcard to show the prospects of purchasing the total number of bales of medium wools at 525 cents/kg over the next 4 weeks?".

RECORD PROBABILITY LEVELS AND SHOW CARD NO. ON DATA SHEET.

QUESTION 12

" Now imagine that the price of medium wools being offered at auction increases to 585 cents/kg C.O.F."

" If necessary, please rearrange the counters on the showcard to show the prospects of purchasing bales of medium wools at 585 cents/kg over the next 4 weeks?".

RECORD PROBABILITY LEVELS AND SHOW CARD NO. ON DATA SHEET.

QUESTION 13

" Now imagine that the price of medium wools being offered at auction increases to 615 cents/kg C.O.F."

" If necessary, please rearrange the counters on the showcard to show the prospects of purchasing bales of medium wools at 615 cents/kg over the next 4 weeks?".

RECORD PROBABILITY LEVELS AND SHOW CARD NO. ON DATA SHEET.

QUESTION 14

" Now imagine that the price of medium wools being offered at auction increases to 645 cents/kg C.O.F."

" If necessary, please rearrange the counters on the showcard to show the prospects of purchasing bales of medium wools at 645 cents/kg over the next 4 weeks?".

RECORD PROBABILITY LEVELS AND SHOW CARD NO. ON DATA SHEET.

QUESTION 15

" Now imagine that the price of medium wools being offered at auction increases to 705 cents/kg C.O.F."

" If necessary, please rearrange the counters on the showcard to show the prospects of purchasing bales of medium wools at 705 cents/kg over the next 4 weeks?".

RECORD PROBABILITY LEVELS AND SHOW CARD NO. ON DATA SHEET.

" The fourth series of five questions relates to medium-coarse wool only. By medium-coarse wool, I mean any wool between 33 and 35 microns, something like 35F3E."

QUESTION 16

" Imagine that the price of medium-coarse wools being offered at auction is 355 cents/kg C.O.F."

" Please place the counters on the showcard to show the prospects of purchasing the total number of bales of medium-coarse wools at 355 cents/kg over the next 4 weeks?".

RECORD PROBABILITY LEVELS AND SHOW CARD NO. ON DATA SHEET.

QUESTION 17

" Now imagine that the price of medium-coarse wools being offered at auction increases to 395 cents/kg C.O.F."

" If necessary, please rearrange the counters on the showcard to show the prospects of purchasing bales of medium-coarse wools at 395 cents/kg over the next 4 weeks?".

RECORD PROBABILITY LEVELS AND SHOW CARD NO. ON DATA SHEET.

QUESTION 18

" Now imagine that the price of medium-coarse wools being offered at auction increases to 415 cents/kg C.O.F."

" If necessary, please rearrange the counters on the showcard to show the prospects of purchasing bales of medium-coarse wools at 415 cents/kg over the next 4 weeks?".

RECORD PROBABILITY LEVELS AND SHOW CARD NO. ON DATA SHEET.

QUESTION 19

" Now imagine that the price of medium-coarse wools being offered at auction increases to 435 cents/kg C.O.F."

" If necessary, please rearrange the counters on the showcard to show the prospects of purchasing bales of medium-coarse wools at 435 cents/kg over the next 4 weeks?".

RECORD PROBABILITY LEVELS AND SHOW CARD NO. ON DATA SHEET.

QUESTION 20

" Now imagine that the price of medium-coarse wools being offered at auction increases to 475 cents/kg C.O.F."

" If necessary, please rearrange the counters on the showcard to show the prospects of purchasing bales of medium-coarse wools at 475 cents/kg over the next 4 weeks?".

RECORD PROBABILITY LEVELS AND SHOW CARD NO. ON DATA SHEET.

" The final series of five questions relates to coarse wool only. By coarse wool, I mean any wool 36 microns or more, something like 36F3D."

QUESTION 21

" Imagine that the price of coarse wools being offered at auction is 330 cents/kg C.O.F."

" Please place the counters on the showcard to show the prospects of purchasing the total number of bales of coarse wools at 330 cents/kg over the next 4 weeks?"

RECORD PROBABILITY LEVELS AND SHOW CARD NO. ON DATA SHEET.

QUESTION 22

" Now imagine that the price of coarse wools being offered at auction increases to 370 cents/kg C.O.F."

" If necessary, please rearrange the counters on the showcard to show the prospects of purchasing bales of coarse wools at 370 cents/kg over the next 4 weeks?"

RECORD PROBABILITY LEVELS AND SHOW CARD NO. ON DATA SHEET.

QUESTION 23

" Now imagine that the price of coarse wools being offered at auction increases to 390 cents/kg C.O.F."

" If necessary, please rearrange the counters on the showcard to show the prospects of purchasing bales of coarse wools at 390 cents/kg over the next 4 weeks?"

RECORD PROBABILITY LEVELS AND SHOW CARD NO. ON DATA SHEET.

QUESTION 24

" Now imagine that the price of coarse wools being offered at auction increases to 410 cents/kg C.O.F."

" If necessary, please rearrange the counters on the showcard to show the prospects of purchasing bales of coarse wools at 410 cents/kg over the next 4 weeks?".

RECORD PROBABILITY LEVELS AND SHOW CARD NO. ON DATA SHEET.

QUESTION 25

" Now imagine that the price of coarse wools being offered at auction increases to 450 cents/kg C.O.F."

" If necessary, please rearrange the counters on the showcard to show the prospects of purchasing bales of coarse wools at 450 cents/kg over the next 4 weeks?".

RECORD PROBABILITY LEVELS AND SHOW CARD NO. ON DATA SHEET.

PART C:

DEMOGRAPHIC QUESTIONNAIRE

This questionnaire was issued to the respondents in June 1993 in order to obtain demographic data about the company and the respondent. The information was used in the analysis of the data for Chapter Six, and to allow the definition of possible discriminatory groups for the analysis in Chapter Seven. Summarised data is tabulated in Section 5.5, Chapter Five, Volume 1.

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The study in which you have been involved in is now moving into its final stages. To help in the analysis of the data for the past two seasons I now need some information about your company. This information is for **RESEARCH PURPOSES ONLY** and will only be used for helping explain any differences in behaviour between your company and the other buyers involved in the study.

First I would like to ask some questions about your company in general.....

1. How many full-time and part-time staff does your company currently employ?

i FULL-TIME: _____

ii PART-TIME: _____

2. How many woolbuyers does your company employ? By woolbuyers I mean people who spend most of their time involved in activities related to the purchasing of wool, such as going to the auctions.

_____ *No. of wool buyers.*

3. What was the turnover of your company for the year ended June 1992?

\$ _____ *If your financial year is not year ended June could you please specify. _____*

4. How many years has your company been involved in the New Zealand wool industry? _____ *No. of years.*

5. What proportion, approximately, would you say are your purchases of wool between auction sales and private sales?

Private sales	_____ %
Auction sales	_____ %
	100%

6. Now some questions about the ownership of your company.

- i Are you 100% New Zealand owned?
 Yes.....1 } **GO TO Q. 7**
 No.....2

- ii What is the name of your parent company?

- iii Where is the head office of the parent company located?
 _____ i.e. *Name of city & country*

7. To which of the following countries is your company involved in the exporting of wool?

CIRCLE ALL THAT APPLY

Australia	1
Belgium	2
China	3
Germany	4
Hong Kong	5
India	7
Japan	8
South Korea	9
Nepal	10
Pakistan	11
United Kingdom	12
United States	13
Other European: _____ <i>please specify</i>	14
Other Mid East: _____ <i>please specify</i>	15

8. To which ONE country is MOST of your exporting of wool undertaken?
CIRCLE ONE ONLY

Australia	1
Belgium	2
China	3
Germany	4
Hong Kong	5
India	7
Japan	8
South Korea	9
Nepal	10
Pakistan	11
United Kingdom	12
United States	13
Other European: _____ <i>please specify</i>	14
Other Mid East: _____ <i>please specify</i>	15

9. How would you describe your use of foreign exchange cover? Would you say your company

CIRCLE ONE ONLY

...never	1
...occasionally	2
...most of the time	3
...always	4

....uses foreign exchange cover.

10. Which of the following activities would you say your company is involved in?

CIRCLE ALL THAT APPLY

Purchase wool for local processors	1
Purchase wool for overseas processors	2
Purchase wool for speculative purposes	3
Purchase wool on behalf of overseas merchants	4

11. Which of the following activities BEST describes the major purpose of your company?

CIRCLE ONE ONLY

- Purchase wool for local processors 1
- Purchase wool for overseas processors 2
- Purchase wool for speculative purposes 3
- Purchase wool on behalf of overseas merchants 4

12. Do you have any other comments about the operations of your company that may help in the study to explain any differences in behaviour?

Finally some questions about yourself.

13. What is your position within the company?

14. How many years experience have you personally had in the wool trade?

No. of years

15. How many years have you personally been with the company you are currently employed with?

No. of years

THANK YOU FOR YOUR HELP.

PART D:

RECONCILIATION QUESTIONNAIRE

This questionnaire was issued to respondents in June, 1993 in order to obtain the respondent's own company data on stockholdings and purchases. This data was used to verify the expectations data obtained from Part A (see Section 7.3, Chapter Seven, Volume 1).

CONFIDENTIAL:

Wool Demand Research - 1992/93

Every month, you fill out a questionnaire on your expectations for the wool market for the forthcoming four weeks. In order to reconcile your forecasts, I need to know what you actually did. Most of the information comes from the New Zealand Wool Board. However, there are questions on stockholdings and purchases which are related specifically to your company. Could you please fill out the tables below and send it back to me in the stamped addressed envelope attached. All this information remains **CONFIDENTIAL** and is not disclosed in the report.

(A) STOCKHOLDINGS

Could you please write in your approximate level of total wool stocks held by your company for each of the months.

	Approximate no. of Bales in Stock
October 1992	
November 1992	
December 1992	
January 1993	
February 1993	
March 1993	
April 1993	
May 1993 (<i>expected</i>)	

(B) QUANTITY OF WOOL PURCHASED (No. of Bales)

Could you please write in your approximate level of total wool purchases in no. of bales for each of the months.

	Approximate no. of Bales Purchased
October 1992	
November 1992	
December 1992	
January 1993	
February 1993	
March 1993	
April 1993	
May 1993 (<i>expected</i>)	

APPENDIX I:

DATA RECORDING SHEET

COMPANY NAME:_____DATE:_____

SURVEY NO:_____

(a) FINE WOOLS - 24 microns and less

CARD NO:_____

		0	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
P1	635c													
P2	710c													
P3	745c													
P4	780c													
P5	855c													

COMMENTS:_____

(b) FINE-MEDIUM WOOLS - 25 microns to 28 microns

CARD NO:_____

		0	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
P1	530c													
P2	590c													
P3	620c													
P4	650c													
P5	710c													

COMMENTS:_____

(c) MEDIUM WOOLS - 29 microns to 32 microns

CARD NO: _____

		0	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
P1	525c													
P2	585c													
P3	615c													
P4	645c													
P5	705c													

COMMENTS: _____

(d) MEDIUM-COARSE WOOLS - 33 to 35 microns

CARD NO: _____

		0	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
P1	355c													
P2	395c													
P3	415c													
P4	435c													
P5	475c													

COMMENTS: _____

(e) COARSE WOOLS - 36 microns or more

CARD NO: _____

		0	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
P1	330c													
P2	370c													
P3	390c													
P4	410c													
P5	450c													

COMMENTS: _____

APPENDIX J:

**FLIP CARDS WITH PRICE LEVELS FOR WOOL
IN CENTS PER kg.**

e.g. November 23 1992

<p>Fine Wools: 24 microns or less</p> <p>635 c/Kg</p> <p>e.g. 21F1W Question 1</p>	<p>Fine-Medium Wools: 25-28 microns</p> <p>530 c/Kg</p> <p>e.g. 25F1W Question 6</p>
<p>Fine Wools: 24 microns or less</p> <p>710 c/Kg</p> <p>e.g. 21F1W Question 2</p>	<p>Fine-Medium Wools: 25-28 microns</p> <p>590 c/Kg</p> <p>e.g. 25F1W Question 7</p>
<p>Fine Wools: 24 microns or less</p> <p>745 c/Kg</p> <p>e.g. 21F1W Question 3</p>	<p>Fine-Medium Wools: 25-28 microns</p> <p>620 c/Kg</p> <p>e.g. 25F1W Question 8</p>
<p>Fine Wools: 24 microns or less</p> <p>780 c/Kg</p> <p>e.g. 21F1W Question 4</p>	<p>Fine-Medium Wools: 25-28 microns</p> <p>650 c/Kg</p> <p>e.g. 25F1W Question 9</p>
<p>Fine Wools: 24 microns or less</p> <p>855 c/Kg</p> <p>e.g. 21F1W Question 5</p>	<p>Fine-Medium Wools: 25-28 microns</p> <p>710 c/Kg</p> <p>e.g. 25F1W Question 10</p>

<p>Medium Wools: 29-32 microns</p> <p>525 c/Kg</p> <p>e.g. 29F2W Question 11</p>	<p>Medium-Coarse Wools: 33-35 microns</p> <p>355 c/Kg</p> <p>e.g. 35F3E Question 16</p>
<p>Medium Wools: 29-32 microns</p> <p>585 c/Kg</p> <p>e.g. 29F2W Question 12</p>	<p>Medium-Coarse Wools: 33-35 microns</p> <p>395 c/Kg</p> <p>e.g. 35F3E Question 17</p>
<p>Medium Wools: 29-32 microns</p> <p>615 c/Kg</p> <p>e.g. 29F2W Question 13</p>	<p>Medium-Coarse Wools: 33-35 microns</p> <p>415 c/Kg</p> <p>e.g. 35F3E Question 18</p>
<p>Medium Wools: 29-32 microns</p> <p>645 c/Kg</p> <p>e.g. 29F2W Question 14</p>	<p>Medium-Coarse Wools: 33-35 microns</p> <p>435 c/Kg</p> <p>e.g. 35F3E Question 19</p>
<p>Medium Wools: 29-32 microns</p> <p>705 c/Kg</p> <p>e.g. 29F2W Question 15</p>	<p>Medium-Coarse Wools: 33-35 microns</p> <p>475 c/Kg</p> <p>e.g. 35F3E Question 20</p>

Coarse Wools:
36 microns or more

330 c/Kg

e.g. 37F3D
Question 21

Coarse Wools:
36 microns or more

370 c/Kg

e.g. 37F3D
Question 22

Coarse Wools:
36 microns or more

390 c/Kg

e.g. 37F3D
Question 23

Coarse Wools:
36 microns or more

410 c/Kg

e.g. 37F3D
Question 24

Coarse Wools:
36 microns or more

450 c/Kg

e.g. 37F3D
Question 25

APPENDIX K:

SHOWCARDS E1 to E7

**- QUANTITY LEVELS FOR
PROBABILITY ESTIMATES**

SHOWCARD E1:

0 to 60 Bales per month

<i>No. of Bales</i>	Probability of Purchase (Chances out of 10)									
	1/10	2/10	3/10	4/10	5/10	6/10	7/10	8/10	9/10	10/10
0	1	2	3	4	5	6	7	8	9	10
5 (Q1)	1	2	3	4	5	6	7	8	9	10
10 (Q2)	1	2	3	4	5	6	7	8	9	10
15 (Q3)	1	2	3	4	5	6	7	8	9	10
20 (Q4)	1	2	3	4	5	6	7	8	9	10
25 (Q5)	1	2	3	4	5	6	7	8	9	10
30 (Q6)	1	2	3	4	5	6	7	8	9	10
35 (Q7)	1	2	3	4	5	6	7	8	9	10
40 (Q8)	1	2	3	4	5	6	7	8	9	10
45 (Q9)	1	2	3	4	5	6	7	8	9	10
50 (Q10)	1	2	3	4	5	6	7	8	9	10
55 (Q11)	1	2	3	4	5	6	7	8	9	10
60 (Q12)	1	2	3	4	5	6	7	8	9	10

SHOWCARD E2:

0 to 120 Bales per month

<i>No. of Bales</i>	Probability of Purchase (Chances out of 10)									
	1/10	2/10	3/10	4/10	5/10	6/10	7/10	8/10	9/10	10/10
0	1	2	3	4	5	6	7	8	9	10
10 (Q1)	1	2	3	4	5	6	7	8	9	10
20 (Q2)	1	2	3	4	5	6	7	8	9	10
30 (Q3)	1	2	3	4	5	6	7	8	9	10
40 (Q4)	1	2	3	4	5	6	7	8	9	10
50 (Q5)	1	2	3	4	5	6	7	8	9	10
60 (Q6)	1	2	3	4	5	6	7	8	9	10
70 (Q7)	1	2	3	4	5	6	7	8	9	10
80 (Q8)	1	2	3	4	5	6	7	8	9	10
90 (Q9)	1	2	3	4	5	6	7	8	9	10
100 (Q10)	1	2	3	4	5	6	7	8	9	10
110 (Q11)	1	2	3	4	5	6	7	8	9	10
120 (Q12)	1	2	3	4	5	6	7	8	9	10

SHOWCARD E3:

0 to 600 Bales per month

<i>No. of Bales</i>	Probability of Purchase (Chances out of 10)									
	1/10	2/10	3/10	4/10	5/10	6/10	7/10	8/10	9/10	10/10
0	1	2	3	4	5	6	7	8	9	10
50 (Q1)	1	2	3	4	5	6	7	8	9	10
100 (Q2)	1	2	3	4	5	6	7	8	9	10
150 (Q3)	1	2	3	4	5	6	7	8	9	10
200 (Q4)	1	2	3	4	5	6	7	8	9	10
250 (Q5)	1	2	3	4	5	6	7	8	9	10
300 (Q6)	1	2	3	4	5	6	7	8	9	10
350 (Q7)	1	2	3	4	5	6	7	8	9	10
400 (Q8)	1	2	3	4	5	6	7	8	9	10
450 (Q9)	1	2	3	4	5	6	7	8	9	10
500 (Q10)	1	2	3	4	5	6	7	8	9	10
550 (Q11)	1	2	3	4	5	6	7	8	9	10
600 (Q12)	1	2	3	4	5	6	7	8	9	10

SHOWCARD E4:**0 to 1200 Bales per month**

<i>No. of Bales</i>	Probability of Purchase (Chances out of 10)									
	1/10	2/10	3/10	4/10	5/10	6/10	7/10	8/10	9/10	10/10
0	1	2	3	4	5	6	7	8	9	10
100 (Q1)	1	2	3	4	5	6	7	8	9	10
200 (Q2)	1	2	3	4	5	6	7	8	9	10
300 (Q3)	1	2	3	4	5	6	7	8	9	10
400 (Q4)	1	2	3	4	5	6	7	8	9	10
500 (Q5)	1	2	<u>3</u>	4	5	6	7	8	9	10
600 (Q6)	1	2	3	4	5	6	7	8	9	10
700 (Q7)	1	2	3	4	5	6	7	8	9	10
800 (Q8)	1	2	3	4	5	6	7	8	9	10
900 (Q9)	1	2	3	4	5	6	7	8	9	10
1000 (Q10)	1	2	3	4	5	6	7	8	9	10
1100 (Q11)	1	2	3	4	5	6	7	8	9	10
1200 (Q12)	1	2	3	4	5	6	7	8	9	10

SHOWCARD E5:

0 to 6000 Bales per month

<i>No. of Bales</i>	Probability of Purchase (Chances out of 10)									
	1/10	2/10	3/10	4/10	5/10	6/10	7/10	8/10	9/10	10/10
0	1	2	3	4	5	6	7	8	9	10
500 (Q1)	1	2	3	4	5	6	7	8	9	10
1000 (Q2)	1	2	3	4	5	6	7	8	9	10
1500 (Q3)	1	2	3	4	5	6	7	8	9	10
2000 (Q4)	1	2	3	4	5	6	7	8	9	10
2500 (Q5)	1	2	3	4	5	6	7	8	9	10
3000 (Q6)	1	2	3	4	5	6	7	8	9	10
3500 (Q7)	1	2	3	4	5	6	7	8	9	10
4000 (Q8)	1	2	3	4	5	6	7	8	9	10
4500 (Q9)	1	2	3	4	5	6	7	8	9	10
5000 (Q10)	1	2	3	4	5	6	7	8	9	10
5500 (Q11)	1	2	3	4	5	6	7	8	9	10
6000 (Q12)	1	2	3	4	5	6	7	8	9	10

SHOWCARD E6:

0 to 24,000 Bales per month

<i>No. of Bales</i>	Probability of Purchase (Chances out of 10)									
	1/10	2/10	3/10	4/10	5/10	6/10	7/10	8/10	9/10	10/10
0	1	2	3	4	5	6	7	8	9	10
2000 (Q1)	1	2	3	4	5	6	7	8	9	10
4000 (Q2)	1	2	3	4	5	6	7	8	9	10
6000 (Q3)	1	2	3	4	5	6	7	8	9	10
8000 (Q4)	1	2	3	4	5	6	7	8	9	10
10,000 (Q5)	1	2	3	4	5	6	7	8	9	10
12,000 (Q6)	1	2	<u>3</u>	4	5	6	7	8	9	10
14,000 (Q7)	1	2	3	4	5	6	7	8	9	10
16,000 (Q8)	1	2	3	4	5	6	7	8	9	10
18,000 (Q9)	1	2	3	4	5	6	7	8	9	10
20,000 (Q10)	1	2	3	4	5	6	7	8	9	10
22,000 (Q11)	1	2	3	4	5	6	7	8	9	10
24,000 (Q12)	1	2	3	4	5	6	7	8	9	10

SHOWCARD E7:

0 to 60,000 Bales per month

<i>No. of Bales</i>	Probability of Purchase <i>(Chances out of 10)</i>									
	1/10	2/10	3/10	4/10	5/10	6/10	7/10	8/10	9/10	10/10
0	1	2	3	4	5	6	7	8	9	10
5000 (Q1)	1	2	3	4	5	6	7	8	9	10
10,000 (Q2)	1	2	3	4	5	6	7	8	9	10
15,000 (Q3)	1	2	3	4	5	6	7	8	9	10
20,000 (Q4)	1	2	3	4	5	6	7	8	9	10
25,000 (Q5)	1	2	3	4	5	6	7	8	9	10
30,000 (Q6)	1	2	3	4	5	6	7	8	9	10
35,000 (Q7)	1	2	3	4	5	6	7	8	9	10
40,000 (Q8)	1	2	3	4	5	6	7	8	9	10
45,000 (Q9)	1	2	3	4	5	6	7	8	9	10
50,000 (Q10)	1	2	3	4	5	6	7	8	9	10
55,000 (Q11)	1	2	3	4	5	6	7	8	9	10
60,000 (Q12)	1	2	3	4	5	6	7	8	9	10

APPENDIX L:

**SHOWCARD B
- THE PURCHASE PROBABILITY SCALE**

SHOWCARD B

10	- Certain, Practically Certain (99 in 100)
9	- Almost Sure (9 in 10)
8	- Very Probable (8 in 10)
7	- Probable (7 in 10)
6	- Good Possibility (6 in 10)
5	- Fairly Good Possibility (5 in 10)
4	- Fair Possibility (4 in 10)
3	- Some Possibility (3 in 10)
2	- Slight Possibility (2 in 10)
1	- Very Slight Possibility (1 in 10)
0	- No Chance, Almost No Chance (1 in 100)

APPENDIX M:

WOOL BOARD DESCRIPTION OF WOOL TYPES

NEW ZEALAND
WOOL BOARD

CATEGORY	Lengths (mm)	Style	A/B	B/B	R	B/C	C	C/D	CANBO
			0	1	2	3	4	5	6
			CODES						
SPINNING PAPER FEELS	18 19 20 21 22 23		V	V					
	24 25 26 27 28 29		V	V					
	30 31 32 33								
	34 35 36								
MAIN BODY	18 19 20 21 22 23			WXY	WXY	WXY	WXY	WXY	
WEBS	24 25 26 27 28 29			WXYZ	WXYZ	WXYZ	WXYZ	WXYZ	X*Z*
	30 31 32 33								
	34 35 36								
PERI-METAL	11 12 13		X						
	14 15 16								
	17 18 19								
	20 21 22								
	23 24 25								
	26 27 28								
	29 30 31								
	32 33 34								
	35 36 37								
	38 39 40								
	41 42 43								
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FLEECE AND SECOND SHEAR BODYWOOL (CROSSBREED)

Super A/BB	Good colour, well grown, good character (speciality wools) well skirted, sound, free, even.
Super/Gd BB/B	Good colour, good character. Fairly well skirted, F.N.E., may be slightly irregular in length and fineness combing wools must be sound.
Good B	Fair to good colour, skirted, may be slightly felty, tender wools may be felty, may contain slight vegetable fault.
Gd/Av B/C	Fair colour, may be unskirted, and contain light vegetable fault and odd soft cott.
Av C	Fair to poor colour, unskirted, may contain light to medium vegetable fault and be partly cotted.
Poor C/D	Poor colour, may contain odd soft and medium to heavy vegetable fault (but not carbonising).

COTTS

Gd/Av	Fair to good colour, free.
Av	Fair colour, may contain slight vegetable fault, free from hard cott in soft cott grade.
Av/Poor	Fair to poor colour, may contain light vegetable fault, odd hard cott in soft cott grade.
Poor	Poor colour, may contain hard cott in soft cott grade, and vegetable fault.

DOWN FLEECE

Gd/Av	Good colour, skirted, may contain slight vegetable fault.
Av	Fair to good colour, semi skirted, may contain slight vegetable fault.
Av/Poor	Fair to poor colour, may be unskirted and contain light vegetable fault.
Poor	Poor colour, unskirted, may contain vegetable fault.

FIRST LAMBS

Super/Gd	Good colour, well picked, free, even length and fineness.
Gd/Av	Good washing colour, fairly well picked, may contain very slight vegetable fault and be slightly irregular in length.
Av	Fair to good colour, may be only semi picked, may contain slight vegetable fault.
Av/Poor	Fair to poor colour, may be unpicked and contain slight to light vegetable fault.
Poor	Poor colour, unpicked, may contain light to medium vegetable fault.
Disc	Discoloured, may contain light to medium vegetable fault.

LAMBS SECONDS

Gd/Av	Fair/good washing colour, free from vegetable fault.
Av	Fair colour, may contain slight vegetable fault.
Av/Poor	Fair/poor colour, may contain light vegetable fault.
Poor	Poor colour, may contain light to medium vegetable fault.
Disc	Heavily discoloured, may contain light to medium vegetable fault.

NECKS

Gd/Av	Good colour, may contain slight vegetable fault.
Av	Fair/good colour, may contain slight vegetable fault.
Av/Poor	Fair colour, may contain light vegetable fault.
Poor	Fair to poor colour, light to medium vegetable fault.

PIECES BELLIES AND CLOTHING ODDMENTS

Gd/Av	Good washing colour, free.
Av	Fair to good colour, may contain slight vegetable fault.
Av/Poor	Fair to poor colour, may contain light vegetable fault.
Poor	Poor colour, may contain light to medium vegetable fault.
Disc	Heavily discoloured, may contain light to medium vegetable fault.

SECOND PIECES & LOCKS

Av	Fair colour, may contain light vegetable fault.
Av/Poor	Fair to poor colour, may contain light vegetable fault.
Poor	Poor colour, may contain light to medium vegetable fault.

FIRST CRUTCHINGS (including Lambs Crutchings)

Super/Gd	Good colour, well picked, free from vegetable fault.
Good/Av	Good average washing colour, fairly well picked, free from vegetable fault.
Av	Fair colour, semi-picked, may contain slight vegetable fault.
Av/Poor	Fair/poor colour, may be unpicked and contain slight vegetable fault.
Poor	Poor colour, may contain light to medium vegetable fault, unpicked.

EYE CUPS

Good/Av	Good colour, may contain light vegetable fault.
Av/Poor	Any colour, medium vegetable fault.
Carho	Heavy vegetable fault.

STAINS

Av/Poor	Light to medium urine stain, may contain light vegetable fault.
Disc	Heavy urine stain, may contain heavy vegetable fault.

DEAD

Gd/Av	Fair/good colour, may be slightly irregular in length, free from vegetable fault, no skin.
Av	Fair colour, may be short or mixed in length, slight vegetable fault, no skin.
Poor	Poor colour, all lengths.

MUD

Carho	Muddy oddments requiring machining.
--------------	-------------------------------------

BLACK

Av	Must be skirted fleeces.
Poor	Pieces and unskirted fleeces.

BRANDS

Av	All in.
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DOUBLE FLEECE

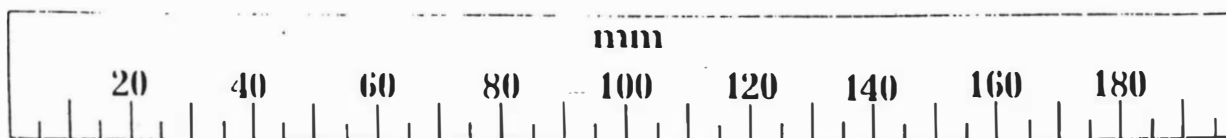
Av	Fair colour may contain light vegetable fault.
Poor	Poor colour, heavy vegetable fault.

DOWN ODDMENTS

Av/Poor	Fair to poor colour, may contain slight vegetable fault.
Disc	Poor to discoloured, may contain vegetable fault.

**CODED SALES ASSISTANCE REPORT
(2 Unit minimum, 5 maximum)**

Sequence	Code	
1	1 - 3	Scouring indicator (for vegetable matter)
2	0 - 5	Scouring indicator (for colour)
3 - 5	A	Autumn Shorn
	B	Butt/Blackjack etc.
	C	Contains Cotts
	D	B minus or discounted type
	E	Belly type or contains bellies
	F	Felty/Webby
	G	Good side of type
	H	Shorn hogget
	I	Urine stain
	J	Unsuitable yield (sand, earth, mud)
	K	Crutchings (belly crutchings & crutchings pickings)
	L	Long
	M	Pen stain
	N	Non standard type
	O	Baggy
	P	Pumice
	Q	Very mixed micron range
	R	Very mixed length
	S	Short
	T	Tender
	U	Bulk 100 mm (75-125mm) autumn shorn
	V	Black fibre (suffolk lambs)
	W	Woolly hogget
	X	Cheviot/ferendale type breeding
	Y	Wet/damp
	Z	Seedy
	.	Fine
	-	Coarse
	*	To be allocated for centralisation



APPENDIX N:

OVERVIEW OF THE 1991-92 & 1992-93 SEASONS

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N.2 The 1991-92 Season	
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N.2.2 Survey No. 1 (October 7 to November 1, 1991)	N.11
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N.2.6 Survey No. 5 (February 24 to March 20, 1992)	N.19
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APPENDIX N: OVERVIEW OF THE 1991-92 & 1992-93 SEASONS

N.1 INTRODUCTION

In developing price and quantity expectations for wool buyers, a great many variables can intervene during the forecast period that will radically alter, or at least influence, the outcome for the particular period. This, as noted in Chapter Four, is a key weakness of the traditional econometric approach and a prime motivator for the search for a 'better prediction tool'. Chapter Five outlined the possibility of a qualitative based approach, namely the use of a purchase probability scale. By asking buyers to consider **all** variables in their assessments of four weekly wool auction purchases, it is assumed that they are **completely** aware of all factors within the market environment which will impinge on their decisions. In other words, in estimating their purchase probabilities for particular quantities it seems reasonable to assume that the 'information set' they use is 'correct' and that they will react rationally (See also Section 6.8, Chapter 6).

Unfortunately, as with any time-series analysis, the problem of intertemporal dynamics can 'sabotage' even the most informed projection. In the wool market this problem is even more pronounced with international, physical, and economic influences all impacting upon the market price and buying levels (See Figure 2.4, Chapter Two). While some attempt has been made to minimise this problem with the use of a four week period of assessment, the fact remains that market changes are inevitable. The purpose of this appendix therefore, is to summarise the key events¹ that occurred during each of the sixteen survey periods as an aid in the analysis of the purchase probability scale as a tool in demand estimation. It is possible that 'forecasting' errors which may be discovered in the analysis may, be more a function

¹ Newspaper articles, qualitative data from the buyers, auction sale data from the New Zealand Wool Board and the Board's weekly *Wool Market Review* were used as sources of information for the chronology.

of the particular characteristics of the environment at that time rather than a weakness of the instrument. Furthermore, knowledge of the environment may provide a useful explanatory role in the interpretation of the results. The appendix provides an overview of the 1991-92 and 1992-93 seasons as well as an analysis of the key economic indicators during each survey period.

N.2 THE 1991-92 SEASON

N.2.1. Overview

The 1991-92 season was the first in which the New Zealand Wool Board did not operate its Market Support at Auction and Minimum Price Schemes (*see Section 2.15, Chapter Two, Volume One*). In effect the market was completely 'free' of central intervention. It became obvious through the course of the research that this first season represented very much of a learning period as the participants within the market adapted to the new environment.

Figure N.3 illustrates the weekly Price Indicator movements for the 1991-92 season. The average auction price for wool for the season was 437.1 cents per kilogram clean (327.6 cents greasy). This was up 3.6% on the previous season. During the duration of the eight survey periods for the 1991-92 season, the All Segments Market Indicator rose 26.8%. The season high was 530 cents (14 May, 1992) while the season low was 369 cents (3 October, 1991). Figure N.4 illustrates the three segment indicators for fine wools (18 to 24 microns), medium wools (25-31 microns) and strong wools (32-41 microns) as produced by the New Zealand Wool Board.

The global recession in Western Europe and the Americas, as well as the continued absence of Russia as a buyer provided international influences that dampened overall prices, particularly in the early periods. From October 1991, Chinese and Middle Eastern demand for medium wools helped to bolster prices in this segment. China, in particular, made a major impact on the market increasing their purchases 148% on the previous season.

The depreciation of the New Zealand dollar against most currencies also helped to support wool prices later in the season (Figure N.7). This is also illustrated by the Wool TWI which fell 8.7 points through the season (Figure N.8).

The amount of wool offered at auction was down 1% to 221,450 clean tonnes. Passings averaged 9% (Figure N.7), up substantially from the 3.5% average of the previous season. The level of passings increased throughout the season, increasing to an average 27% in the last period. Table N.1 summarises the key production statistics throughout the season. The quantity of wool sold privately increased by

TABLE N.1
Production of Wool during the 1991-92 season
('000 clean tonnes)

	1986-87	1990-91	1991-92	% CHANGE
Growers wool sold at auction	160.0	153.3	140.1	- 8.6%
Wool sold privately	65.7	44.1	51.9	17.6%
Growers wool sold to UK	2.5	-	-	
Slips	30.8	27.8	29.7	6.8%
Sheepskins	2.2	1.0	1.1	10.0%
Change in stocks	- 0.8	1.3	- 2.1	-
TOTAL PRODUCTION	260.4	227.5	220.8	- 3.0%
NZWB Opening stocks	13.0	60.4	72.0	
TOTAL WOOL AVAILABLE	273.5	287.9	292.8	+ 1.7%

Source: New Zealand Wool Board Statistical Handbook, 1992-93

17.6% while the auction sales fell 8.6% compared to the previous year. As a proportion of total sales, auction sales accounted for 62.9% (67.7% in 1990-91), while private sales accounted for 23.3% (19.5% in 1990-91). The fall in wool production in 1991-92 was the result of a fall in sheep numbers (-4.7%), although this was partially offset by an increase in wool production per sheep by 0.1 kg to 5.4 kg.

Export volumes increased 19% in the season to 224,308 clean tonnes, largely as a result of the re-emergence of China as a major buyer, continued growth in the Nepalese market and large increases in other Asian markets. However, there were decrease in export levels to previously large buyers such as the Soviet Union/ C.I.S. and 'India, which had 'restrained' early season buying levels. The value of wool exports increased to \$1076 million, following a 10% decline in the Wool TWI (Figure N.6).

Figures N.1 and N.2 below illustrate the seasonal flows of wool onto the total and auction markets. With the exception of July and February, total wool sales and auction wool sales for 1991-92 were below the levels recorded for the same month in 1990-91.

FIGURE N.1
Total Wool Sales by Month - 1991-92

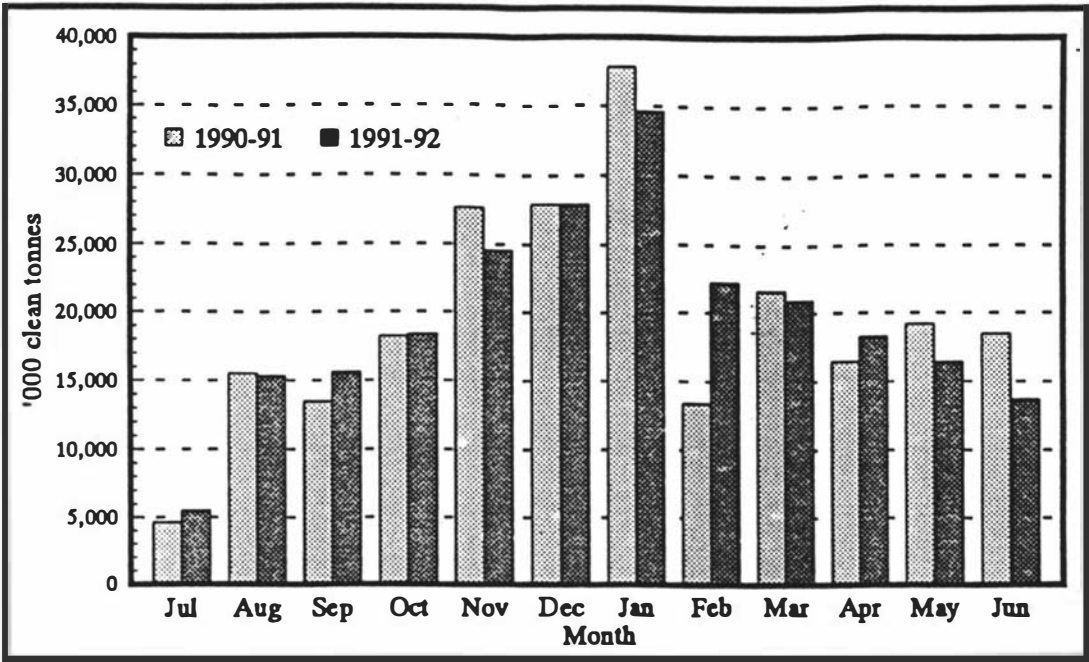


FIGURE N.2
Total Auction Wool Sales by Month - 1991-92

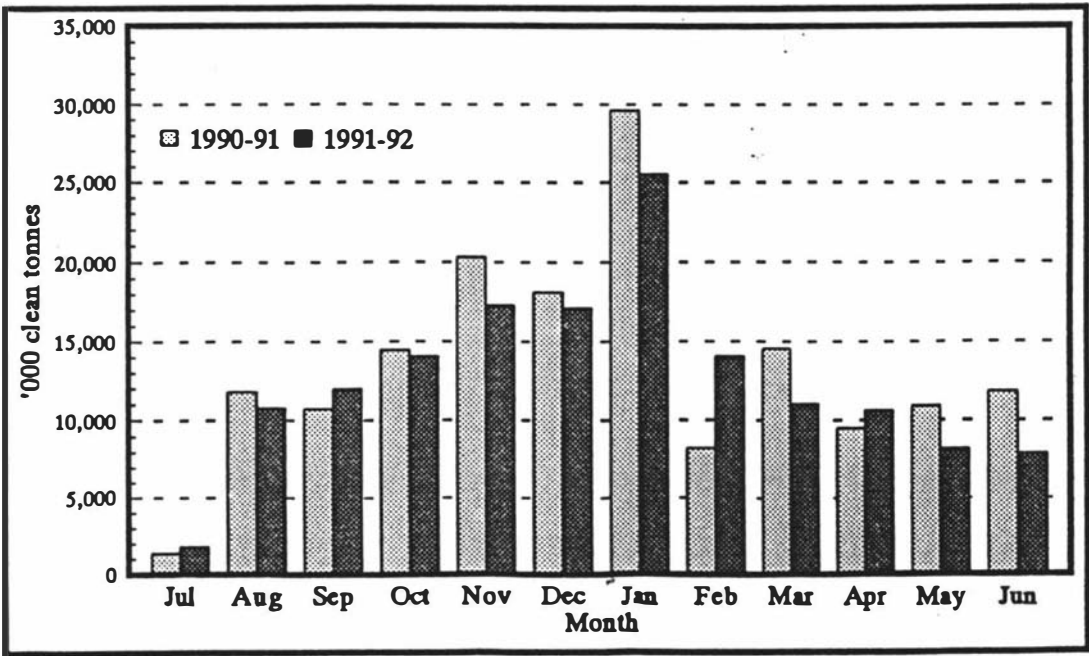
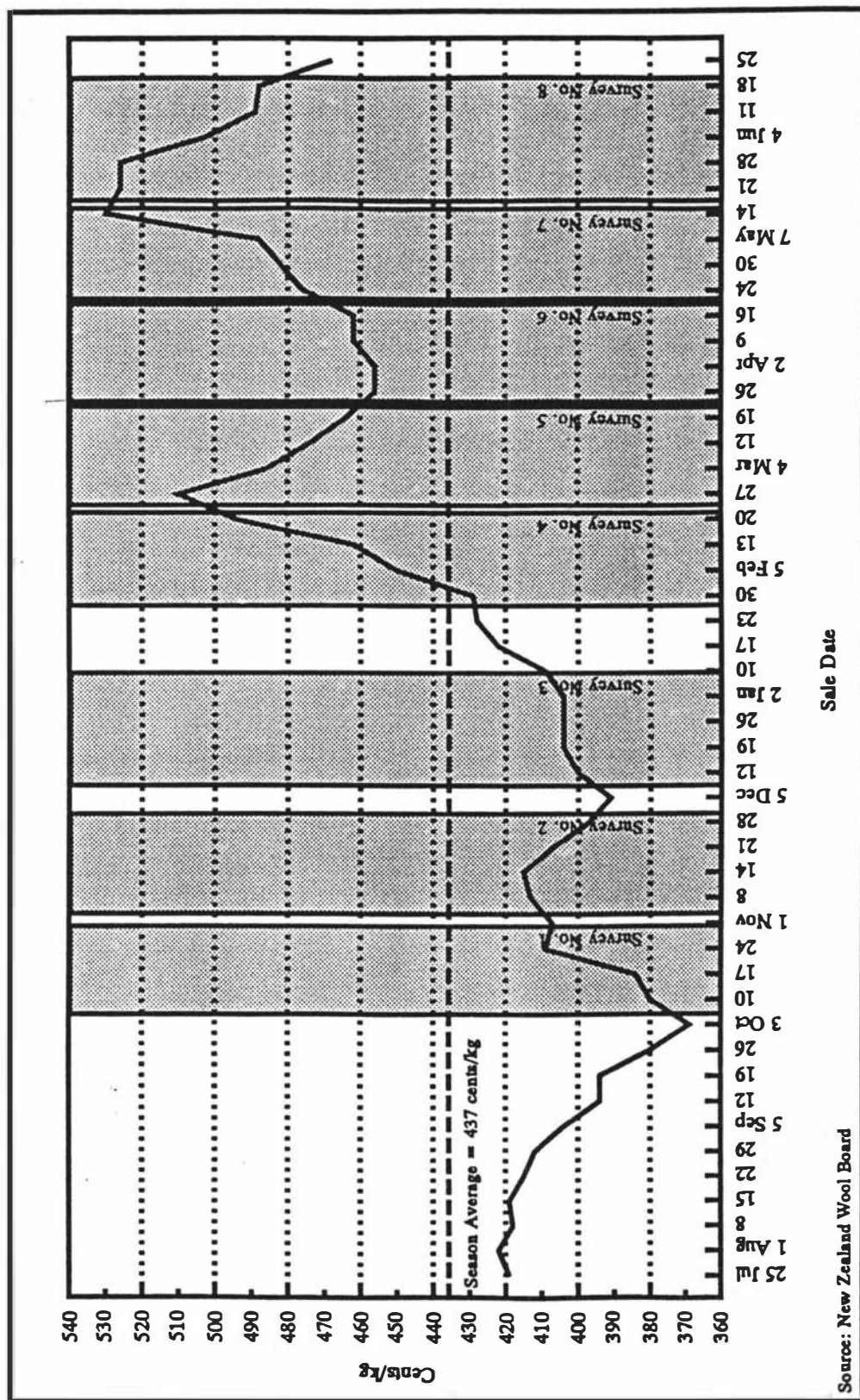


FIGURE N.3
All Segments Market Indicator - 1991-92



Source: New Zealand Wool Board

FIGURE N.4
Fine, Medium and Strong Market Indicators - 1991-92

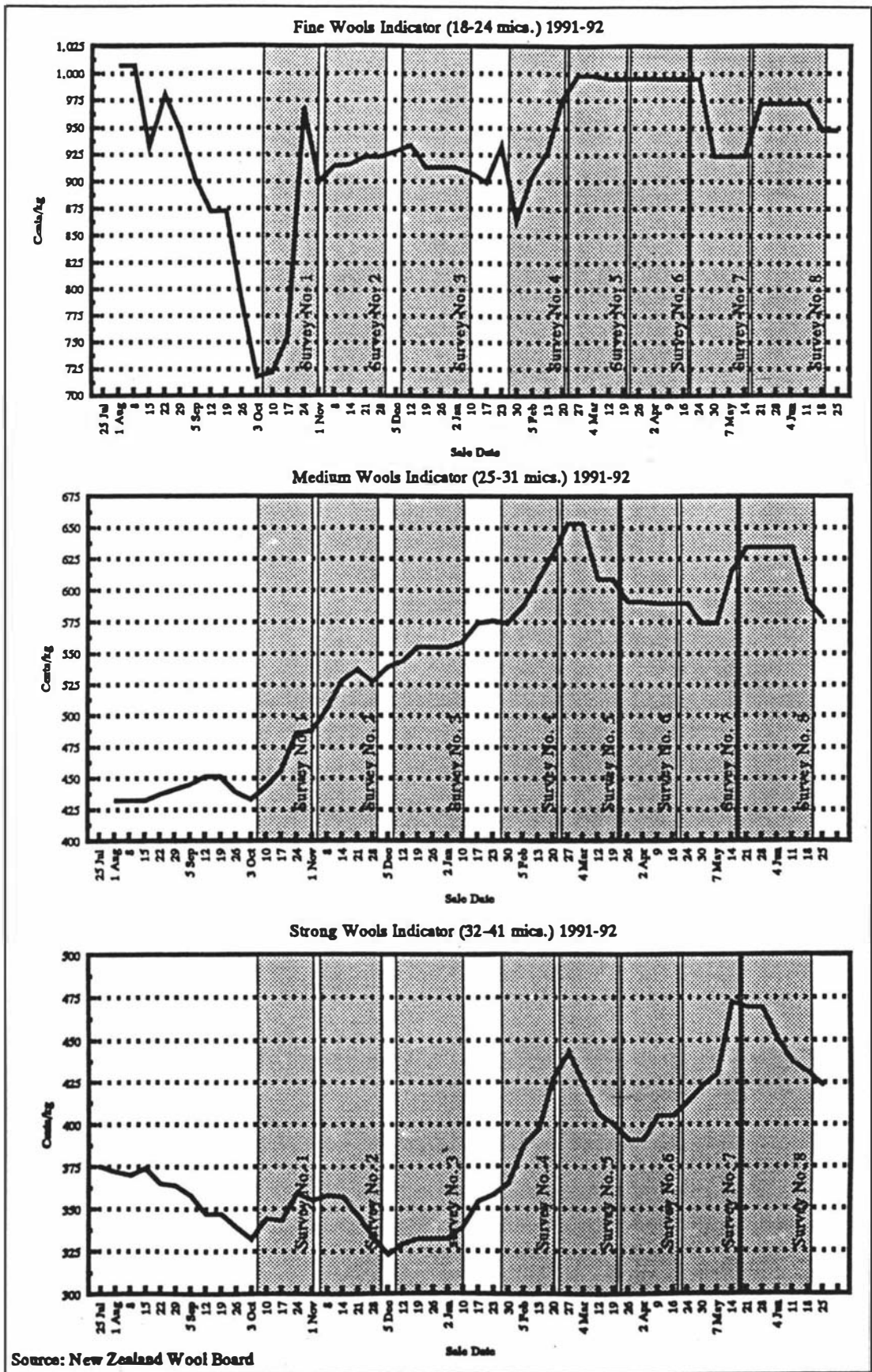
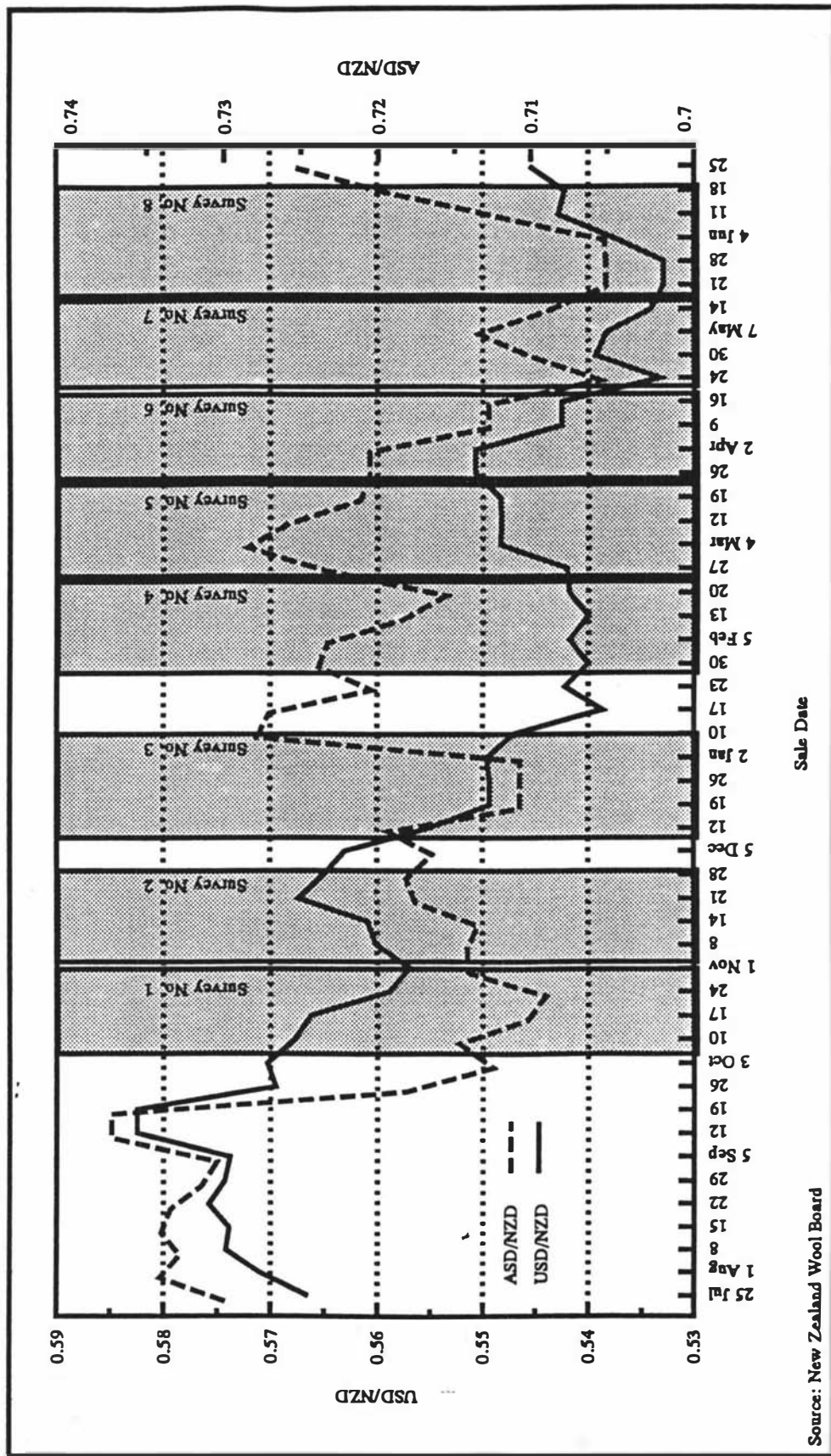


FIGURE N.5
USD/NZD & ASD/NZD Exchange Rates - 1991-92.



Source: New Zealand Wool Board

FIGURE N.6
Wool Trade Weighted Exchange Index - 1991-92

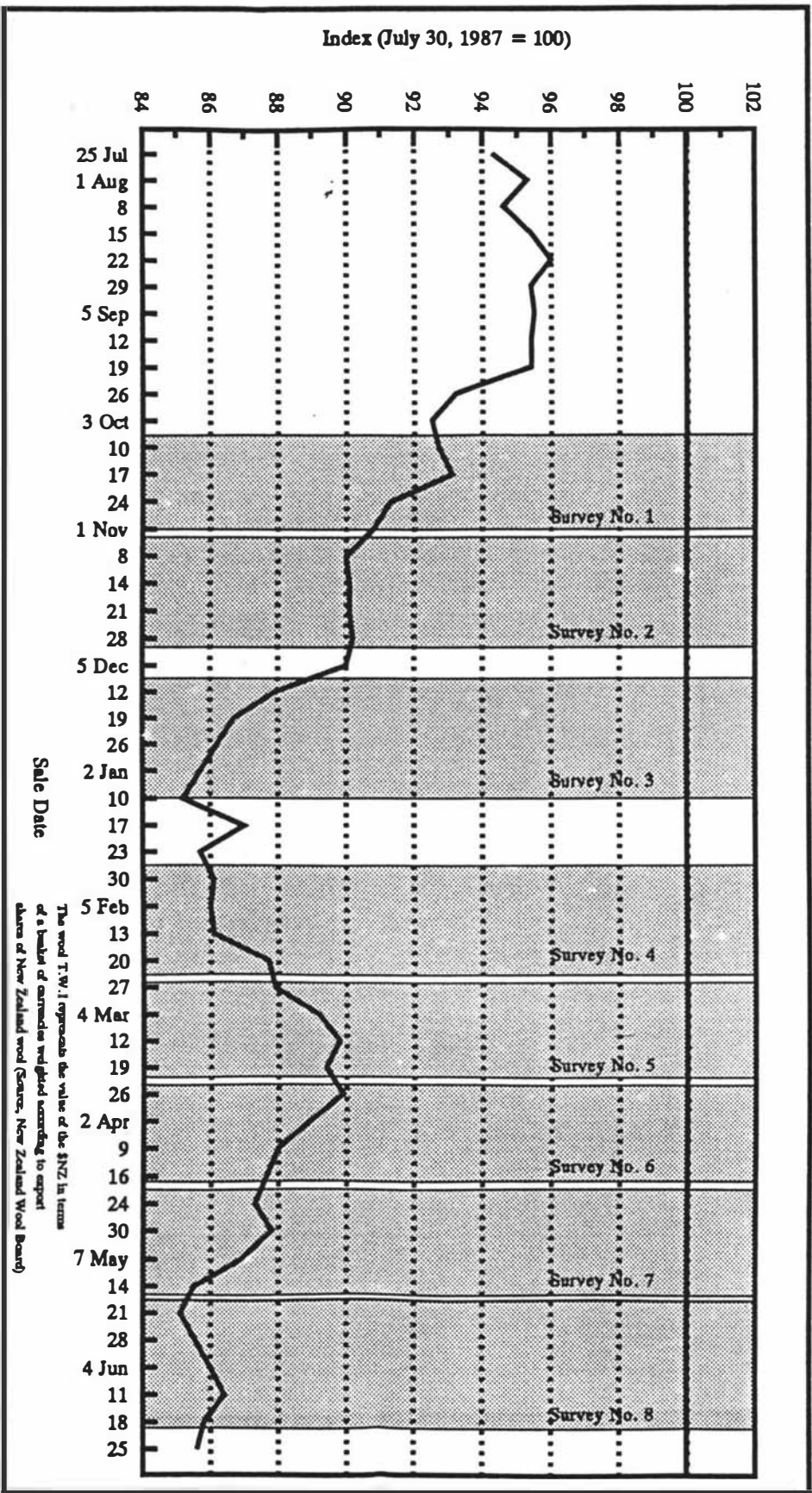
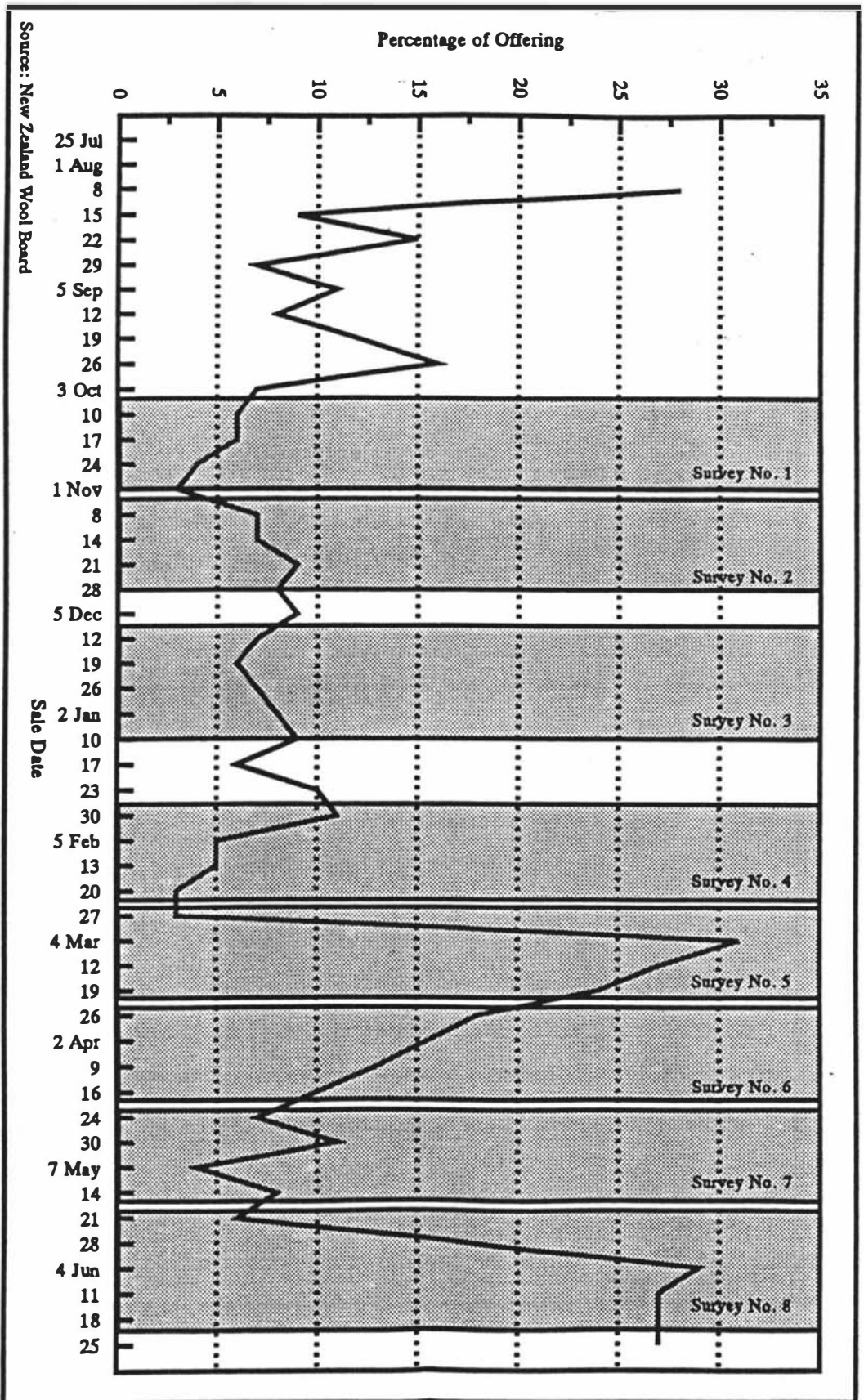


FIGURE N.7
 Passings as a Proportion of Auction Offerings - 1991-92



N.2.2. Survey No. 1: October 7 to November 1, 1991.

Prices prior to the start of this period were at the season's low with the Indicator at 369 cents. International wool prices, which had weakened in late August, also began to stabilise during this period, particularly in the Australian market. The Australian Market Indicator had started at 434 cents (8 October), peaked at 543 cents (23 October) before closing at the end of the month at 493 cents. This, combined with strong demand for limited types of crossbred wools in New Zealand, saw the Market Indicator rise from 369 cents to 416 cents (24 November) before closing at the end of the month at 407 cents, a 10.3% increase. There were particularly large increases in the prices of fine wools with the Indicator rising 25.4% to close at 900 cents. This increase was largely due to an increase in demand from Chinese and Japanese mills as well as a fall-off in the supply of these types onto the market.

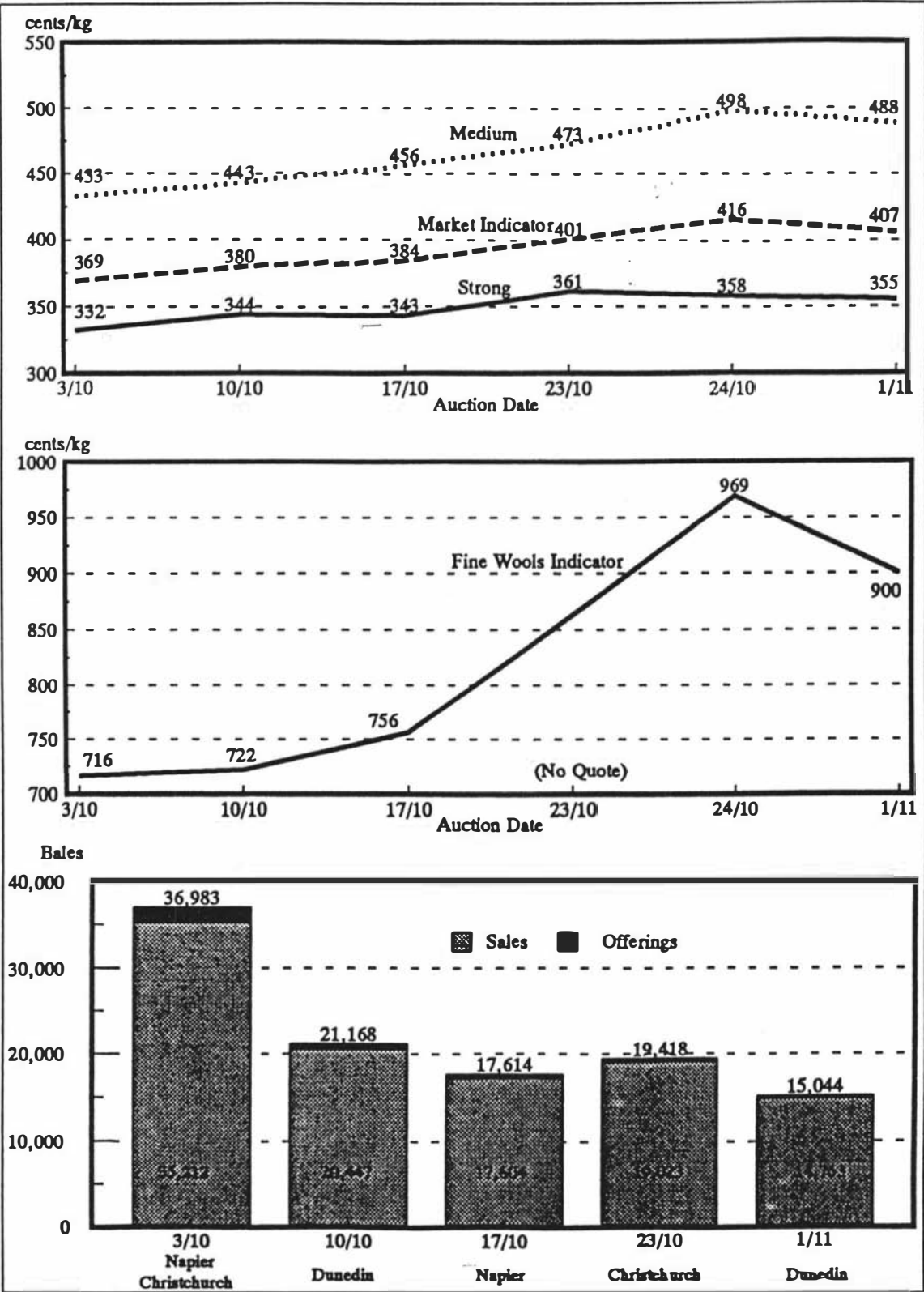
TABLE N.2
Auction Offerings During October 7 to November 1, 1991

	Bales	%
Crossbred Fleece	29,060	26.4
Merino Fleece	28,660	26.0
Halfbred Fleece	14,940	13.5
Second Shear	10,420	9.5
Skirtings, Oddments	15,400	14.0
Miscellaneous	11,620	10.6
	110,000	100.0

Source: New Zealand Wool Market Review

As Table N.2 shows, over half of the wool being offered during this period tended to be finer merino and coarser crossbred wools. There were four sales during this period. Average sale offerings at 18,311 bales were down 23% on the same period in the previous year. Passings averaged around 4%. The majority of buyers had expected some decline in supplies coming onto the market in later periods and subsequently were looking to increase their purchase levels.

FIGURE N.8
Price Indicators: October 7 to November 1, 1991



N.2.3. Survey No. 2: November 4 to November 29, 1991.

Prices remained relatively firm over the early part of this period, but eased towards the end of the month as more wool was offered onto the market. Price falls were quite noticeable for the coarser wools which dominated the offerings. Wet weather had delayed shearing which meant that the supply of wool coming onto the market was lower than anticipated in the early parts of the month. In order for the minimum quantity of wool to be available for auction, the New Zealand Wool Board placed a total of 8,000 bales of mostly second shear stocks onto the market. At the end of November, offerings of wool onto the market were down 7% compared to the previous year. This was particularly noticeable in the North Island where offerings were down 12%. An increase in private sales and slipe production was also noted with increases of 7% and 23% on the same period during the last season respectively.

TABLE N.3

Auction Offerings during November 4 to November 29, 1991

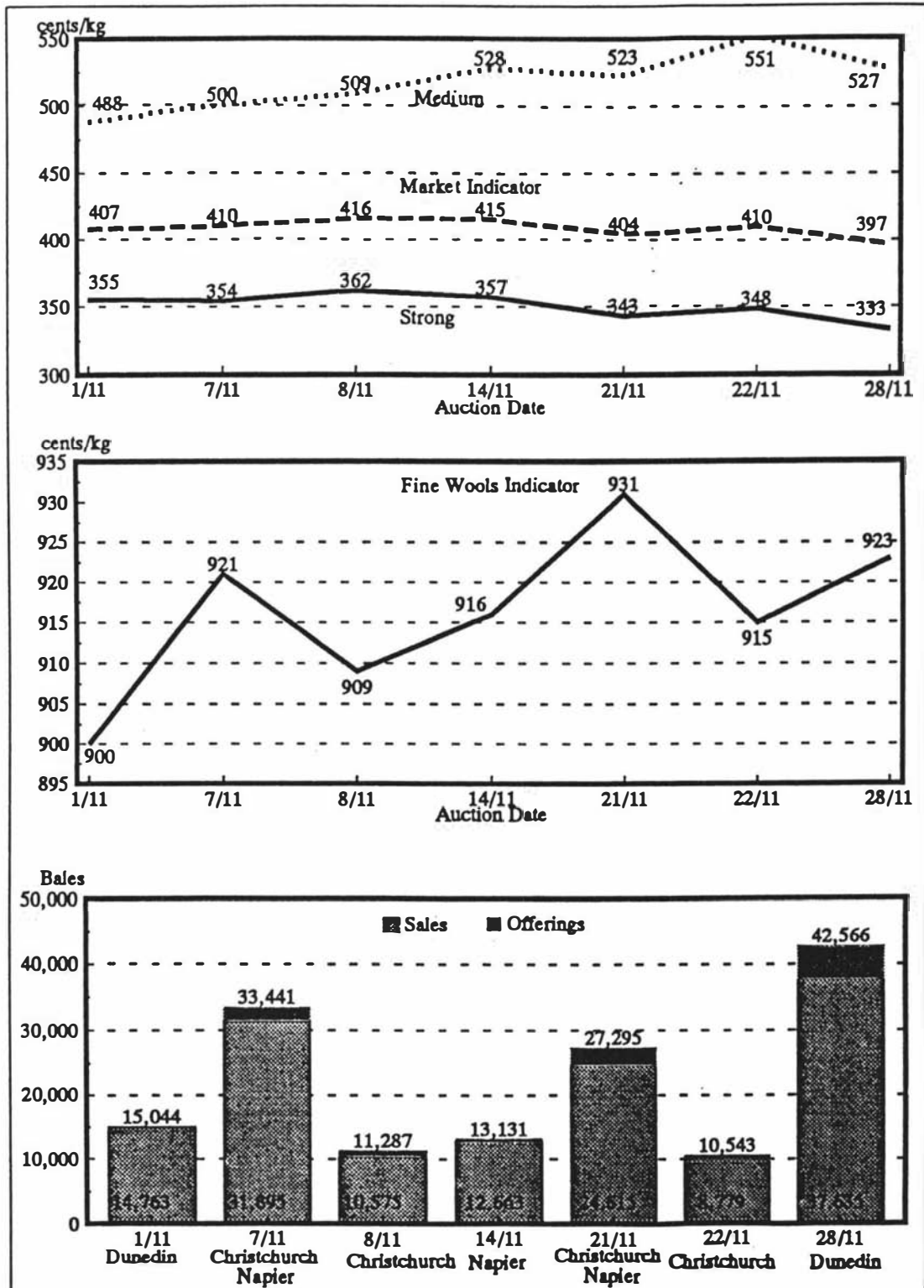
	Bales	%
Crossbred Fleece	50,694	36.4
Merino Fleece	19,488	14.0
Halfbred Fleece	12,882	9.2
Second Shear	27,486	19.7
Skirtings, Oddments	17,286	12.4
Miscellaneous	11,364	8.2
	139,200	100.0

Source: New Zealand Wool Market Review

Average auction offerings totalled 23,045 bales with passings averaging just under 8%, double the previous period. Eight sales were held in this period.

FIGURE N.9

Price Indicators: November 4 to November 29, 1991



N.2.4 Survey No. 3: December 9, 1991 to January 10, 1992.

Prices, as measured by the Medium and Strong Indicator's, gradually improved over the period, rising 4.2% and 6.2% respectively. The closing price of 562 cents for the medium wool segment represented the seasons high. The ASD/NZD exchange rate strengthened slightly during this period following poor economic reports on the Australian economy. This appreciation of the currency led to a fall in the Fine Wool Indicator of 3%. Wool Board stocks were reduced by 8,600 bales.

TABLE N.4

Auction Offerings during December 9, 1991 to January 10, 1992

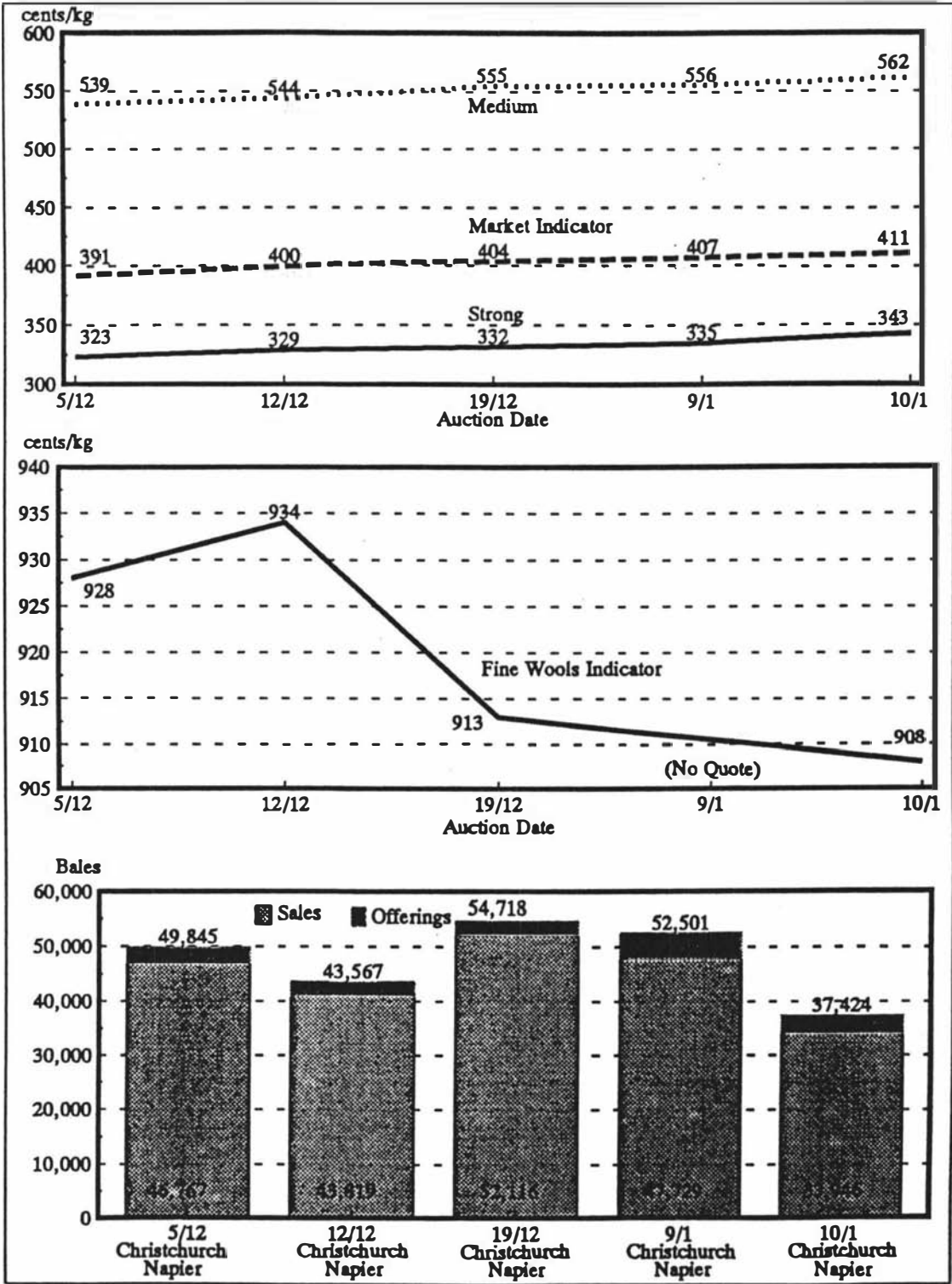
	Bales	%
Crossbred Fleece	100,429	42.2
Merino Fleece	4,662	1.9
Halfbred Fleece	7,460	3.1
Second Shear	59,891	25.1
Skirtings	11,894	5.0
Oddments	13,340	5.6
Lambswool	21,086	8.9
Miscellaneous	19,126	8.0
	237,888	100.0

Source: New Zealand Wool Market Review

Average offerings of wool were 47,052 bales, as the bulk of the seasons production flowed into the market. This was up 9% on the same period the previous year. The bulk of the offerings continued to be fleece wools. The range of merino wools available started to narrow. This gap in the market was starting to be replaced by lambswools. Passings were steady at just under 8%. Eight sales were held in this period.

FIGURE N.10

Price Indicators: December 9, 1991 to January 10, 1992.



N.2.5 Survey No. 4: January 27 to February 21, 1992.

This period was marked by some sharp increases in prices across all segments, particularly in the strong wools category. The All Segments Market Indicator over the period rose 15.4%. The rise was put down to strong competition between exporters who had contracted to sell greater quantities of wool than were available. This increase in demand was supported by an improvement in demand from India following the removal of import restrictions. The supply of wools coming onto the market was also falling below rostered levels causing the Wool Board to supplement supplies with out-of-season wools.

TABLE N.5

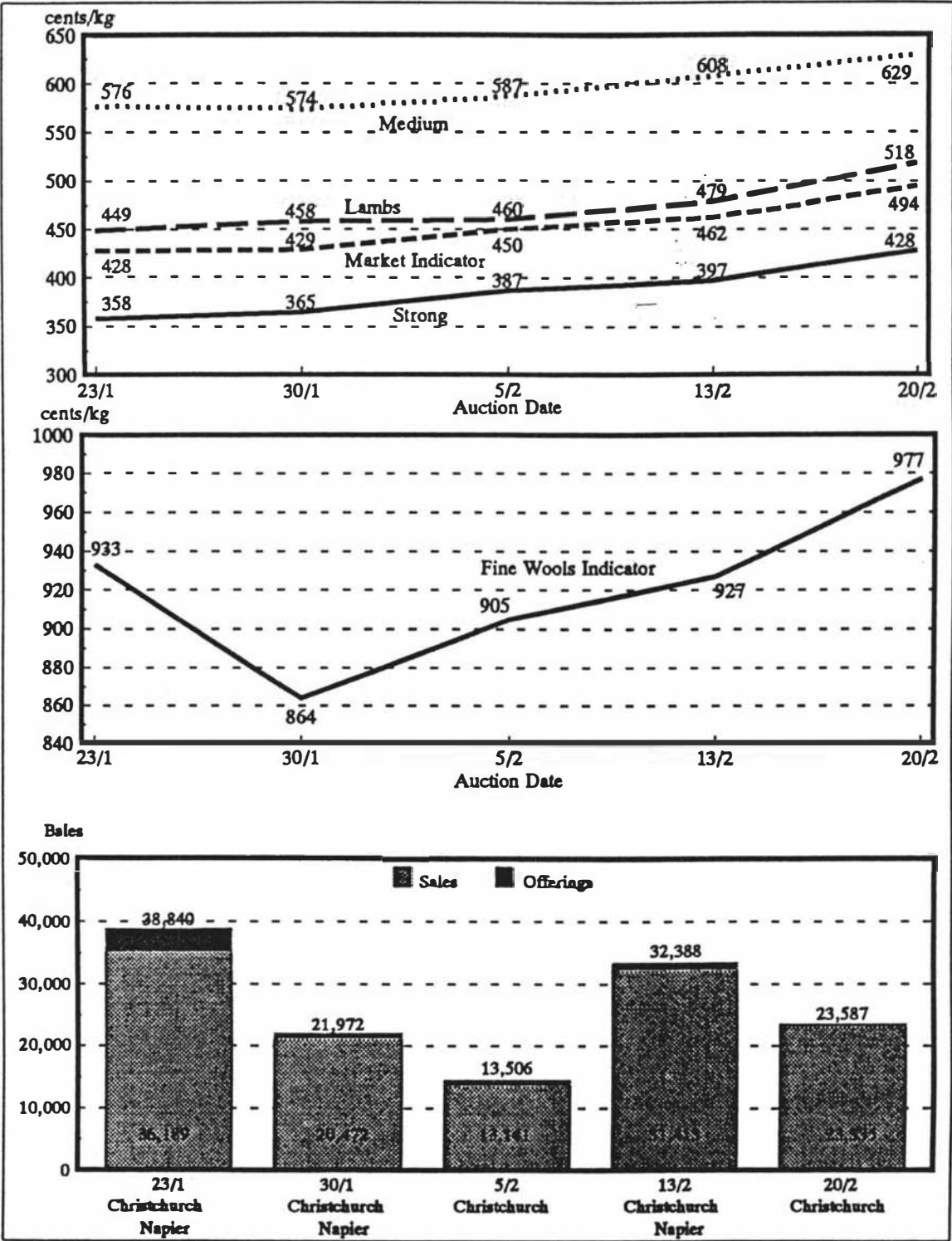
Auction Offerings during January 27 to February 21, 1992

	Bales	%
Crossbred Fleece	35,159	30.4
Merino Fleece	0	0.0
Halfbred Fleece	5,748	4.9
Second Shear	17,392	15.0
Skirtings, Oddments	10,376	8.9
Lambswool	35,455	30.6
Miscellaneous	11,570	10.0
	115,700	100.0

Source: New Zealand Wool Market Review

The amount of wool on offer during this period however, was substantially up from the same period in the previous season. Wool offerings at auction were dominated by lambswools, crossbred fleeces, and second shears. Average sale offerings amounted to 22,863 bales, with passings averaging 6%. There were six sales during this period.

FIGURE N.11
 Price Indicators: January 27 to February 21, 1992



N.2.6 Survey No. 5: February 24 to March 20, 1992.

Prices peaked during this period for all indicators. The Market Indicator reached 510 cents (27 February) before settling to 464 cents, an overall decline of 6% over the period. The resultant decline in prices led to a large increase in passings of up to 30%, although some of this may have been sold privately following the close of auctions trading. The Kiwi dollar also had some impact depreciating about 4% between December and early February after Reserve Bank intervention.

TABLE N.6
Auction Offerings during February 24 to March 20, 1992

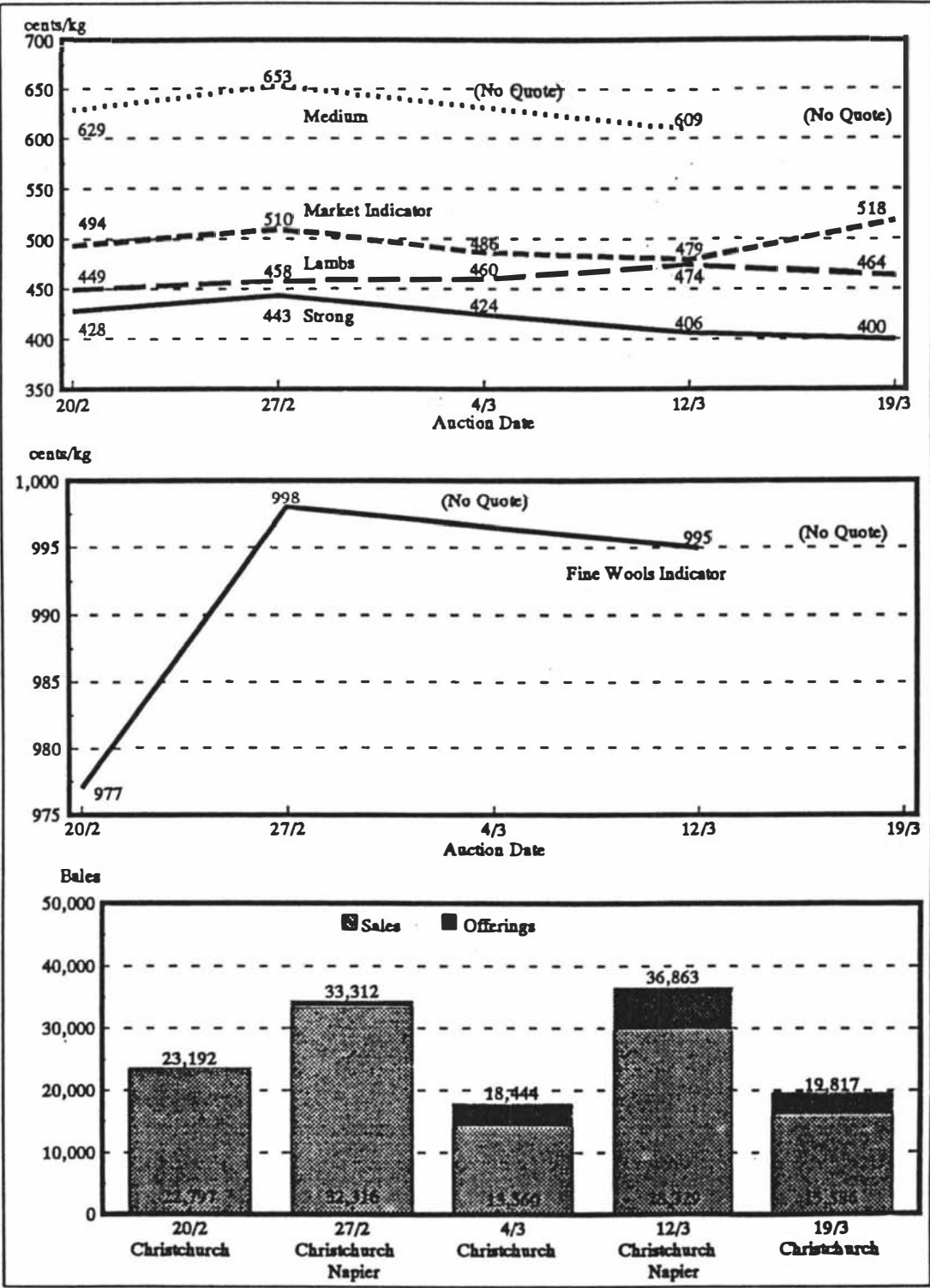
	Bales	%
Crossbred Fleece	25,402	23.4
Merino Fleece	0	0.0
Halfbred Fleece	1,554	1.4
Second Shear	30,640	28.3
Skirtings, Oddments	8,154	7.5
Lambswool	33,364	30.8
Cotts	1,698	1.6
Miscellaneous	7,588	7.0
	108,400	100.0

Source: New Zealand Wool Market Review

The composition of wool available to purchase started its seasonal change. The supply of fine merino wools started to fall away, with the top end of the fine wool range and medium range being supplemented by lambswools. Second Shear and crossbred fleece accounts for over half the offerings. The amount of wool offered for sales was 23% higher than the same time last season. However, with average passings of 21%, purchase levels were only slightly higher (+2%) than at the same period last season. There were six sales held in this period.

FIGURE N.12

Price Indicators: February 24 to March 20, 1992



N.2.7 Survey No. 6: March 23 to April 17, 1992.

Prices generally eased over this period with the Market Indicator dropping ½ % to 462 cents. The Strong Segment Indicator rose 3.5% in the latter part of the period countering a 2.2% fall at the beginning. A significant proportion of the wool offered for sale was second shear, particularly in the North Island. The supply of lambswool has dropped away significantly on the previous period. Only four sales over two days were held in this period due to the intervention of Easter.

TABLE N.7

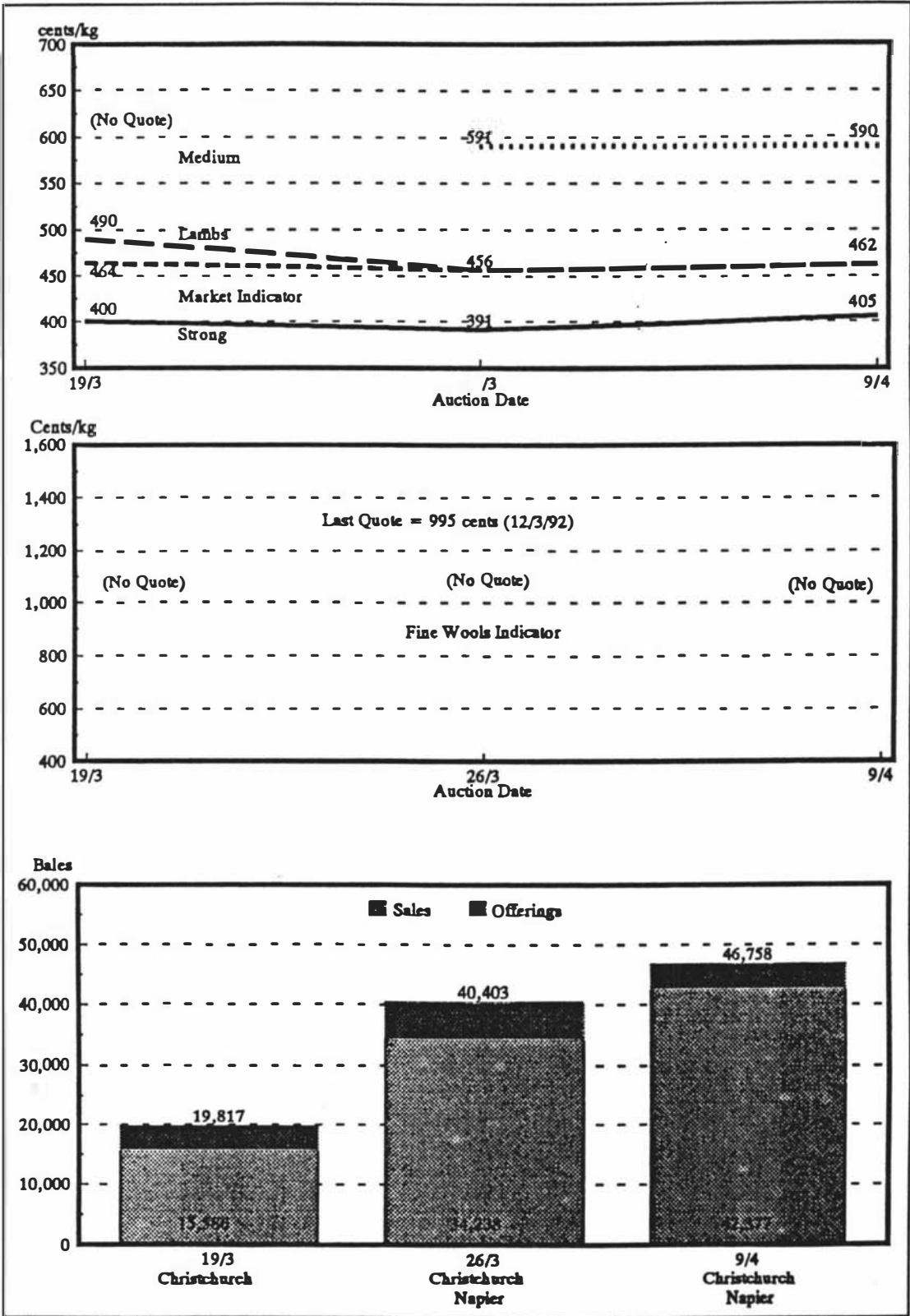
Auction Offerings during March 23 to April 17, 1992

	Bales	%
Crossbred Fleece	13,128	15.0
Merino Fleece	0	0.0
Halfbred Fleece	808	0.9
Second Shear	45,292	52.0
Skirtings, Oddments	5,378	6.2
Lambswool	12,939	14.8
Clothing oddments	4,670	5.4
Miscellaneous	4,077	4.6
	87,100	100.0

Source: New Zealand Wool Market Review

The quantity of wool on offer was considerably down from the same time last season (-19.8%). Average auction offerings amounted to 43,580 bales with passings averaging 15%. Auction purchases were also subsequently well down (-28.6%) on the same period last year. Second shear wools made up the bulk of the auction offerings.

FIGURE N.13
Price Indicators: March 23 to April 17, 1992



N.2.8 Survey No. 7: April 20 to May 15, 1992.

Prices during this period improved quite markedly across all segments (excluding fine wools). The Market Indicator rose 14.7% during the period to reach 530 cents, its highest level for two seasons. Much of the rise was attributable to the strengthening of crossbred prices, following a fall in the ASD/NZD exchange rate. Auction quantities were down by 5% on the same period the previous season, leading to a cancellation of the North Island sale on May 14. The Wool Board also reached agreement (in principle) to resume sales of wool to Russia. The quantity agreed upon was approximately 132,000 bales which were to be supplied during the remainder of the year. This deal however, later collapsed with only a small fraction being shipped.

TABLE N.8

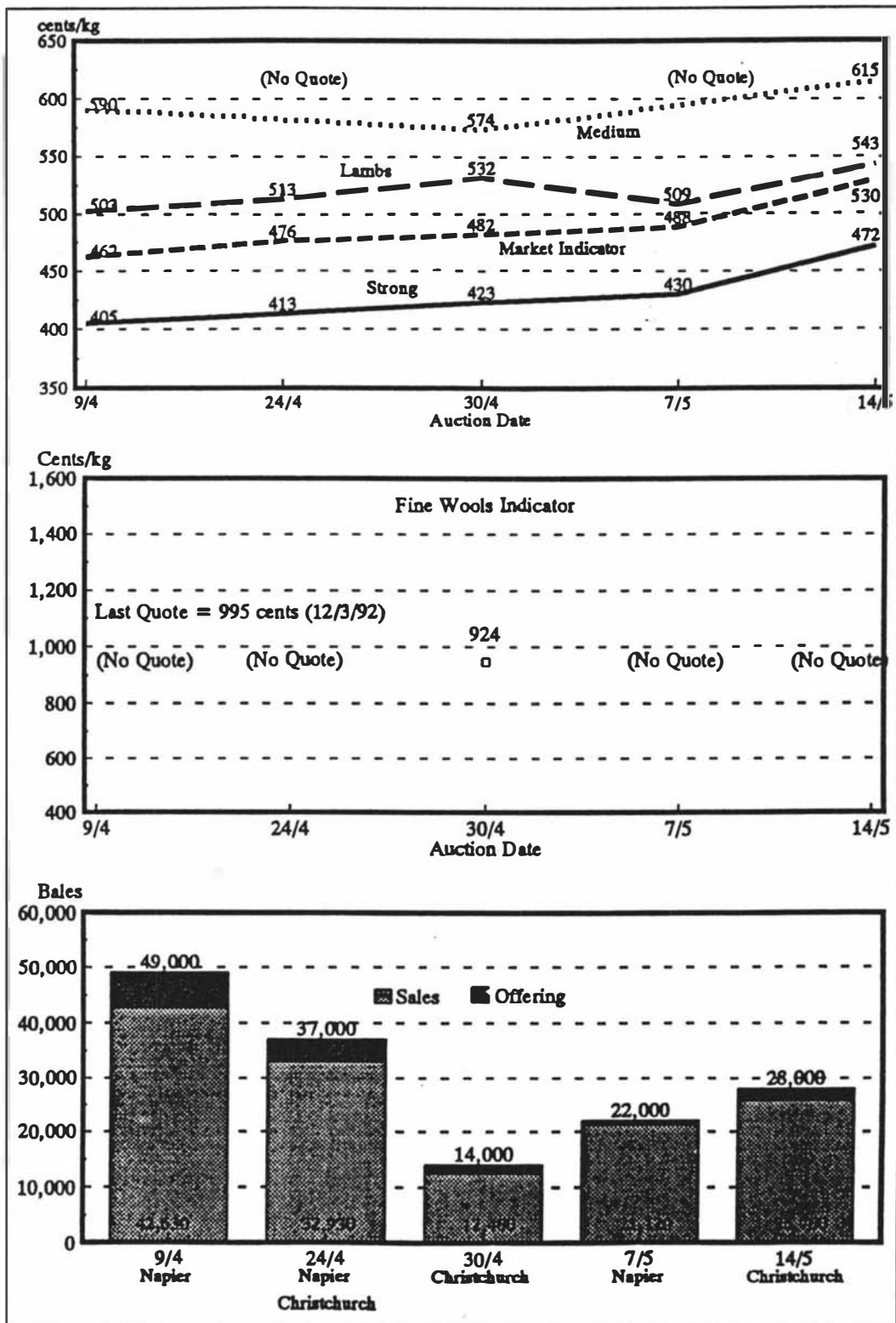
Auction Offerings during April 20 to May 15, 1992

	Bales	%
Crossbred Fleece	13,824	16.7
Merino Fleece	0	0.0
Halfbred Fleece	1,434	1.7
Second Shear	43,388	52.5
Skirtings, Oddments	4,176	5.0
Lambswool	8,738	10.5
Clothing oddments	4,302	5.2
Crutchings	1,044	1.3
Miscellaneous	5,694	6.9
	82,600	100.0

Source: New Zealand Wool Market Review

Over half of the auction composition was second shear. Average auction offerings amounted to 22,250 bales, with passings averaging 7.5%, down considerably from the previous two periods. Five sales were held in this period.

FIGURE N.14
Price Indicators: April 20 to May 15, 1992



N.2.9 Survey No. 8: May 15 to June 19, 1992.

With the reduction of varieties on offer, prices eased across all segments. Most of the North Island offering (90%) comprised oddments and second shears. Quantities in the latter sales during the period had to be supplemented with Wool Board stocks (3,000 bales). Only one Christchurch sale remained for the season after the end of this period.

TABLE N.9

Auction Offerings during May 15 to June 19, 1992

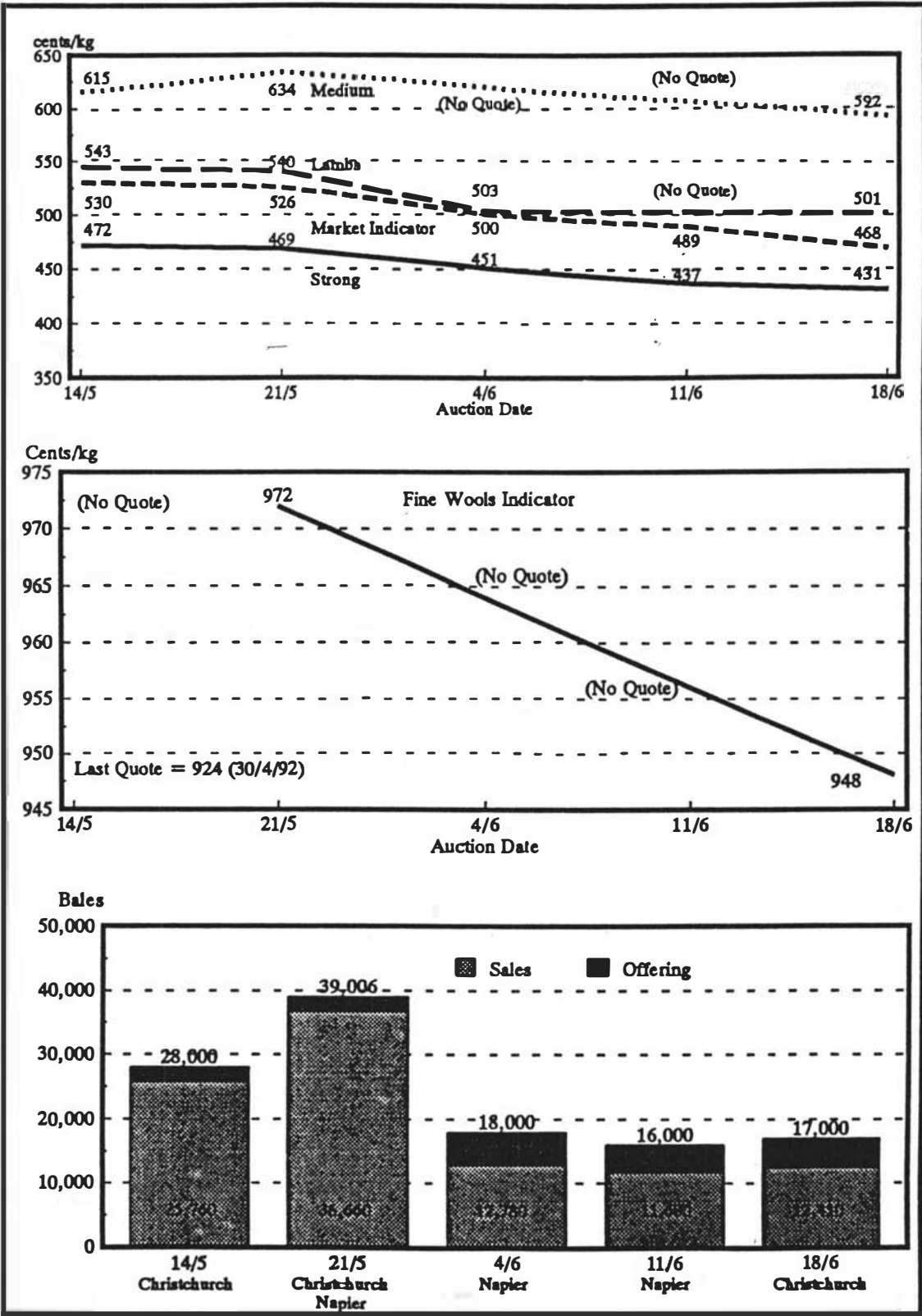
	Bales	%
Crossbred Fleece	6,397	9.7
Merino Fleece	0	0.0
Halfbred Fleece	1,416	2.1
Second Shear	42,495	64.3
Skirtings, Oddments	8,640	13.0
Lambswool	2,478	3.7
Miscellaneous	4,674	7.0
	66,100	100.0

Source: New Zealand Wool Market Review

The Indicator dropped 7.2% to finish at 468 cents. However, the level immediately prior to the start of the period was the seasons high at 530 cents, largely the result of a single sale increase of 42 cents (+8.6%). This was also the result of a two period increase in prices from 456 cents which started on the 26 March. The fall in the Indicator during the period could have been due, in part, to a significant appreciation in the ASD/NZD exchange rate.

Almost two-thirds of the wool offerings this period were second shears. In addition, both auction offerings (-39%) and auction sales (-43%) were down on the same period last season. Passings averaged 30%.

FIGURE N.15
 Price Indicators: May 15 to June 19, 1992



N.3 1992-93 SEASON

N.3.1. Overview

The 1992-93 season was the second season in which the New Zealand Wool Board played no active role in the auction system. It was also a season that saw negative influences in the form of continuing declines in quality wools as a result of wet spring weather, and an ongoing downturn in the demand for wools by international buyers. Table N.10 summarises the key statistics for wool production throughout the season.

TABLE N.10
Production of Wool during the 1992-93 season
('000 clean tonnes)

	1987-88	1991-92	1992-93	% Change
Growers wool sold at auction	167.1	140.1	116.4	- 16.9%
Wool sold privately	63.7	51.9	48.5	- 6.5%
Growers wool sold to UK	-	-	-	
Slips	26.3	29.7	25.4	- 14.4%
Sheepskins	2.0	1.1	0.7	- 36.4%
Change in stocks	0.4	- 2.1	- 2.0	-
TOTAL PRODUCTION	259.5	220.8	193.0	- 12.6%
NZWB Opening stocks	3.9	72.0	53.4	
TOTAL WOOL AVAILABLE	263.5	292.8	246.4	- 15.8%

Source: New Zealand Wool Board Statistical Handbook, 1992-93

Auction offerings were down 16.9%, while private sales were down 6.5% on the previous season. Auction sales, as a proportion of total production, fell to 60.9% (62.9% in 1991-92), while private sales increased as a proportion to 25.4% (23.3% in 1991-92). New Zealand Wool Board stocks fell 10% to 58,969 tonnes. Passings increased by 71% to 35,720 greasy tonnes as growers maintained relatively high reserve prices. Passings, not surprisingly, averaged a third of offerings in 1992-93.

The average price for the season was 432.8 cents (clean), 1% down from the previous season. In fact, prices exhibited a downward trend throughout the season closing almost a full 100 cents at the season end. This was in contrast to previous seasons in which the price inevitably picked up through the season.

Wool exports fell by 20% to 180,394 clean tonnes as a result of the continuing western recession, and substantially weaker demand in other markets. China (20.2%) continued to be the major importer of wool from New Zealand followed by Nepal (9.8%), United Kingdom (9.8%) and Japan (8.6%). The Asian/Indian sub-continent destinations as a group purchased 57% of exports, compared to 42% five years ago.

Figures N.16 and N.17 show the distribution of total wool sales and auction sales by month throughout the 1992-93 season. With the exception of June, both the total wool sales and auction sales were down on the same period in 1991-92.

FIGURE N.16
Total Wool Sales by Month - 1992-93

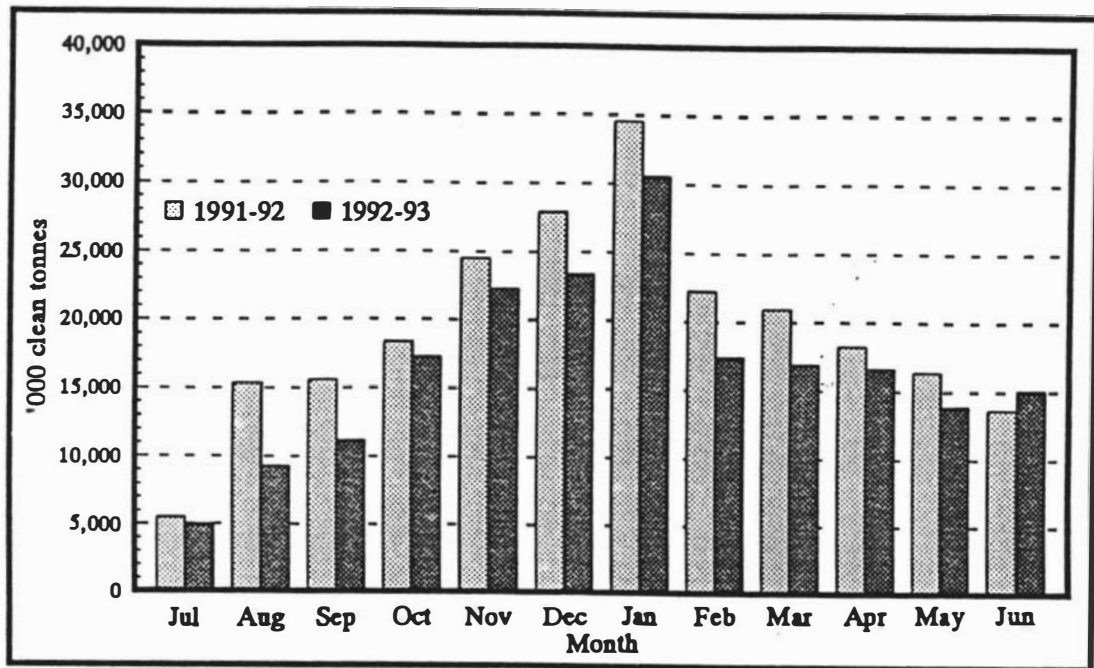


FIGURE N.17
Total Auction Wool Sales by Month - 1992-93

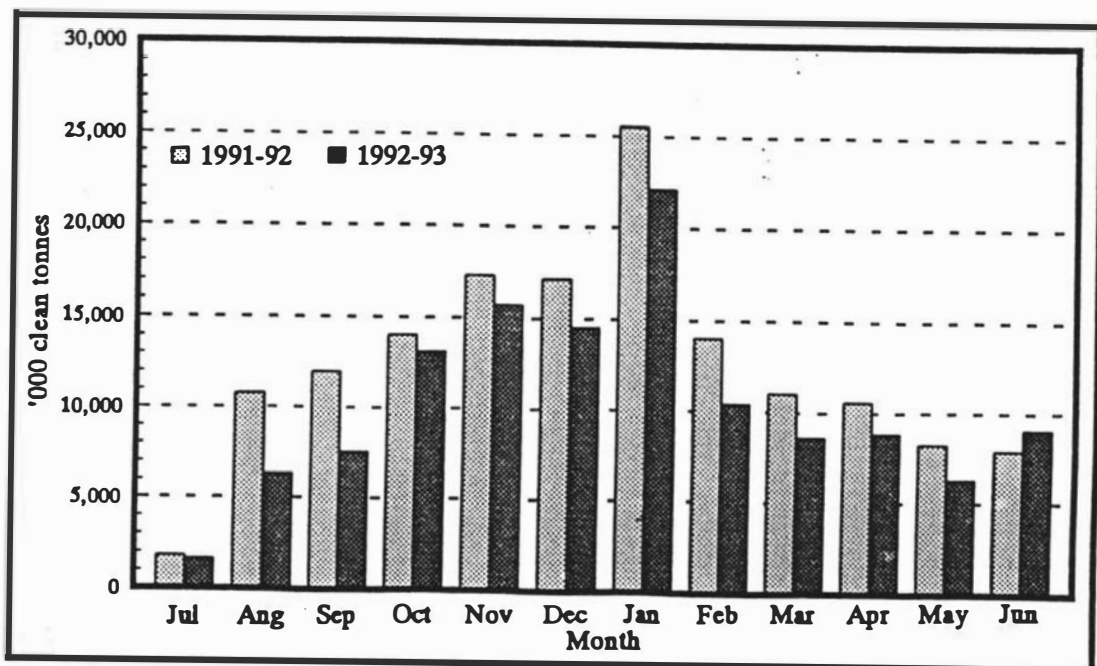


FIGURE N.18
All Segments Market Indicator - 1992-93

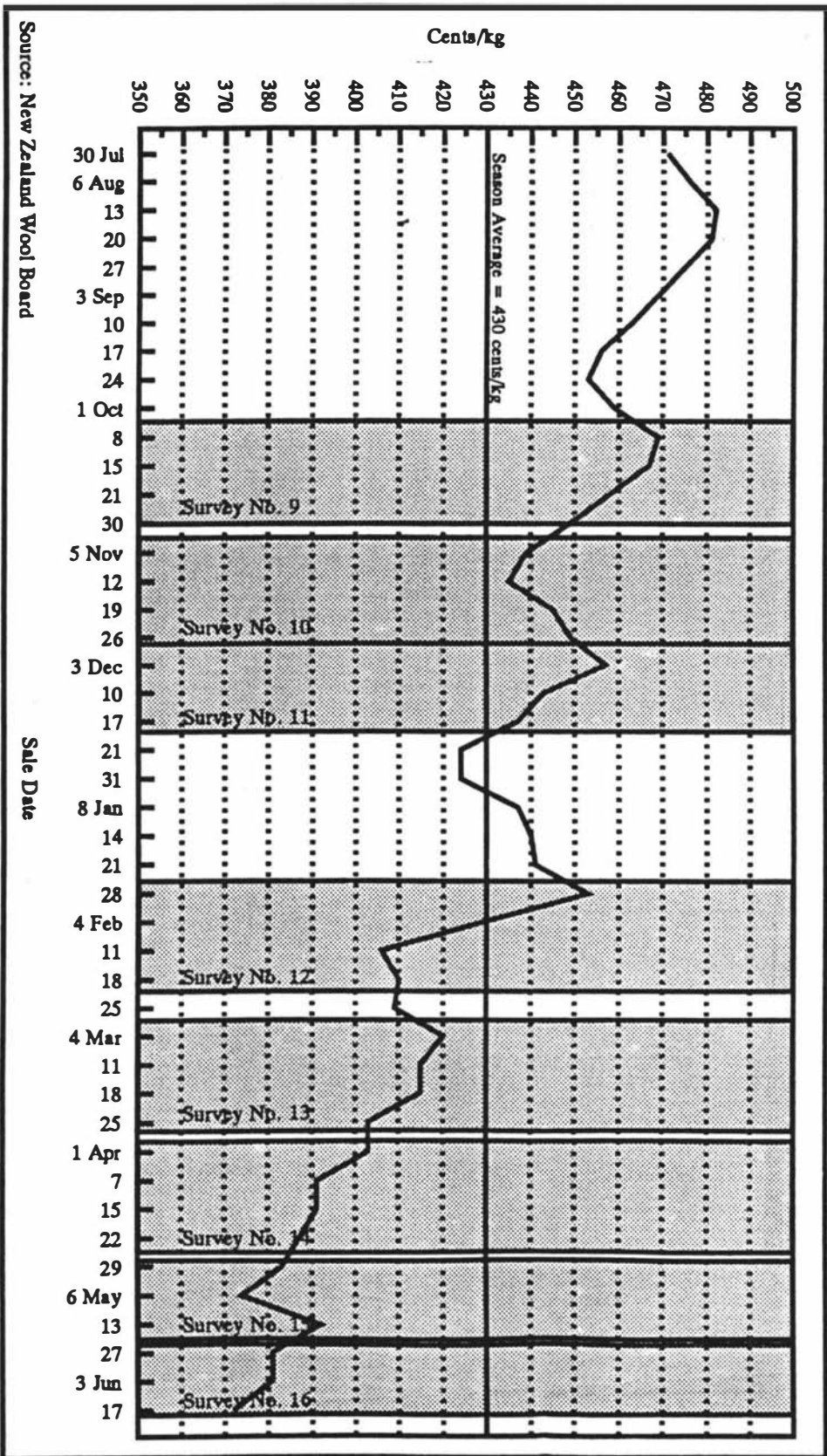


FIGURE N.19
Fine, Medium, & Strong Market Indicators - 1992-93

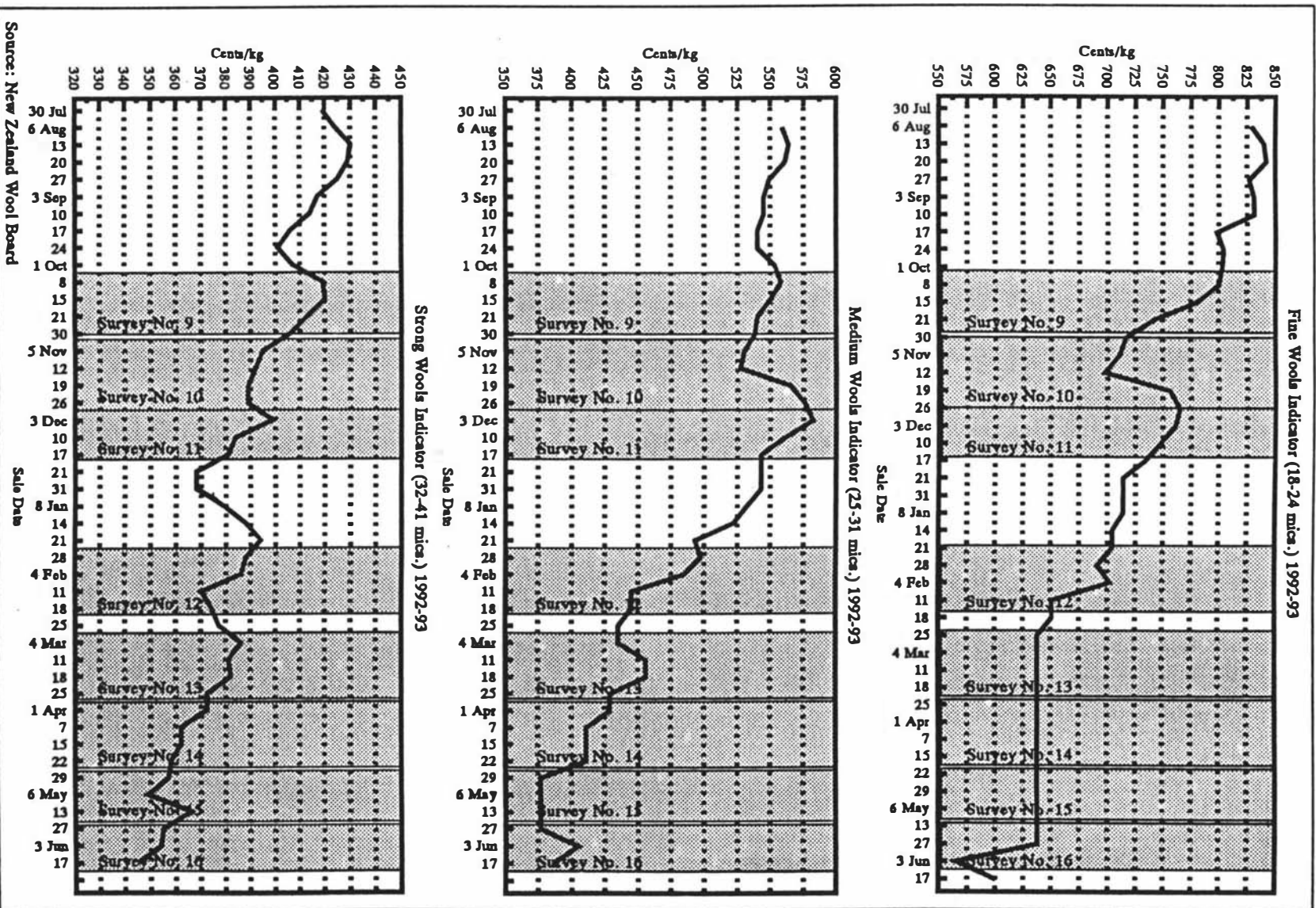


FIGURE N.20
USD/NZD & ASD/NZD Exchange Rates - 1992-93

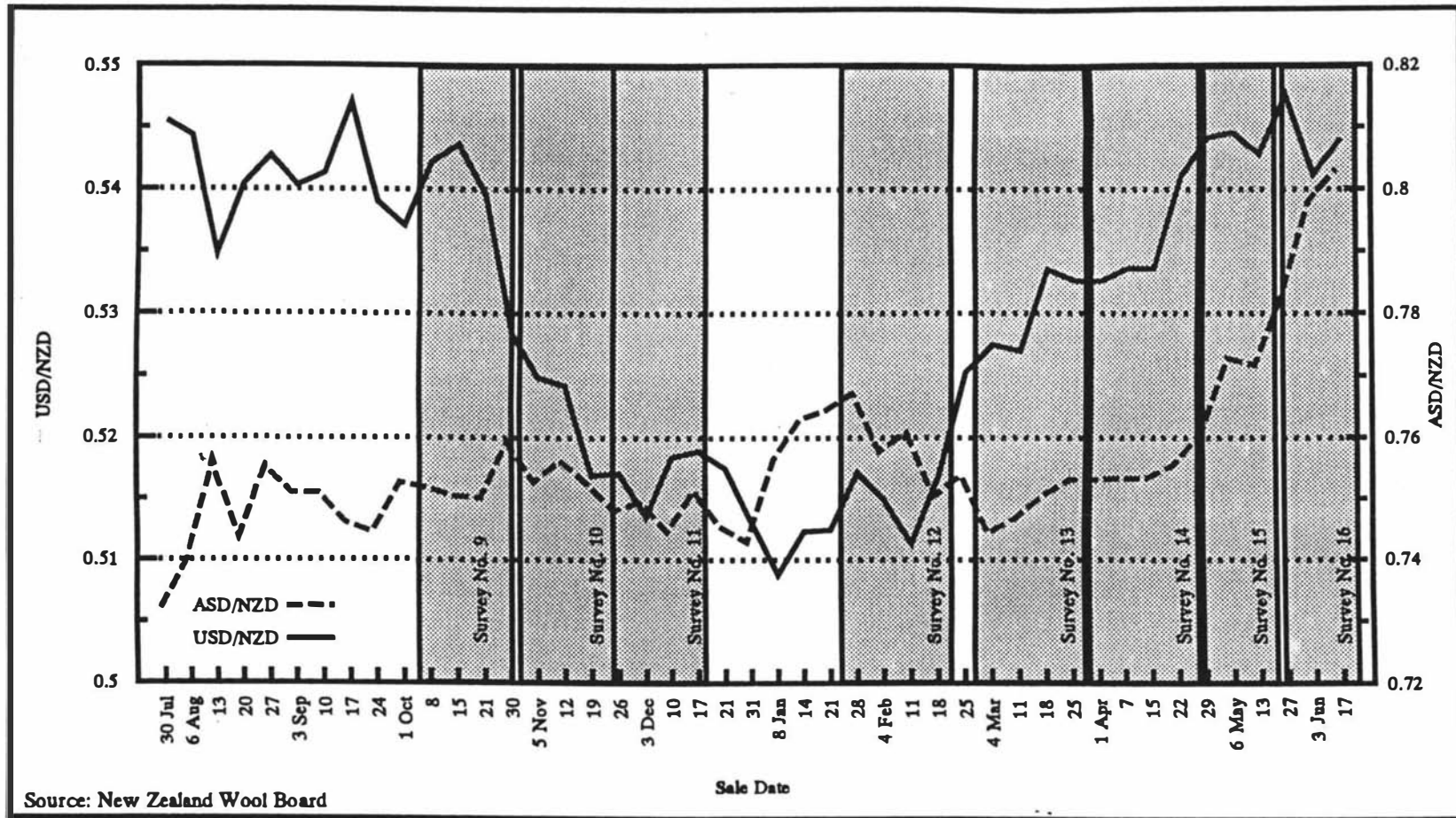


FIGURE N.21
Wool Trade Weighted Exchange Rate Index - 1992-93

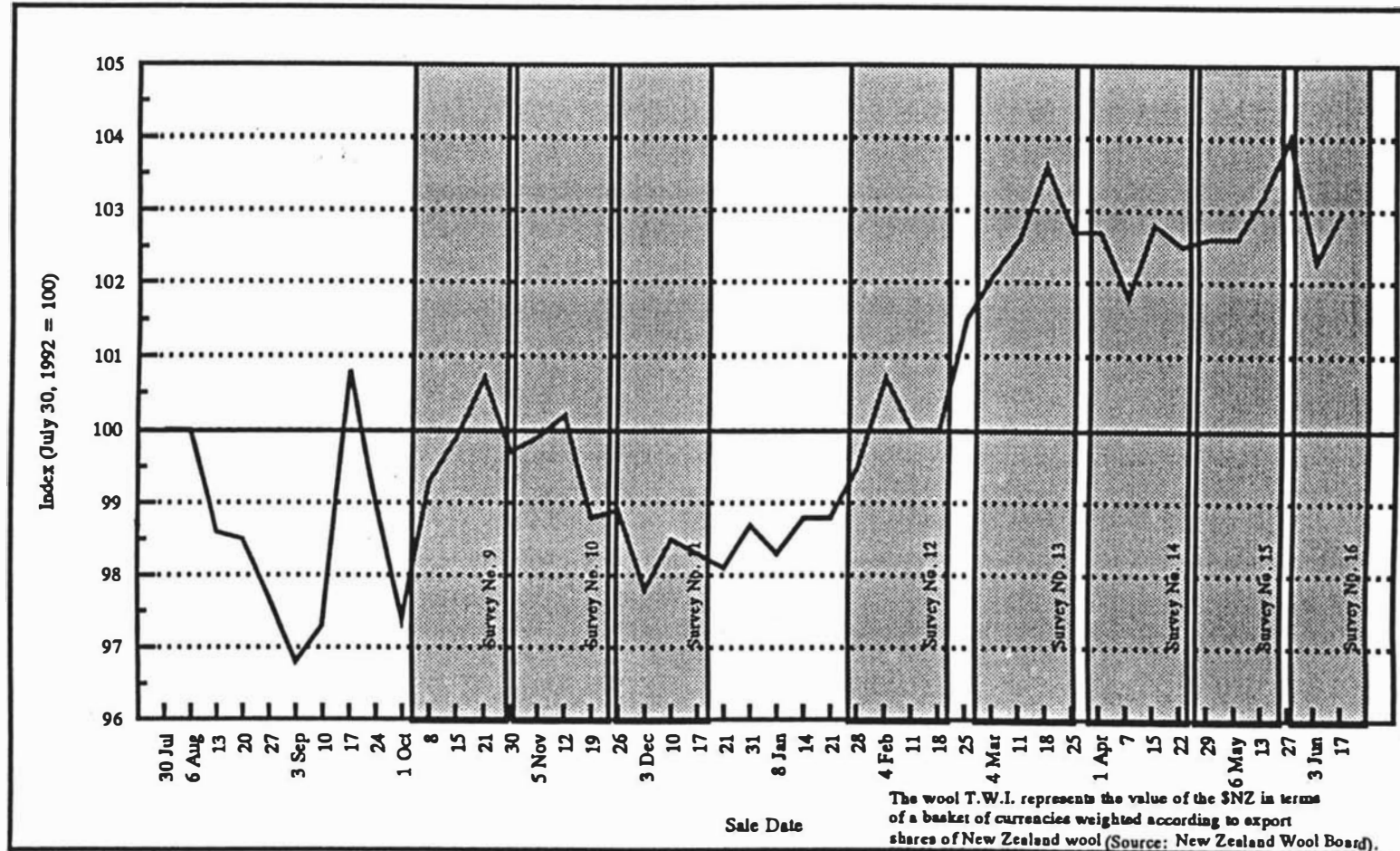
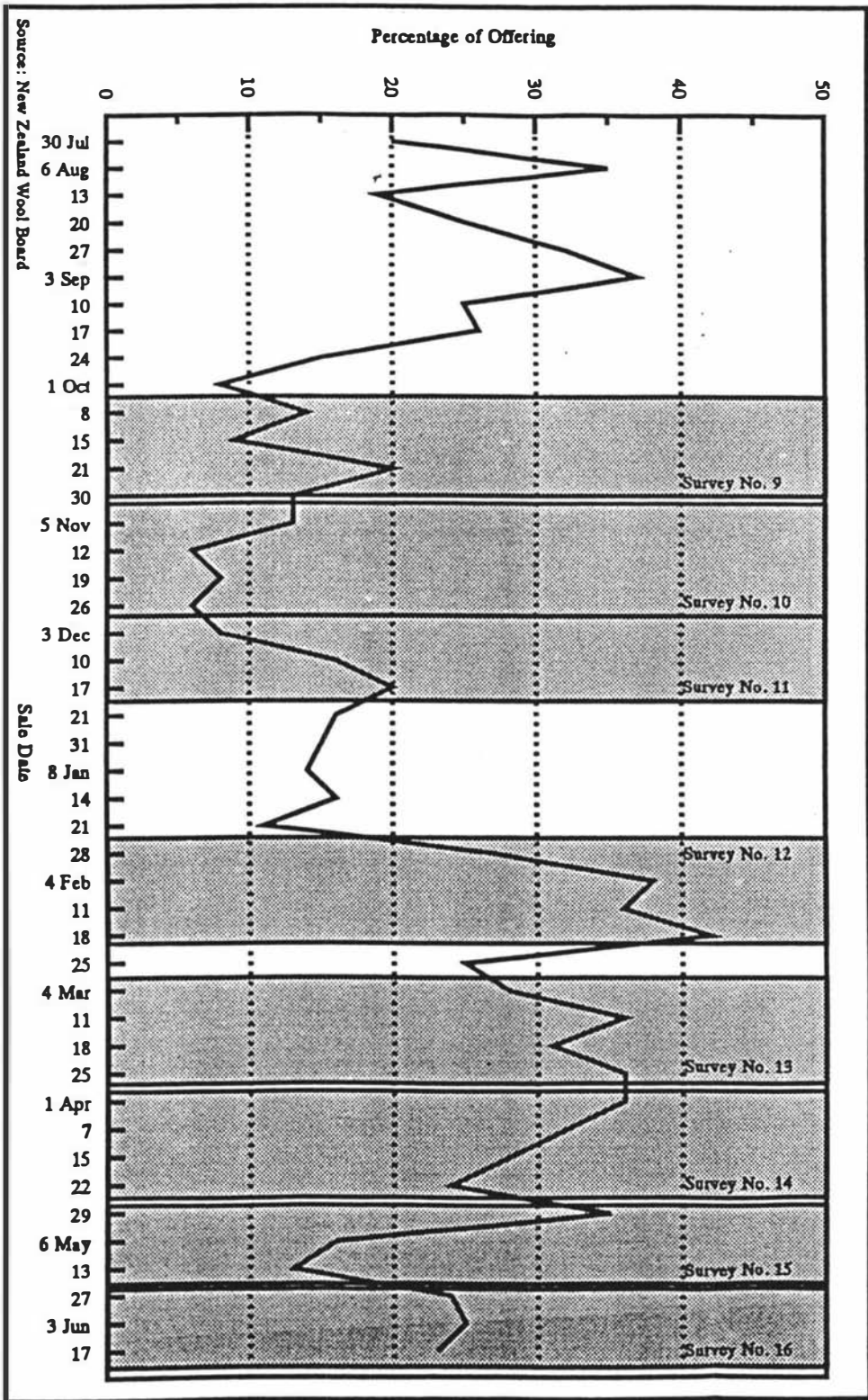


FIGURE N.22
 Passings as a Proportion of Auction Offerings - 1992-93



N.3.2. Survey No. 9: October 5 to October 30, 1992.

Prices at the start of this period were higher than at the same time last season for all diameters of wool except fine wools in the 18 - 19 micron range. Wool between 22 and 32 microns were \$1.00 to \$1.50 per kilogram higher while wools 33 to 37 microns were about \$1.00 per kilogram higher. Wool above 37 microns were \$.40 per kilogram higher. The reasons for this improvement were traced to three factors. First, the cold, wet weather conditions had led to a delay in shearing, which reduced the quantity being offered for auction. Second, the harsh winter and poor spring had led to the New Zealand Meat and Wool Board's Economic Service forecasting a 9% decline in wool production for the season. Finally, farmers were placing 'unrealistic' reserves on their lots with the result that passings were running at relatively high levels (\approx 25%). Wool Board stocks were reduced by 3,000 bales over this period to make up for the shortfalls in supply. The amount of wool offered was about the same as the corresponding period last season, but sales were down 10%.

TABLE N.11

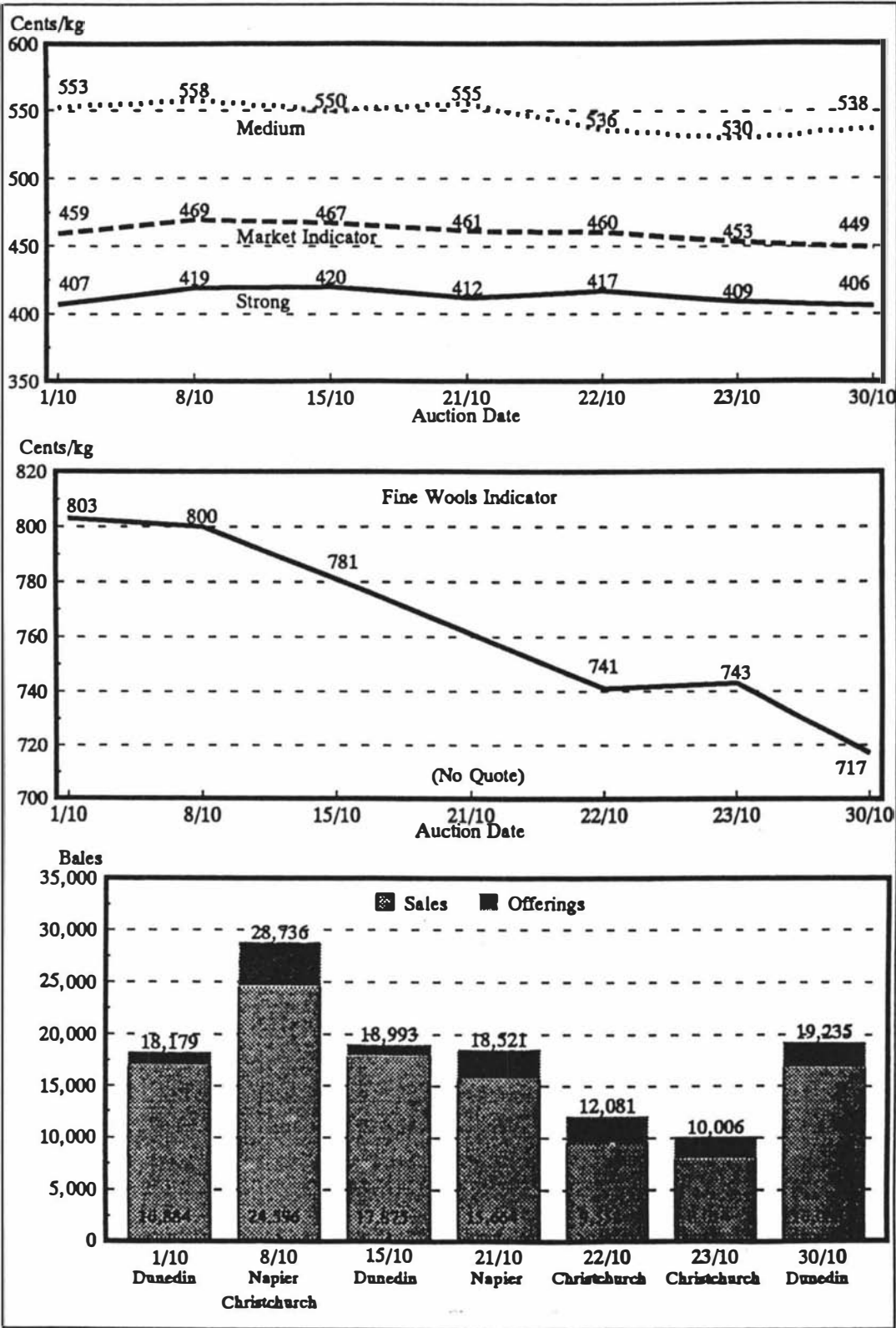
Auction Offerings during October 5 to October 30, 1992

	Bales	%
Crossbred Fleece	26,948	25.1
Merino Fleece	28,267	26.3
Halfbred Fleece	14,653	13.6
Second Shear	13,949	13.0
Skirtings, Oddments	12,876	12.0
Lambswool	0	0.0
Crutchings	1,900	1.7
Miscellaneous	5,382	5.0
	107,300	100.0

Source: New Zealand Wool Market Review

Not surprisingly the Indicator fell 4.6% during this period to finish at 449 cents/kg, a fall of 20 cents. Buyers main concerns focused on fluctuations in the exchange rates for buying countries and uncertainties about supplies.

FIGURE N.23
Price Indicators - October 5 to October 30, 1992



N.3.3. Survey No. 10: November 2 to November 27, 1992.

Prices at the early part of this period eased apparently following the breakdown of the GATT talks between the United States and the European Community, which raised the threat of a trade war. Provisional figures from the New Zealand Meat and Wool Boards Economic Service revealed that wool production for the first four months of the season were down 20% on 1991-92. At the sale of North Island and Christchurch wools on 19 February, there were marked increases in the Fine and Medium Segment Indicator's of 8%. This helped push the indicator back to 449 cents/kg, the opening level. The Wool TWI decreased by 1%, on the back of a sharp fall in the USD/NZD exchange rate. The Arthur D. Little report on wool marketing system was also released during this period.

TABLE N.12

Auction Offerings during November 2 to November 27, 1992

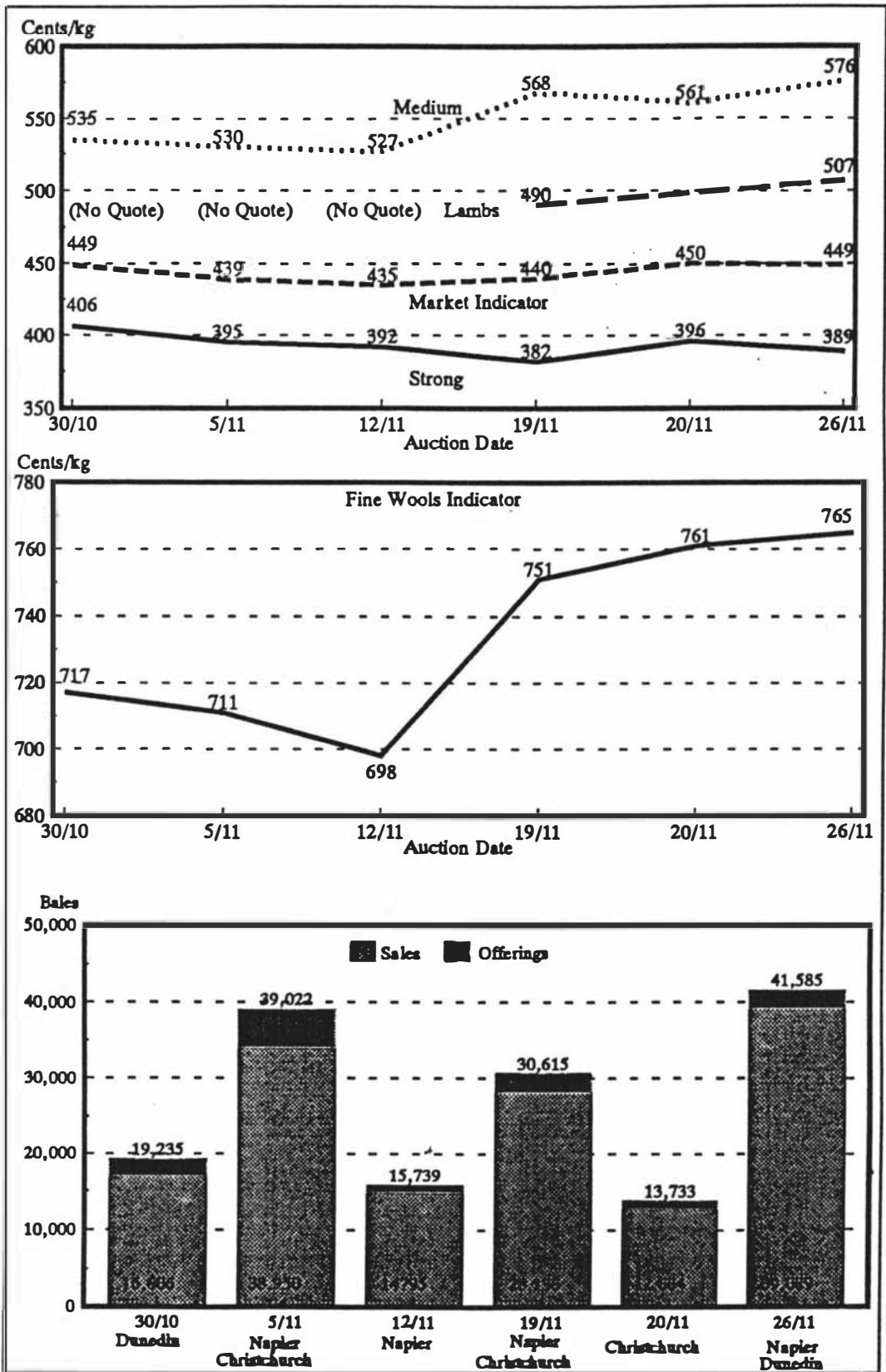
	Bales	%
Crossbred Fleece	50,154	35.7
Merino Fleece	24,492	17.4
Halfbred Fleece	11,778	8.4
Second Shear	26,676	19.0
Skirtings, Oddments	16,302	11.6
Lambswool	0	0.0
Miscellaneous	10,998	7.8
	140,400	100.0

Source: New Zealand Wool Market Review

Passings averaged around 8%. While supplies were down 4%, compared to the same time last year, actual purchases were down 23%. This situation reflected a lack of overseas interest and continuing falls in the Australian market. There was also a decrease in the availability of 'Chinese-type' wools (30-34 mics.) and larger quantities of less attractive coarse crossbred wools (35-38 mics.). Eight sales were held in this period.

FIGURE N.24

Price Indicators: November 2 to November 27, 1992



N.3.4. Survey No. 11: November 23 to 18 December, 1992.

Prices generally eased across all segments. The Market Indicator fell 4% to finish the period at 433 cents, its lowest point for the season. Total offerings continued to be well below roster. The amount available for sale was down 15%, while purchases were down 17%. Bad weather at the beginning of the period led to a delay in shearing with a consequent reduction in supplies. Passings averaged around 15%, peaking at 20% towards the end of the period.

TABLE N.13

Auction Offerings during November 23 to December 18, 1992

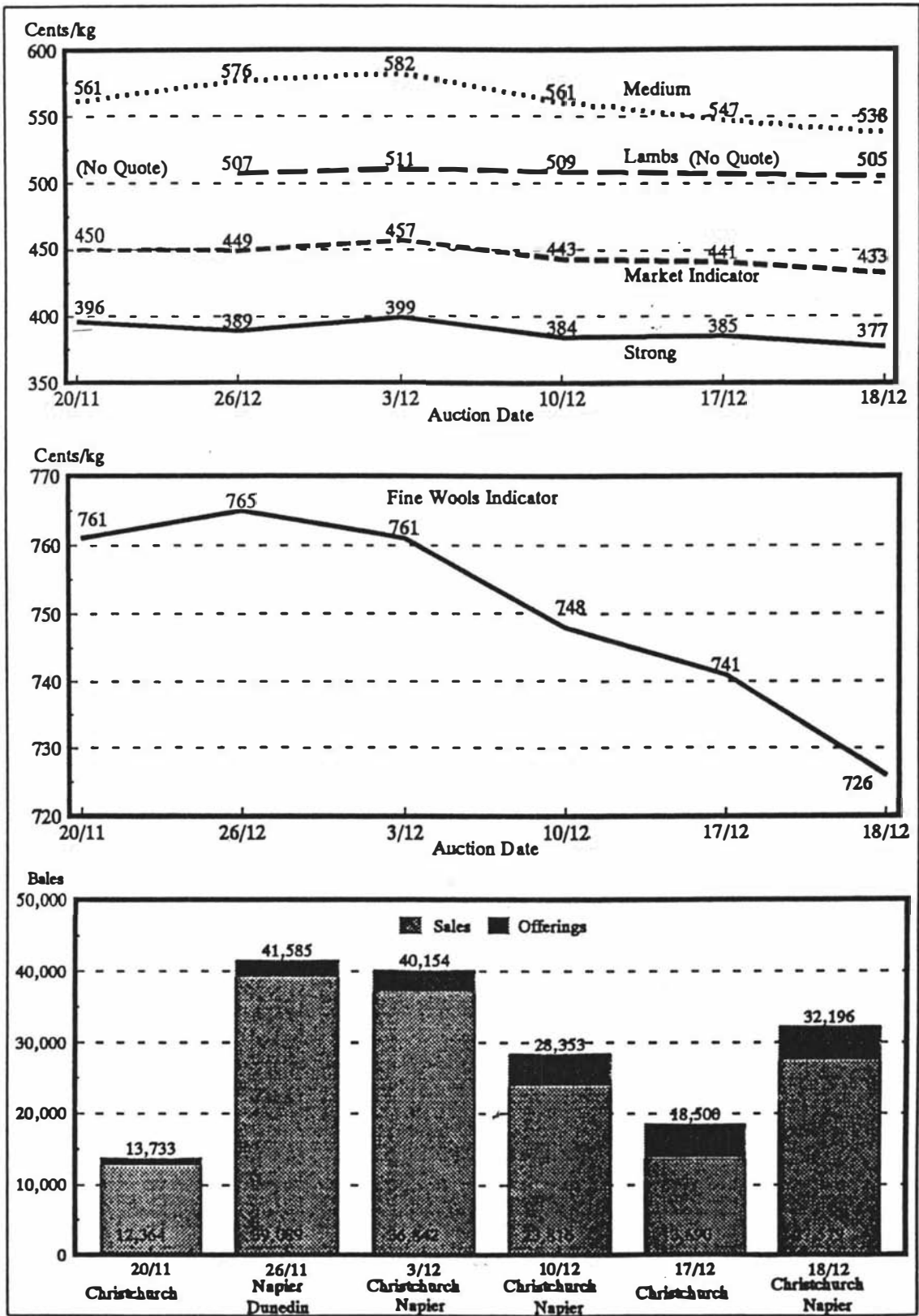
	Bales	%
Crossbred Fleece	42,752	32.0
Merino Fleece	11,370	8.5
Halfbred Fleece	12,024	9.0
Second Shear	36,072	27.0
Skirtings, Oddments	11,118	14.4
Lambswool	4,578	3.4
Miscellaneous	7,502	5.6
	133,600	100.0

Source: New Zealand Wool Market Review

While the Wool TWI fell slightly over the period, there were considerable fluctuations during the period. This exacerbated the uncertainty already faced by buyers. Other areas of concern were about future quantities of wool available and the quality of wools likely to be offered. The level of uncertainty is typified by half of the panel expecting an increase in quantities offered, while the other half expected a decrease! One apt description of the market was exemplified in the following quote from a buyer: ‘...*basically a hand-to-mouth principle until the market consolidates.*’ There were nine sales held in this period.

FIGURE N.25

Price Indicators: November 23 to December 18, 1992



N.3.5. Survey No. 12: January 25 to February 20, 1993.

Prices for all segments continued their decline, particularly at the beginning of February. The All Segments Indicator fell 7% over the period closing at 410, which at the time was the season's low. The Wool Board and buyers isolated a number of factors which contributed to this. Currency depreciations in the sterling, deutschmark and the yen acted as a disincentive to wool purchases by foreign buyers. The Australian market continued to deteriorate with uncertainty as to how the stock pile, with a target disposal of ½ million bales, would be disposed of next season (1993-94). In terms of supply, large quantities of wool were also now being offered for sale after earlier delays in shearing due to the wet weather. Finally, delays in payment for exports to some markets meant that some exporters were holding back wool for shipment.

TABLE N.14

Auction Offerings during January 25 to February 20, 1993

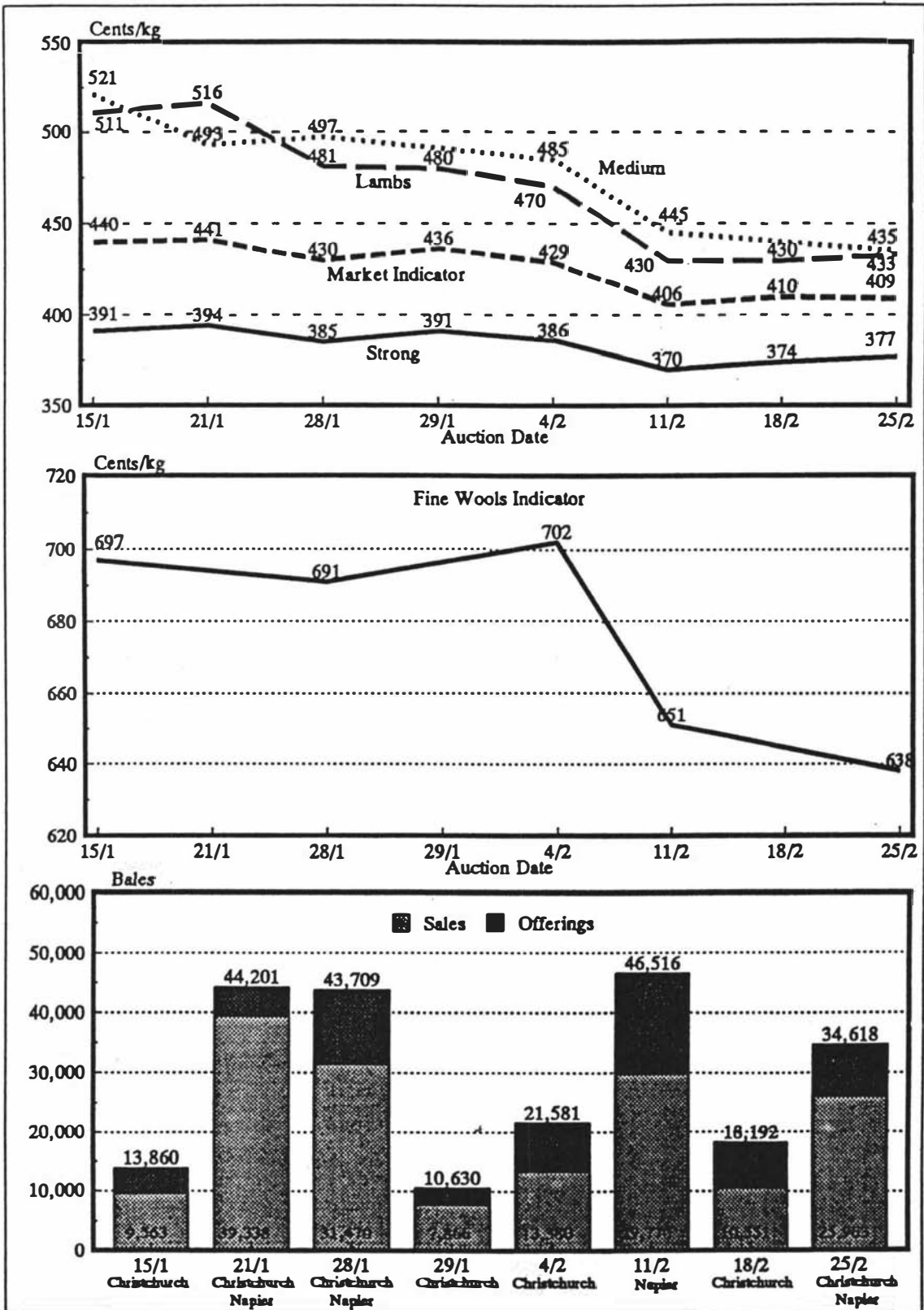
	Bales	%
Crossbred Fleece	51,584	31.8
Merino Fleece	3,942	2.4
Halfbred Fleece	3,868	2.4
Second Shear	26,604	16.4
Skirtings, Oddments	26,988	16.6
Lambswool	39,013	24.0
Cotts	10,401	6.4
	162,400	100.0

Source: New Zealand Wool Market Review

Passings continued to be high at around 35-50% for each sale. Passings were particularly high for lambswools, reaching nearly 75% in one Christchurch sale. This was a function of little foreign demand and a stagnant Australian market. There was also a greater quantity of poor quality wools (cotts) coming onto the market following the wet weather and delayed shearing in early December.

FIGURE N.26

Price Indicators: January 25 to February 19, 1993



N.3.6. Survey No. 13: March 1 to March 26, 1993

There was a slight improvement in prices in this period reflecting the reduced volumes coming onto the market (-16.0%). The Market Indicator rose 11 cents from the start of the period, before finishing at 403 cents, an overall decline of 6 cents (-1.1%). Passings continued to remain historically high at 32%. Subsequently,

TABLE N.15

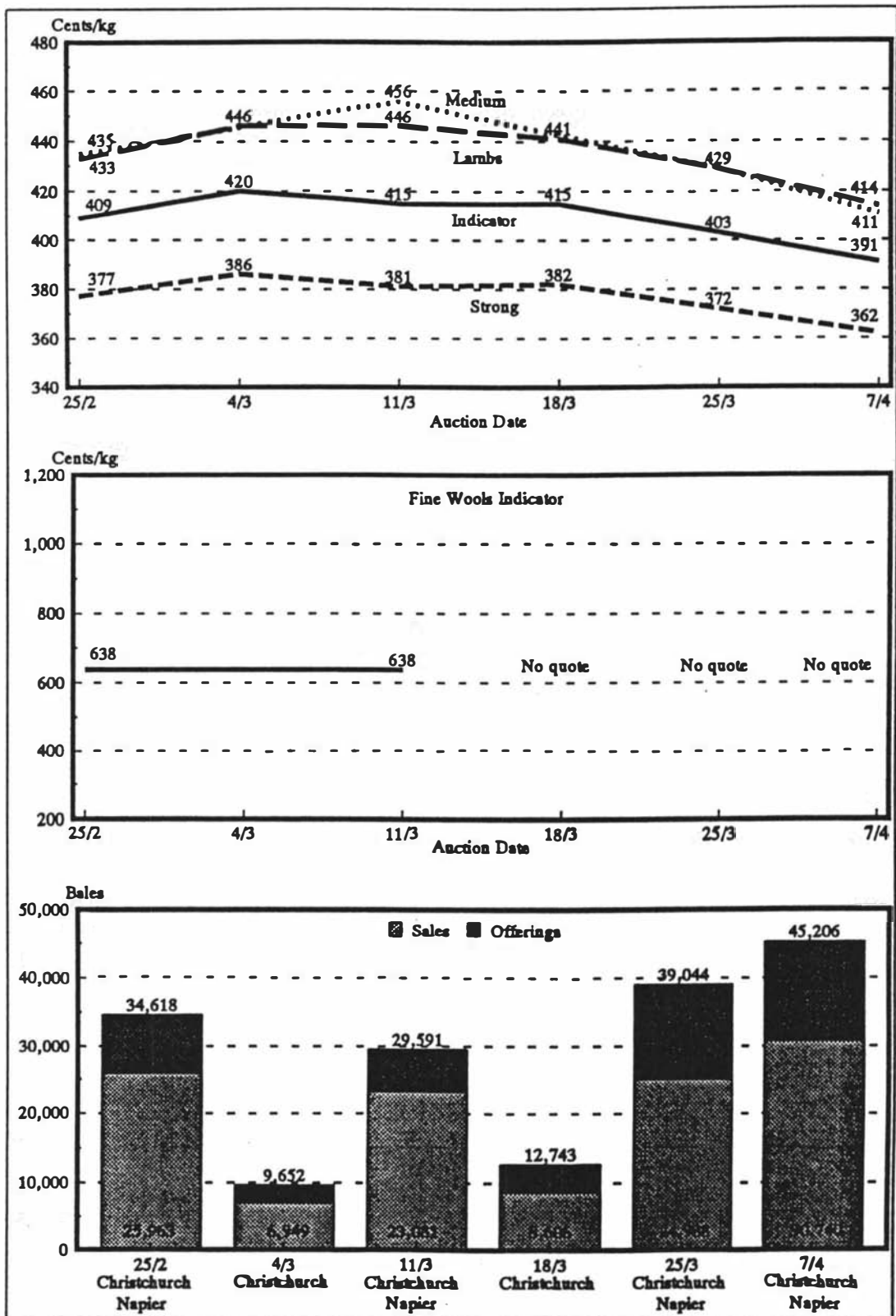
Auction Offerings during March 1 to March 26, 1993

	Bales	%
Crossbred Fleece	20,523	22.7
Merino Fleece	0	0.0
Halfbred Fleece	3,099	34.3
Second Shear	27,684	30.6
Skirtings, Oddments	8,373	9.3
Lambswool	23,889	26.4
Cotts	4,002	4.4
Miscellaneous	2,730	3.0
	90,300	100.0

Source: New Zealand Wool Market Review

sales remained relatively low with a 23% decline on the same period last season. The Wool TWI rose 2.1 points during this period, finally settling at 102.7, a rise of 1.2 points. This was due largely to a further sustained appreciation of the USD/NZD which had started in the previous period. Buyers expressed uncertainty about the exchange rates, the high level of passings, and the unrealistic reserves being set, as well as the continuing shortfall in supplies and the generally depressed international trading conditions. Average auction offerings were 22,757 bales while average purchases amounted to 15,906 bales. Six sales were held during this period.

FIGURE N.27
Price Indicators: March 1 to March 26, 1993



N.3.7. Survey No. 14: March 29 to April 23, 1993

The Market Indicator fell below 400 cents (finishing at 387 cents), its lowest level since October 7, 1991. This overall fall amounted to 16 cents, or 4%. The main problem continued to be one of low overseas demand, coupled with poor quality offerings, and high reserve prices. While auction offerings were about the same as that in the same period last season, sales were down 18%.

TABLE N.16
Auction Offerings during March 29 to April 23, 1993

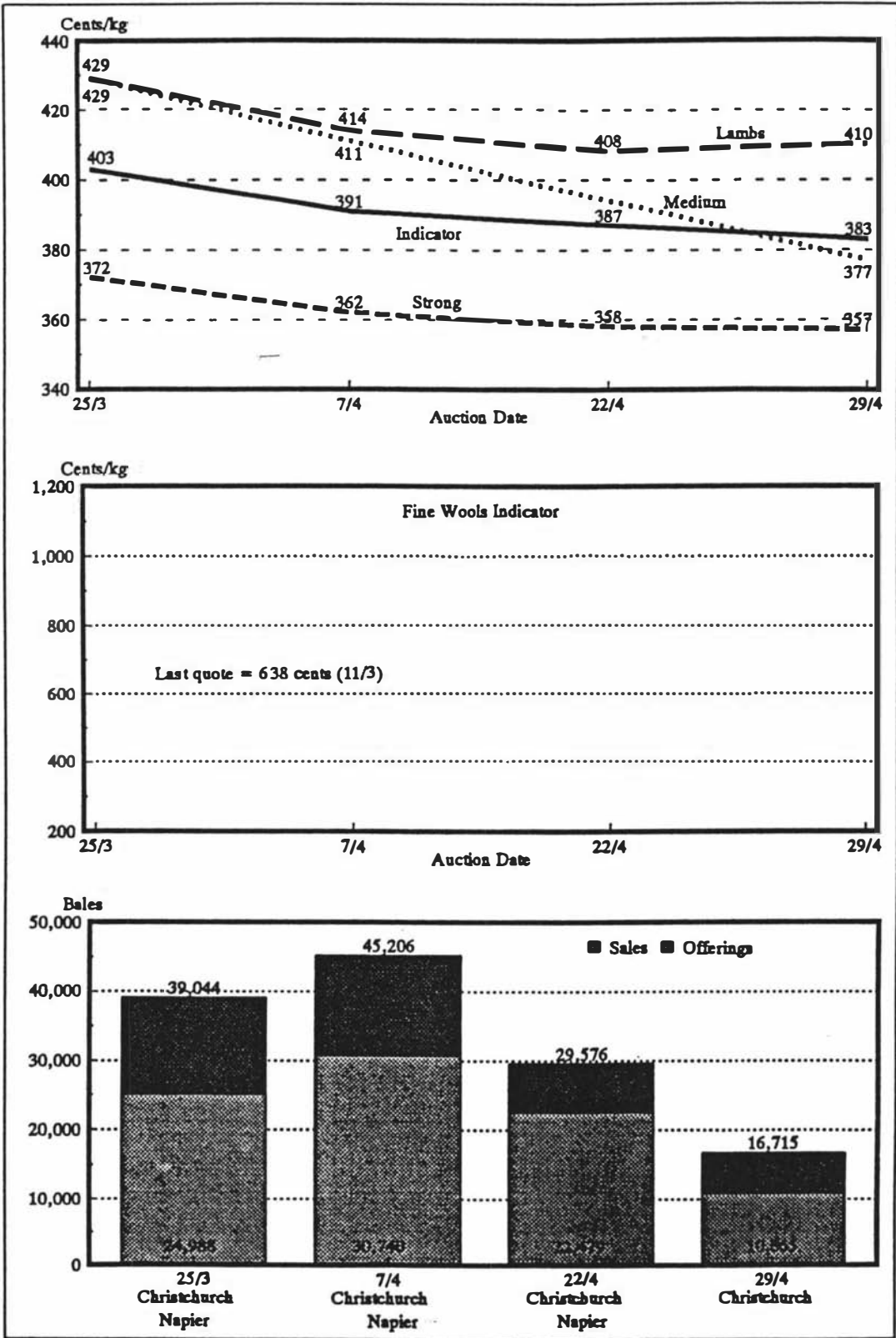
	Bales	%
Crossbred Fleece	13,880	18.6
Merino Fleece	0	0.0
Halfbred Fleece	0	0.0
Second Shear	37,142	49.8
Skirtings, Oddments	11,642	15.6
Lambswool	11,936	16.0
	74,600	100.0

Source: New Zealand Wool Market Review

There was no major change in the Wool TWI at the end of the period, although there was a sharp drop and subsequent recovery of 0.9 points. Passings continued to remain high (28%), although they were lower than the two previous periods. Only four sales on two days were held due to Easter.

Buyers were uncertain about new orders, payments from China, the continuing high passings and the poor quality of the wools offered for sale.

FIGURE N.28
Price Indicators: March 29 to April 23, 1993



N.3.7. Survey No. 15: April 26 to May 21, 1993

The Market Indicator continued to fall in spite of improvements in the Australian market and the prospect of the resolution of the Chinese payments problems. The All Segments Indicator reached a low of 374 cents/kg before increasing during the last sale of the period to 392 cents/kg. This was the first time since November 1992 (survey No. 10) that the Indicator finished higher than the starting level. This improvement was due, according to the New Zealand Wool Board, the Australian Wool realisation Committees decision to extend the debt rescheduling for the wool stockpile to 8 years.

TABLE N.17

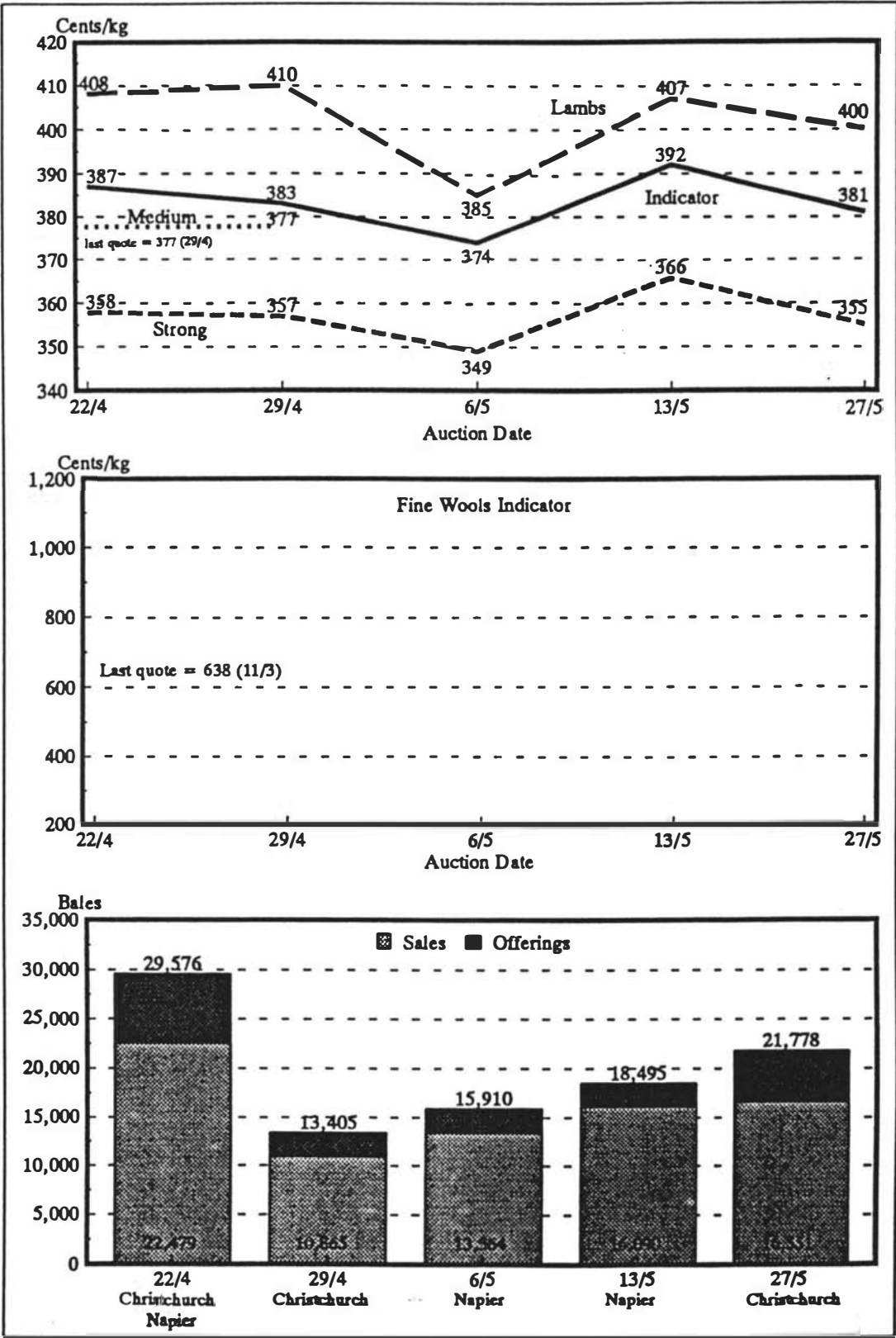
Auction Offerings during April 26 to May 21, 1993

	Bales	%
Crossbred Fleece	8,295	16.3
Merino Fleece	0.0	0.0
Halfbred Fleece	0.0	0.0
Second Shear	23,925	46.9
Skirtings, Oddments	7,140	14.0
Lambswool	8,390	16.5
Miscellaneous	3,250	6.4
	51,000	100.0

Source: New Zealand Wool Market Review

Not surprisingly, passings fell throughout the period to a low of 13% (Average = 21%). This period also saw the first national sale held in Napier (13 May) with 75% South Island offerings. The Wool TWI rose largely as a result of a large appreciation of the ASD/NZD exchange rate. The buyers expressed uncertainty about orders from Nepal (who had stopped buying after over-purchasing earlier in the season), the lack of international demand, and the quantity of wool being re-offered for sale.

FIGURE N.29
Price Indicators: April 26 to May 21, 1993



N.3.7. Survey No. 16: May 24 to June 18, 1993

The rise in the Market Indicator, as reported in the last period, did not continue, declining instead to a new season's low of 372, only slightly above the previous record low of 369 cents (October, 3, 1991). The decline amounted to 9 cents (-4.8%). The Indicator had lost 99 cents since the start of the season (July 30, 1992), a drop of 21%. The Medium Wools Indicator improved in the middle of the period but dropped away again to end up slightly about the starting level.

TABLE N.18

Auction Offerings during May 24 to June 18, 1993

	Bales	%
Crossbred Fleece	12,829	14.9
Merino Fleece	0	0.0
Halfbred Fleece	3,292	3.8
Second Shear	41,785	48.7
Skirtings, Oddments	7,634	8.9
Lambswool	9,777	11.4
Miscellaneous	10,538	12.3
	85,856	100.0

Source: New Zealand Wool Market Review

Buyers continued to be uncertain about the quantity of wools being re-offered, the lack of international demand, the re-emergence of Eastern Europe as a buyer, the devaluation of the Chinese currency, and the need to purchase quality wools to meet orders.

There were only four sales held in this period with one being cancelled due to lack of quality wools.

FIGURE N.30
Price Indicators: May 24 to June 18, 1993

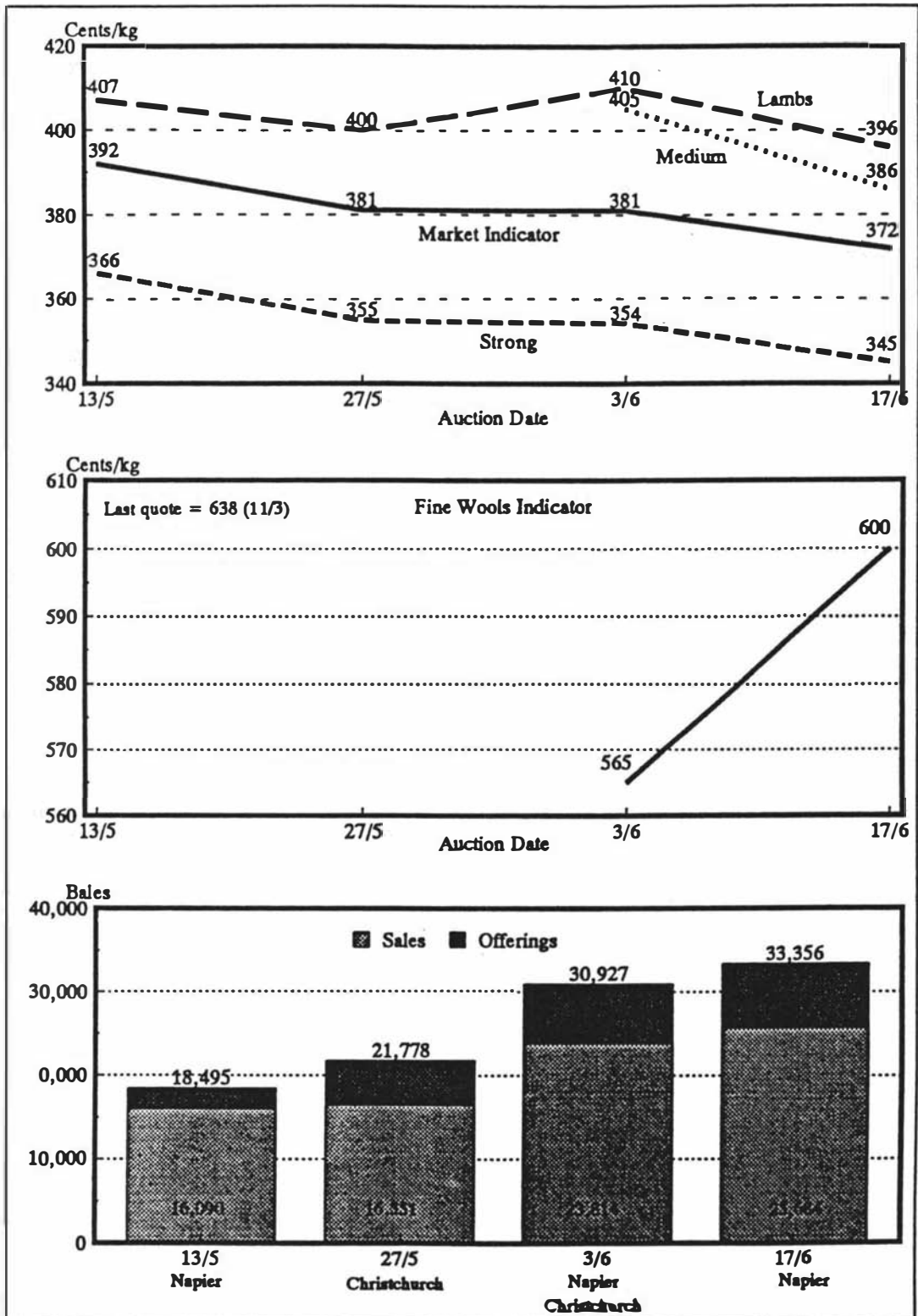


TABLE N.19

Historical Production, Price & Export Data for New Zealand Wool

New Zealand Wool Production 1946 - 1993

Season	Sheep Numbers million(1)	Wool Production (1000 tonnes) gross(2)	Clip per head(3) grams(4)	Average Fibre weight grams(5)	Average Staple length mm(6)
1946/47	..	108	120		
1947/48	32.7	164	118	9.0	
1948/49	33.9	189	120	9.1	
1949/50	32.9	177	127	9.4	
1950/51	34.8	186	123	9.3	
1951/52	36.4	190	127	9.4	
1952/53	38.2	190	126	9.2	
1953/54	38.0	198	126	9.4	
1954/55	38.0	208	146	9.4	
1955/56	38.1	215	161	9.4	
1956/57	40.3	223	181	9.5	
1957/58	42.4	225	162	9.5	
1958/59	44.0	248	178	9.8	
1959/60	46.9	262	188	9.8	
1960/61	47.1	267	180	9.7	71.3
1961/62	48.5	266	189	9.9	70.8
1962/63	48.0	291	202	9.7	71.9
1963/64	50.2	279	202	9.8	72.5
1964/65	51.3	263	209	9.8	72.3
1965/66	53.6	316	229	9.9	72.3
1966/67	57.2	322	231	9.8	71.7
1967/68	60.0	332	240	9.8	71.7
1968/69	60.8	338	244	9.8	72.6
1969/70	64.9	338	237	9.5	72.4
1970/71	60.3	324	244	9.5	72.1
1971/72	60.8	322	234	9.5	72.7
1972/73	60.8	308	223	9.1	72.1
1973/74	66.7	296	208	9.0	71.8
1974/75	66.9	294	211	9.2	71.8
1975/76	68.2	318	229	9.8	72.5
1976/77	68.4	323	216	9.4	72.3
1977/78	68.4	323	226	9.5	72.5
1978/79	62.3	321	226	9.5	72.5
1979/80	66.8	367	268	9.8	71.7
1980/81	66.8	381	273	9.5	71.3
1981/82	68.9	363	261	9.3	72.0
1982/83	70.3	371	274	9.3	72.6
1983/84	70.3	364	271	9.4	74.5
1984/85	68.7	373	277	9.4	74.3
1985/86	67.9	387	266	9.3	74.3
1986/87	67.5	348	260	9.4	74.0
1987/88	64.2	348	260	9.4	75.0
1988/89	64.6	338	254	9.2	75.0
1989/90	60.8	311	233	9.1	74.9
1990/91	57.9	308	227	9.2	74.9
1991/92	56.3	296	221	9.4	74.9
1992/93	52.6	256	183	9.0	75.5

1. Sheep numbers as at the beginning of the season.
2. Combined best price production using average yield figures. Prior to 1980/81 an assumed average yield of 17% was used. This is the average for the period 1980/81 to 1988/89. Revised for 1988/89 months.
3. Grossing production obtained by sheep numbers.
4. For the period 1980/81 to 1992/93 average estimated yield using 1977/78 average yield per head.

Season	Average Price cents/kg gross(1)	NZWSP Minimum Price(2)	NZWSP Maximum Price(2)	Clear Price in 1987/88 cents(4)	Value of Wool Shorn in 1987/88 NZWSP FOE(5)	% of total wool shorn
1946/47	32.0	48.8		1108.0	63.9	24.9
1947/48	46.1	64.0		1468.1	89.0	30.2
1948/49	47.4	65.8		1443.3	93.1	31.7
1949/50	68.8	96.9		2088.2	149.3	40.8
1950/51	161.4	224.2		4383.7	256.4	51.8
1951/52	72.8	102.5		1808.1	164.0	34.2
1952/53	64.8	117.8		1964.4	176.4	36.2
1953/54	62.3	128.2		2058.8	176.8	36.2
1954/55	61.3	135.6		2158.8	182.8	36.2
1955/56	61.3	117.8		1987.0	182.8	36.2
1956/57	100.8	139.7	77	1788.4	183.1	33.0
1957/58	75.8	128.0	84	2040.7	212.1	36.4
1958/59	96.3	92.1	84	1602.2	164.3	36.7
1959/60	82.0	113.9	84	1241.3	160.5	31.1
1960/61	74.1	103.9	85	1367.3	186.8	34.0
1961/62	72.0	101.7	86	1304.0	207.4	36.1
1962/63	78.7	108.5	86	1378.8	214.4	34.6
1963/64	101.2	136.8	84	1712.8	271.4	37.3
1964/65	77.4	107.1	89	1263.7	208.8	28.4
1965/66	75.5	105.8	89	0.0	1212.9	231.9
1966/67	64.8	90.4	92	77.5	990.3	174.1
1967/68	50.4	86.4	78	82.5	728.8	158.2
1968/69	61.8	84.3	87	97.8	840.7	212.4
1969/70	56.5	78.0	86	42.1	742.6	187.9
1970/71	52.4	73.1	83	31.5	638.5	187.9
1971/72	86.5	91.5	89	0.0	1500.1	242.0
1972/73	144.0	180.7	89	0.0	131.3	228.8
1973/74	139.2	183.8	87	2.4	1224.5	261.6
1974/75	81.8	127.8	97/130	28.6	773.2	281.7
1975/76	137.1	213.8	170	8.5	1122.4	281.7
1976/77	128.6	202.5	170	13.2	1122.4	281.7
1977/78	218.6	252.3	207	24.3	1324.7	446.2
1978/79	218.6	252.3	207	24.3	1324.7	446.2
1979/80	265.1	268.8	232	9.7	1088.5	464.3
1980/81	247.5	268.2	279	14.2	1080.8	464.3
1981/82	255.7	317.2	302	41.2	887.9	862.6
1982/83	255.7	345.5	340	90.5	794.0	918.8
1983/84	255.9	344.7	340	34.2	886.7	1017.1
1984/85	277.4	357.9	340	11.1	788.3	1113.3
1985/86	343.8	463.3	424	4.7	873.2	1475.4
1986/87	416.7	556.2	443	14.7	702.8	1281.4
1987/88	453.2	603.6	478	12.9	711.8	1567.9
1988/89	518.0	867.8	500	12.3	774.5	1821.8
1989/90	480.2	814.5	525	80.8	845.3	1795.2
1990/91	316.4	422.0	485	72.1	431.1	1315.9
1991/92	327.8	437.1	.	53.4	442.1	862.5
1992/93	326.8	432.8	46.0	432.8	900.3	6.3

1. Combined best price production using average yield figures. Prior to 1980/81 an assumed average yield of 17% was used. This is the average for the period 1980/81 to 1988/89.
2. Clear price production obtained by sheep numbers using average yield figures prior to 1987/88. Since 1987/88 the minimum price was used in value terms. In the 1980/81 season the minimum price was used in value terms and the 1980/81 season was used in value terms.
3. NZWSP means at end of the season.
4. NZWSP means at end of the season.
5. As indicated by Department of Statistics.

TABLE N.20
Historical Auction Sales & Price Data for New Zealand Wool

Sales of New Season Greasy Wool Sold at Auction by Diameter
(Clean Tonnes)

Diameter (Tested Microns)	1988-89	%	1989-90	%	1990-91	%	1991-92	%	1992-93	%
16	6	0.0	2	0.0	6	0.0	4	0.0	8	0.0
17	41	0.0	41	0.0	88	0.1	121	0.1	174	0.1
18	248	0.1	301	0.2	478	0.3	578	0.4	773	0.6
19	784	0.6	1,088	0.7	1,411	0.9	1,833	1.1	1,776	1.5
20	1,844	1.0	2,387	1.4	2,513	1.6	2,800	2.0	2,827	2.4
21	1,886	1.1	2,187	1.4	2,506	1.6	2,525	1.8	2,253	1.9
22	1,314	0.8	1,427	0.9	1,818	1.0	1,818	1.1	1,261	1.1
23	828	0.6	1,008	0.6	1,078	0.7	1,070	0.8	837	0.7
24	1,102	0.7	1,308	0.8	1,088	0.7	1,011	0.7	1,016	0.8
25	1,811	1.1	1,731	1.1	1,488	0.9	1,472	1.0	1,248	1.0
26	2,173	1.3	2,227	1.4	2,087	1.3	1,878	1.3	1,584	1.3
27	4,142	2.3	3,756	2.4	3,808	2.3	2,947	1.9	2,242	1.9
28	7,081	4.3	6,328	4.0	6,441	4.1	5,318	3.7	3,816	3.2
29	7,556	4.6	7,717	4.8	7,140	4.6	7,088	5.0	5,146	4.3
30	6,481	3.9	7,156	4.5	8,371	4.1	8,336	4.3	6,814	4.0
31	6,190	3.7	6,986	4.4	8,848	3.8	5,127	3.8	4,101	3.4
32	7,324	4.4	7,388	4.7	8,578	4.2	8,625	4.0	4,288	3.6
33	9,337	5.6	8,906	6.3	7,740	6.0	6,304	4.4	8,588	4.7
34	12,718	7.6	13,517	8.8	11,501	7.4	8,086	6.4	8,330	7.0
35	17,750	10.7	15,538	9.9	16,880	10.8	13,484	9.8	11,824	9.7
36	21,248	12.8	17,216	10.9	20,888	13.4	18,843	13.9	14,528	12.2
37	24,315	14.6	17,780	11.3	18,731	12.7	17,483	12.3	14,784	12.4
38	18,883	10.3	18,248	9.7	14,878	8.4	14,843	10.4	11,888	9.6
39	8,884	6.2	8,488	6.0	8,888	6.6	8,744	6.8	8,388	7.0
40	3,622	2.3	4,171	2.8	3,723	2.4	6,288	3.7	4,358	3.8
41	823	0.6	1,718	1.1	1,848	1.0	1,088	1.2	1,574	1.3
42	2	0.0	148	0.1	181	0.1	431	0.3	422	0.4
43	0	0.0	23	0.0	41	0.0	104	0.1	108	0.1
44	0	0.0	4	0.0	6	0.0	18	0.0	21	0.0
45	0	0.0	1	0.0	3	0.0	8	0.0	8	0.0
22 and finer	8,803	2.8	7,303	4.6	6,523	5.5	9,227	6.8	9,073	7.6
23-24	2,028	1.2	2,214	1.4	2,134	1.4	2,081	1.8	1,853	1.8
25-27	6,126	4.8	7,724	4.8	7,134	4.8	8,888	4.2	8,043	4.2
28-30	21,118	12.7	21,204	13.8	18,882	12.8	18,781	13.2	13,778	11.8
31-32	12,514	8.1	14,384	8.1	12,538	8.0	10,732	7.6	8,388	7.0
33-34	22,062	12.3	23,423	14.8	18,241	12.3	15,400	10.8	13,878	11.8
35 and stronger	83,484	66.2	81,315	51.6	86,283	66.4	78,880	66.2	87,478	66.5
Total (Tested)	186,223	100	157,367	100	186,808	100	142,088	100	119,474	100
Other*	380		380		386		448		144	
Total Tested and Other	186,603		157,747		187,194		142,536		119,618	
% tested	99.6		99.5		99.5		99.7		99.5	

* Other includes untested and diameters less than 16 microns and greater than 48 microns, some of which are incorrect values.

Average Prices and Total Value of New Season Greasy Wool Sold at Auction
(clean prices)

Diameter (Tested Microns)	1988-89	\$/kg	total value	1989-90	\$/kg	total value	1990-91	\$/kg	total value	1991-92	\$/kg	total value	1992-93	\$/kg	total value
16	53.79	323	82.17	184	40.08	300	20.79	61	15.80	119					
17	43.84	1,802	61.58	2,524	29.20	2,774	16.10	1,528	11.21	1,947					
18	32.87	8,210	32.48	8,778	30.38	8,871	13.38	7,710	6.17	7,102					
19	24.87	19,341	20.26	22,248	18.04	21,221	11.38	18,568	7.98	14,174					
20	18.48	32,025	18.84	36,468	11.86	38,048	8.08	25,804	7.43	21,003					
21	16.13	30,082	12.78	27,718	8.88	24,888	7.81	18,872	7.30	18,218					
22	13.78	18,081	11.83	18,463	6.86	13,810	7.23	10,981	7.01	8,842					
23	11.87	10,982	10.47	10,884	7.91	8,838	6.57	7,031	6.73	8,838					
24	10.15	11,188	8.88	10,488	6.78	7,183	5.88	8,044	6.28	8,377					
25	8.80	18,118	7.77	13,480	5.94	8,788	3.78	8,508	6.87	7,323					
26	8.31	18,088	7.23	18,174	6.32	10,843	6.73	10,741	6.79	6,988					
27	7.47	30,841	6.74	25,318	4.88	18,828	6.50	14,568	6.38	12,088					
28	6.88	48,768	6.08	38,844	3.81	38,184	4.88	28,488	4.88	18,044					
29	6.78	51,078	3.88	48,222	3.78	27,081	4.78	33,881	4.78	24,888					
30	6.68	43,283	5.80	41,518	3.73	23,784	4.88	28,483	4.88	21,802					
31	6.62	40,878	5.88	38,807	3.72	22,127	4.48	22,888	4.53	18,577					
32	6.62	48,488	6.61	41,447	3.78	24,733	4.31	24,243	4.63	18,780					
33	6.58	81,831	5.88	85,077	3.88	28,483	3.83	24,773	4.31	23,808					
34	6.38	80,740	5.51	74,478	3.58	40,828	3.87	33,383	3.88	33,188					
35	6.21	10,228	5.47	84,908	3.48	68,841	3.82	47,484	3.67	42,880					
36	6.12	130,018	5.48	83,988	3.57	74,708	3.88	60,288	3.88	53,177					
37	6.12	148,808	5.41	88,082	3.88	72,810	3.87	64,181	3.72	84,823					
38	6.08	103,305	6.42	82,633	3.78	58,048	3.78	58,810	3.87	42,887					
39	6.02	82,137	5.45	51,715	3.78	32,864	3.84	37,418	3.88	30,023					
40	6.00	21,732	5.44	22,880	3.77	14,838	3.88	20,288	3.48	15,087					
41	6.03	8,588	5.43	9,328	3.78	6,830	3.87	6,442	3.48	5,380					
42	4.53	8	5.44	805	3.86	882	3.88	1,873	3.38	1,383					
43			5.88	128	3.77	188	4.08	423	3.42	382					
44			6.82	22	3.88	84	3.97	77	3.25	88					
45			5.81	6	3.88	12	3.84	24	3.68	32					
22 and finer	18.61	108,863	18.88	114,335	11.87	101,325	8.21	88,011	7.88	88,408					
23-24	10.84	22,177	8.49	21,022	7.28	18,888	6.38	13,078	6.48	12,012					
25-27	8.01	88,118	7.11	84,838	8.07	38,184	5.84	33,808	6.82	38,404					
28-30	6.78	143,180	6.91	125,282	3.81	78,008	4.80	88,842	4.78	88,810					
31-32	6.62	88,483	6.88	81,254	3.74	48,880	4.38	47,212	4.58	38,337					
33-34	6.48	143,271	6.53	128,588	3.80	88,312	3.78	88,158	4.12	87,158					
35 and stronger	6.12	571,823	8.44	442,408	3.84	314,888	3.58	284,080	3.64	245,844					
Average price & total value	6.88	1,143,873	6.15	888,788	4.22	680,153	4.37	621,280	4.33	518,871					
Average Auction Price*	8.88		6.15		4.22		4.37		4.33						

* Includes untested and untested wool not in table above.

APPENDIX O:

DERIVED DEMAND CURVES

Key to Derived Demand Curves: Figures O.1 - O.69

(Average Price [c/kg], Expected Aggregate Purchase [bales])

(Expected Aggregate Purchase [Bales], Experimental Price Level [c/kg])

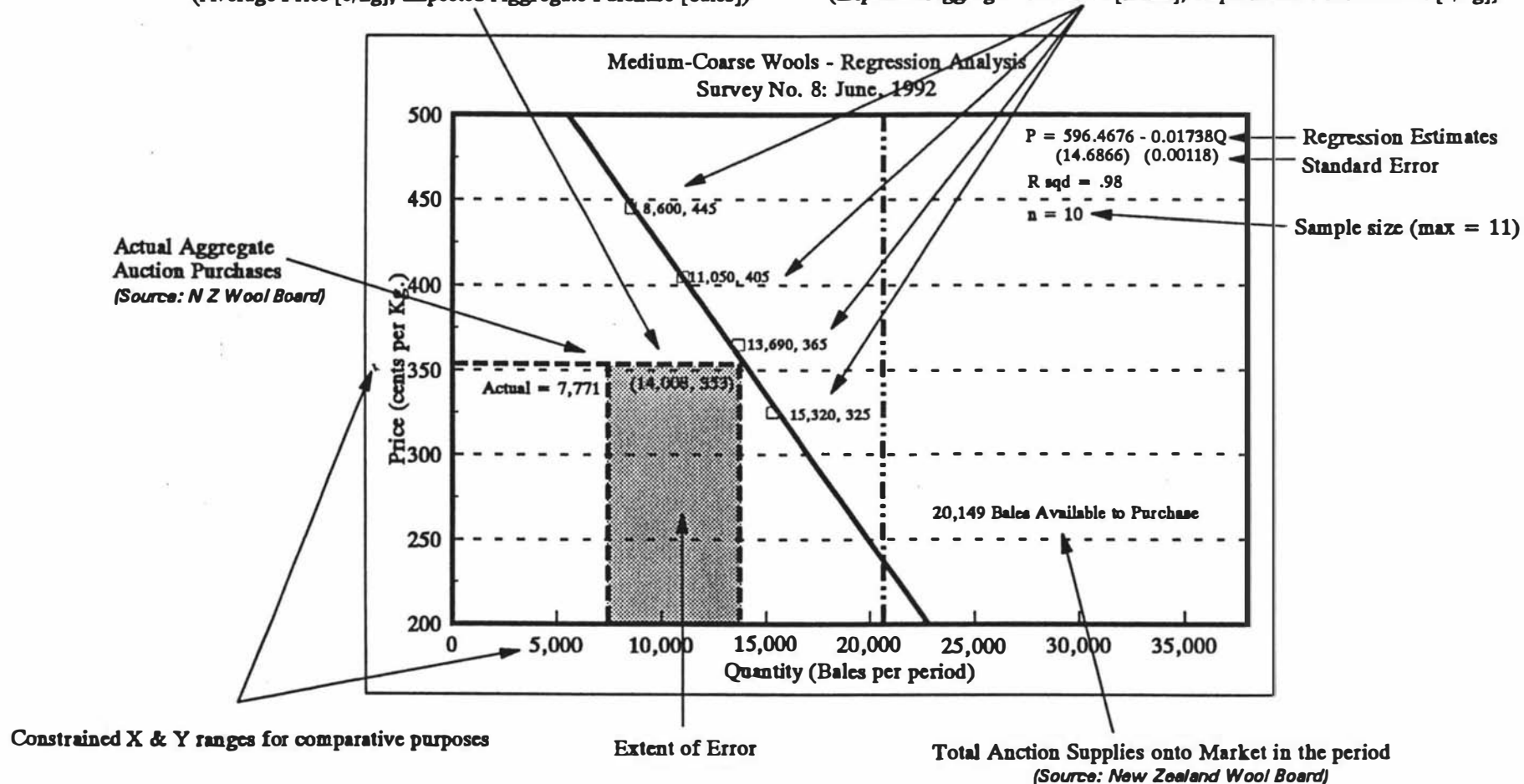


Figure O.1

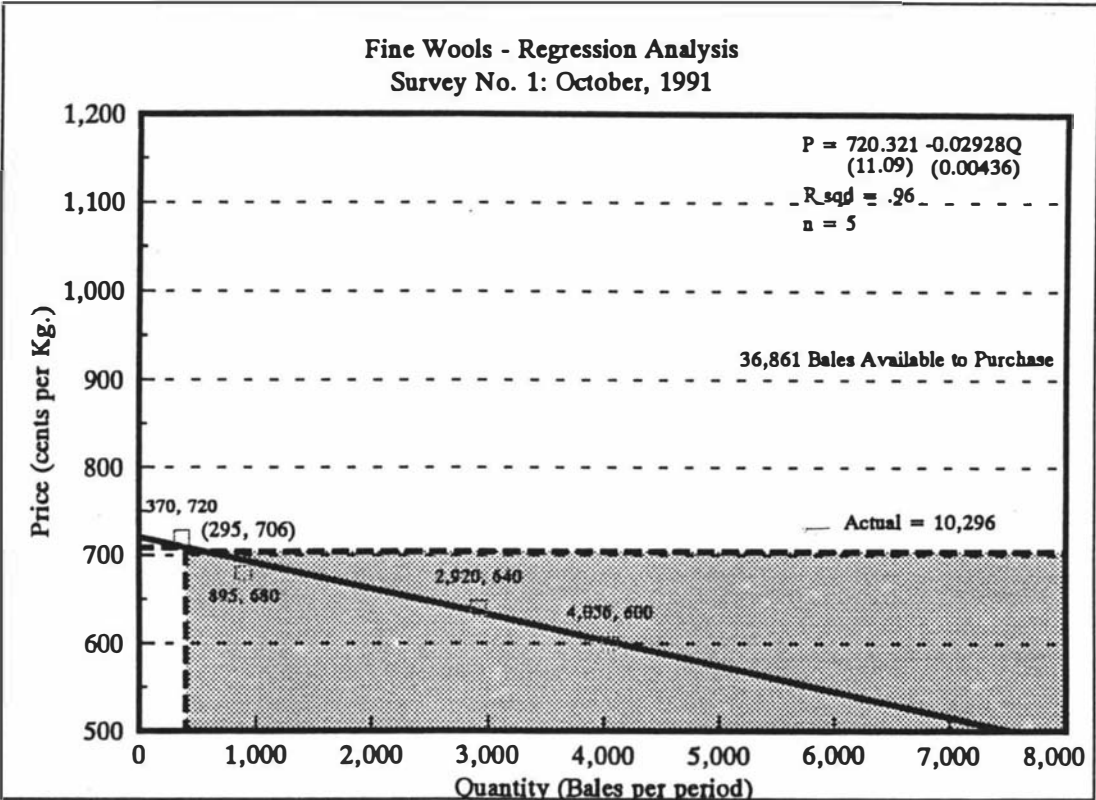


Figure O.2

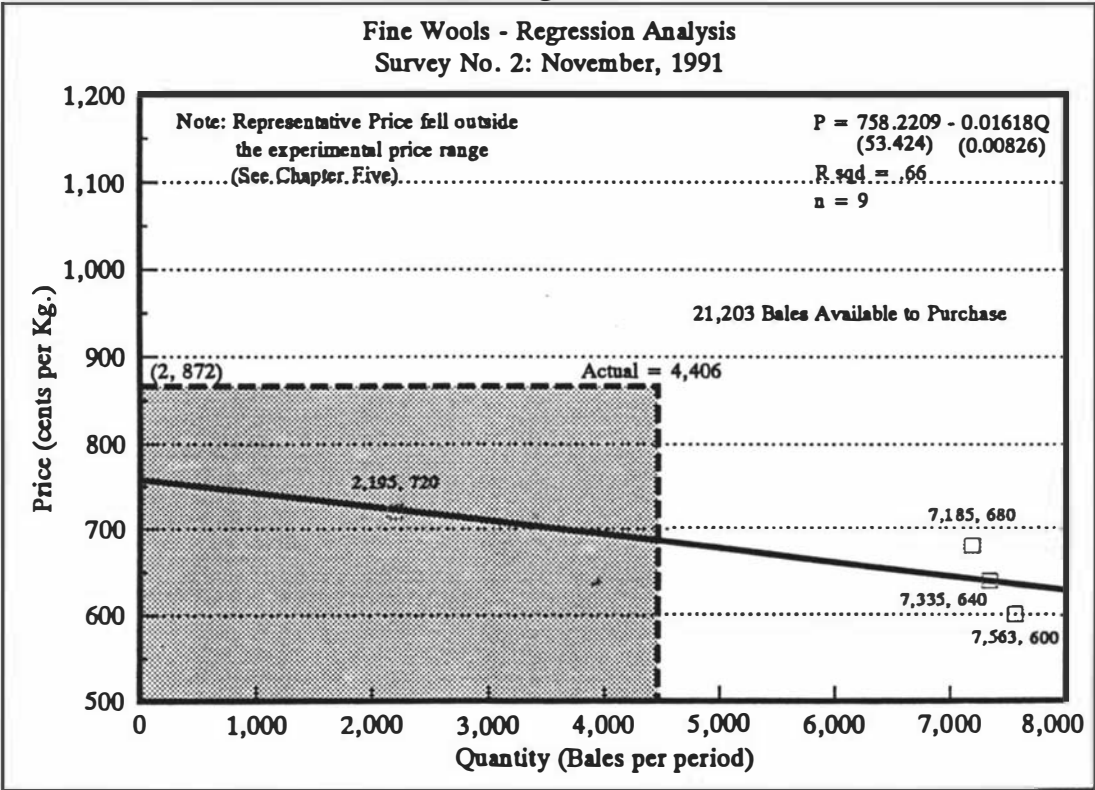


Figure O.3

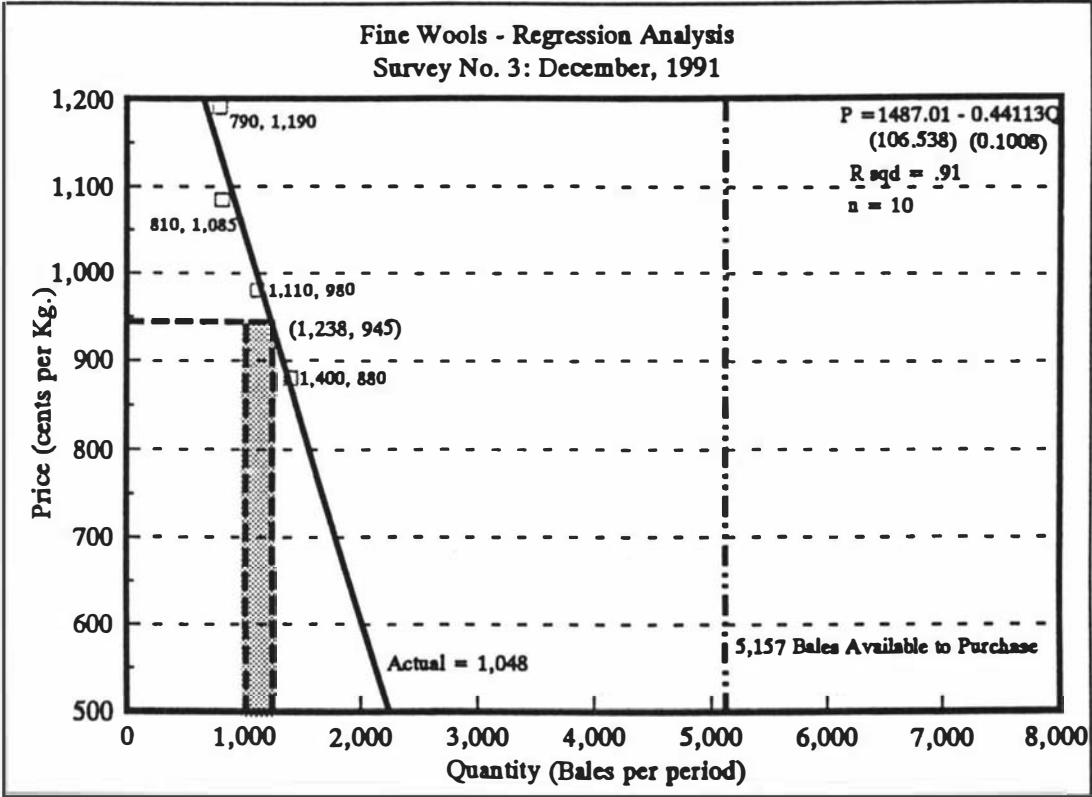


Figure O.4

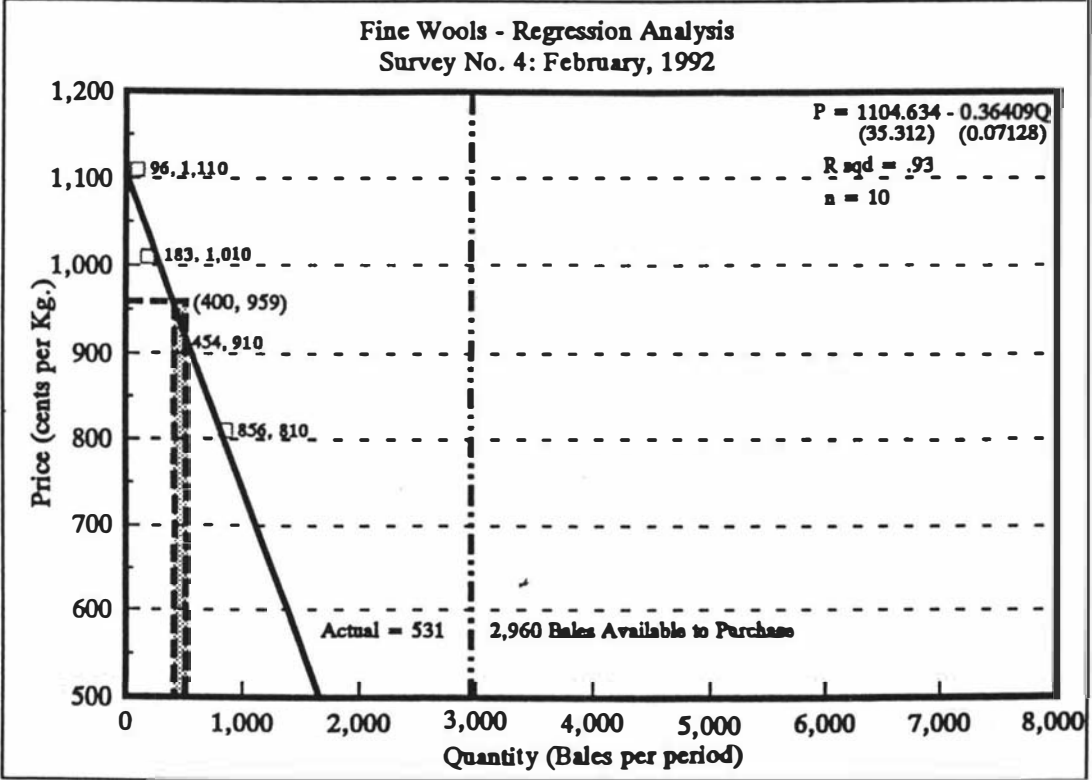


Figure O.5

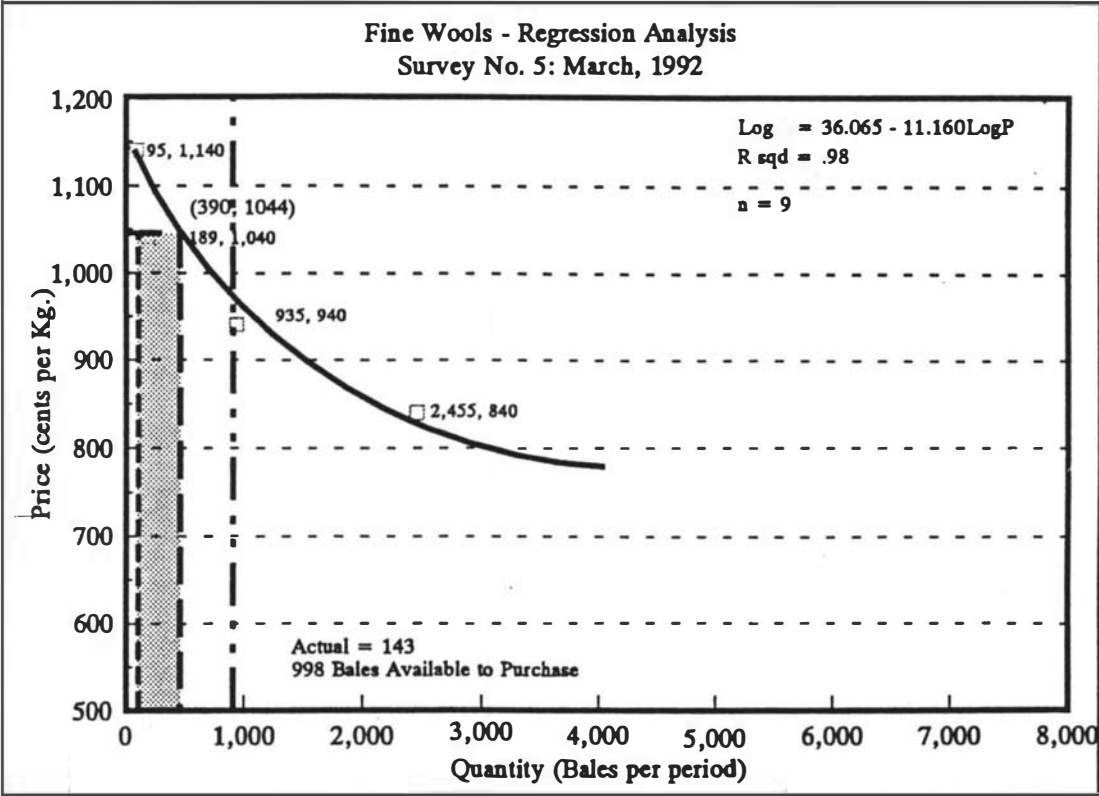


Figure O.6

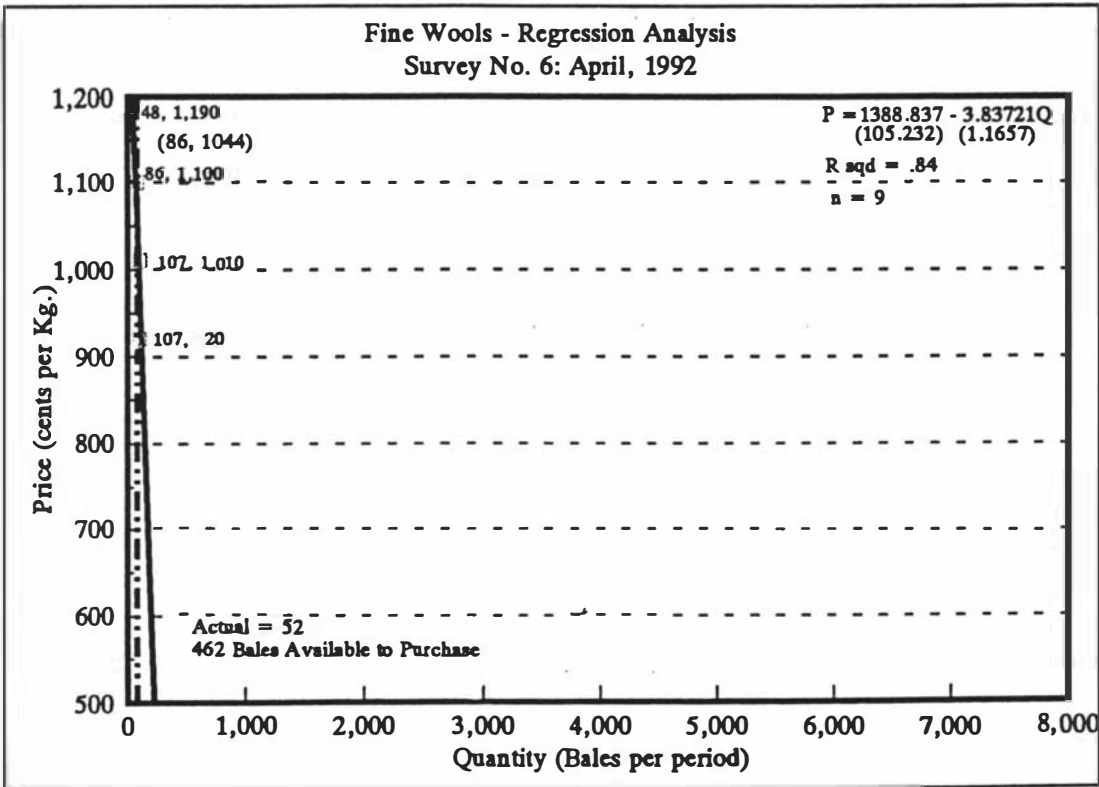


Figure O.7

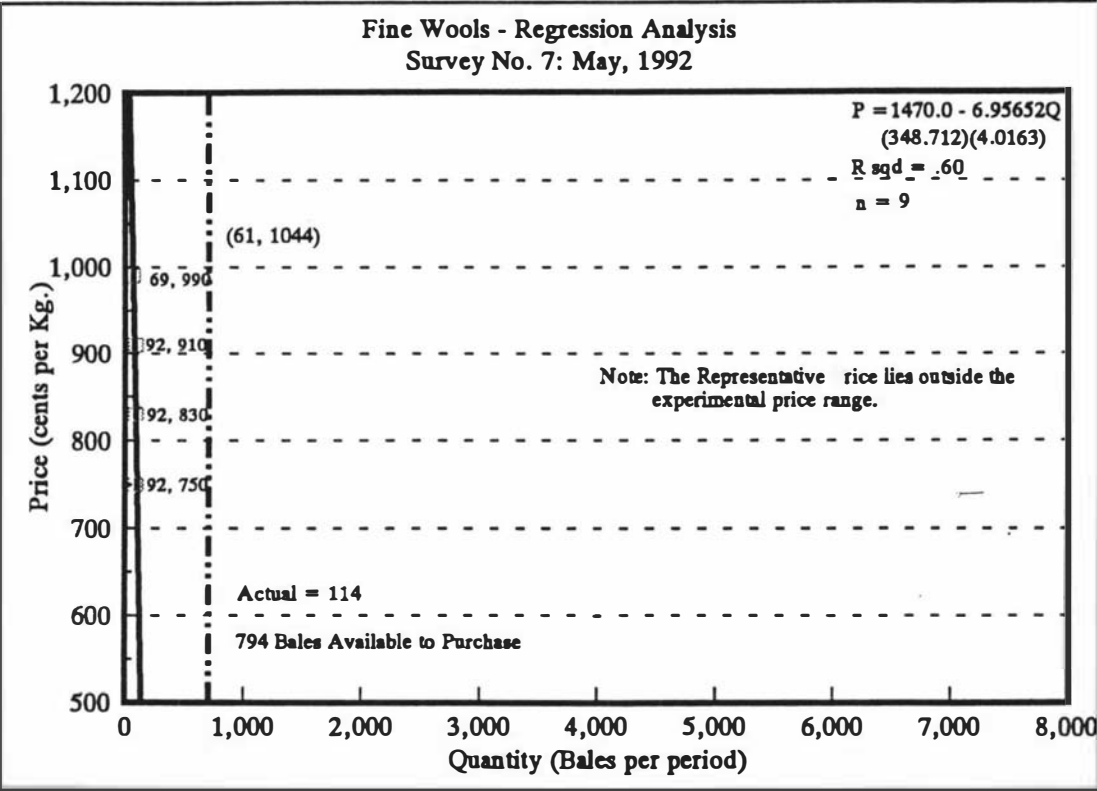


Figure O.8

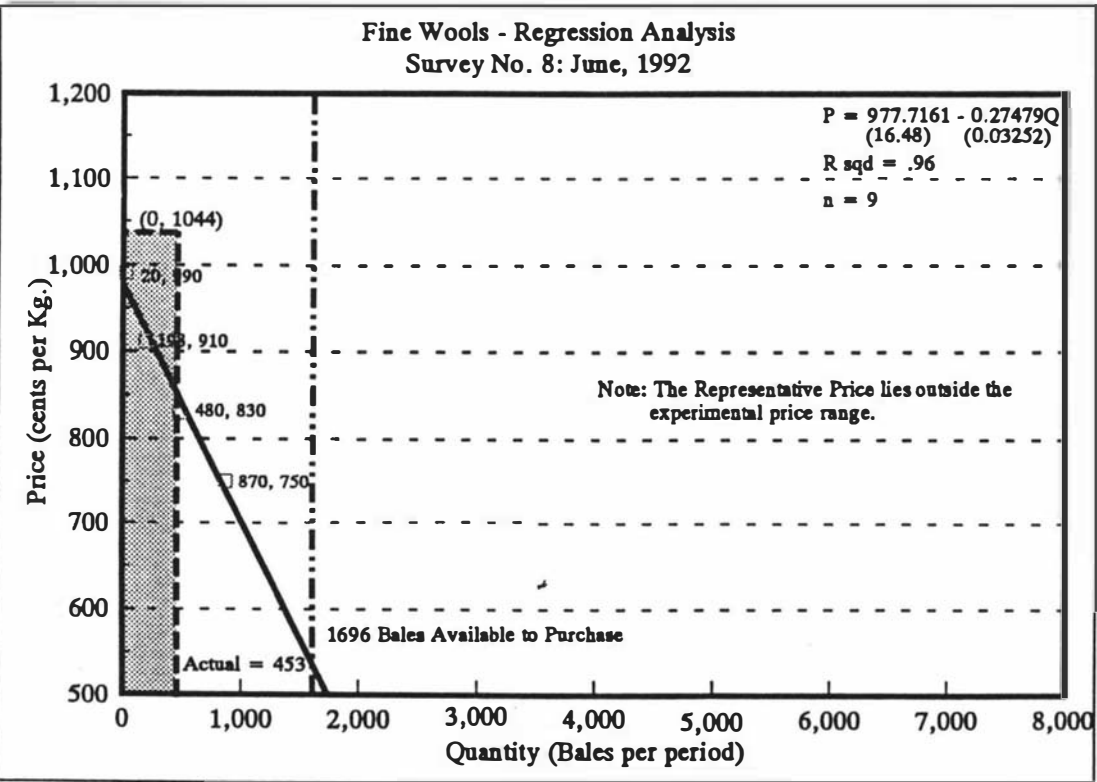


Figure O.9

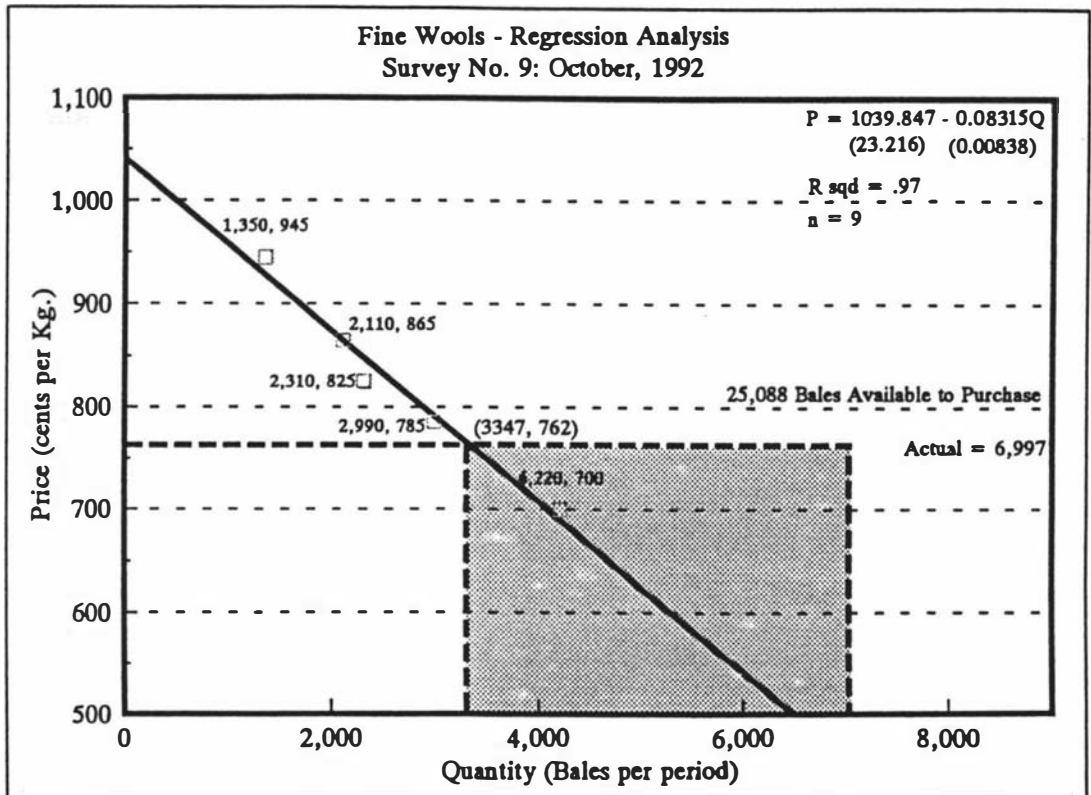


Figure O.10

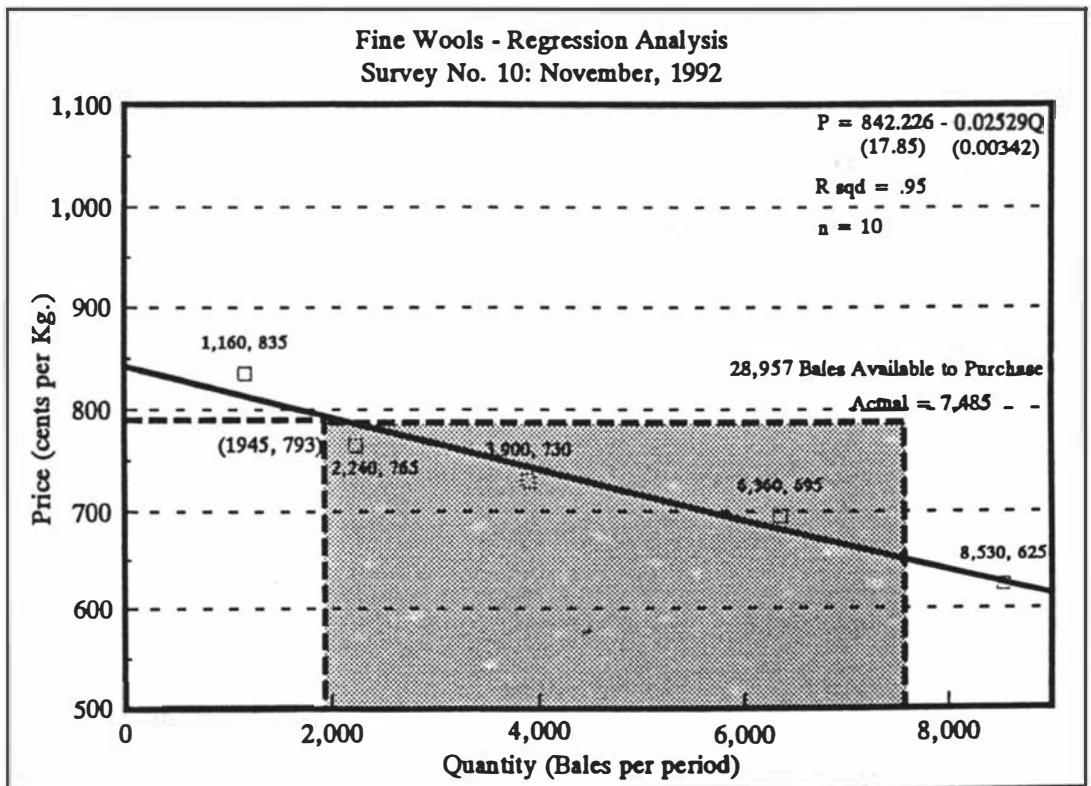


Figure O.11

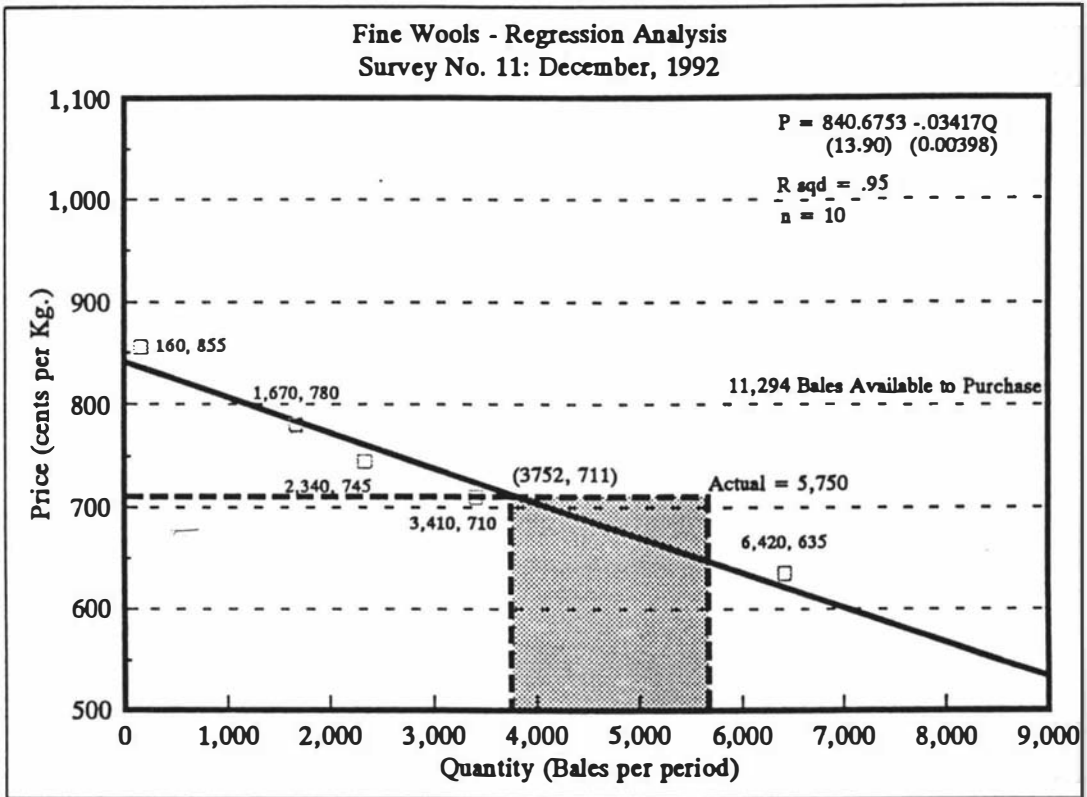


Figure O.12

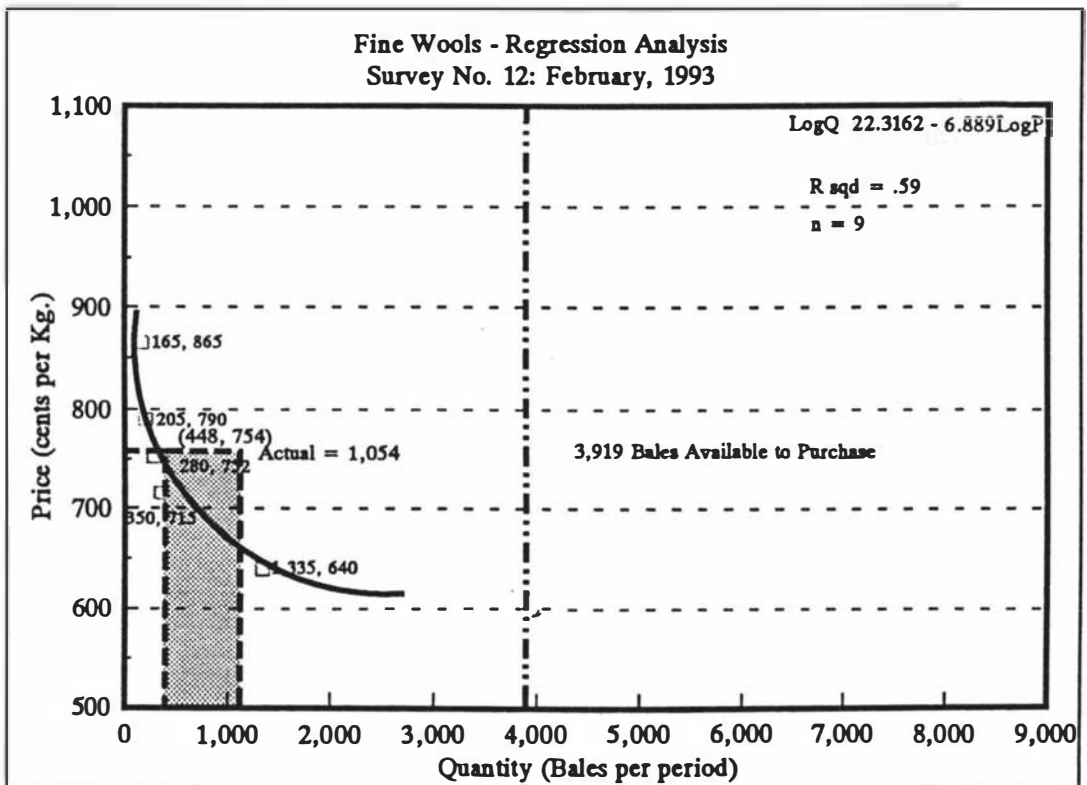


Figure O.13

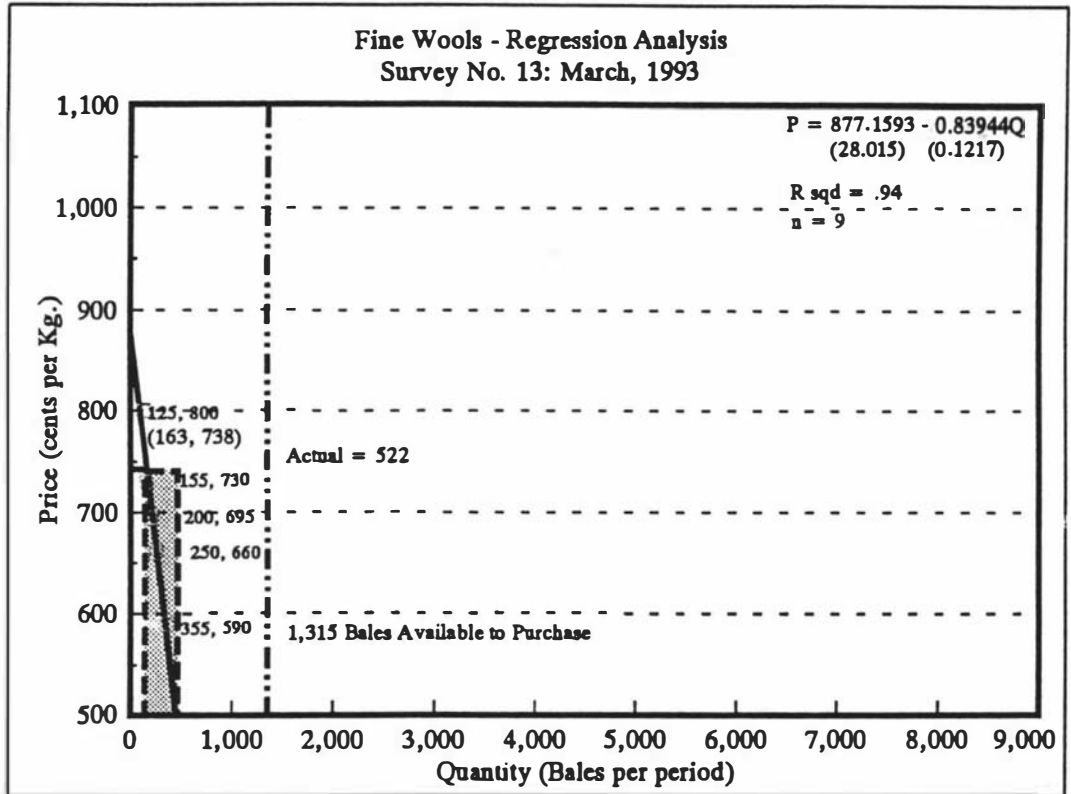


Figure O.14

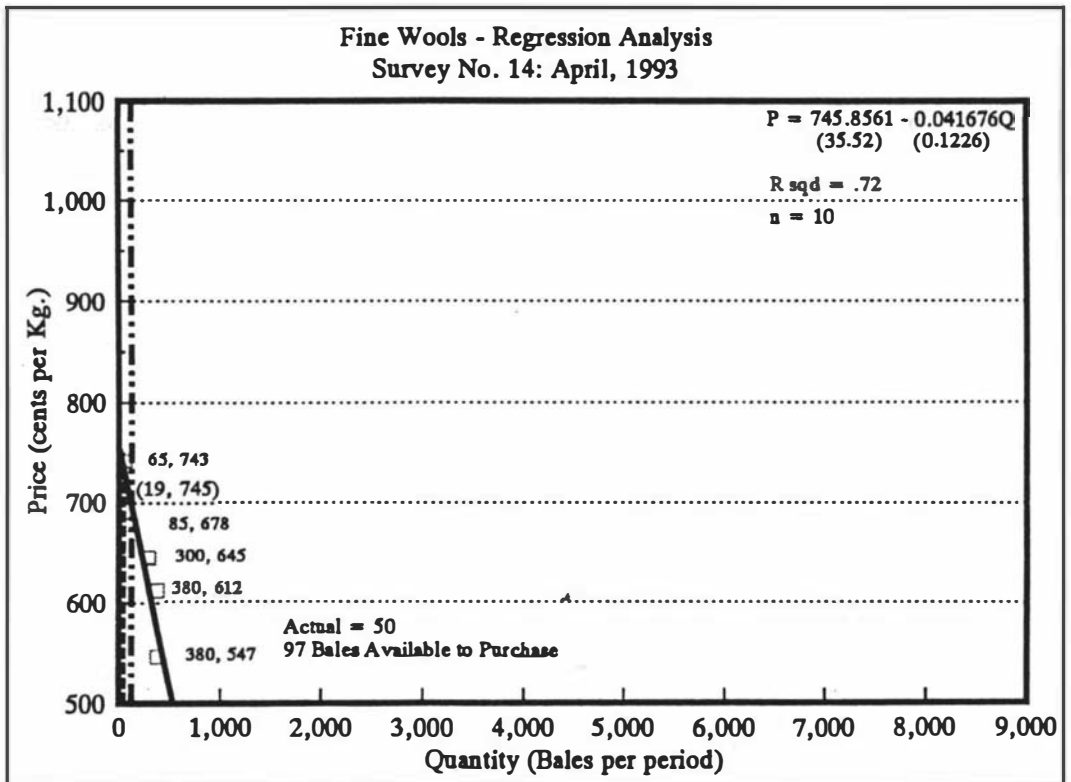


Figure O.15

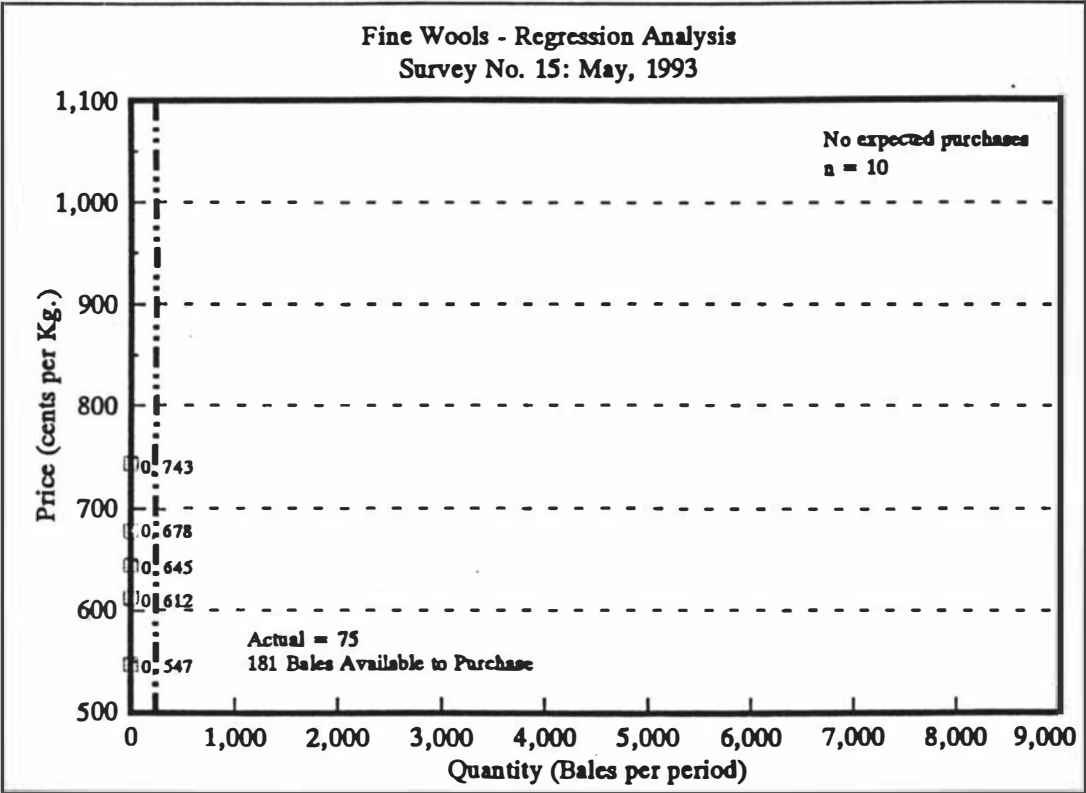


Figure O.16

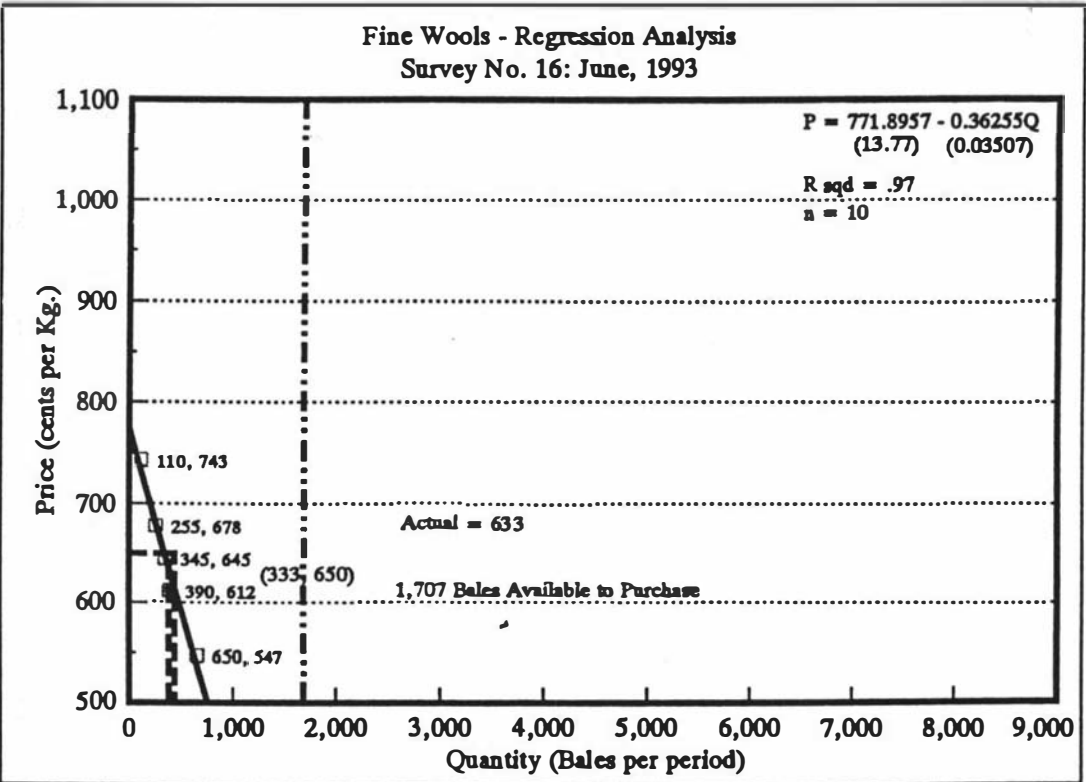


Figure O.17

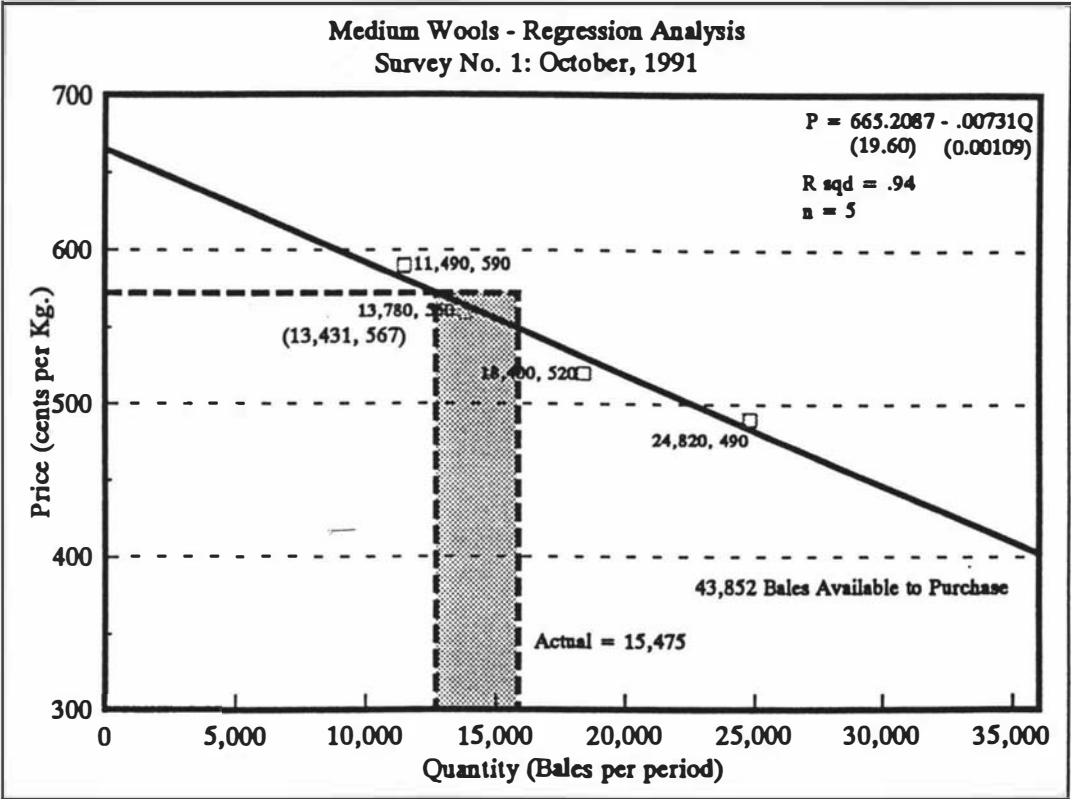


Figure O.18

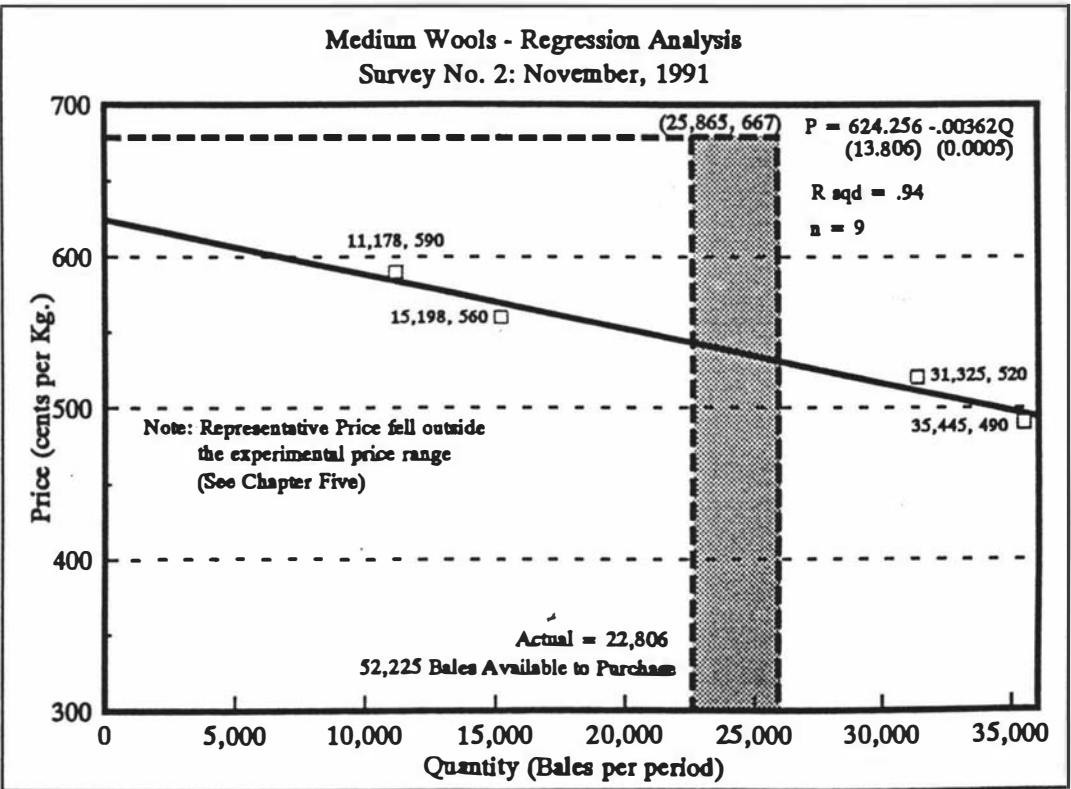


Figure O.19

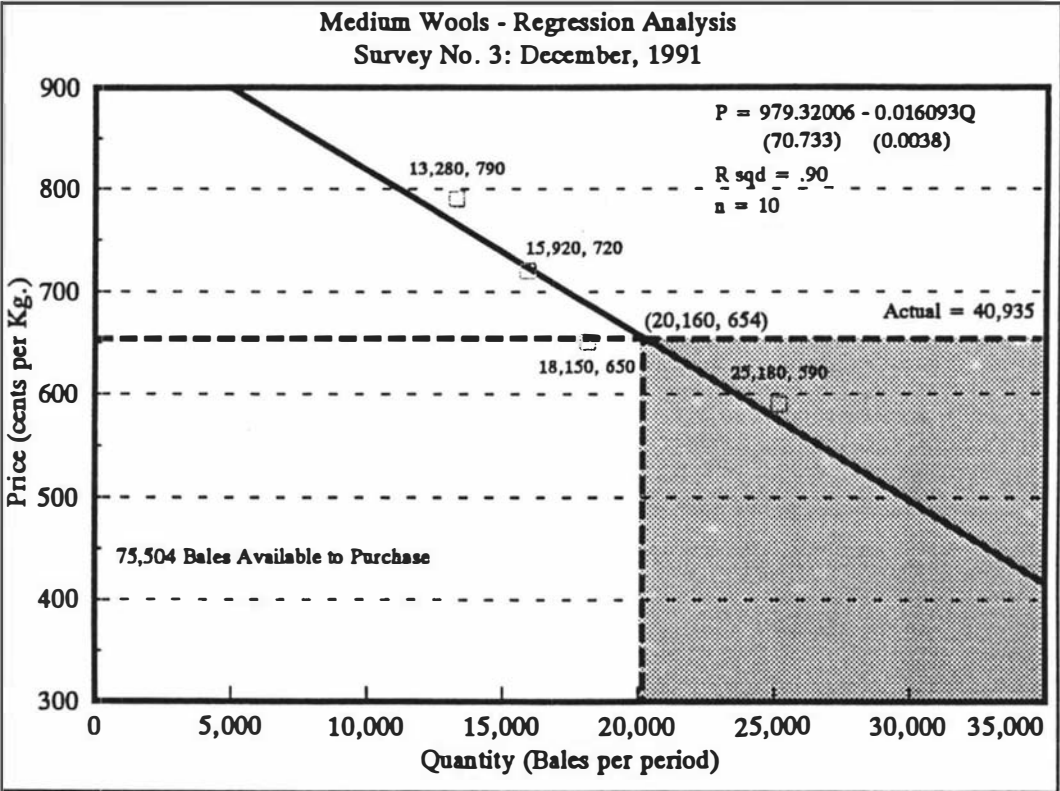


Figure O.20

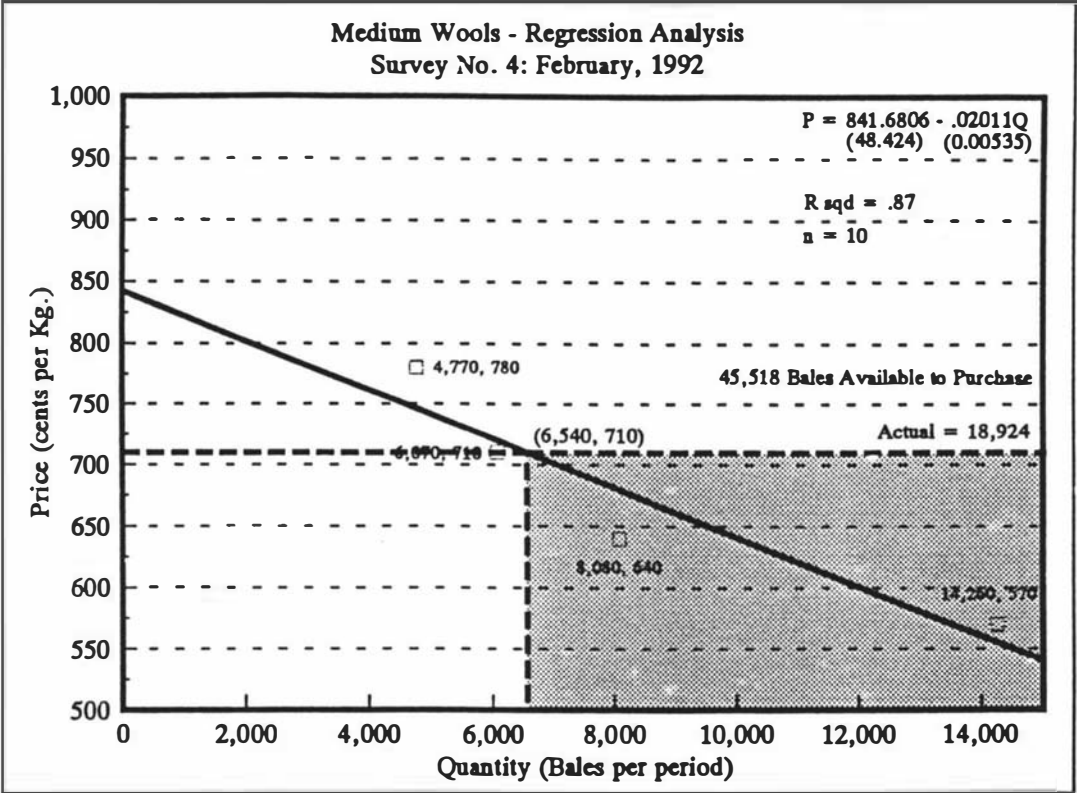


Figure O.21

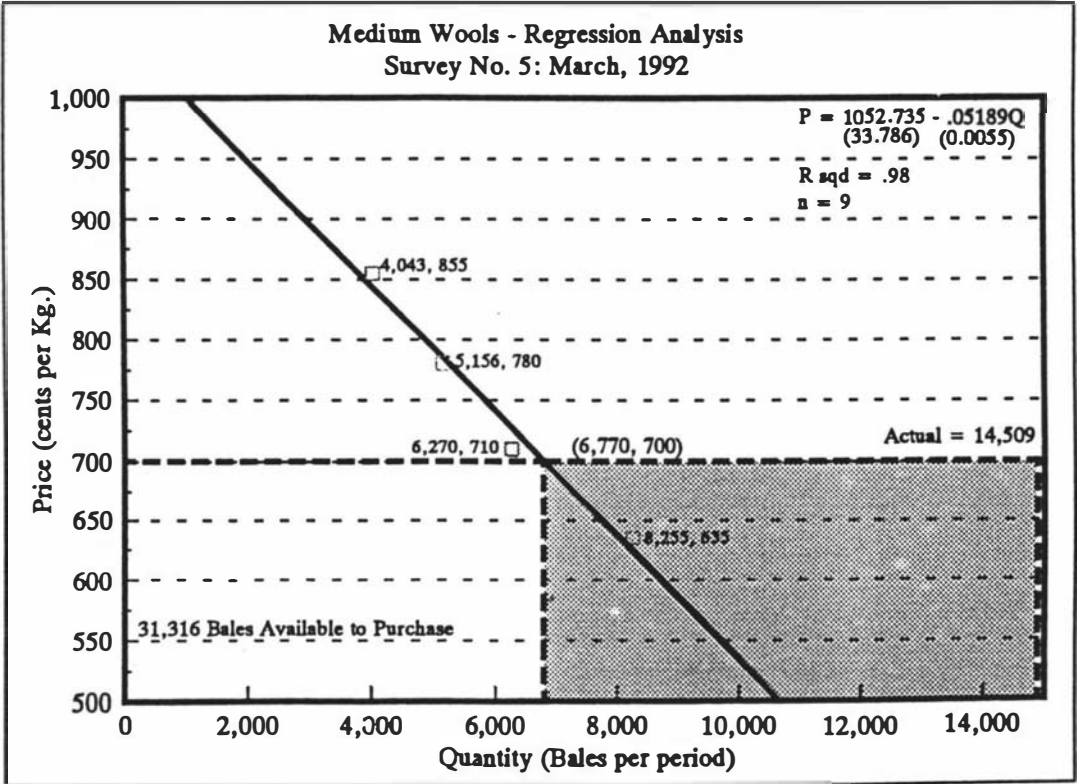


Figure O.22

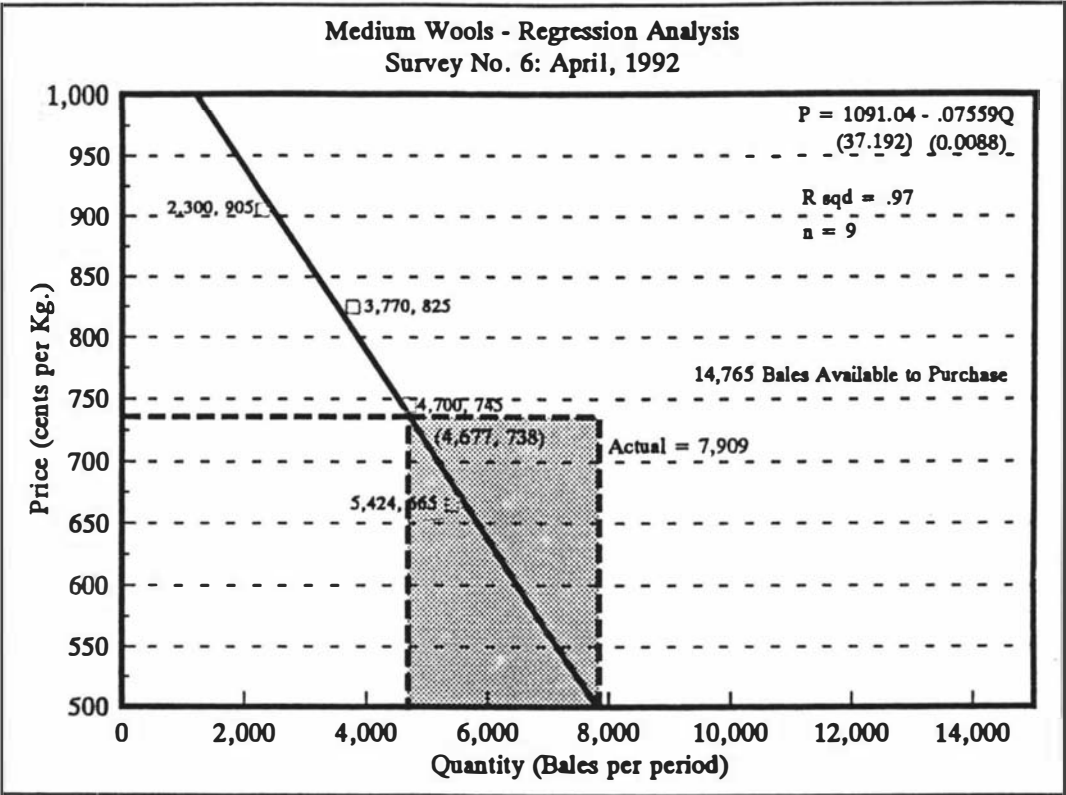


Figure O.23

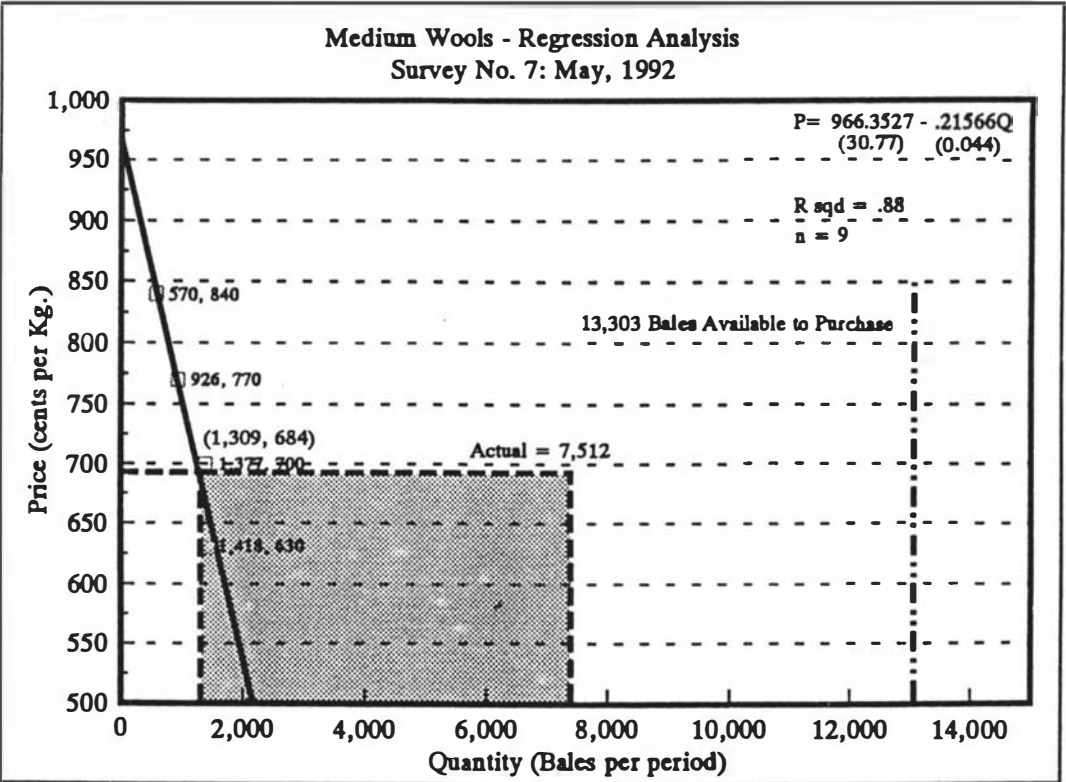


Figure O.24

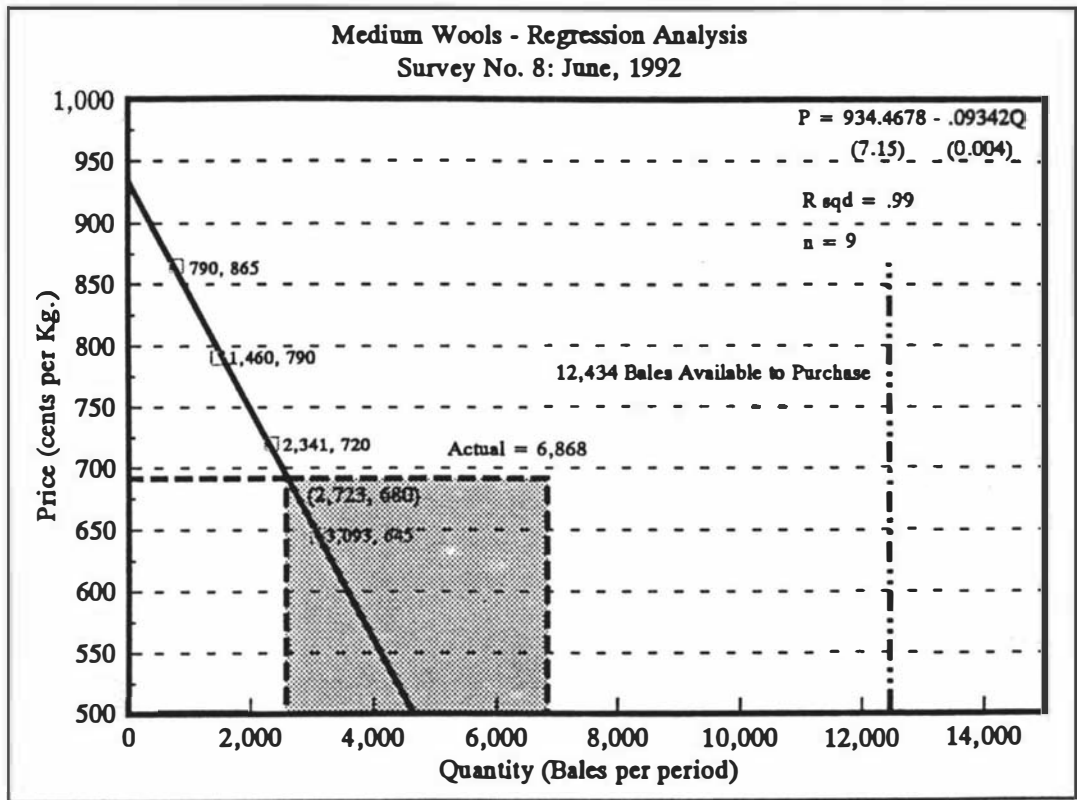


Figure O.25

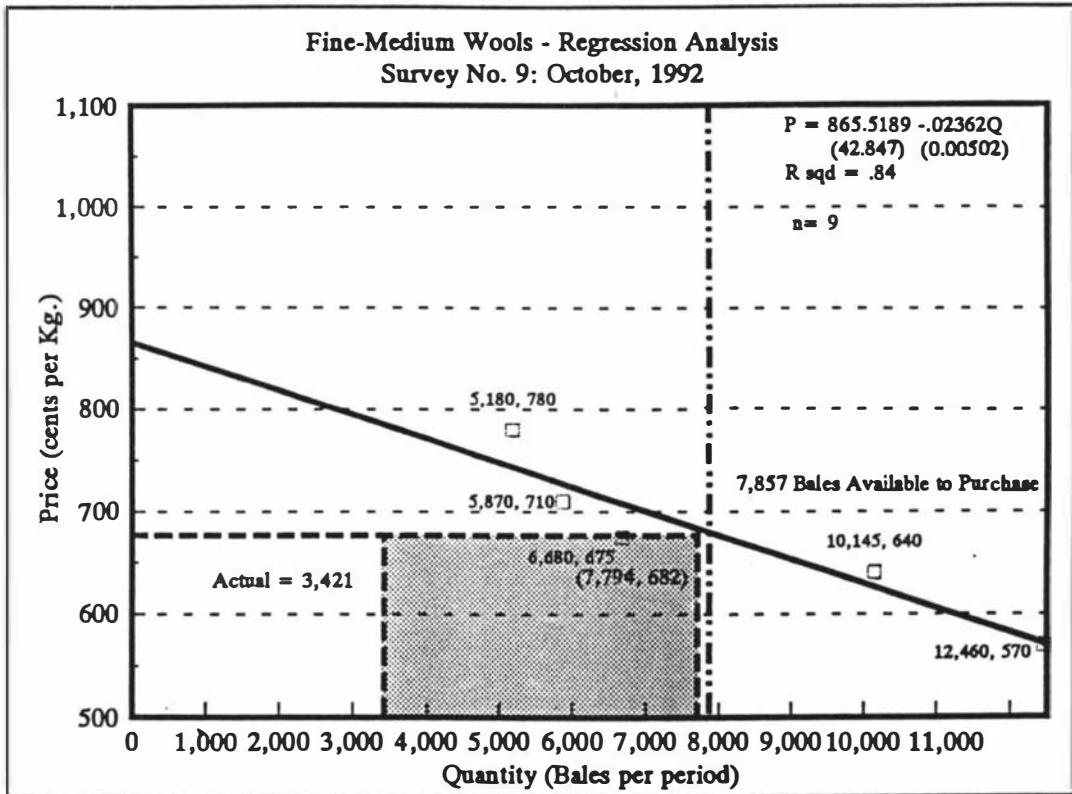


Figure O.26

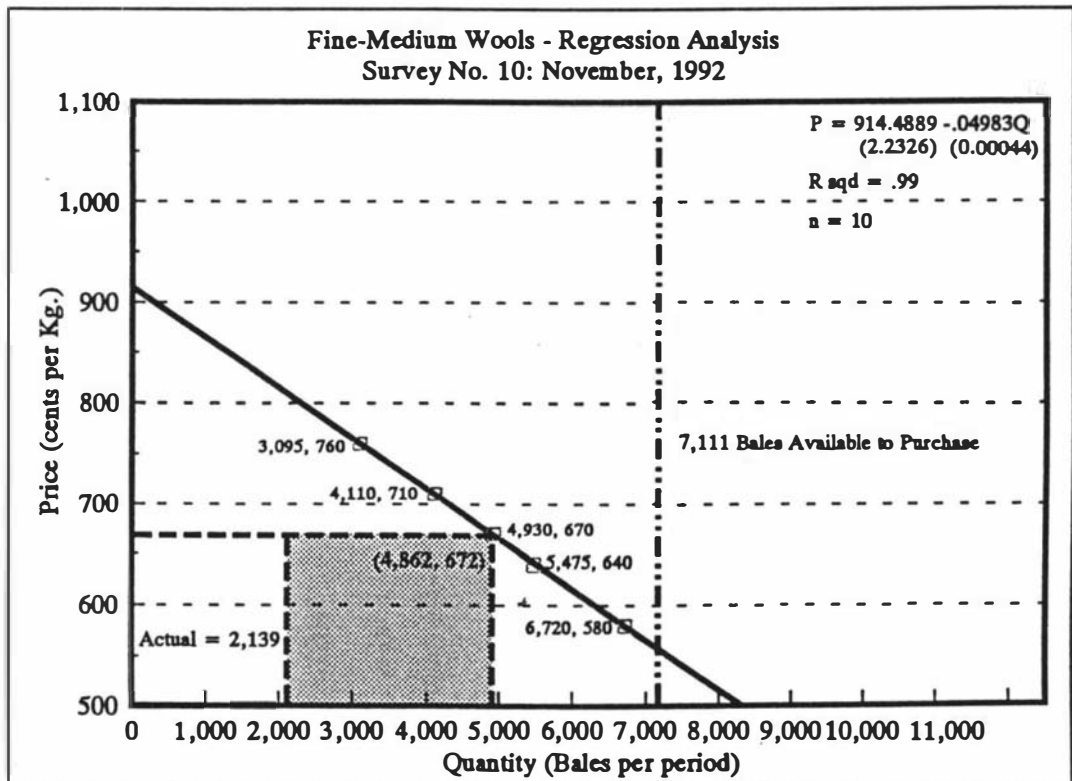


Figure O.27

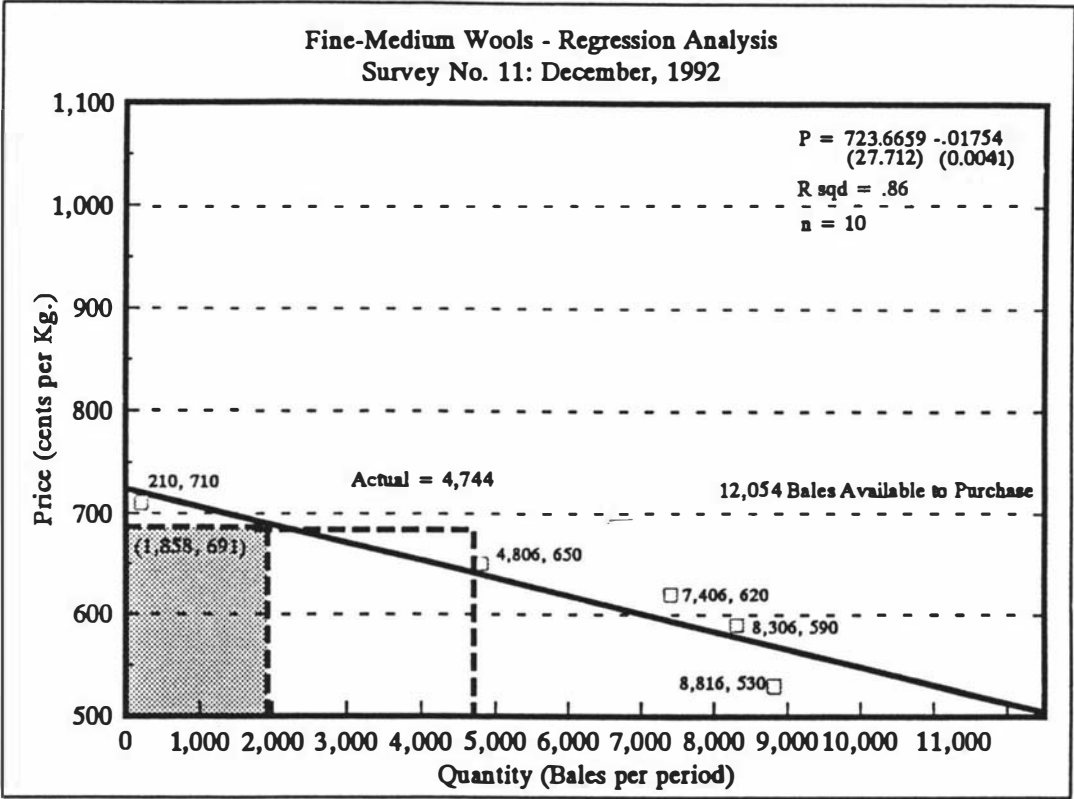


Figure O.28

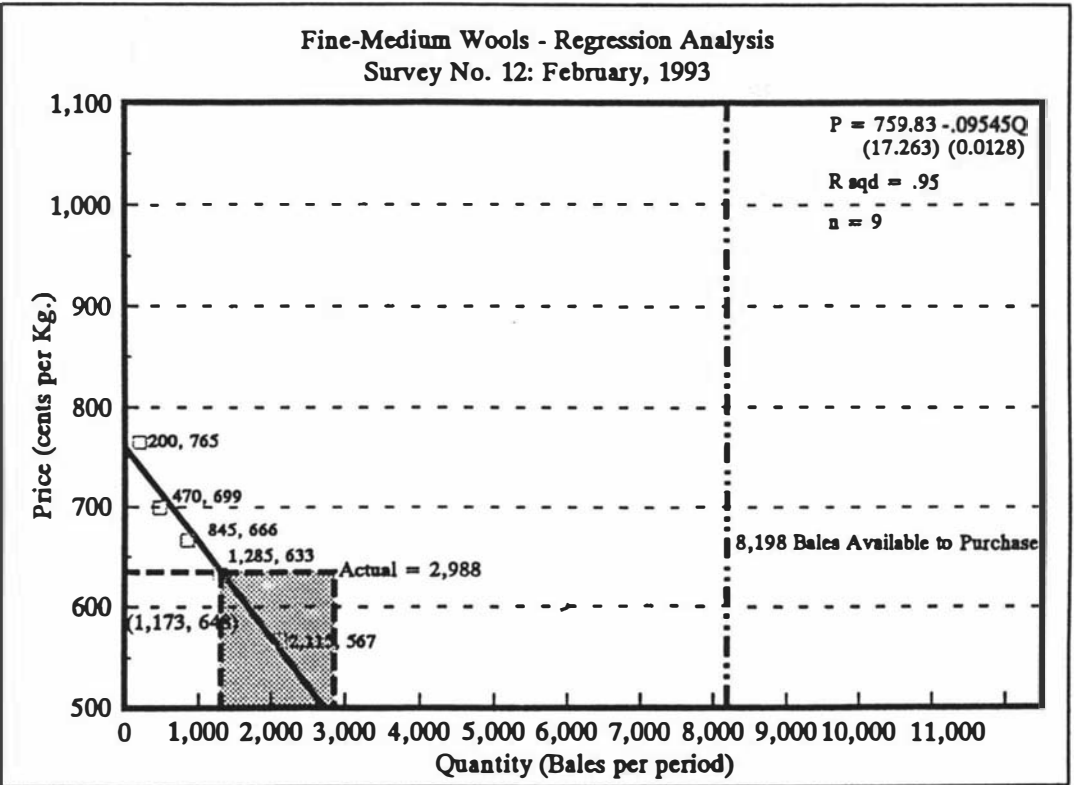


Figure O.29

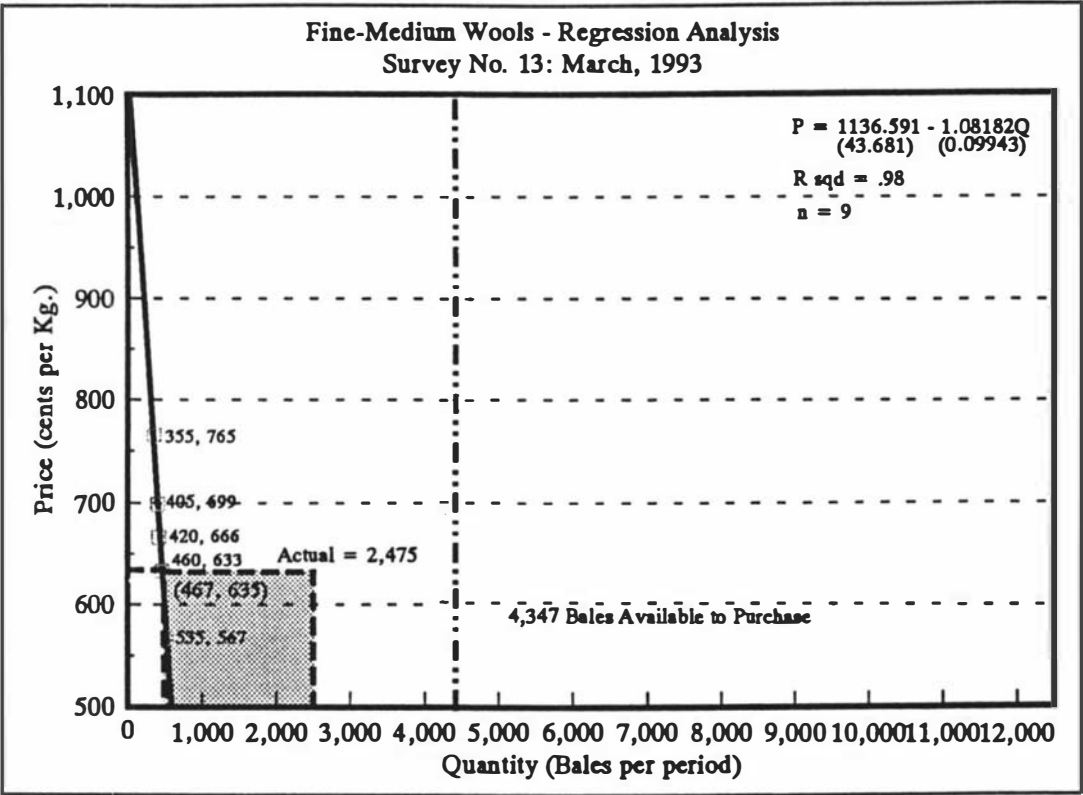


Figure O.30

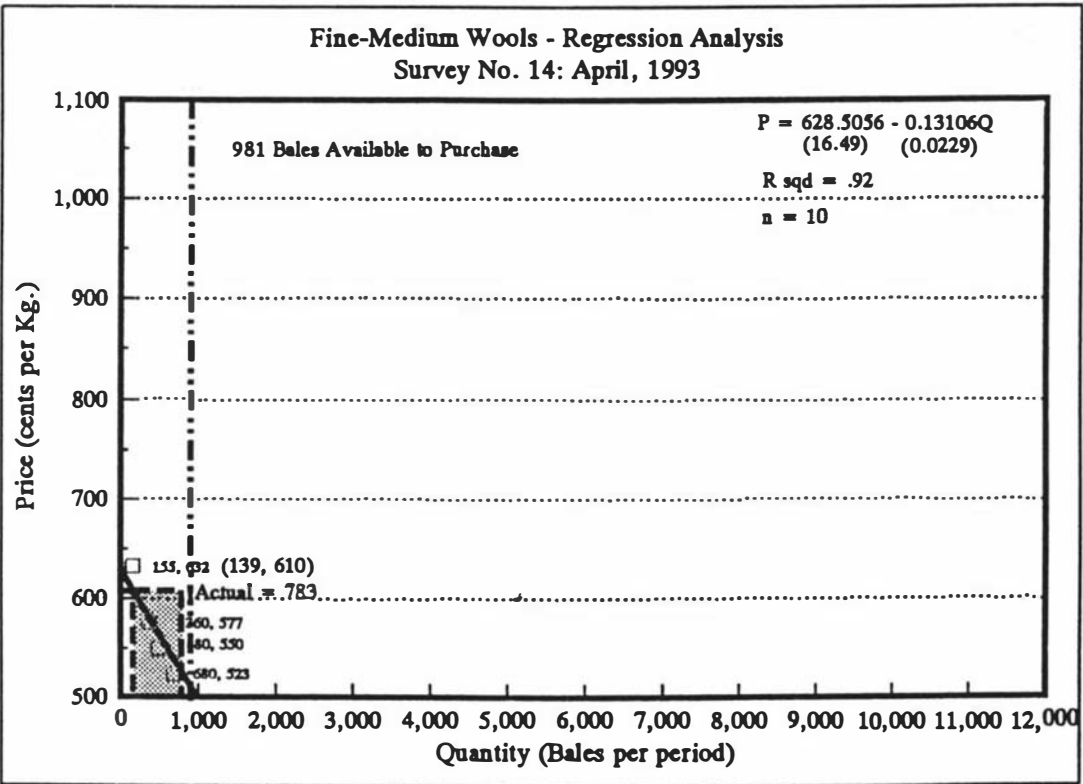


Fig re O.31

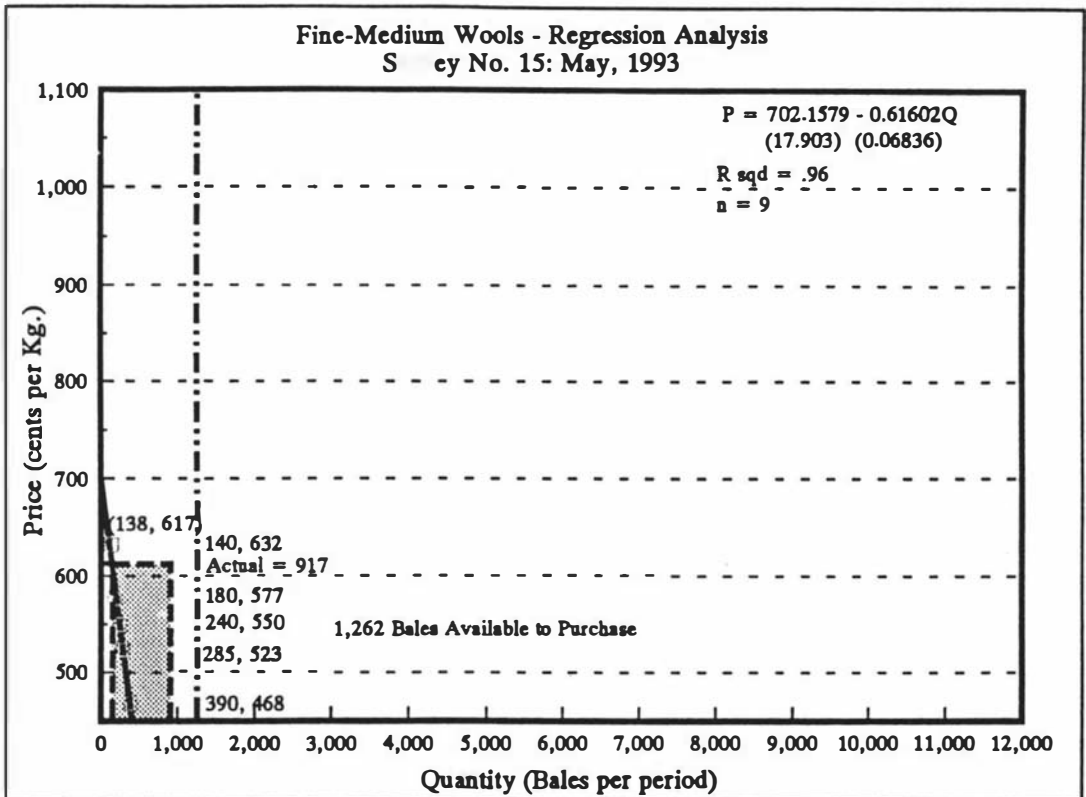


Figure O.32

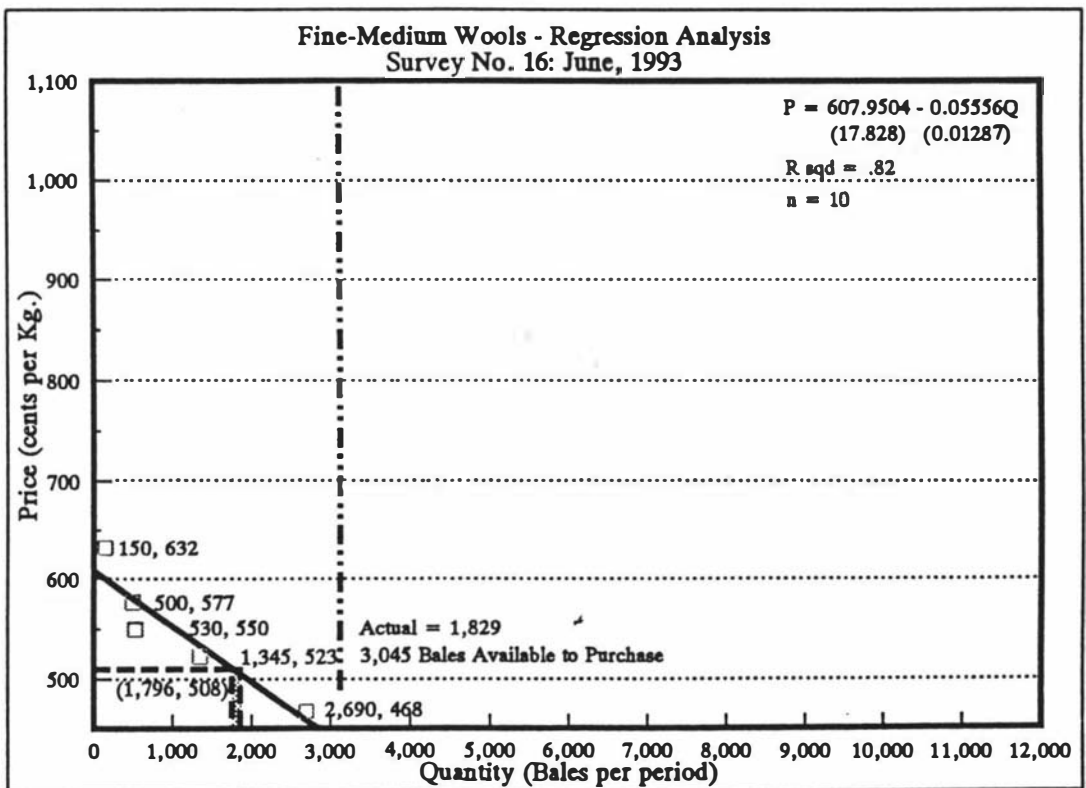


Figure O.33

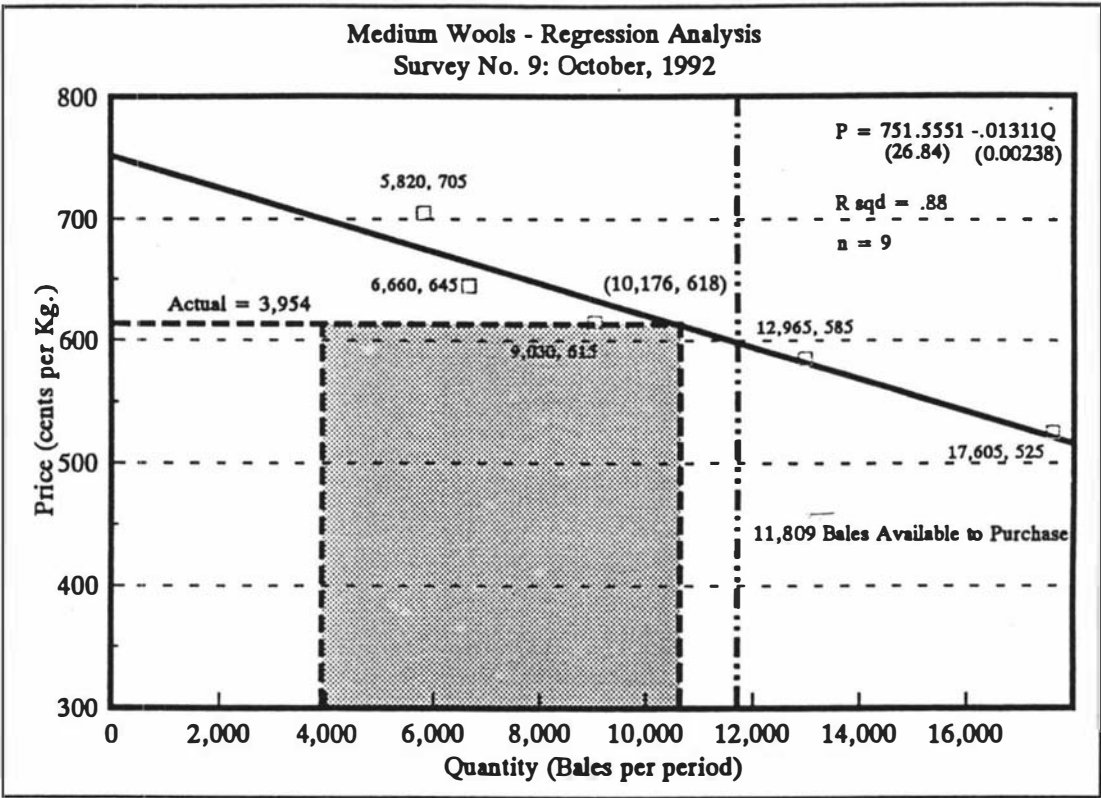


Figure O.34

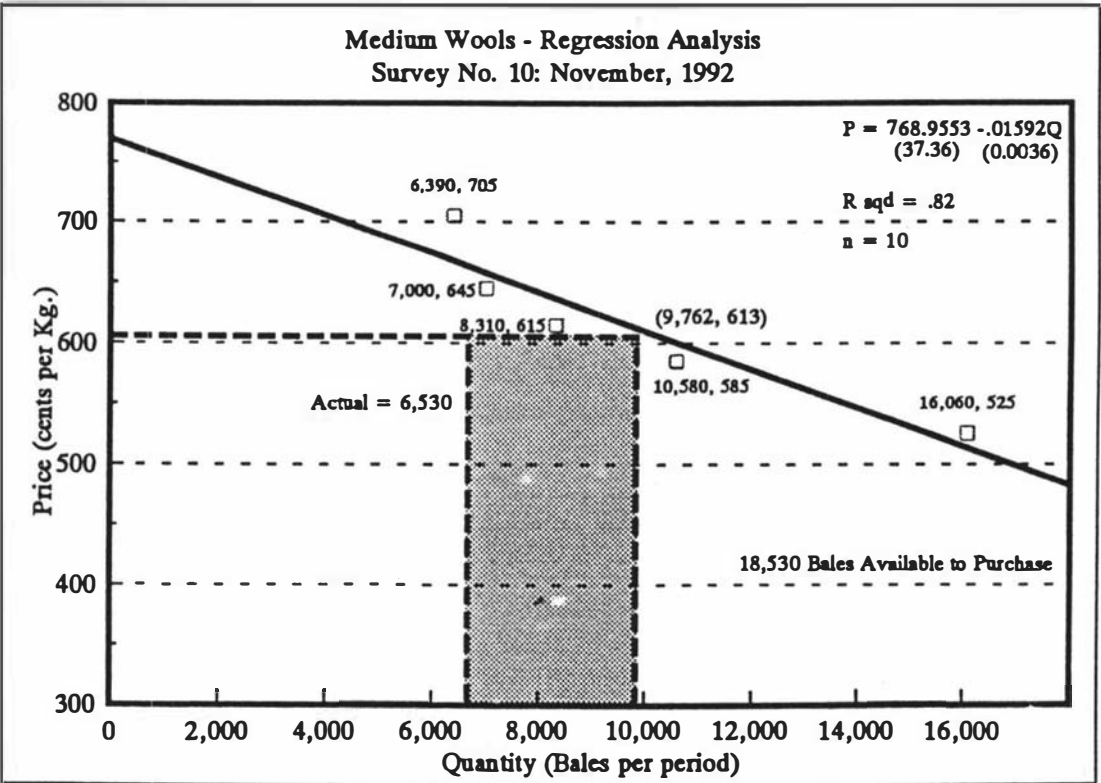


Figure O.35

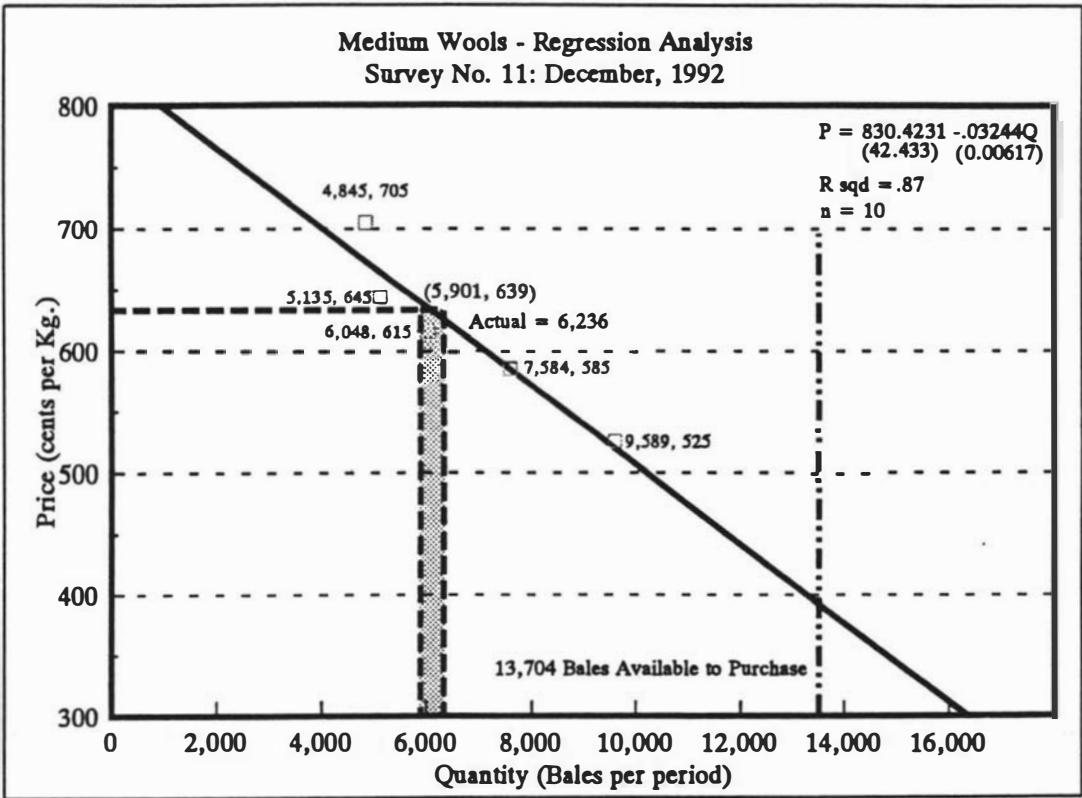


Figure O.36

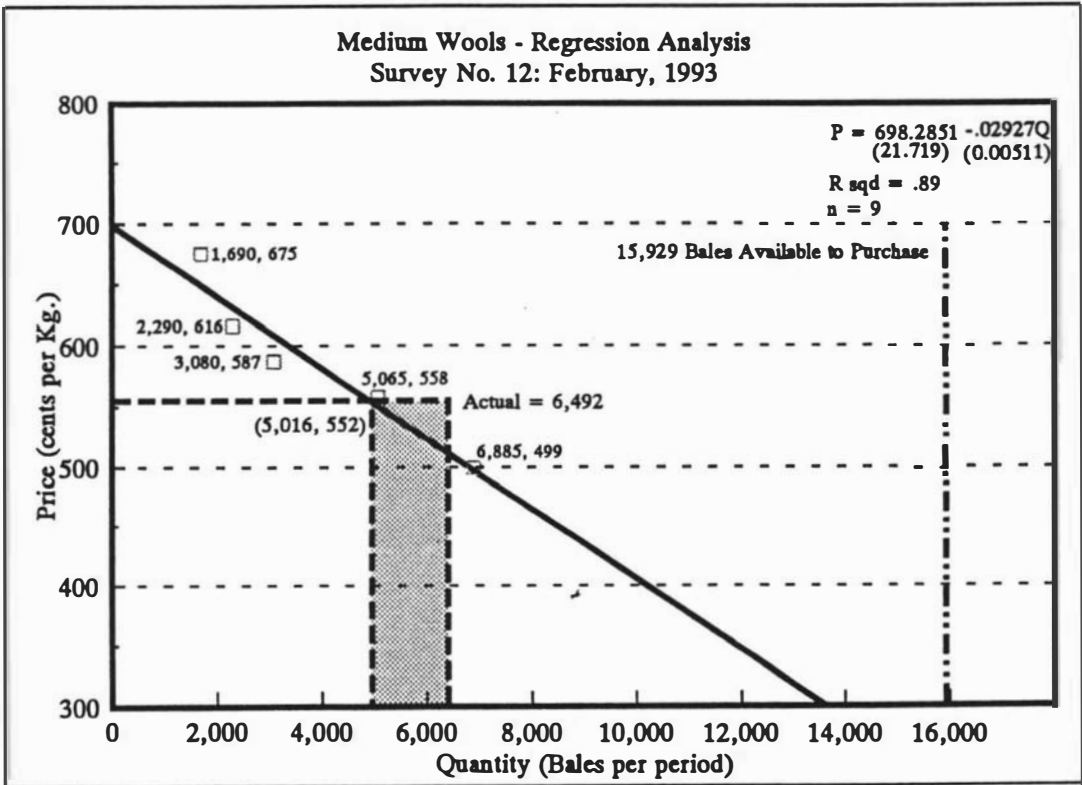


Figure O.37

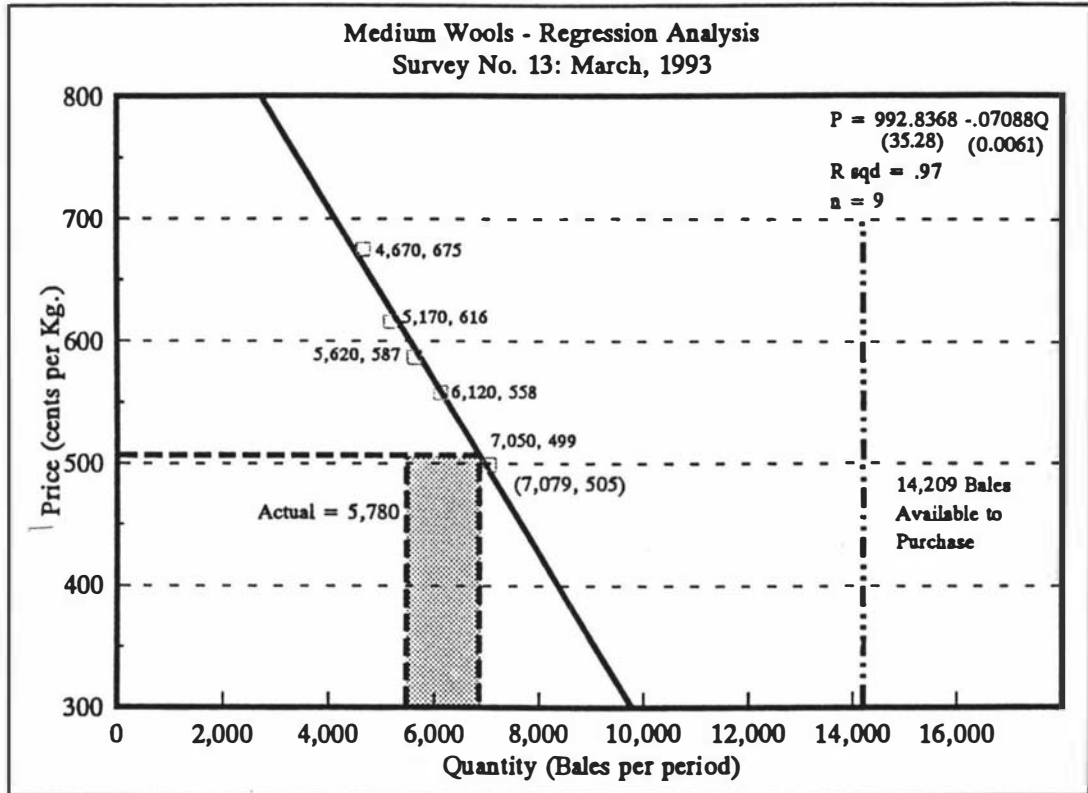


Figure O.38

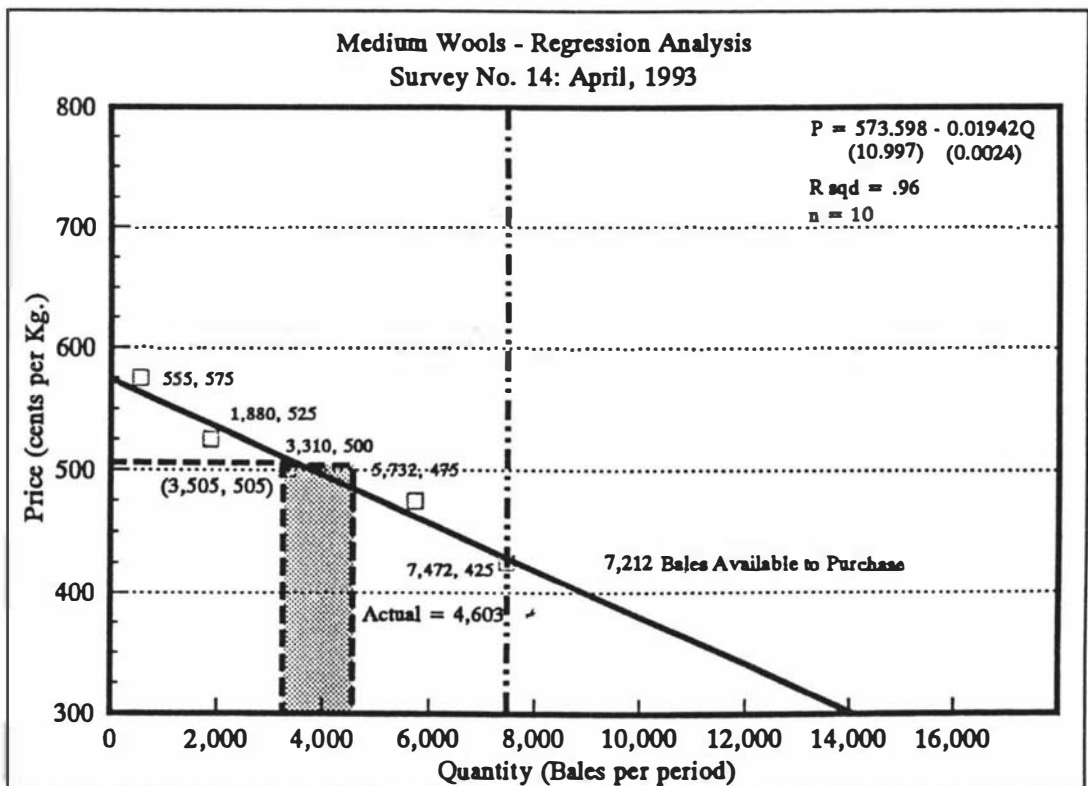


Figure O.39

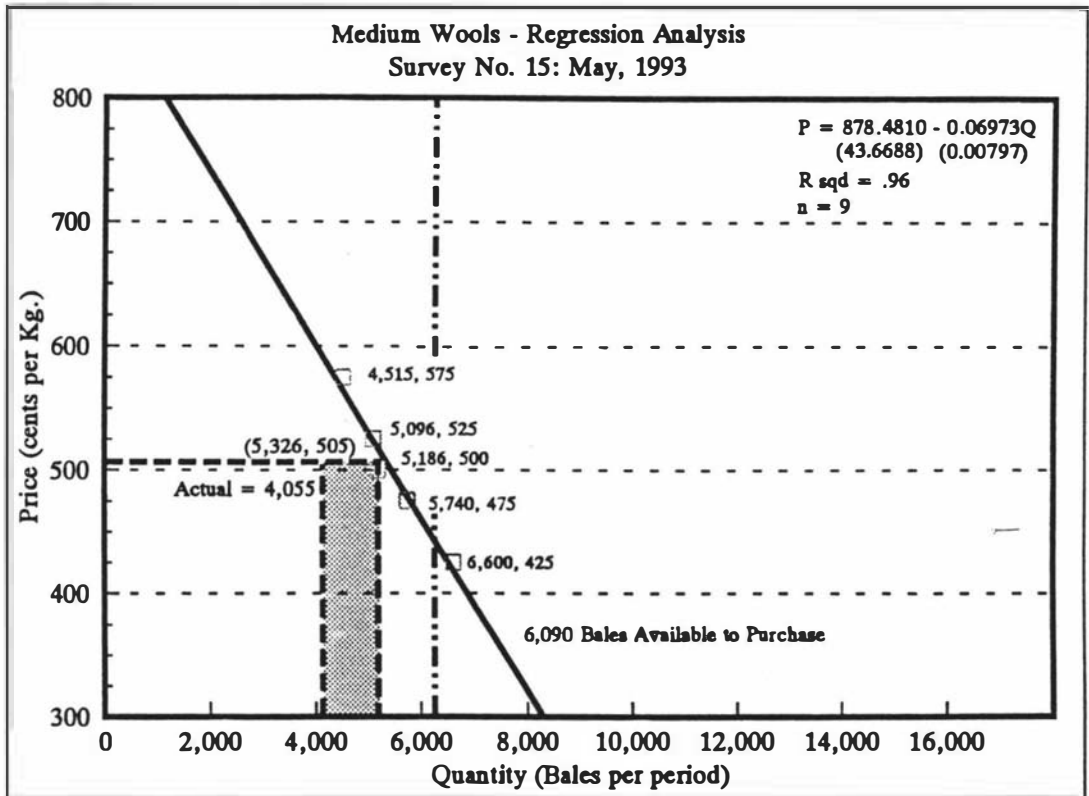


Figure O.40

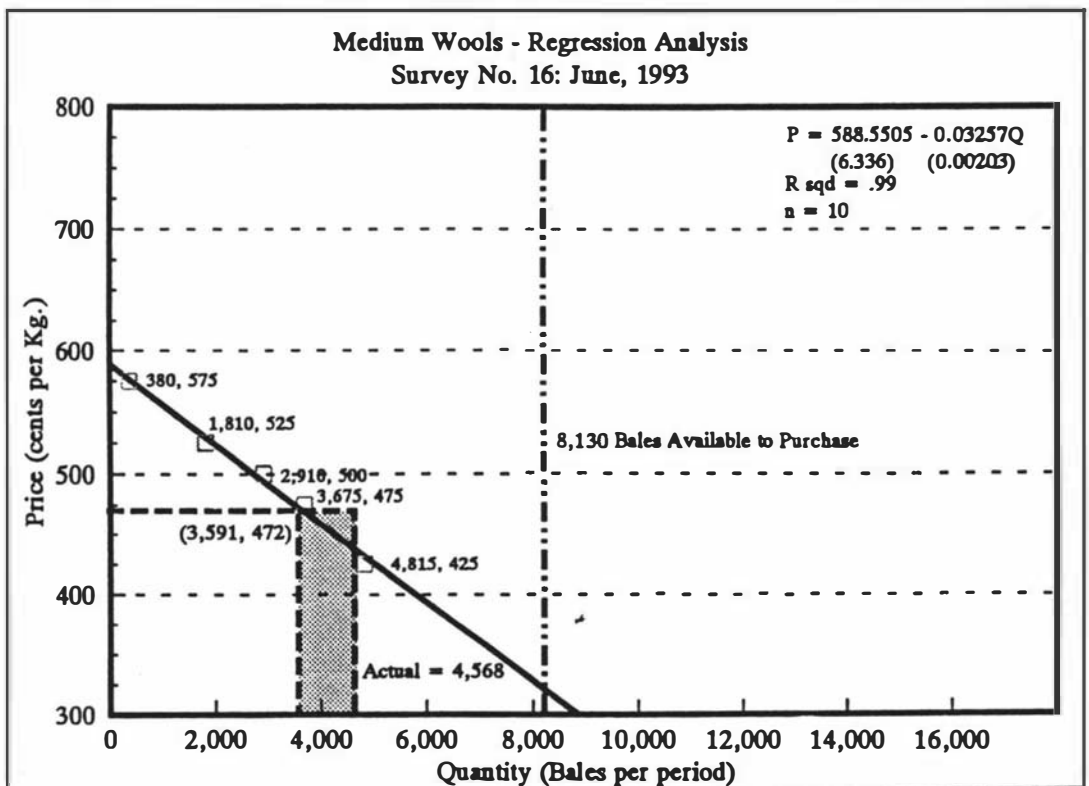


Figure O.41

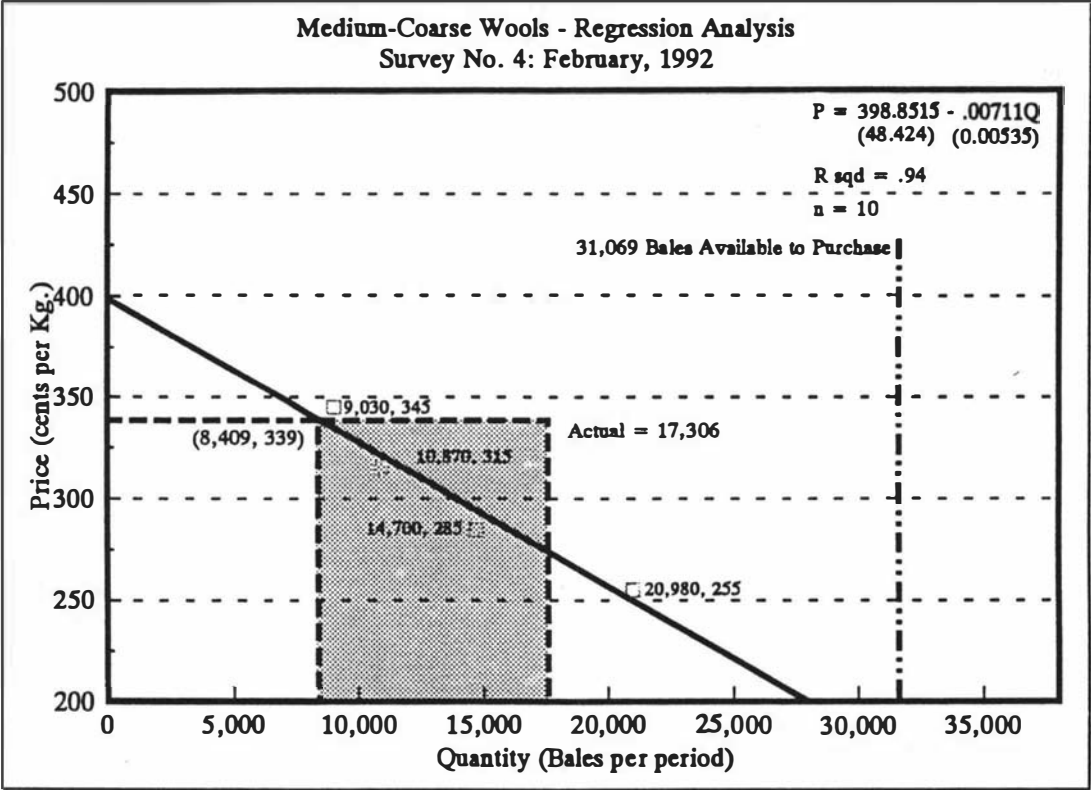


Figure O.42

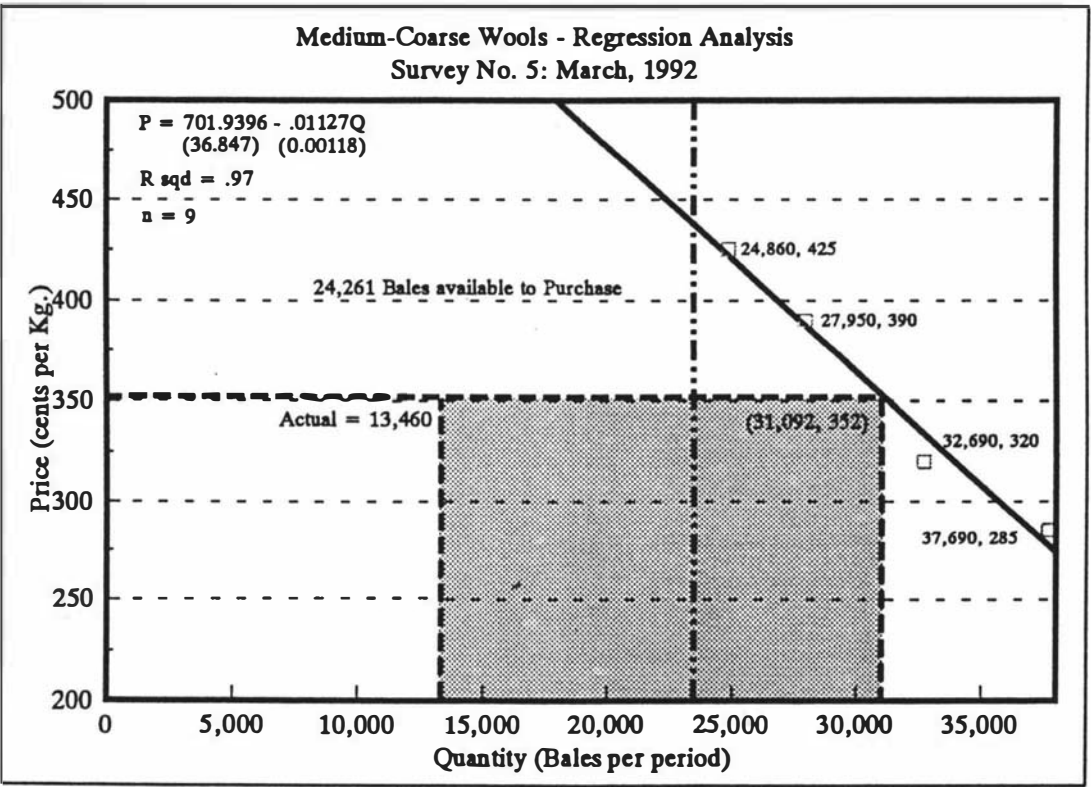


Figure O.43

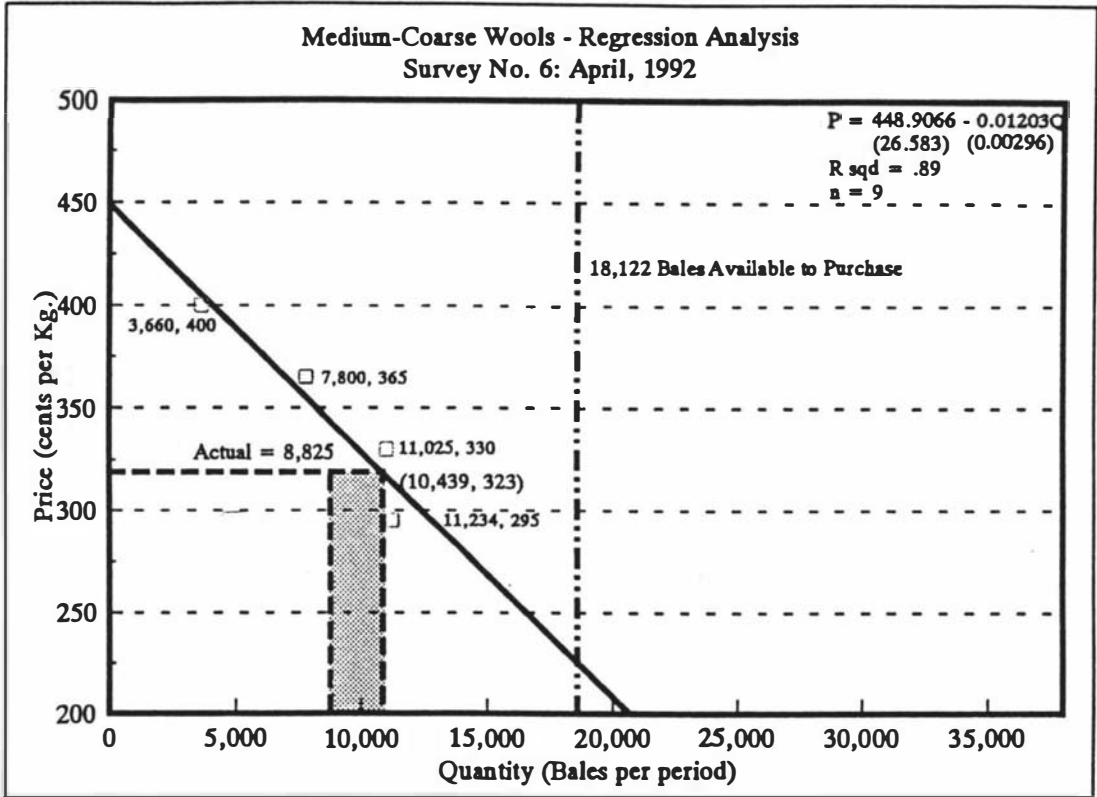


Figure O.44

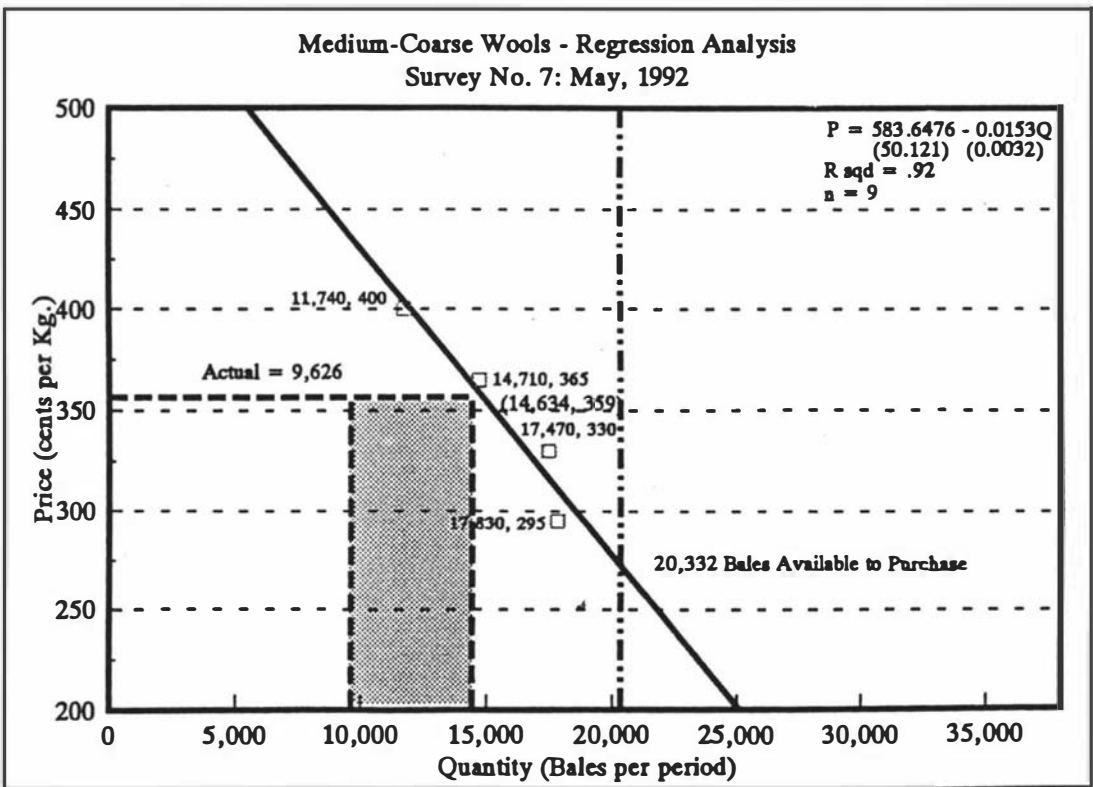


Figure O.45

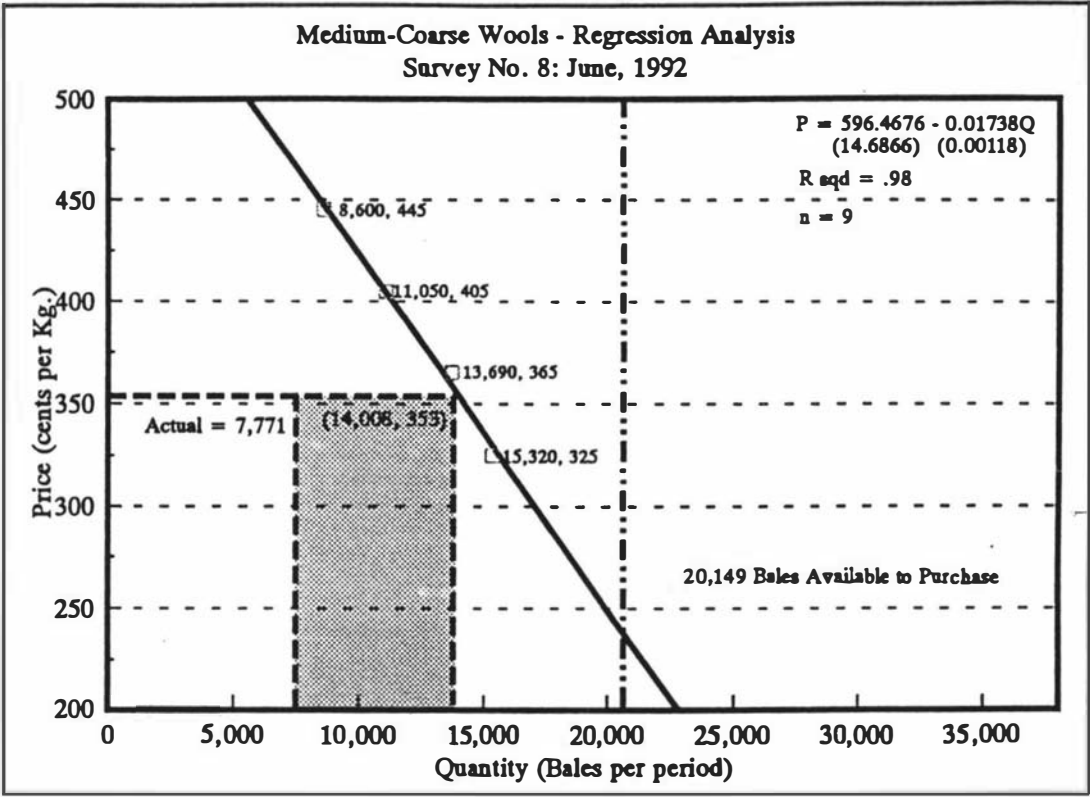


Figure O.46

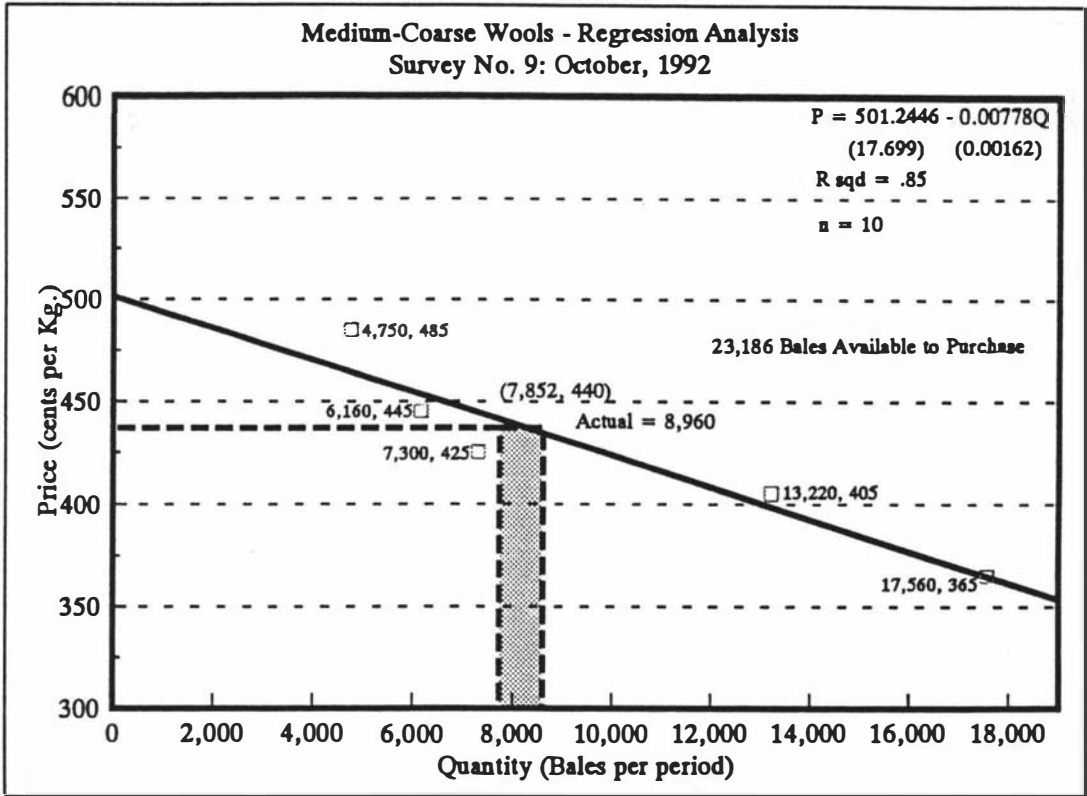


Figure O.47

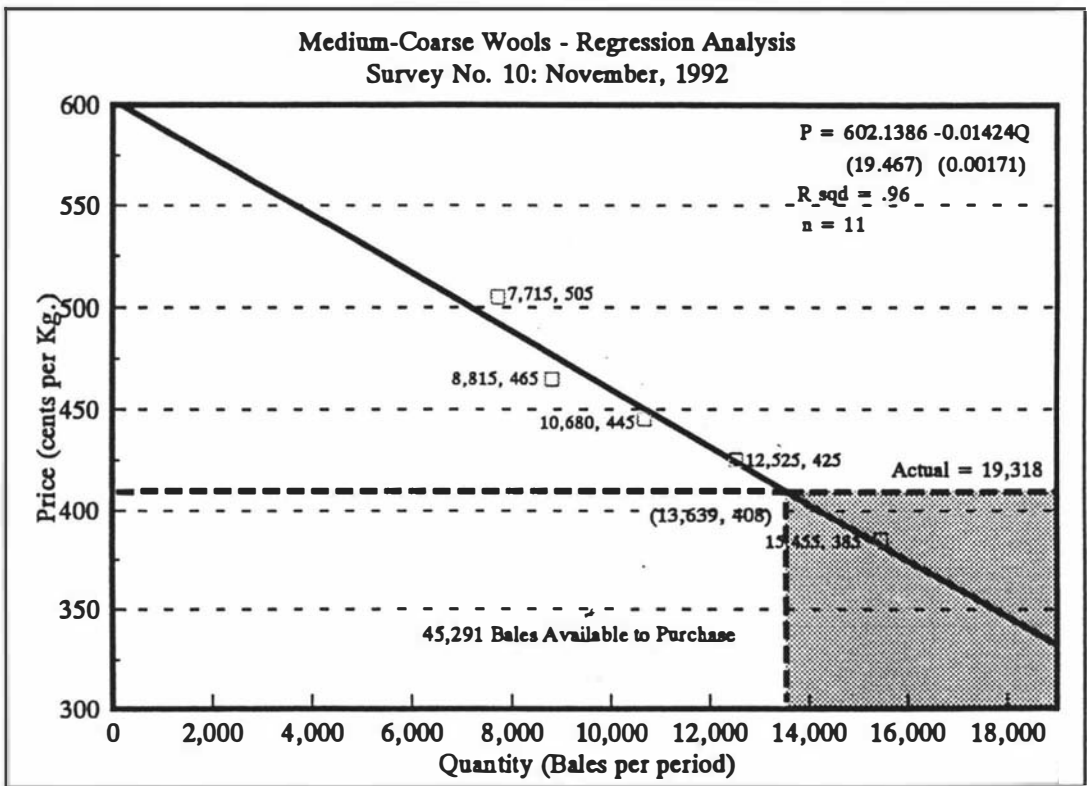


Figure O.48

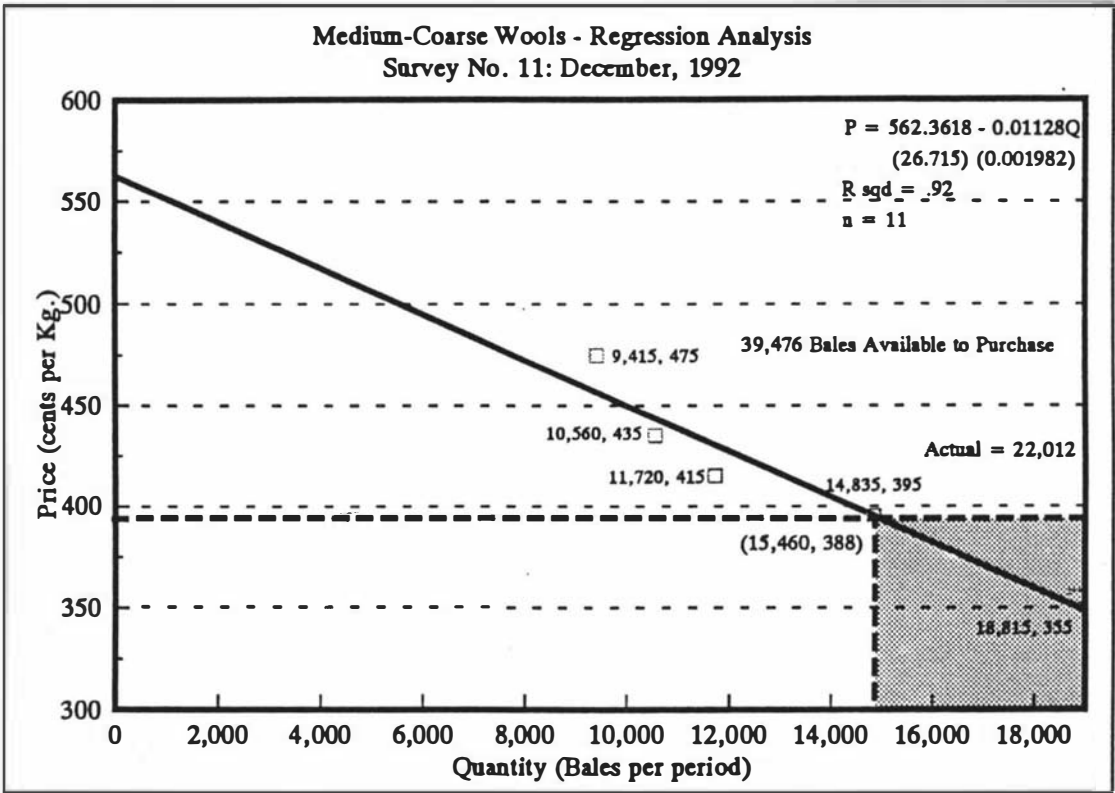


Figure O.49

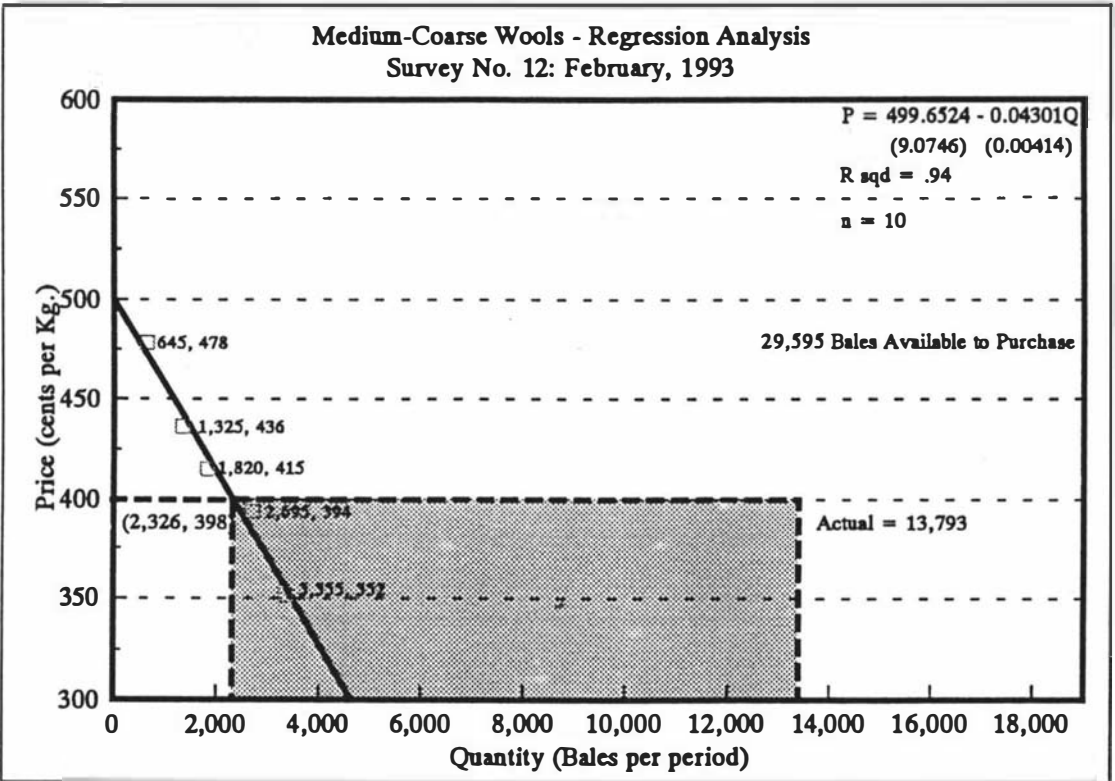


Figure O.50

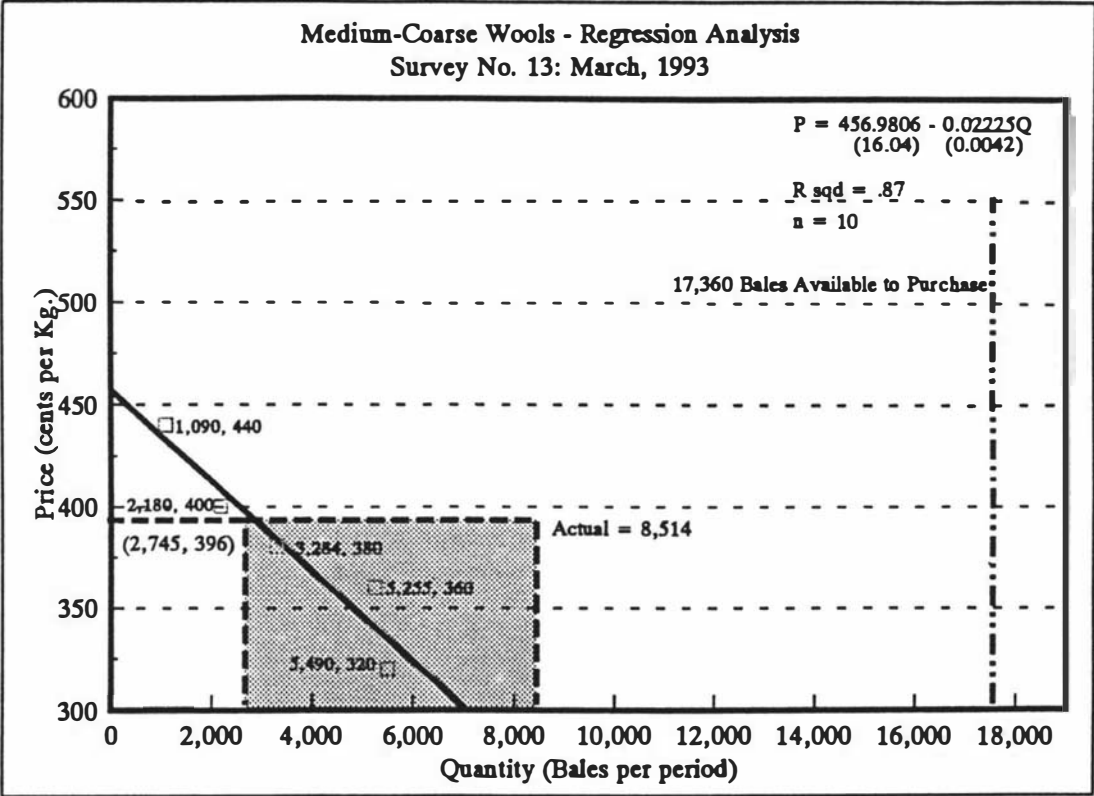


Figure O.51

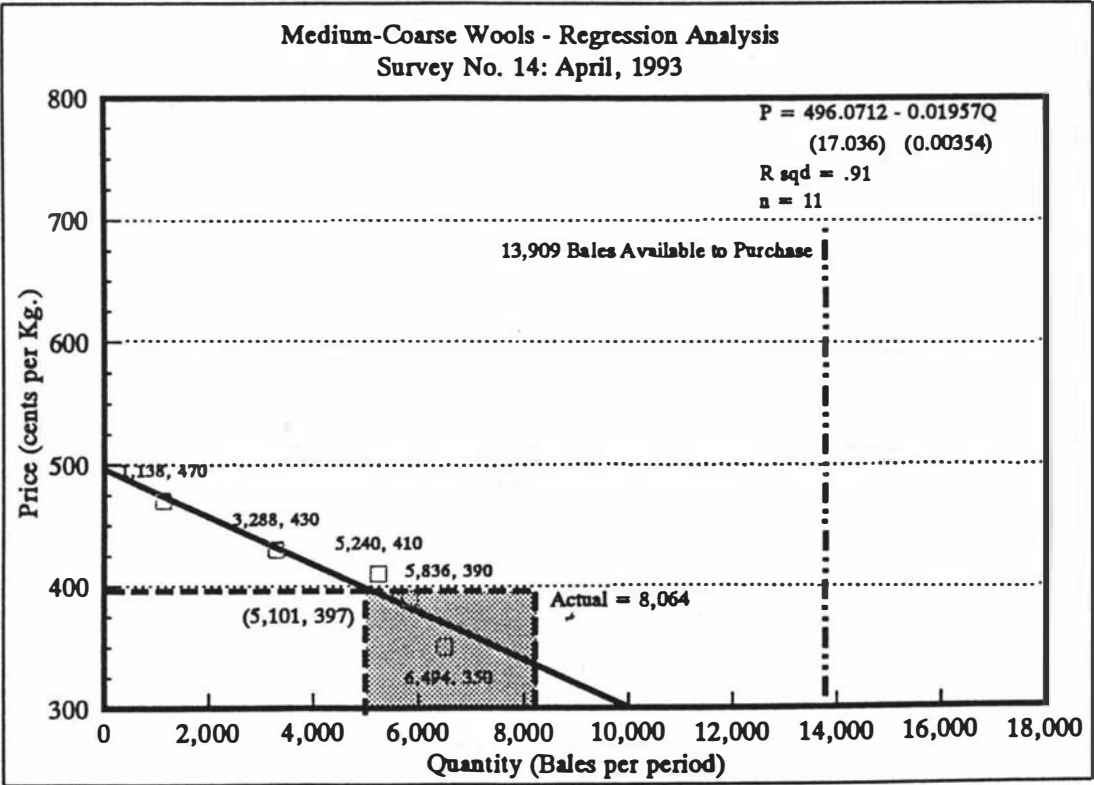


Figure O.52

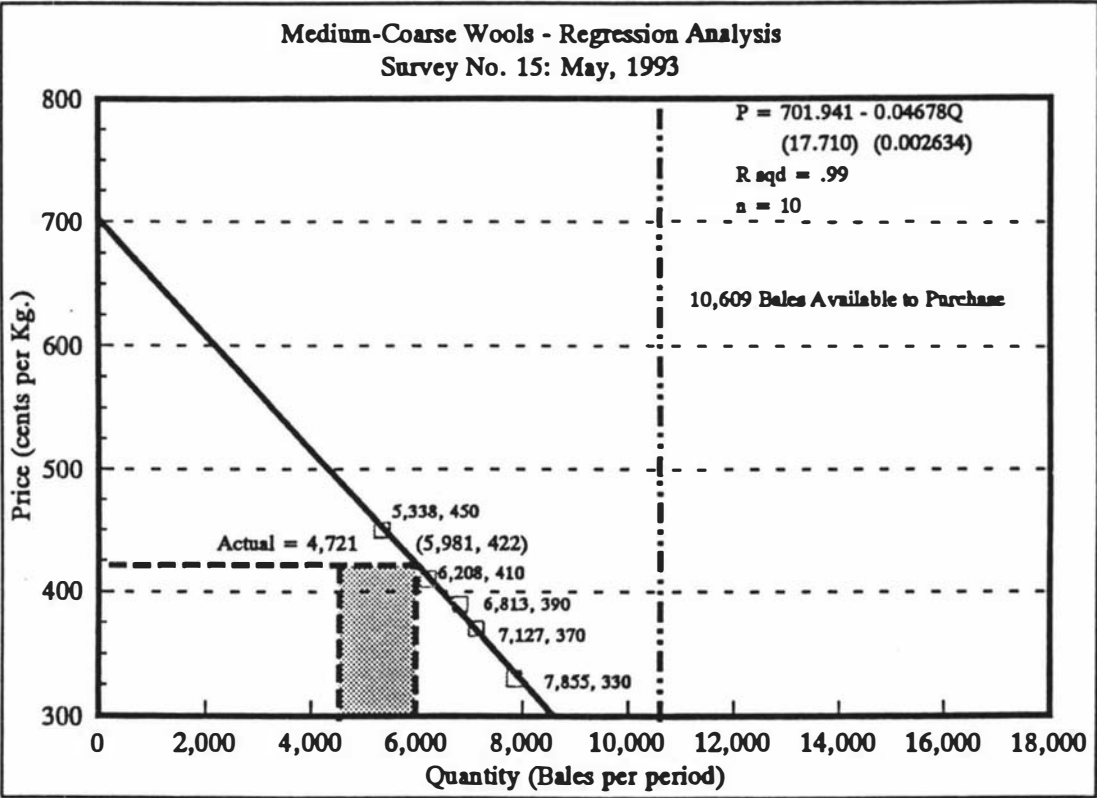


Figure O.53

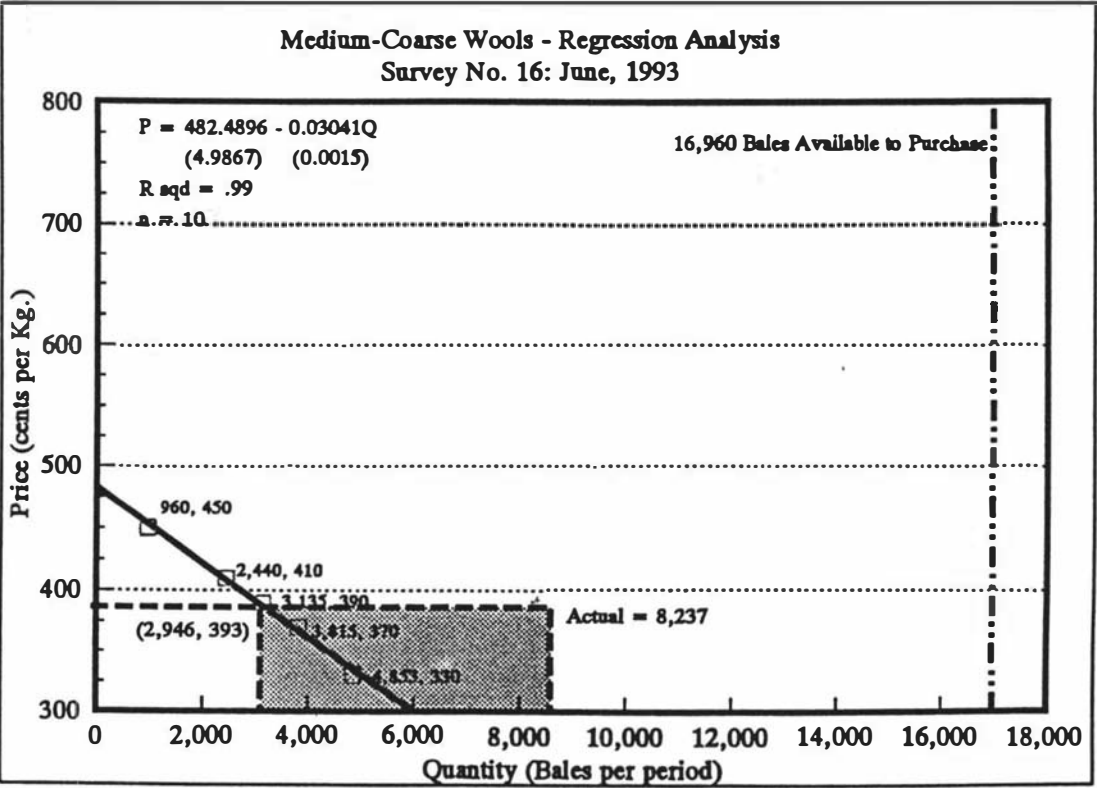


Figure O.54

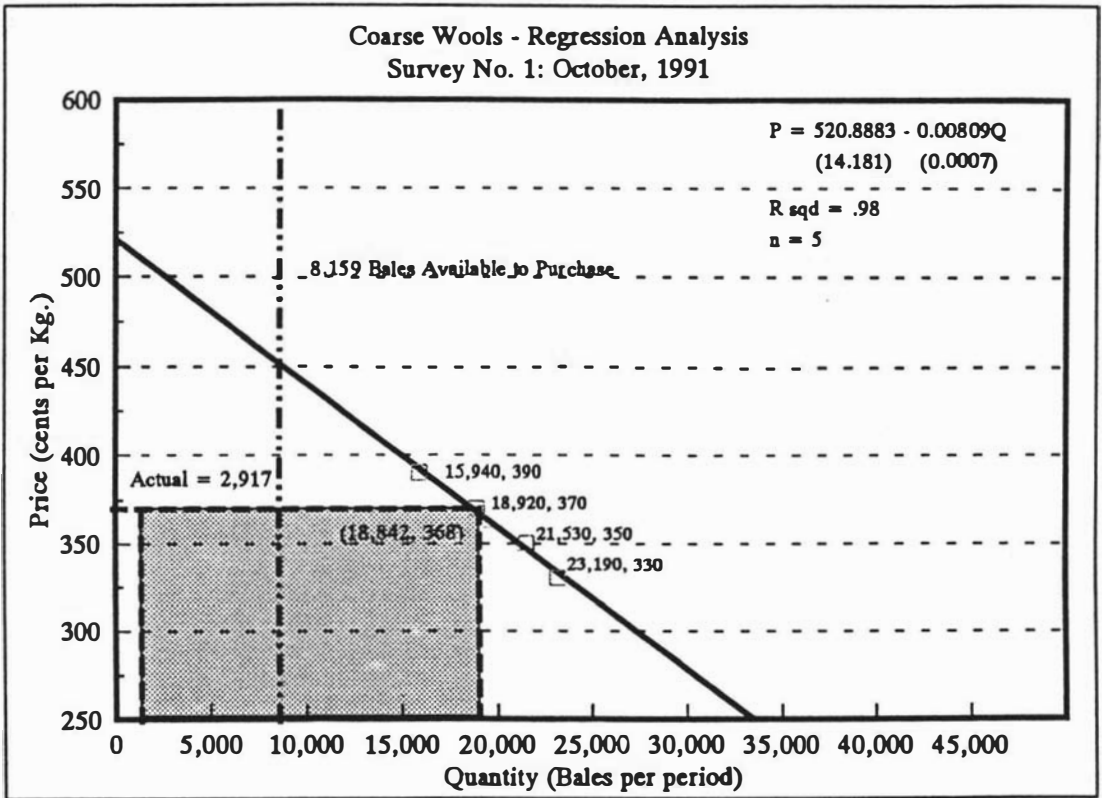


Figure O.55

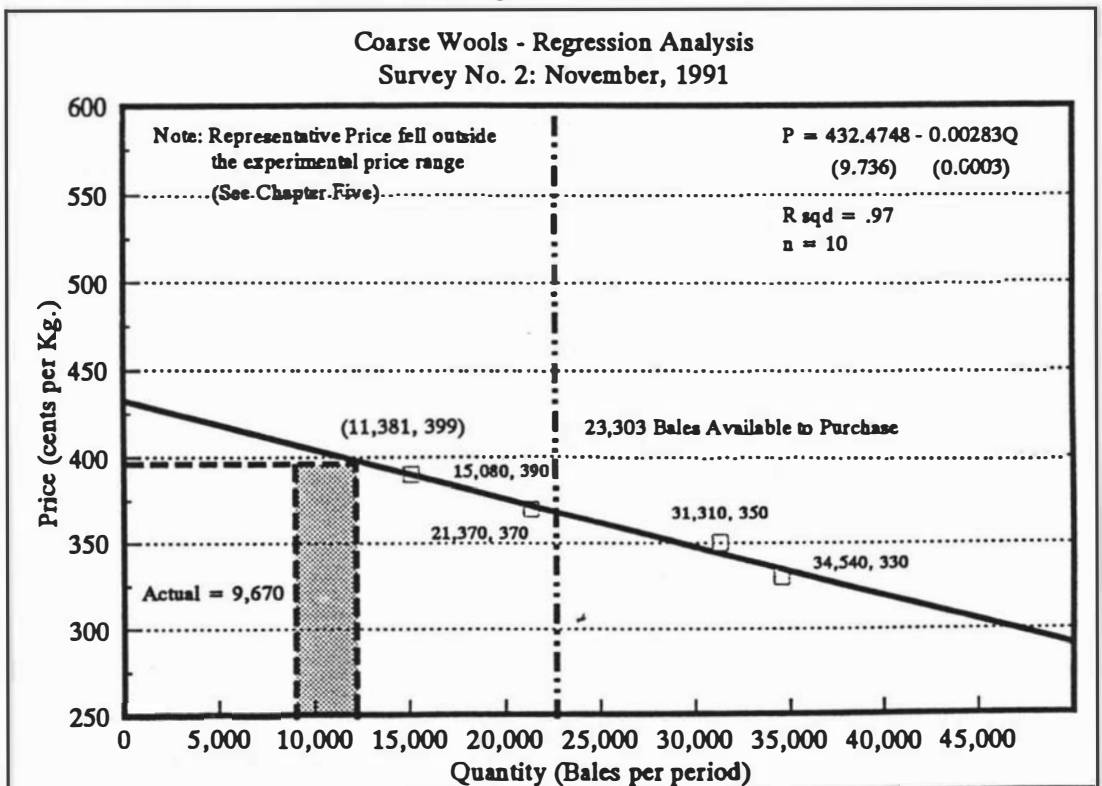


Figure O.56

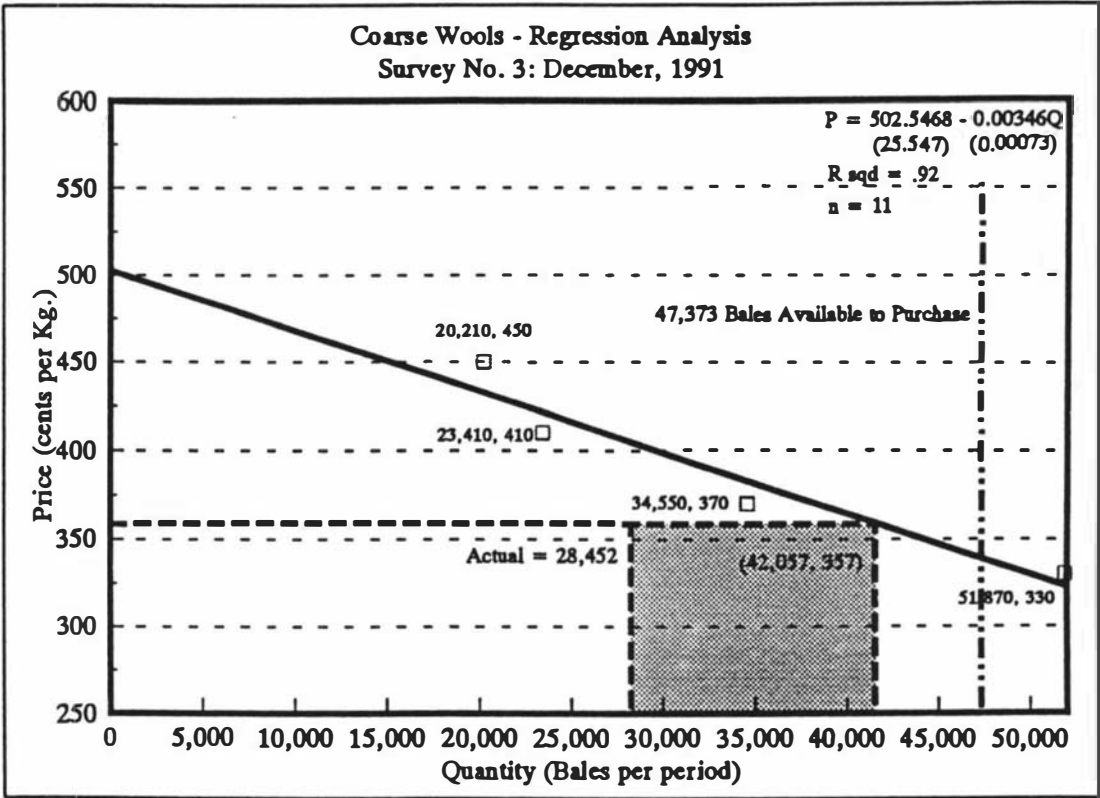


Figure O.57

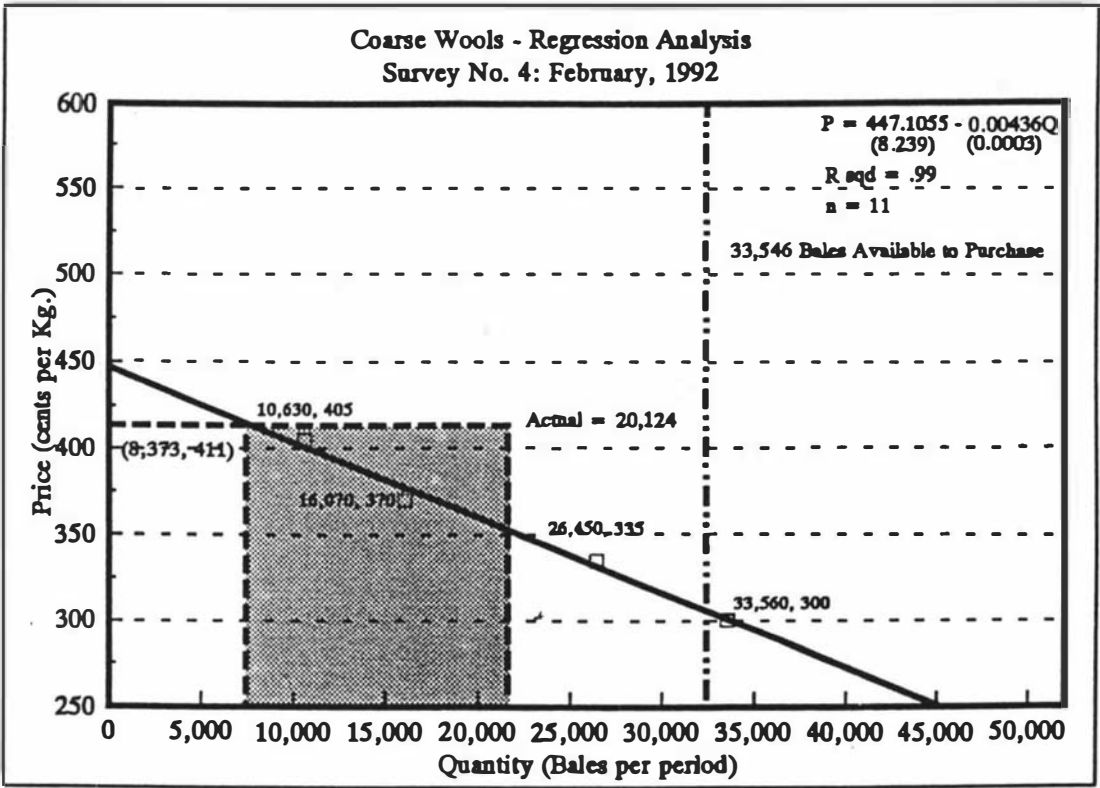


Figure O.58

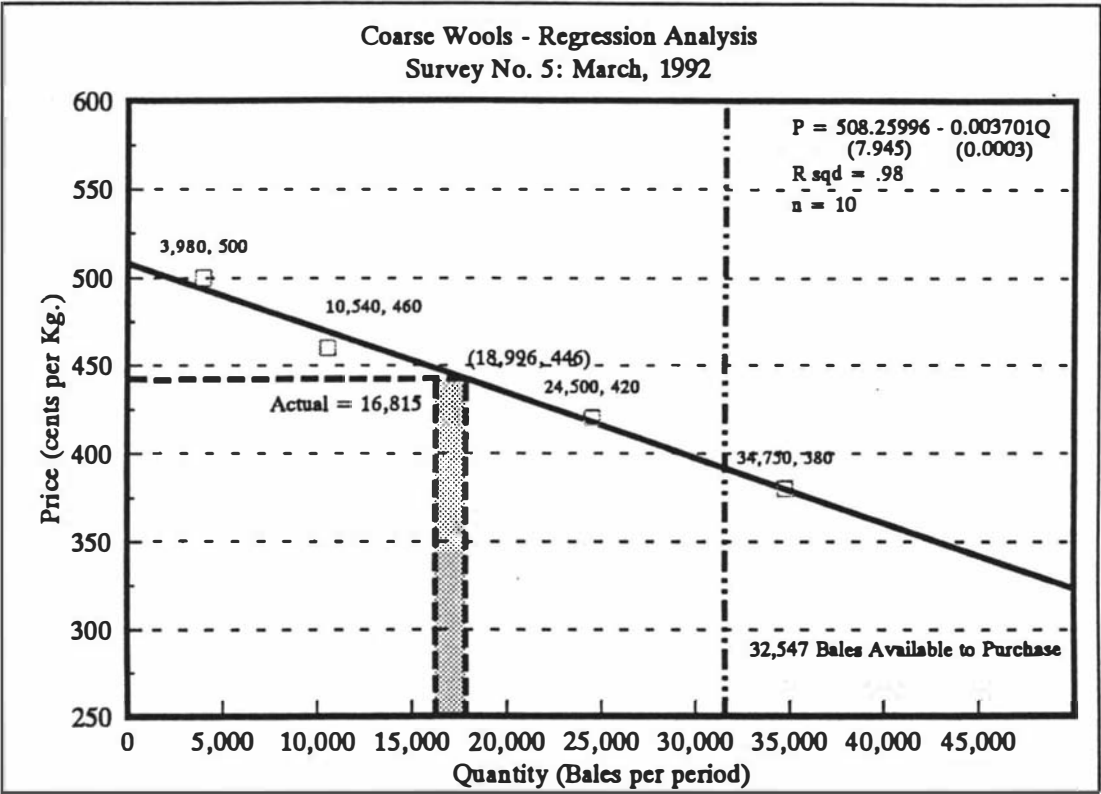


Figure O.59

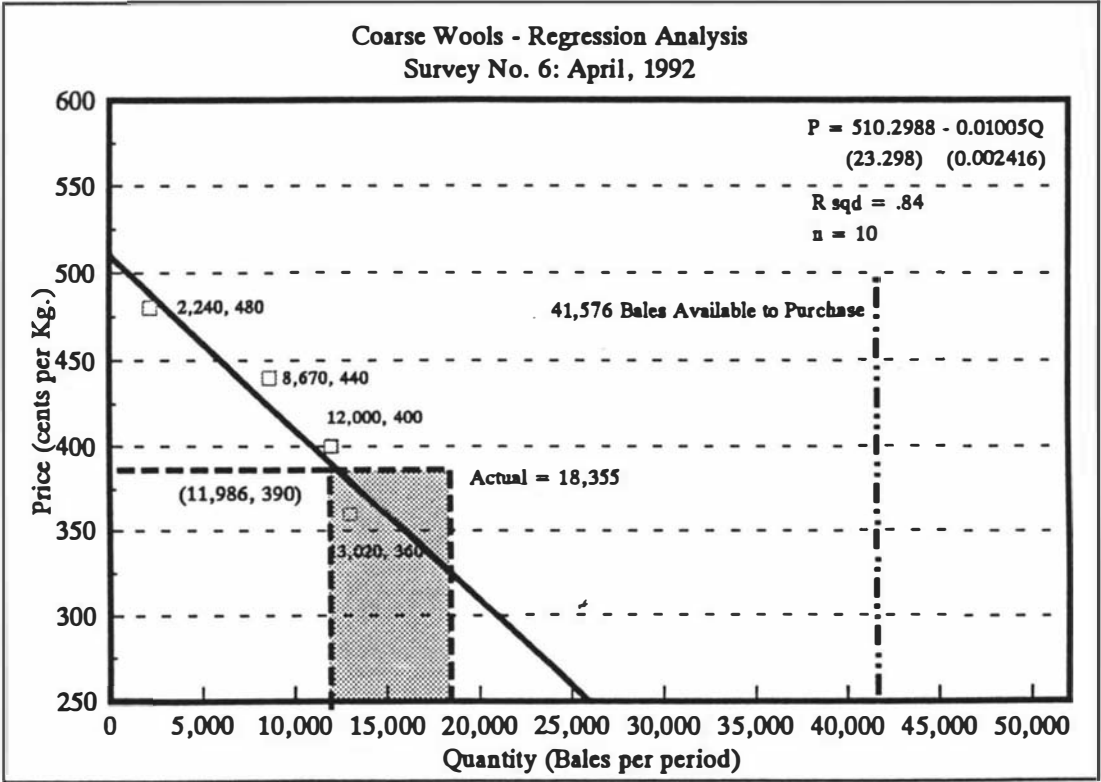


Figure O.60

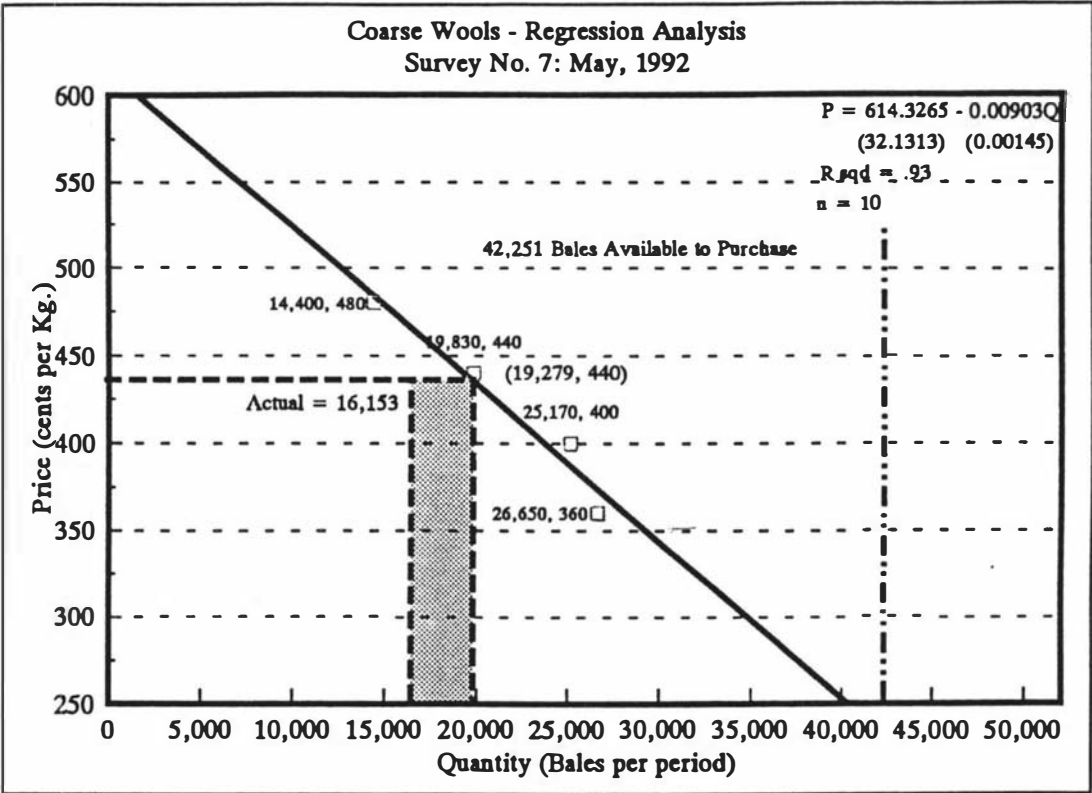


Figure O.61

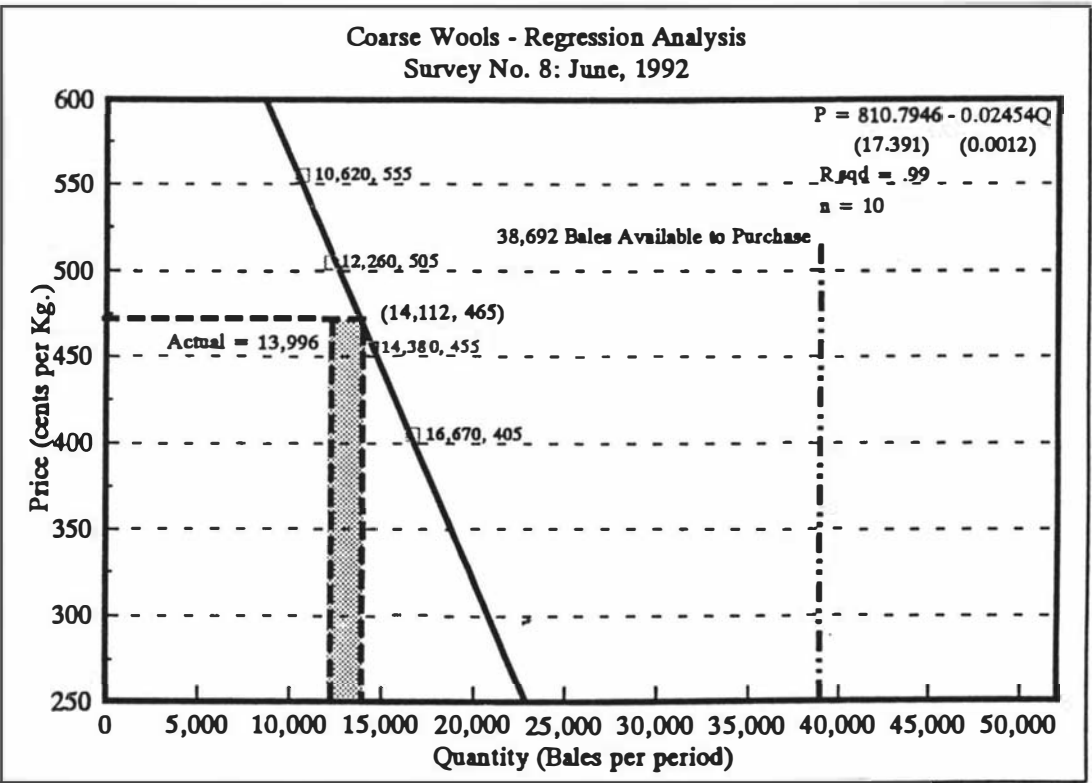


Figure O.62

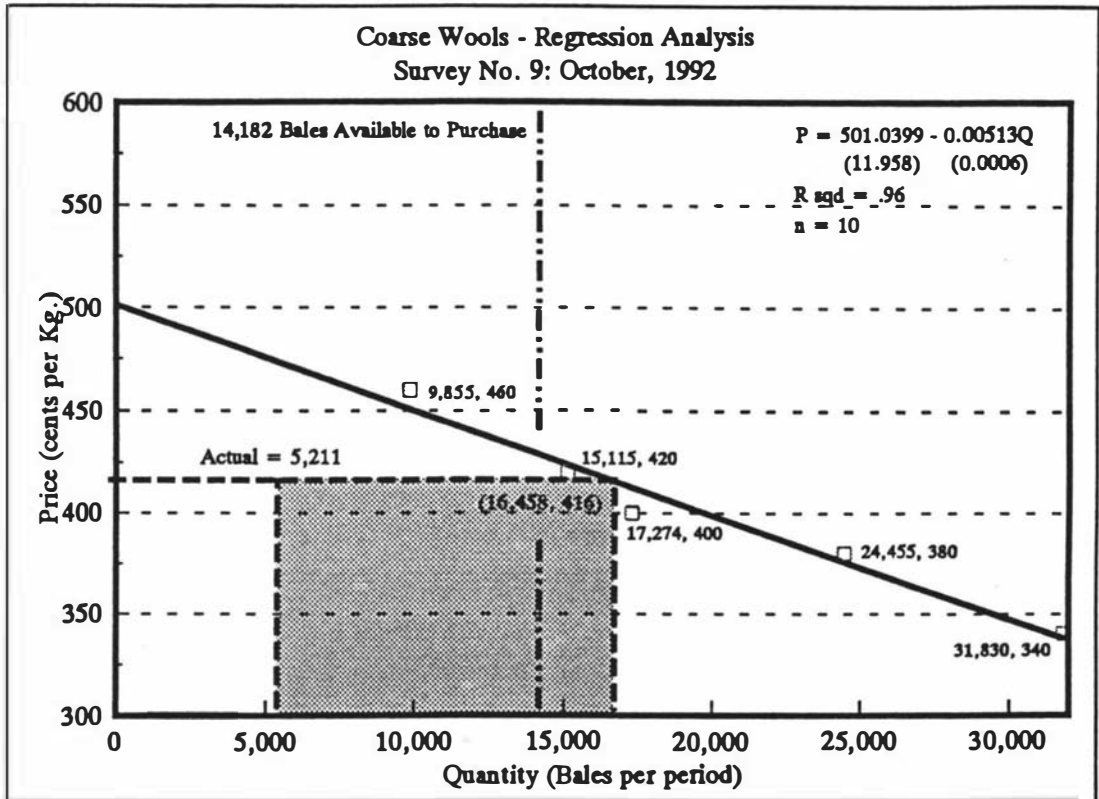


Figure O.63

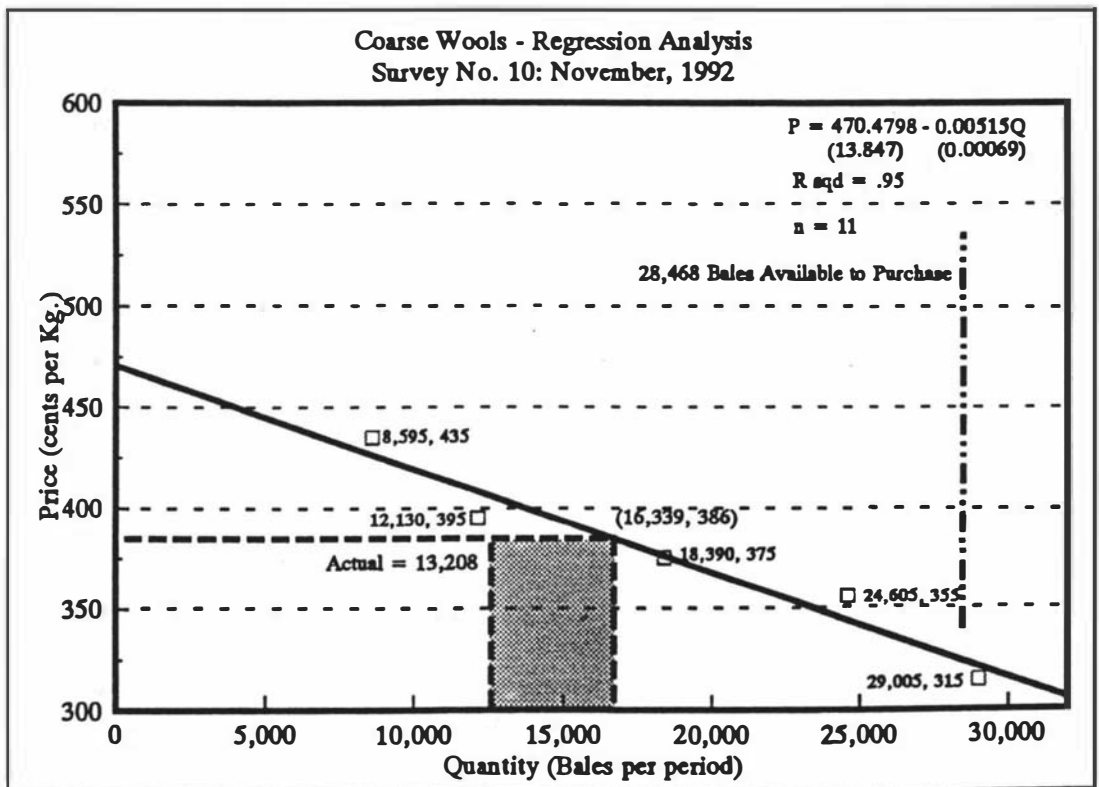


Figure O.64

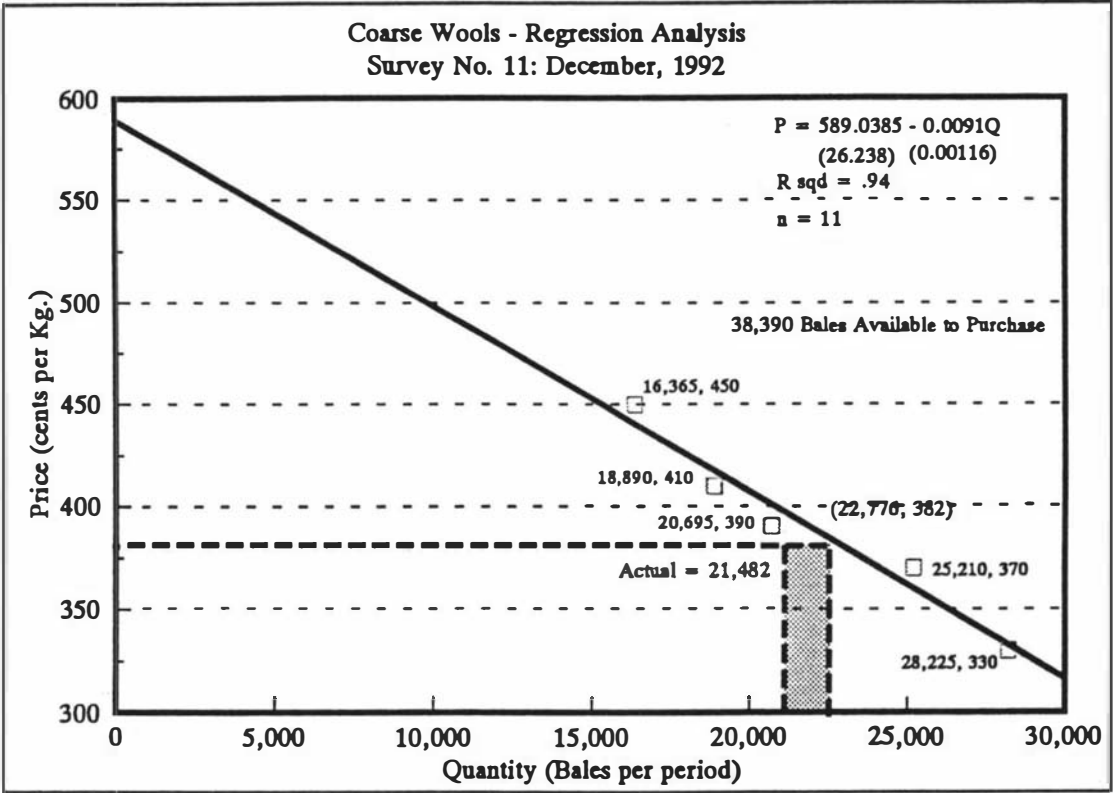


Figure O.65

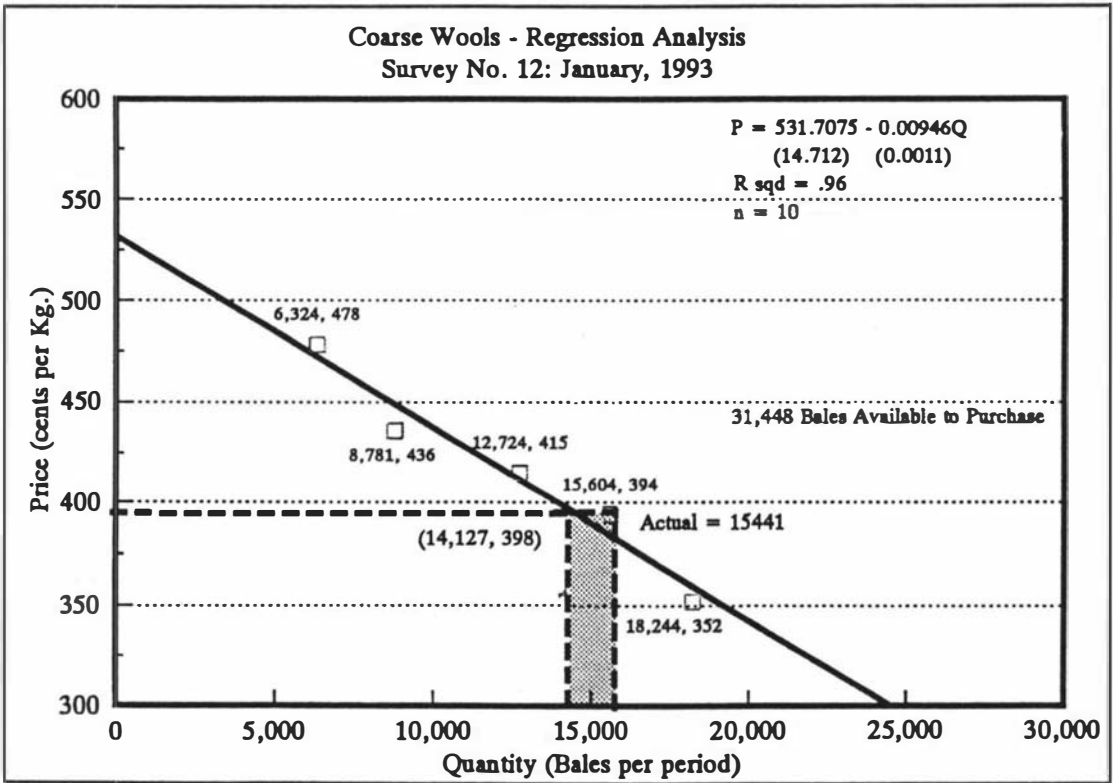


Figure O.66

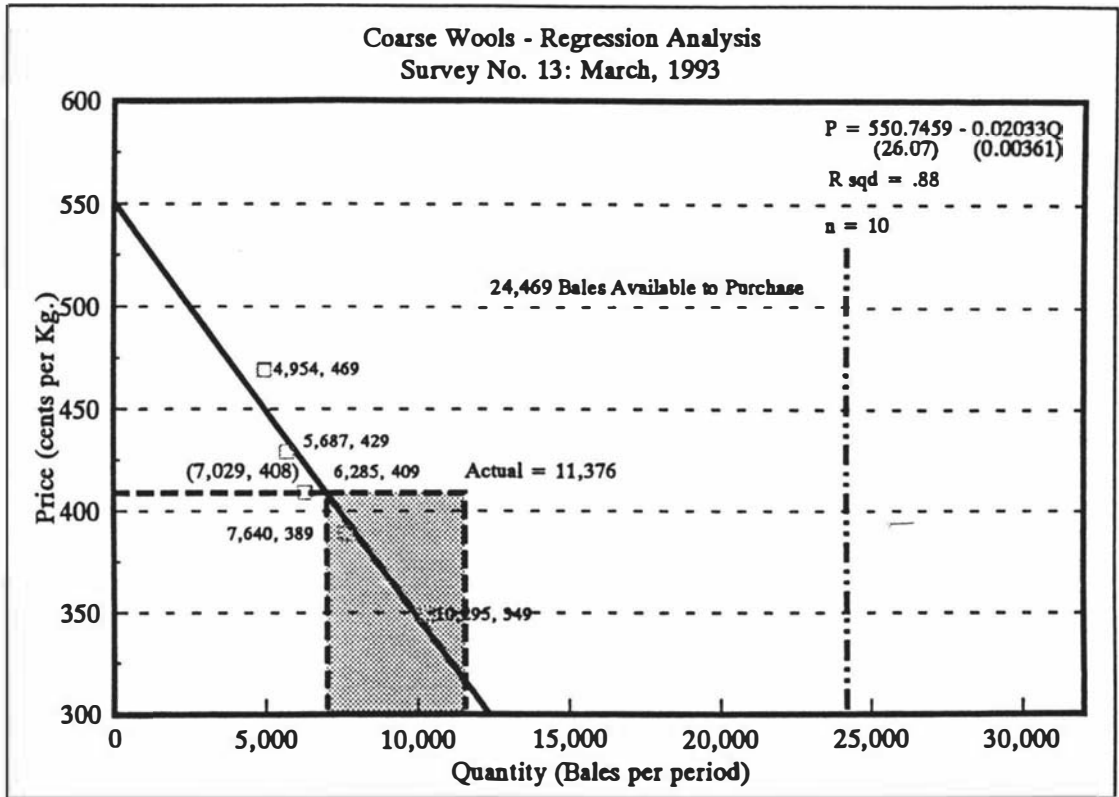


Figure O.67

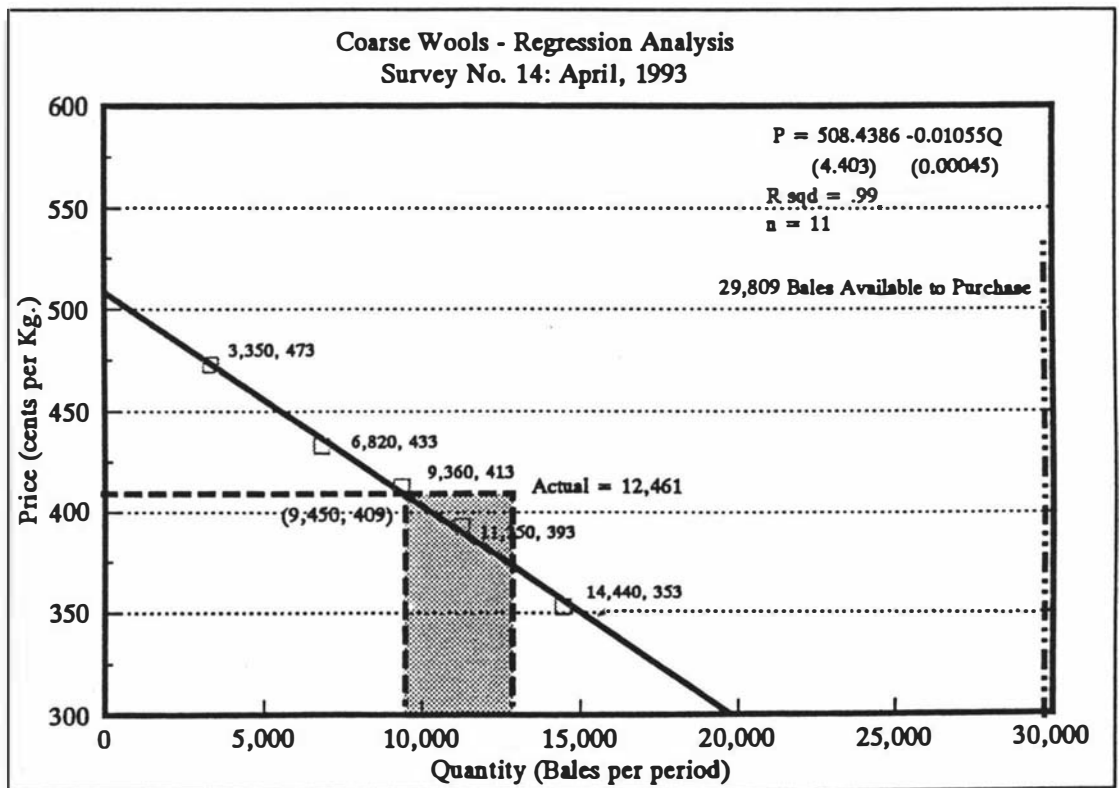


Figure O.68

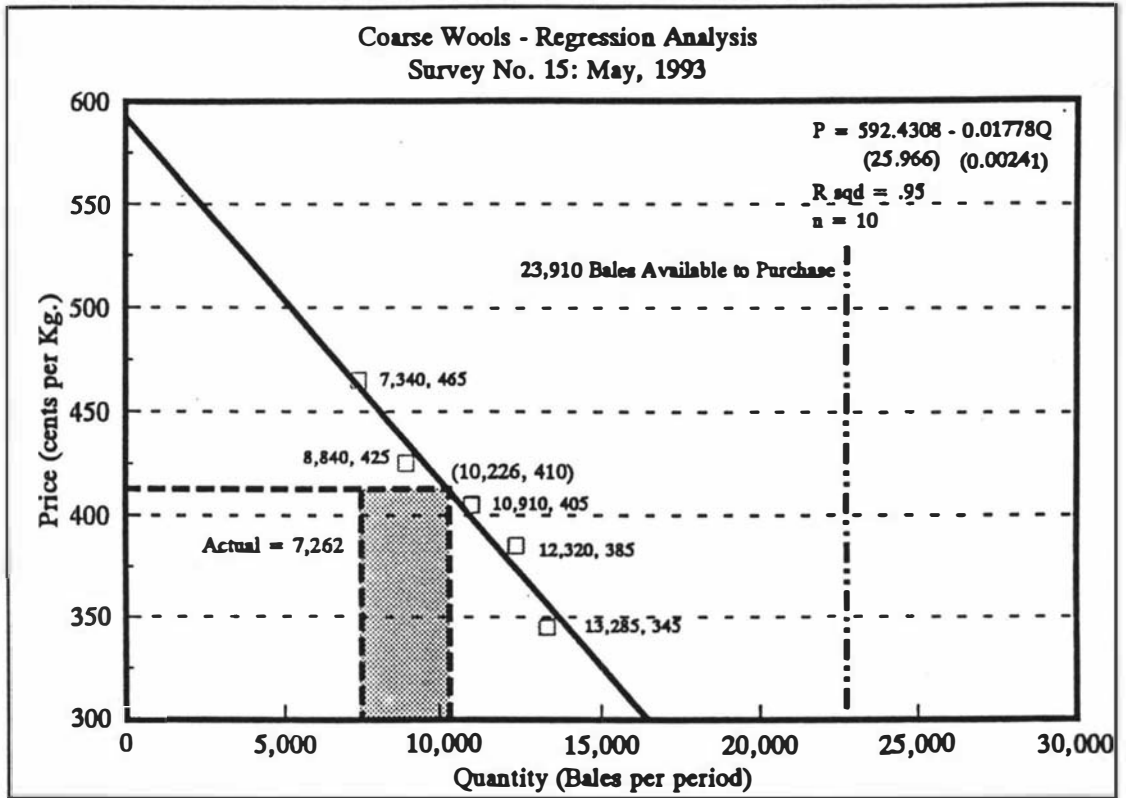
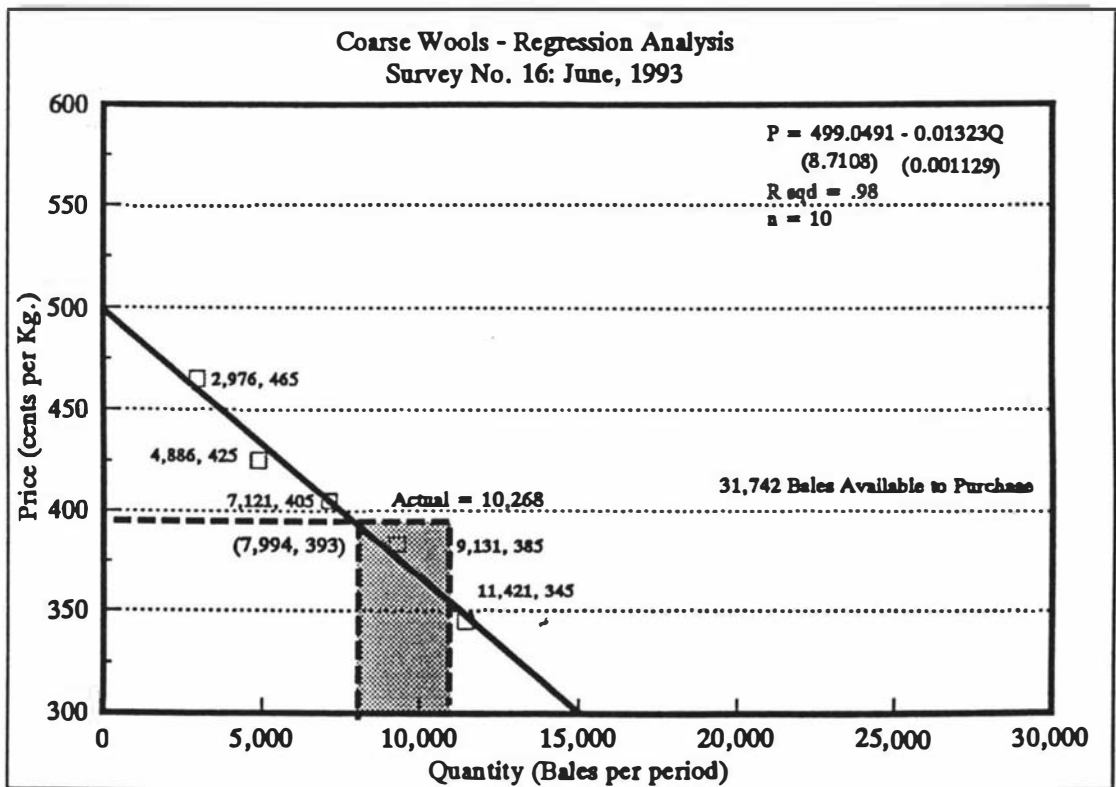


Figure O.69



APPENDIX P:

AVERAGE REPRESENTATIVE PRICES

TABLE P.1
AVERAGE WEIGHTED REPRESENTATIVE PRICES
DURING EACH SURVEY PERIOD

(clean cents/kg)

Period	Fine	Fine-Medium	Medium	Medium-Coarse	Coarse
Micron Range	< 24 m	25-28 m	29-32 m	33-35 m	> 36 m
1991-92 SEASON					
1	706	567			368
2	872*	667*			399*
3	945	654			357
4	959	710		339	411
5	1044	700		352	446
6	1044**	738		323	390
7	1044**	684		359	440
8	1044**	680		353	465
1992-93 SEASON					
9	762	682	618	440	416
10	793	672	613	408	386
11	711	691	639	388	382
12	754	648	552	398	398
13	738	635	505	396	408
14	745	610	505*	397	409
15	738	617	505*	422	410
16	650	508	472	393	393

Notes:

- a No quotes were set for this category during this month. The last price quoted is used as the indicator.
- b The medium wools category was split into two groups, 25-32 and 33-35 microns, in the fourth survey. The category was further refined from the ninth survey with a split into another two groups; 25-28, and 29-32 microns. For the purposes of a representative price, the wool type 35C3O was used as an indicator.
- c There may be more than one sale on each sale day (*i.e.* a North Island (Napier) and a South Island (Christchurch or Dunedin) sale (see Section 5.3, Chapter 5). Details of these sales are in Appendix N.
- * These representative prices are outside the bounds used in the experiment. In other words, the indicator either rose or fell sharply through the survey period to be at a mean level which was more than $\pm 20\%$ of the opening price (see Appendix N).

APPENDIX Q:

AGGREGATE DERIVED DEMAND SCHEDULES

INTRODUCTION:

The following tables represent the schedules derived from the horizontal aggregation of each of the three (Survey 1-3), four (Survey 4-8) or five (Survey 9-16) individual wool group schedules. The quantity of wool has been constrained in some cases to the maximum amount of wool available for purchase per survey period. This data was supplied by the New Zealand Wool Board and is based on the offerings available for auction (see Appendix N). Figure Q.1 below illustrates the aggregation procedure applied in these tables. The aggregated quantities provided the data for the estimation of the aggregate demand functions, slopes and price elasticities as discussed in Chapter Six, Volume One.

FIGURE Q.1
Aggregation of Wool Group Demand Schedules

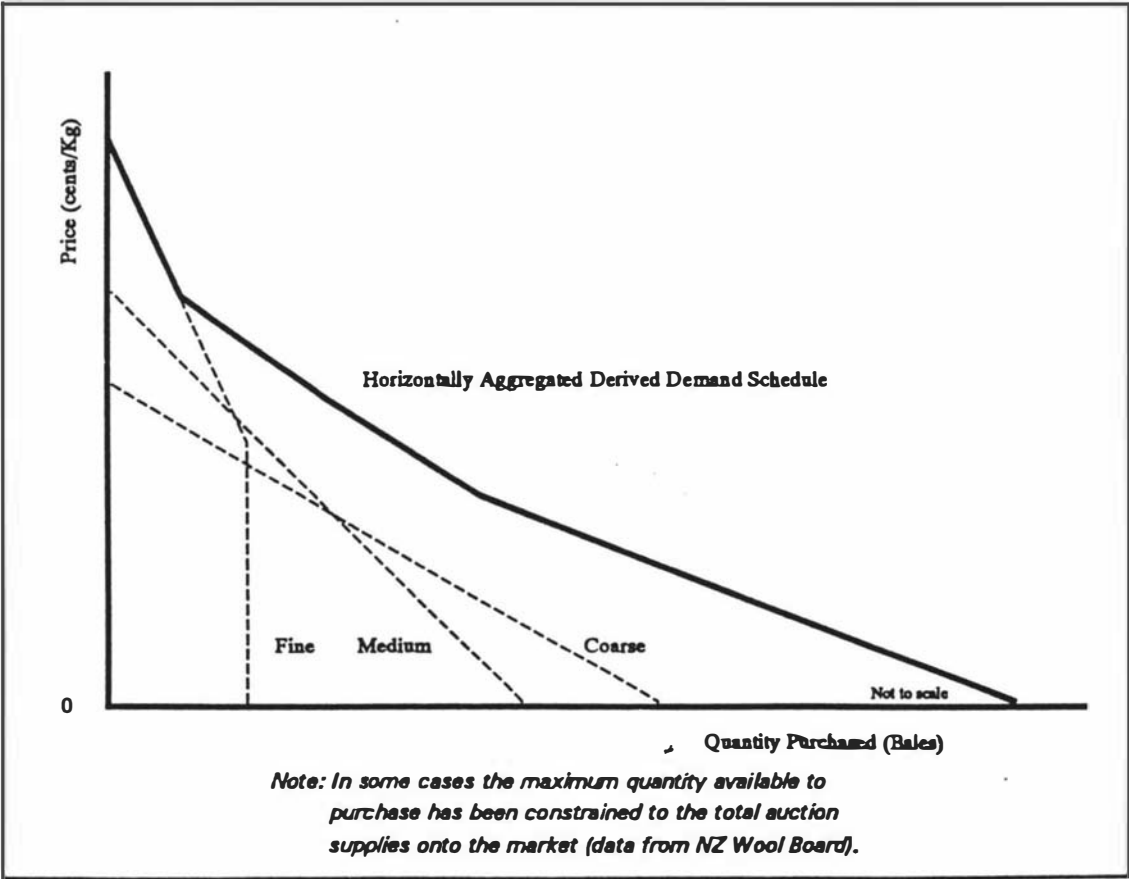


TABLE Q.1
Survey No. 1 (October 7 to November 1, 1991)

PRICE	FINE	MEDIUM	COARSE	AGGREGATE QUANTITY
α	720.3268	665.2087	523.6526	
β	0.02928	0.00731	0.00825	
750	0	0	0	0
725	0	0	0	0
700	694	0	0	694
675	1548	0	0	1548
650	2402	0	0	2402
625	3256	0	0	3256
600	4110	0	0	4110
575	4963	12340	0	17303
550	5817	15760	0	21577
525	6671	19180	0	25851
500	7525	22600	0	30125
475	8379	26020	0	34399
450	9232	29440	0	38672
425	10086	32860	0	42946
400	10940	36280	0	47220
375	11794	39700	8159	59653
350	12648	43120	8159	63927
325	13502	45852	8159	67513
300	14355	45852	8159	68366
275	15209	45852	8159	69220
250	16063	45852	8159	70074
α	14.84719	β	-3.97606	$R^2 = .73$

TABLE Q.2
Survey No. 2 (November 4 to November 29, 1991)

PRICE	FINE	MEDIUM	COARSE	AGGREGATE QUANTITY
α	758.2209	624.2560	453.6932	
β	0.01618	0.00363	0.00406	
750	0	0	0	0
725	0	0	0	0
700	3598	0	0	3598
675	5143	0	0	5143
650	6689	0	0	6689
625	8234	0	0	8234
600	9779	0	0	9779
575	11324	13569	0	24893
550	12869	20456	0	33325
525	14414	27343	0	41757
500	15959	34230	0	50189
475	17504	41117	0	58621
450	19049	48004	0	67053
425	20595	52225	0	72820
400	21203	52254	0	73428
375	21203	52225	19383	92811
350	21203	52225	23303	96731
325	21203	52225	23303	96731
300	21203	52225	23303	96731
275	21203	52225	23303	96731
250	21203	52225	23303	96731
α	12.90362	β	-3.14373	$R^2 = .76$

Q.3

TABLE Q.3
Survey No. 3 (December 9, 1991 to January 10, 1992)

PRICE	FINE	MEDIUM	COARSE	AGGREGATE QUANTITY
α	1487.01	979.3201	502.5468	
β	0.44113	0.01609	0.00346	
1200	0	0	0	0
1175	707	0	0	707
1150	764	0	0	764
1125	821	0	0	821
1100	877	0	0	877
1075	934	0	0	934
1050	991	0	0	991
1025	1047	0	0	1047
1000	1104	0	0	1104
975	1161	0	0	1161
950	1217	0	0	1217
925	1274	0	0	1274
900	1331	0	0	1331
875	1387	0	0	1387
850	1444	0	0	1444
825	1501	0	0	1501
800	1557	0	0	1557
775	1614	12699	0	14313
750	1671	14252	0	15923
725	1727	15806	0	17533
700	1784	17360	0	19144
675	1841	18914	0	20755
650	1897	20467	0	22364
625	1954	22021	0	23975

Q.4

<i>continued from page Q.4</i>				
600	2011	23575	0	25586
575	2067	25129	0	27196
550	2124	26682	0	28806
525	2181	28236	0	30417
500	2237	29790	0	32027
475	2294	31344	0	33638
450	2351	32897	15187	50435
425	2407	34451	22412	59270
400	2464	36005	29638	68107
375	2521	37559	36863	76943
350	2577	39112	44089	85778
325	2634	40666	47373	90673
300	2691	42220	47373	92284
275	2748	43774	47373	93895
250	2804	45328	47373	95505
α	14.85954	β	-3.88169	$R^2 = .86$

TABLE Q.4
Survey No. 4 (January 27 to February 21, 1992)

PRICE	FINE WOOL	FINE-MED WOOL	MEDIUM -COARSE	COARSE WOOL	AGGREGATE QUANTITY
α	1104.634	841.9526	398.8515	447.1055	
β	0.36409	0.02011	0.00711	0.00436	
1125	0	0	0	0	0
1100	13	0	0	0	13
1075	81	0	0	0	81
1050	150	0	0	0	150
1025	219	0	0	0	219
1000	287	0	0	0	287
975	356	0	0	0	356
950	425	0	0	0	425
925	493	0	0	0	493
900	562	0	0	0	562
875	631	0	0	0	631
850	699	0	0	0	699
825	768	0	0	0	768
800	837	0	0	0	837
775	905	3329	0	0	4234
750	974	4572	0	0	5546
725	1043	5816	0	0	6859
700	1111	7059	0	0	8170
675	1180	8302	0	0	9482
650	1249	9545	0	0	10794
625	1317	10788	0	0	12105
600	1386	12031	0	0	13417
575	1455	13275	0	0	14730

<i>continued from page Q.6</i>					
550	1523	14518	0	0	16041
525	1592	15761	0	0	17333
500	1661	17004	0	0	18665
475	1729	18247	0	0	19976
450	1798	19490	0	0	21288
425	1867	20734	0	0	22601
400	1935	21977	0	10804	34716
375	2004	23220	0	16538	41762
350	2073	24463	0	22272	48808
325	2141	25706	10387	28006	66240
300	2210	26949	13903	33546	76608
275	2279	28193	17419	33546	81437
250	2347	29436	20936	33546	86265
α		17.36613	β	-4.92001	$R^2 = .84$

TABLE Q.5
Survey No. 5 (February 24 to March 20, 1992)

PRICE	FINE WOOL (n)	FINE-MED WOOL	MEDIUM -COARSE	COARSE WOOL	AGGREGATE QUANTITY
α	36.065	1052.735	701.9396	504.7469	
β	11.16	0.05189	0.01127	0.00360	
1150	0	0	0	0	0
1125	102	0	0	0	102
1100	132	0	0	0	132
1075	169	0	0	0	169
1050	224	0	0	0	224
1025	295	0	0	0	295
1000	380	0	0	0	380
975	513	0	0	0	513
950	676	0	0	0	676
925	912	0	0	0	912
900	998	0	0	0	998
875	998	0	0	0	998
850	998	3907	0	0	4905
825	998	4389	0	0	5387
800	998	4871	0	0	5869
775	998	5352	0	0	6350
750	998	5834	0	0	6832
725	998	6316	0	0	7314
700	998	6798	0	0	7796
675	998	7280	0	0	8278
650	998	7761	0	0	8759
625	998	8243	0	0	9241
600	998	8725	0	0	9723

<i>continued from page Q.8</i>					
575	998	9207	0	0	10205
550	998	9688	0	0	10686
525	998	10170	0	0	11168
500	998	10652	0	1319	12969
475	998	11134	0	8263	20395
450	998	11616	0	15207	27821
425	998	12097	24573	22152	59820
400	998	12579	24573	29096	67246
375	998	13061	24573	32547	71179
350	998	13543	24573	32547	71661
325	998	14025	24573	32547	72143
300	998	14506	24573	32547	72624
275	998	14988	24573	32547	73106
250	998	15470	24573	32547	73588
α		16.01644	β	-4.38523	$R^2 = .86$

Note: (n) = Non-linear regression estimates

TABLE Q.6
Survey No. 6 (March 23 to April 17, 1992)

PRICE	FINE WOOL	FINE-MED WOOL	MEDIUM -COARSE	COARSE WOOL	AGGREGATE QUANTITY
α	1388.837	1091.04	448.9066	510.2988	
β	3.83721	0.07559	0.01203	0.01005	
1225	0	0	0	0	0
1200	0	0	0	0	0
1175	56	0	0	0	56
1150	62	0	0	0	62
1125	69	0	0	0	69
1100	75	0	0	0	75
1075	82	0	0	0	82
1050	88	0	0	0	88
1025	95	0	0	0	95
1000	101	0	0	0	101
975	108	0	0	0	108
950	114	0	0	0	114
925	121	0	0	0	121
900	127	2527	0	0	2654
875	134	2858	0	0	2992
850	140	3189	0	0	3329
825	147	3520	0	0	3667
800	153	3850	0	0	4003
775	160	4181	0	0	4341
750	166	4512	0	0	4678
725	173	4842	0	0	5015
700	180	5173	0	0	5353
675	186	5504	0	0	5690

continued from page Q.10					
650	193	5835	0	0	6028
625	199	6165	0	0	6364
600	206	6496	0	0	6702
575	212	6827	0	0	7039
550	219	7158	0	0	7377
525	225	7488	0	0	7713
500	232	7819	0	0	8051
475	238	8150	0	3512	11960
450	245	8480	0	6000	14725
425	251	8811	0	8487	17559
400	258	9142	4065	10975	24440
375	264	9473	6144	13463	29344
350	271	9803	8222	15950	34246
325	277	10134	10300	18438	39149
300	284	10465	12378	20925	44052
275	290	10796	14456	23413	48955
250	297	11126	16534	25900	53857
α		16.56064	β	-4.67868	$R^2 = .80$

TABLE Q.7
Survey No. 7 (April 20 to May 15, 1991)

PRICE	FINE WOOL	FINE-MED WOOL	MEDIUM -COARSE	COARSE WOOL	AGGREGATE QUANTITY
α	1470.000	966.3527	583.6746	614.3265	
β	6.95652	0.21566	0.01530	0.00903	
1000	0	0	0	0	0
975	71	0	0	0	71
950	75	0	0	0	75
925	78	0	0	0	78
900	82	0	0	0	82
875	86	0	0	0	86
850	89	0	0	0	89
825	93	655	0	0	748
800	96	771	0	0	867
775	100	887	0	0	987
750	104	1003	0	0	1107
725	107	1119	0	0	1226
700	111	1235	0	0	1346
675	114	1351	0	0	1465
650	118	1467	0	0	1585
625	121	1583	0	0	1704
600	125	1699	0	0	1824
575	129	1815	0	0	1944
550	132	1931	0	0	2063
525	136	2047	0	0	2183
500	139	2162	0	0	2301
475	143	2278	0	15429	17850
450	147	2394	0	18198	20739
425	150	2510	0	20966	23626
400	154	2626	12005	23735	38520
375	157	2742	13639	26503	43041
350	161	2858	15273	29272	47564
325	165	2974	16907	32041	52087
300	168	3090	18541	34809	56608
275	172	3206	20175	37578	61131
250	175	3322	20332	40346	64175
α		18.59461	β	-5.51821	$R^2 = .91$

TABLE Q.8
Survey No. 8 (May 15 to June 19, 1992)

PRICE	FINE WOOL	FINE-MED WOOL	MEDIUM -COARSE	COARSE WOOL	AGGREGATE QUANTITY
α	977.7161	927.5279	596.4676	810.7946	
β	0.27479	0.08912	0.01738	0.02454	
1000	0	0	0	0	0
975	10	0	0	0	10
950	101	0	0	0	101
925	192	0	0	0	192
900	283	0	0	0	283
875	374	0	0	0	374
850	465	870	0	0	1335
825	556	1150	0	0	1706
800	647	1431	0	0	2078
775	738	1711	0	0	2449
750	829	1992	0	0	2821
725	920	2273	0	0	3193
700	1011	2553	0	0	3564
675	1102	2834	0	0	3936
650	1193	3114	0	0	4307
625	1284	3395	0	0	4679
600	1375	3675	0	0	5050
575	1466	3956	0	0	5421
550	1557	4236	0	10627	16420
525	1647	4517	0	11646	17810
500	1696	4797	0	12665	19158
475	1696	5078	0	13684	20458
450	1696	5358	0	14702	21756
425	1696	5639	9866	15721	32922
400	1696	5919	11304	16740	35659
375	1696	6200	12743	17759	38398
350	1696	6480	14181	18777	41134
325	1696	6761	15620	19796	43873
300	1696	7041	17058	20815	46610
275	1696	7322	18496	21834	49348
250	1696	7602	19935	22852	52085
α		16.58833	β	-4.68086	R² = .77

TABLE Q.9
Survey No. 9 (October 5 to October 30, 1992)

PRICE	FINE WOOL	FINE-MED WOOL	MEDIUM WOOL	MEDIUM COARSE	COARSE WOOL	AGGREGATE QUANTITY
α	1039.847	865.5189	751.5551	501.2446	501.0399	
β	0.08315	0.02362	0.01311	0.00778	0.00513	
925	0	0	0	0	0	0
900	1682	0	0	0	0	1682
875	1983	0	0	0	0	1983
850	2283	0	0	0	0	2283
825	2584	0	0	0	0	2584
800	2885	0	0	0	0	2885
775	3185	0	0	0	0	3185
750	3486	4891	0	0	0	8377
725	3786	5949	0	0	0	9737
700	4087	7008	3933	0	0	15028
675	4388	7857	3839	0	0	18084
650	4688	7857	7746	0	0	20291
625	4989	7857	9653	0	0	22499
600	5290	7857	11560	0	0	24707
575	5590	7857	11809	0	0	25256
550	5891	7857	11809	0	0	25557
525	6192	7857	11809	0	0	25858
500	6492	7857	11809	0	0	26158
475	6793	7857	11809	0	0	26459
450	7094	7857	11809	6587	9949	43296
425	7394	7857	11809	9800	14182	51042
400	7695	7857	11809	13013	14182	54556
375	7996	7857	11809	16227	14182	58071
350	8296	7857	11809	19440	14182	61584
325	8597	7857	11809	22654	14182	65099
300	8898	7857	11809	23186	14182	65932
275	9198	7857	11809	23186	14182	66232
250	9499	7857	11809	23186	14182	66533
α		12.19500		β	-2.91011	$R^2 = .80$

TABLE Q.10
Survey No. 10 (November 2 to November 27, 1992)

PRICE	FINE WOOL	FINE-MED WOOL	MEDIUM WOOL	MEDIUM -COARSE	COARSE WOOL	AGGREGATE QUANTITY
α	842.226	914.4889	768.9553	602.1386	470.4798	
β	0.02529	0.04983	0.01592	0.01424	0.00515	
850	0	0	0	0	0	0
825	681	0	0	0	0	681
800	1670	0	0	0	0	1670
775	2658	0	0	0	0	2658
750	3647	3301	0	0	0	6948
725	4635	3803	0	0	0	8438
700	5624	4304	4331	0	0	14259
675	6612	4806	5902	0	0	17320
650	7601	5308	7472	0	0	20381
625	8589	5810	9042	0	0	23441
600	9578	6311	10613	0	0	26502
575	10566	6813	12183	0	0	29562
550	11555	7111	13753	0	0	32419
525	12544	7111	15324	0	0	34979
500	13532	7111	16894	7173	0	44710
475	14521	7111	18465	8928	0	49025
450	15509	7111	18530	10684	0	51834
425	16498	7111	18530	12440	8831	63410
400	17486	7111	18530	14195	13685	71007
375	18475	7111	18530	15951	18540	78607
350	19463	7111	18530	17706	23394	86204
325	20452	7111	18530	19462	28249	93804
300	21440	7111	18530	21218	28468	96766
275	22429	7111	18530	22973	28468	99512
250	23417	7111	18530	24729	28468	102255
α	13.27676		β	-3.27844		$R^2 = .74$

TABLE Q.11
Survey No. 11 (November 23 to December 18, 1992)

PRICE	FINE WOOL	FINE-MED WOOL	MEDIUM WOOL	MEDIUM-COARSE	COARSE WOOL	AGGREGATE QUANTITY
α	840.6753	723.6659	830.4231	562.3618	589.0385	
β	0.03417	0.01754	0.03244	0.01128	0.00910	
875	0	0	0	0	0	0
850	273	0	0	0	0	273
825	459	0	0	0	0	459
800	1190	0	0	0	0	1190
775	1922	0	0	0	0	1922
750	2654	0	0	0	0	2654
725	3385	0	0	0	0	3385
700	4117	1349	4020	0	0	9486
675	4849	2775	4791	0	0	12415
650	5580	4200	5562	0	0	15342
625	6312	5625	6332	0	0	18269
600	7043	7051	7103	0	0	21197
575	7775	8476	7874	0	0	24125
550	8507	9901	8644	0	0	27052
525	9238	11326	9415	0	0	29979
500	9970	12054	10186	0	0	32210
475	10702	12054	10956	7745	0	41457
450	11294	12054	11727	9961	15279	60315
425	11294	12054	12498	12177	18026	66049
400	11294	12054	13268	14394	20773	71783
375	11294	12054	13704	16610	23521	77183
350	11294	12054	13704	18826	26268	82146
325	11294	12054	13704	21043	29015	87110
300	11294	12054	13704	23259	31762	92073
275	11294	12054	13704	25475	34510	97037
250	11294	12054	13704	27692	37257	102001
α		15.53899		β	-4.16517	$R^2 = .76$

TABLE Q.12
Survey No. 12 (January 25 to February 20, 1993)

PRICE	FINE WOOL (n)	FINE-MED WOOL	MEDIUM WOOL	MEDIUM-COARSE	COARSE WOOL	AGGREGATE QUANTITY
α	22.6162	759.8300	698.2851	499.6524	531.7075	
β	6.899	0.09545	0.02927	0.04301	0.00946	
875	0	0	0	0	0	0
850	254	0	0	0	0	254
825	313	0	0	0	0	313
800	387	0	0	0	0	387
775	481	0	0	0	0	481
750	604	103	0	0	0	707
725	763	365	0	0	0	1128
700	972	627	0	0	0	1599
675	1250	889	796	0	0	2935
650	1621	1151	1650	0	0	4422
625	2123	1413	2504	0	0	6040
600	2818	1674	3358	0	0	7850
575	3775	1936	4212	0	0	9923
550	3775	2198	5066	0	0	11039
525	3775	2460	5920	0	0	12155
500	3775	2722	6774	0	0	13271
475	3775	2984	7628	573	0	14960
450	3775	3246	8483	1154	8637	25295
425	3775	3508	9337	1736	11280	29636
400	3775	3770	10191	2317	13923	33976
375	3775	4032	11045	2898	16565	38315
350	3775	4294	11899	3479	19208	42655
325	3775	4556	12753	4061	21851	46996
300	3775	4817	13607	4642	24493	51334
275	3775	5079	14461	5223	27136	55674
250	3775	5341	15316	5805	29779	60016
α		16.34583		β	-4.60710	$R^2 = .86$

Note: (N) = Non-linear regression estimates

TABLE Q.13
Survey No. 13 (March 1 to March 26, 1993)

PRICE	FINE WOOL	FINE-MED WOOL	MEDIUM WOOL	MEDIUM-COARSE	COARSE WOOL	AGGREGATE QUANTITY
α	877.1593	1136.591	992.8368	456.9806	550.7459	
β	0.83944	1.08182	0.07088	0.02250	0.02033	
825	0	0	0	0	0	0
800	92	0	0	0	0	92
775	122	0	0	0	0	122
750	151	357	0	0	0	508
725	181	380	0	0	0	561
700	211	404	0	0	0	615
675	241	427	4484	0	0	5152
650	271	450	4837	0	0	5558
625	300	473	5190	0	0	5963
600	330	496	5542	0	0	6368
575	360	519	5895	0	0	6774
550	390	542	6248	0	0	7180
525	420	565	6600	0	0	7585
500	449	588	6953	0	0	7990
475	479	612	7306	0	0	8397
450	509	635	7659	0	4956	13759
425	539	658	8011	1421	6185	16814
400	568	681	8364	2532	7415	19561
375	598	704	8717	3644	8645	22308
350	628	727	9069	4755	9874	25053
325	658	750	9422	5866	11104	27800
300	688	773	9775	6977	12334	30547
275	717	796	10127	8088	13563	33291
250	747	820	10480	9199	14793	36039
α		15.31718		β	-4.29201	$R^2 = .73$

TABLE Q.14
Survey No. 14 (March 29 to April 23, 1993)

PRICE	FINE WOOL	FINE-MED WOOL	MEDIUM WOOL	MEDIUM-COARSE	COARSE WOOL	AGGREGATE QUANTITY
α	745.8561	628.5056	573.598	496.0712	508.4386	
β	0.41676	0.13106	0.01942	0.01957	0.01055	
750	0	0	0	0	0	0
725	50	0	0	0	0	50
700	97	0	0	0	0	97
675	97	0	0	0	0	97
650	97	0	0	0	0	97
625	97	27	0	0	0	124
600	97	218	0	0	0	315
575	97	408	72	0	0	577
550	97	599	1215	0	0	1911
525	97	790	2502	0	0	3389
500	97	981	3790	0	0	4868
475	97	981	5077	0	0	6155
450	97	981	6364	2354	5539	15335
425	97	981	7212	3632	7909	19831
400	97	981	7212	4909	10279	23478
375	97	981	7212	6187	12648	27125
350	97	981	7212	7464	15018	30772
325	97	981	7212	8742	17388	34420
300	97	981	7212	10019	19757	38066
275	97	981	7212	11296	22127	41713
250	97	981	7212	12574	24497	45361
α		22.46139		β	-7.11984	$R^2 = .86$

TABLE Q.15
Survey No. 15 (April 26 to May 21, 1993)

PRICE	FINE WOOL	FINE-MED WOOL	MEDIUM WOOL	MEDIUM-COARSE	COARSE WOOL	AGGREGATE QUANTITY
α	N/A	702.1579	978.481	701.9410	592.4307	
β	N/A	0.61602	0.06973	0.04678	0.01778	
650	0	0	0	0	0	0
625	0	125	0	0	0	125
600	0	166	0	0	0	166
575	0	206	5786	0	0	5992
550	0	247	6090	0	0	6337
525	0	288	6090	0	0	6378
500	0	328	6090	0	0	6418
475	0	369	6090	0	0	6459
450	0	409	6090	5386	8011	19896
425	0	450	6090	5920	9417	21877
400	0	491	6090	6454	10823	23858
375	0	531	6090	6989	12229	25839
350	0	572	6090	7523	13635	27820
325	0	612	6090	8058	15041	29801
300	0	653	6090	8592	16447	31782
275	0	693	6090	9127	17853	33763
250	0	734	6090	9661	19259	35744
α		16.38408		β	-4.73583	R² = .60

TABLE Q.16
Survey No. 16 (May 24 to June 18, 1993)

PRICE	FINE WOOL	FINE-MED WOOL	MEDIUM WOOL	MEDIUM -COARSE	COARSE WOOL	AGGREGATE QUANTITY
α	771.8957	607.9504	588.5505	482.4896	499.0491	
β	0.36255	0.05556	0.03257	0.03041	0.01323	
750	0	0	0	0	0	0
725	129	0	0	0	0	129
700	198	0	0	0	0	198
675	267	0	0	0	0	267
650	336	0	0	0	0	336
625	405	0	0	0	0	405
600	474	143	0	0	0	617
575	543	593	416	0	0	1552
550	612	1043	1184	0	0	2839
525	681	1493	1951	0	0	4125
500	750	1943	2719	0	0	5412
475	819	2393	3486	0	0	6698
450	888	2843	4254	1068	3707	12760
425	957	3293	5022	1890	5597	16759
400	1026	3743	5789	2713	7487	20758
375	1095	4193	6557	3535	9376	24756
350	1164	4643	7324	4357	11266	28754
325	1233	5093	8092	5179	13156	32753
300	1302	5543	8859	6001	15045	36750
275	1371	5993	9627	6823	16935	40749
250	1440	6443	10395	7645	18825	44748
α		19.10002		β	-5.79870	$R^2 = .89$

APPENDIX R:

**A COMPARISON OF EXPECTED
AND ACTUAL PURCHASES MADE**

R.1 INTRODUCTION

This appendix provides the data from which the study is based upon. As explained in Chapter Six, the actual purchase data was obtained from auction sales records from the New Zealand Wool Board. The expected purchase data was derived from the survey using 'auction' prices and the process as explained in Chapter Six.

NOTES:

N/S No survey was conducted at this time.

N/A This buyer specialises in wools 33 microns or more and hence was excluded from the fine wools category.

* The price used to estimate expected purchases falls outside the relevant range as measured by the price levels used in the survey. However, the average auction price paid must still be used to maintain consistency.

% The error = error/actual
i.e. $\Sigma(A_{ij} - E_{ij})/A_{ij}$ where i = individual buyer & j = period ($j = 1..16$)

SPY The total amount of wool offered at auction in the period (bales).

TABLE R.1

Fine Wools (less than 24 microns) 1991-92 Season

	1		2*		3		4		5		6*		7*		8*	
	E	A	E	A	E	A	E	A	E	A	E	A	E	A	E	A
A	N/S		0	0	0	0	0	0	0	0	0	0	0	0	0	0
B	N/S		0	120	0	0	34	0	185	0	0	0	0	0	0	0
C	N/S		2	367	614	329	0	75	0	35	0	22	0	36	0	105
D	N/S		N/S		0	0	0	0	N/S		0	0	0	0	0	0
E	N/S		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
F	N/S		0	0	0	0	0	0	0	0	0	0	0	0	0	0
G	61	4657	0	1477	0	148	0	235	48m	0	N/S		N/S		0	0
H	16	571	0	667	0	0	0	39	0	84	0	23	0	19	0	0
I	0	2957	0	908	0	252	177	154	46	4	0	0	0	14	N/S	
J	129	1727	0	867	324	32	150	0	95	8	90	0	61	45	0	311
K	89	384	N/S		300	287	39	24	16	12	0	7	N/S		0	37
TOT	295	10296	2	4406	1238	1048	400	531	390	143	86	52	61	114	0	453
Devn	10,001		4,404		-190		131		-247		-34		53		453	
%	97		100		-18		25		-173		-65		46		100	
SPY	36,861		21,203		5,157		2,960		998		462		794		1,696	

R.2

TABLE R.2

Medium Wools (25-35 microns) 1991-92 Season

	1		2*			3
	E	A	E	A	E	A
A	N/S		714	1188	443	451
B	N/S		0	1282	421	2020
C	N/S		168	1165	2149	1723
D	N/S		N/S		315	697
E	N/S		0	168	0	177
F	N/S		81	313	0	121
G	303	2469	1084	2736	1484	4005
H	238	4208	812	5513	247	9980
I	0	2082	19443	1961	0	3622
J	11609	4270	3563	8480	14789	10776
K	1281	2446	N/S		312	7363
TOT	13431	15475	25865	22806	20160	40935
Devn	2,204		-3,059		20,775	
%	13		-13		51	
SPY	43,852		52,225		75,504	

TABLE R.3

Medium-Fine Wools (25-32 microns) 1991-92 Season

	4		5		6		7		8	
	E	A	E	A	E	A	E	A	E	A
A	0	289	0	250	0	183	0	81	0	0
B	55	1900	113	175	322	750	91	1180	331	700
C	0	1207	0	1079	0	1109	0	680	0	538
D	0	467	N/S		8	168	0	15	0	47
E	0	0	0	127	0	38	0	46	0	14
F	0	125	139	26	5	55	0	4	0	59
G	210	2871	272	1380	N/S		N/S		329	1219
H	0	3674	852	2466	247	879	367	1026	236	847
I	231	1910	132	606	0	567	0	666	N/S	
J	5333	5041	4495	7729	3362	4014	851	3814	1097	2975
K	711	1440	767	671	733	146	N/S		730	469
TOT	6540	18924	6770	14509	4677	7909	1309	7512	2723	6868
Devn	12,384		7,739		3,232		6,203		4,145	
%	65		53		41		83		60	
SPY	45,518		31,316		14,765		13,303		12,434	

TABLE R.4

Medium-Coarse Wools (33-35 microns) 1991-92 Season

	4		5		6		7		8	
	E	A	E	A	E	A	E	A	E	A
A	760	172	560	80	1063	5	1003	0	375	0
B	534	360	1341	880	521	330	577	580	516	400
C	591	1956	2650	1297	2123	1338	2414	999	4643	829
D	482	384	N/S		206	10	2384	145	2778	81
E	0	53	0	56	0	27	0	18	0	71
F	1483	83	502	130	78	60	297	15	588	186
G	0	2518	526	1828	N/S		N/S		600	987
H	408 ^b	5786	1082	3830	929	2951	2171	4016	2410	3151
I	116	1910	21672	1043	3077	989	4000	1121	N/S	
J	3761	2227	2261	3236	1919	2354	1788	2732	1350	1181
K	274	1857	498	1080	523	761	N/S		748	885
TOT	8409	17306	31092	13460	10439	8825	14634	9626	14008	7771
Devn	8,897		-17,632		-1,614		-5,008		-6,237	
%	51		-131		-18		-52		-80	
SPY	31,069		24,261		18,122		20,332		20,149	

TABLE R.5

Coarse Wools (36 microns or more) 1991-92 Season

	1		2		3*		4		5		6		7		8	
	E	A	E	A	E	A	E	A	E	A	E	A	E	A	E	A
A	N/S		0	0	1280	5	0	0	514	14	446	0	161	0	149	0
B	N/S		444	600	956	720	67	600	746	720	370	120	116	480	342	700
C	N/S		641	228	5737	1084	0	3654	1346	2112	947	2253	2386	1183	4646	965
D	N/S		N/S		5527	1260	658	562	N/S		4717	321	1742	352	1592	126
E	N/S		378	12	665	206	195	133	482	269	227	310	323	114	126	289
F	N/S		1728	110	178	56	1511	41	514	167	323	0	511	146	266	188
G	114	126	296	1080	4	1789	0	2889	834	1904	N/S		N/S		236	312
H	1997	2000	5046	6501	10409	14821	1101	8617	1422	8190	946	9698	9514	8560	1890	8947
I	10105	316	2400	222	489	2084	451	1467	9330	681	815	2544	906	2850	N/S	
J	5503	281	448	917	14100	5416	3024	1014	2215	1684	2173	2175	3620	2468	4369	1847
K	1123	194	N/S		2712	1011	1366	1152	1587	1071	1022	934	N/S		496	602
TOT	18842	2917	11381	9670	42057	28452	8373	20124	18996	16815	11986	18355	19279	16153	14112	13996
Devn	-15,925		-1,711		-13,605		11,756		-2,181		6,369		-3,126		-116	
%	-546		-18		-48		58		-13		35		-19		-1	
SPY	8,159		23,303		47,373		33,546		32,547		41,576		42,251		38,692	

R.6

TABLE R.6

Fine Wools (Less than 24 microns) 1992-93 Season

	9		10		11		12		13		14		15		16	
	E	A	E	A	E	A	E	A	E	A	E	A	E	A	E	A
A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21
B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C	412	645	0	465	723	816	N/S		0	241	0	7	N/S		4	249
D	N/S		0	0	0	0	0	0	N/S		0	0	0	0	0	0
E	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N/S	
F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
G	436	2718	359	1827	477	738	7	273	N/S		0	0	0	0	110	11
H	0	334	0	1102	892	1659	0	225	0	0	0	0	0	0	0	14
I	805	1670	406	2534	1303	1728	146	469	0	197	0	0	0	53	0	95
J	1077	1169	780	1116	69	487	120	47	163	84	19	43	0	22	219	243
K	617	461	400	441	288	322	175	40	0	0	0	0	0	0	0	0
TOT	3347	6997	1945	7485	3752	5750	448	1054	163	522	19	50	0	75	333	633
DEVN	3,650		5,540		1,998		606		359		31		75		300	
%	52		74		35		57		69		62		100		47	
SPY	25,088		28,957		11,294		3,919		1,315		97		181		1,707	

TABLE R.7

Fine - Medium Wools (25-28 microns) 1992-93 Season

	9		10		11		12		13		14		15		16	
	E	A	E	A	E	A	E	A	E	A	E	A	E	A	E	A
A	10	0	0	0	0	0	0	8	0	9	0	0	0	0	0	0
B	4	125	42	200	0	0187	159	87	37	403	0	128	0	350	175	225
C	0	182	0	33	0	257	N/S		0	521	0	46	N/S		139	493
D	N/S		144	15	133	73	0	97	N/S		0	56	0	80	0	47
E	0	0	0	0	0	0	0	3	0	0	0	7	0	0	N/S	
F	2	0	0	0	0	0	0	18	0	97	0	0	0	0	0	0
G	792	297	430	36	118	258	18	475	N/S		0	11	0	17	32	196
H	194	855	475	883	174	1489	0	88	0	32	0	0	0	0	0	0
I	0	33	0	136	43	210	45	154	0	185	0	49	0	5	0	133
J	5420	1771	3604	677	1337	2037	594	2019	430	1043	139	440	138	431	1281	671
K	1372	158	167	159	53	233	357	39	0	185	0	46	0	34	169	64
TOT	7794	3421	4862	2139	1858	4744	1173	2988	467	2475	139	783	138	917	1796	1829
DEVN	-4,373		-2,723		2,886		1,815		2,008		644		779		33	
%	-128		-127		61		61		81		82		85		2	
SPY	7,857		7,111		12,054		8,198		4,347		981		1,262		3,045	

TABLE R.8

Medium Wools (29-32 microns) 1992-93 Season

	9		10		11		12		13		14		15		16	
	E	A	E	A	E	A	E	A	E	A	E	A	E	A	E	A
A	36	50	3	0	0	9	0	59	0	110	0	0	2	0	0	0
B	7	480	166	520	47	379	222	580	135	750	65	200	81	850	272	245
C	152	27	3	260	55	182	N/S		0	553	239	467	N/S		17	623
D	N/S		144	359	133	310	0	139	N/S		0	254	0	242	0	288
E	0	43	0	0	0	38	0	161	0	109	0	31	0	15	N/S	
F	20	0	44	0	13	0	6	0	800	0	62	0	23	0	68	0
G	1322	365	893	744	370	929	614	1052	N/S		116	206	47	515	167	347
H	1002	585	699	335	335	560	893	323	588	191	63	73	128	72	149	30
I	0	80	174	203	50	215	53	161	0	115	0	55	0	13	10	89
J	5740	1983	6715	3332	4632	3388	3080	3782	4918	3397	2750	3083	4942	2281	2670	2814
K	1897	341	921	777	268	226	148	235	638	555	210	234	103	67	238	132
TOT	10176	3954	9762	6530	5901	6236	5016	6492	7079	5780	3505	4603	5326	4055	3591	4568
DEVN	-6,222		-3,232		335		1,476		-1,299		1,098		-1,271		977	
%	-157		-49		5		23		-22		24		-31		21	
SPY	11,809		18,530		13,704		15,929		14,209		7,212		6,090		8,130	

TABLE R.9

Medium - Coarse Wools (33-35 microns) 1992-93 Season

	9		10		11		12		13		14		15		16	
	E	A	E	A	E	A	E	A	E	A	E	A	E	A	E	A
A	1	760	0	1288	560	1028	0	74	70	0	125	0	16	0	2	46
B	0	207	192	647	131	475	111	840	26	800	99	250	9	840	68	200
C	83	478	1063	713	440	949	N/S		709	578	1051	818	N/S		745	954
D	N/S		1768	869	325	769	511	398	N/S		526	147	784	64	0	103
E	259	251	259	114	85	59	0	142	46	25	48	0	49	39	N/S	
F	59	0	106	52	0	0	32	103	0	30	0	25	0	140	0	0
G	393	788	713	1926	510	3388	26	2244	N/S		5	1546	0	215	26	1145
H	861	2073	1063	1436	308	3037	441	4134	349	655	422	749	85	1294	286	490
I	814	185	0	450	405	386	220	581	271	803	458	311	0	353	391	288
J	3536	2771	7269	9028	9403	9047	762	4310	953	4682	1927	2916	4782	1214	1023	3982
K	1846	1447	1206	2795	3293	2874	253	967	321	941	440	1302	256	562	405	1029
TOT	7852	8960	13639	19318	15460	22012	2356	13793	2745	8514	5101	8064	5981	4721	2946	8237
DEVN	1,108		5,679		6,552		11,437		5,769		2,963		-1,260		5,291	
%	12		29		30		83		68		37		-27		64	
SPY	23,186		45,291		39,476		29,595		17,360		13,909		10,609		16,960	

R.10

TABLE R.10

Coarse Wools (36 microns or more) 1992-93 Season

	9		10		11		12		13		14		15		16	
	E	A	E	A	E	A	E	A	E	A	E	A	E	A	E	A
A	0	0	0	0	0	13	0	0	21	0	0	0	0	0	0	93
B	211	0	195	750	244	500	282	470	103	900	200	350	88	675	159	0
C	678	447	182	227	259	1067	N/S		498	904	252	751	N/S		659	822
D	N/S		1989	621	771	859	3512	1686	N/S		1723	384	882	115	907	236
E	27	18	197	53	95	0	146	5	94	146	57	228	108	112	N/S	
F	57	0	95	24	320	50	57	217	388	235	165	371	106	87	280	38
G	305	117	374	1964	369	3057	83	3130	N/S		79	1126	2	276	16	1009
H	8581	2878	6511	3140	7730	8272	5014	6213	1972	3667	2499	4189	2169	4121	1134	2457
I	2168	573	157	1282	412	1147	482	861	297	1073	618	1074	290	424	376	717
J	3519	1043	4401	4316	9674	5317	2922	2019	3269	3191	3004	3638	5737	1239	3017	3682
K	912	135	2238	831	2902	1200	1629	840	387	1260	853	350	844	213	1446	1034
TOT	16458	5211	16339	13208	22776	21482	14127	15441	7029	11376	9450	12461	10226	7262	7994	10268
DEVN	-11,247		-3,131		-1,294		1,314		4,347		3,011		-2,964		2,274	
%	-216		-24		-6		9		38		24		-41		22	
SPY	14,182		28,468		38,390		31,448		24,469		29,809		23,910		31,742	

APPENDIX S:

THEIL'S U STATISTIC

To compare the expectations of the panel with their actual purchases it is possible to make use of Theils Inequality coefficient¹.

The statistic is defined as follows:

$$U = \frac{\sqrt{1/T \sum (Y_i^e - Y_i^a)^2}}{\sqrt{1/T \sum (Y_i^e)^2} + \sqrt{1/T \sum (Y_i^a)^2}} \quad (S.1)$$

where:

Y_i^e = expected value of Y_i

Y_i^a = actual value of Y_i

T = Number of periods

If $U = 0$, then $Y_i^e = Y_i^a$ for all t and there is a perfect fit. If $U = 1$, then the forecast values are always 0 when actual values are nonzero, or *vice versa*.

This Inequality Coefficient, U , can be decomposed into three proportions of inequality:

$$U^m = \frac{(\bar{Y}^e - \bar{Y}^a)^2}{(1/T) \sum (Y_i^e - Y_i^a)^2} \quad (S.2)$$

$$U^s = \frac{(\sigma_e - \sigma_a)^2}{(1/T) \sum (Y_i^e - Y_i^a)^2} \quad (S.3)$$

$$U^c = \frac{2(1 - p) \sigma_e \sigma_a}{(1/T) \sum (Y_i^e - Y_i^a)^2} \quad (S.4)$$

¹ This section is derived from Pindyck, R.S and Rubinfeld, D.L. *Econometric Models and Economic Forecasts*, 1981.

The three proportions, U^m , U^s and U^c are called, respectively, the bias, variance and the covariance proportions.

The bias proportion, U^m , shows the extent of systematic error since it measures the extent to which the average values of the expected and actual series deviate from each other.

The variance proportion, U^s , shows the ability of the expectations to be cope with the variability in the actual series. If U^s is large then the actual series has fluctuated considerably while the expectations show little fluctuation, or *vice versa*.

The covariance proportion, U^c , represents the extent of unsystematic error. It measures the remaining error after deviations from average values and average variabilities have been accounted for.

APPENDIX T:

**QUALITATIVE ANALYSIS
EXPECTED *vs.* REALISED PURCHASES**

TABLE T.1

Expectations vs. Realisations for Total Wool Available to purchase at auction over the next four weeks compared to the same time last year

	Up a lot	Up a little	Same	Down a little	Down a lot	Total
Up a lot	0	0	3	0	0	3
Up a little	7	4	4	3	3	21
Same	11	3	7	2	13	36
Down a little	16	13	19	3	24	75
Down a lot	6	1	4	3	4	18
Total	40	21	37	11	44	153

TABLE T.2

Expectations vs. Realisations for Total Wool Purchased at auction over the next four weeks compared to the same time last year

	Up a lot	Up a little	Same	Down a little	Down a lot	Total
Up a lot	3	2	1	2	3	11
Up a little	11	2	5	2	13	33
Same	9	0	9	2	20	40
Down a little	4	1	16	2	34	57
Down a lot	3	0	0	0	9	12
Total	30	5	31	8	79	153

TABLE T.3**Expectations vs. Realisations for the USD/NZD Exchange Rate
over the next four weeks***(Survey no. 9 - 16 only)*

	Up a lot	Up a little	Same	Down a little	Down a lot	Total
Up a lot	0	0	1	2	1	4
Up a little	2	7	4	3	6	22
Same	8	10	6	7	6	37
Down a little	1	4	0	9	8	22
Down a lot	0	0	0	0	0	0
Total	11	21	11	21	21	85

TABLE T.4**Expectations vs. Realisations for N.Z. Wool Board's Full Indicator Price
over the next four weeks***(Survey no. 9 - 16 only)*

	Up a lot	Up a little	Same	Down a little	Down a lot	Total
Up a lot	0	0	0	0	0	0
Up a little	0	2	1	8	8	19
Same	0	2	5	14	6	27
Down a little	0	16	5	8	8	37
Down a lot	0	2	0	0	0	2
Total	0	22	11	30	22	85

TABLE T.5

Expectations vs. Realisations for the Quantity of Wool Purchased by the Company in the Survey Period Compared to the Following Survey Period

	Up a lot	Up a little	Same	Down a little	Down a lot	Total
Up a lot	3	3	0	0	1	7
Up a little	4	5	1	6	7	23
Same	3	4	2	6	10	25
Down a little	6	4	0	3	2	15
Down a lot	1	1	0	1	2	5
Total	17	17	3	16	22	75

TABLE T.6

Expectations vs. Realisations for the Quantity of Wool Offered at Auction in the Survey Period Compared to the Following Survey Period

	Up a lot	Up a little	Same	Down a little	Down a lot	Total
Up a lot	0	5	6	0	0	11
Up a little	1	3	6	3	9	22
Same	4	0	5	3	4	16
Down a little	5	2	5	4	8	24
Down a lot	1	0	0	0	1	2
Total	11	10	22	10	22	75

TABLE T.7

Expectations vs. Realisations for the Stockholdings of Wool Held by the Company in the Survey Period Compared to the Following Survey Period .

	Up a lot	Up a little	Same	Down a little	Down a lot	Total
Up a lot	0	0	0	1	0	1
Up a little	0	2	2	6	8	18
Same	0	6	2	2	5	15
Down a little	0	3	5	2	18	28
Down a lot	0	0	1	0	1	2
Total	0	11	10	11	32	64

TABLE T.8

Expectations vs. Realisations for the N.Z. Wool Board's Full Indicator Price in the Survey Period Compared to the Following Survey Period

	Up a lot	Up a little	Same	Down a little	Down a lot	Total
Up a lot	0	0	0	1	0	1
Up a little	0	2	3	6	8	19
Same	0	6	8	2	5	21
Down a little	0	3	8	2	18	31
Down a lot	0	0	1	0	1	2
Total	0	11	20	11	32	74