



FINAL REPORT

**REVIEW OF THE ACIL
TASMAN STUDY INTO THE
VALUE OF LIVE SHEEP
EXPORTS FROM WESTERN
AUSTRALIA**

Prepared for:
LiveCorp & Meat and
Livestock Australia

Prepared by:
John Zeitsch
Ph: +61 419 479 184
Email: john.zeitsch@gmail.com

Economic Insights
6 Kurundi Place
Hawker ACT 2614
Australia
Ph: +61 2 6278 3628

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EXECUTIVE SUMMARY

In late 2008, RSPCA Australia commissioned ACIL Tasman to examine the likely scale and scope of the adjustments that would be required to the Western Australian (WA) sheep industry if the exportation of live sheep were to cease.

ACIL Tasman indicated that cessation of the live sheep trade in WA would reduce the value of the WA flock by \$74 million.¹ In contrast, Clarke, Morison and Yates estimate that cessation of live sheep exports from Southern WA would result in a medium term “On-farm loss (livex)” of \$120 million based on market conditions that prevailed in 2005-06.²

In light of the much lower estimates obtained by ACIL Tasman of the cost to producers of ceasing live sheep exports from WA, LiveCorp requested Economic Insights to review the ACIL Tasman study. This report presents Economic Insights key findings.

ACIL Tasman use decision trees to calculate the expected values of alternate sheep enterprises with and without the live sheep trade. They then use the decision tree results to value a typical flock of sheep in WA, with and without the live sheep trade. In the final step of their methodology ACIL Tasman scale up the results for a typical farm to estimate the value of the WA sheep flock with and without the live sheep trade.

Overall, we find that the approach implemented by ACIL Tasman was reasonable as a ‘first step’ and has merit as a means for deriving an estimate of the impact of cessation of live sheep exports on the WA sheep industry. However, significant further work is required before the ACIL Tasman approach can produce reliable results. Much of the data and many of the assumptions built into the ACIL Tasman methodology remain to be verified or tested by industry. In addition we find that the ACIL Tasman methodology is underdeveloped in several important areas, including:

1. The study does not fully utilise the results that can be generated by a decision tree analysis. This has the effect of underestimating by \$40 million the effect of the cessation of live sheep exports on flock values in WA; and
2. The methodology does not allow for sheep and mutton prices to be affected by increased supplies of these meats on the domestic market that would be generated by cessation of live sheep exports. This leads to an underestimation by \$115 million of the effects of the cessation of live sheep exports on flock values in WA.

Overall, and subject to the significant qualifications regarding the yet to be verified data and assumptions built into the ACIL Tasman methodology, we find that removal of live sheep exports in WA could lower the value of the WA flock by about \$230 million (Table 5), not the \$74 million reported by ACIL Tasman.

¹ ACIL Tasman 2009, *The Value of Live Sheep Exports from Western Australia*, March, p.38.

² Michael Clarke, Julian Morison and Warwick Yates 2007, *The Live Export Industry, Assessing the Value of the Livestock Export Industry to Regional Australia*, Report prepared for Meat and Livestock Australia, p.99.

1. INTRODUCTION

In late 2008, RSPCA Australia commissioned ACIL Tasman to examine the likely scale and scope of the adjustments that would be required to the WA sheep industry if the exportation of live sheep were to cease.

In March 2009 ACIL Tasman released their report titled: *The value of live sheep exports from Western Australia*. The report concluded that:

- The option to sell sheep to the live sheep trade is likely to be worth between \$2 to \$6 per wether and for ewe dominant flocks the cost was put at \$2 per ewe (pp. 37-38); and
- These effects “when aggregated across WA at current sheep numbers” gives a reduction in the value of the WA flock of \$74,449,130 (p. 38). If the flock has an average life of 5 years, this is equivalent to an annual reduction in the flock value of about \$20 million assuming a real weighted average cost of capital of about 7 per cent.

In contrast, Clarke, Morison and Yates estimate that, given market conditions that prevailed in 2005-06, cessation of live sheep exports from Southern WA would result in a year-one “On-farm loss (livex)” of \$149 million in 2005-06. The On-farm loss (livex) falls to \$120 million in the medium (5 year) term and to \$104 million in the long term (10 years).³

In the light of the much lower estimates obtained by ACIL Tasman of the cost to producers of ceasing the export of live sheep from Western Australia, LiveCorp requested Economic Insights to review the ACIL Tasman study.

This report presents our key findings. It is presented in 6 sections. Section 2 provides an evaluation of the ACIL Tasman methodology. Section 3 identifies inappropriate use of decision tree results. Section 4 explains how the methodology is weakened by no modelling of the effect of cessation of live sheep exports on domestic mutton and lamb prices. Section 5 discusses how readers should interpret Economic Insights’ results. Section 6 concludes.

2. EVALUATION OF THE ACIL TASMAN METHODOLOGY

To gain an understanding of why ACIL Tasman obtained such a small number for the value to WA of the live sheep trade in contrast to other industry studies we first undertook an evaluation of their methodology. Our review of the methodology was aided by the extensive documentation provided by ACIL Tasman in their report.

As noted by the authors, the ACIL Tasman methodology involves 4 broad steps.

STEP 1: Evaluation of the expected value of flock structures in WA. The three flock structures evaluated by ACIL Tasman are:

- a merino flock where a proportion of the wethers are retained for wool production for 5 years;

³ Michael Clarke, Julian Morison and Warwick Yates 2007, *The Live Export Industry, Assessing the Value of the Livestock Export Industry to Regional Australia*, Report prepared for Meat and Livestock Australia, p.97-100.

- a merino flock where all wethers are sold before they reach 2-3 years old; and
- a merino ewe flock where a mix of merino and first-cross lambs are produced.

For each of these enterprises various options available to the farmer are evaluated. For example, in the enterprise where a proportion of the wethers are retained for wool production for 5 years, 5 options for the wether portion of the flock are evaluated. These are:

- wether lambs sold at 6 to 8 months as a merino prime lamb;
- wether lambs that do not make the prime lamb market at 6 to 8 months are fed and the heavier lambs are sold at 10 to 12 months into the merino prime lamb market;
- wether lambs that do not make the prime lamb market at 6 to 8 months are fed and the lighter lambs are sold at 10 to 12 months into the live export trade;
- wethers are retained. At their first shearing all wethers are classed. Those classed as having superior wool (quantity and quality) are retained as wool cutters and are eventually sold into the live sheep trade; and
- of the retained wethers, the lighter culled wethers are sold for slaughter.

For each of these options ACIL Tasman prepares a monthly budget that lists the revenue and costs associated with the option. Using what we believe is a pre tax real weighted average cost of capital ACIL Tasman then derive the net present value of each option.

The results from the net present value calculations are then fed into a decision tree and given the proportions of sheep assumed to be in different categories the expected value of each of the 3 enterprises are calculated.

STEP 2: ACIL Tasman repeats STEP 1 excluding the live sheep export option. For example, in the merino flock enterprise where a proportion of the wethers are retained for wool production for 5 years, the option to sell the heavier cull wethers into the live sheep trade is removed. Using a decision tree, the expected value of the merino enterprise is then recalculated with the live sheep export option removed.

STEP 3: ACIL Tasman use the results from Step 1 and Step 2 to calculate the reduction in the value of a ewe and a wether associated with removal of the live sheep trade. Using data on a typical flock in WA they then calculate what the reduction in ewe and wether values would mean for the value of the typical flock.

STEP 4: Using the results from STEP 3 ACIL Tasman extrapolate the results from a typical farm to WA as a whole. The data used in this calculation is not presented in the ACIL Tasman report.

As part of our review of the ACIL Tasman study we replicated their results. That is, we recalculated the partial budgets for each of the sheep options evaluated in the ACIL Tasman study. Using the data from the budgets we then reconstructed the various decision trees ACIL Tasman presented in their report.

While we could generally replicate the ACIL Tasman results, we found several errors or unexplained inconsistencies in their calculations. For example:

- In the ewe budget (Table 23, p. B9):
 - a WACC of 10 per cent was used to discount revenue and costs in all partial budgets other than the budget for a ewe. In this budget a 7.6 per cent WACC was used;
 - the cost of phosphorus was set at \$200 per tonne but in all other budgets it was set at \$500 per tonne spread; and
 - shearing and crutching costs were set at \$3.25 and \$0.80 per head respectively while in other budgets where sheep are shorn or crutched the respective values were \$4.90 and \$1.10.
- In the budget for wethers that are retained (Table 21, p.B7), classed, culled and sold for slaughter, the cost of the purchased wether lambs of \$15 is inappropriately reduced by \$1.40 due to a summation error.
- In the budget for retained wethers (Table 22, page B8) there are no crutching costs. Also, the carcass value of the wethers when sold at 5 years of \$15 seems extremely low and should be reviewed/validated by industry.
- In all farm budgets, the cost associated with deaths of sheep did not include the actual cost of the sheep that were assumed to have died.
- In budgets for sheep older than 6 to 9 months where it may be likely that sheep would be jetted to control blow fly strike over summer months, there are no jetting costs built into the budgets for these sheep types. This may bias the calculation of net revenues in favour of sheep retained for periods greater than 9 months and industry should clarify if the no jetting assumption is appropriate for sheep in WA.

We note that ACIL Tasman use a weighted average cost of capital (WACC) of 10 per cent in all budgets other than the ewe budget. This is derived using a cost of equity of 11 per cent and a cost of debt of 6 per cent. We suspect these values are real costs but it is important to clarify the full status of the WACC used by ACIL Tasman (e.g. real versus nominal, pre-tax versus post-tax) as the value of the WACC can significantly affect the results.

We also note that the ACIL Tasman results are sensitive to the values assumed for parameters in the analysis and in particular the sale value (\$/Sheep or \$/kg) assumed for the different types of sheep in the analysis and the proportions of different types of sheep that are destined for particular market segments. ACIL Tasman note (page 25) that:

The values at each of the branches in this decision tree are the NPV, weighted by the probability of this event occurring. The outcomes are not purely chance but are a combination of the normal distribution of the sheep within the flock, the seasonal conditions at the time and a range of other management considerations.

While recognising that the probability of an outcome occurring is influenced by many factors, ACIL Tasman do not document the factors that led them to select the probabilities of outcomes occurring that were built into their decision trees.

Industry should verify/validate the key data used in the ACIL Tasman study. This includes the typical flock structure they use, prices of the different

types of sheep and the proportions of different types of sheep that are allocated to different market outlets.

Data issues aside, we find that the ACIL Tasman study significantly underestimates the cost associated with the cessation of live sheep exports from WA because:

- ACIL Tasman did not fully utilise the results that can be generated by the decision tree analysis. This includes:
 - selective use of the results of the decision tree analysis when calculating the aggregate value of the loss of the live sheep trade in WA;
 - inconsistencies between the expected values of different sheep types calculated by the decision trees and the values for the same sheep fed into the ACIL Tasman decision trees; and
 - in some decision trees certain sheep categories do not fall in value when they are diverted from the live sheep trade to the domestic market.
- ACIL Tasman do not allow the price of mutton and lamb to alter as a result of increased supplies of mutton and lamb associated with the cessation of the live sheep trade in WA.

We explore these deficiencies in the following sections where we find that the use of inappropriate values for livestock by ACIL Tasman led to an underestimation by \$40 million of the cost of cessation of the live sheep trade. The failure to allow the price of mutton and lamb to alter as a result of cessation of the live sheep trade led to further underestimation of the effects of cessation of the trade of \$115 million.

3. INAPPROPRIATE LIVESTOCK VALUES

In the ACIL Tasman study, decision trees are used to calculate the expected value of various sheep enterprises with and without the live sheep option. However, ACIL Tasman makes selective use of the results of their decision tree analysis.

Also ACIL Tasman has not adjusted down the value of some sheep that were previously exported live and in the analysis end up being slaughtered on the domestic market. There also appear to be inconsistencies between the expected values of different sheep types calculated by the decision trees and the values for the same sheep fed into the ACIL Tasman decision trees. We outline these concerns in more detail in the following sections.

3.1. SELECTIVE USE OF DECISION TREE RESULTS

After running the various decision trees, ACIL Tasman noted that the reduction in the expected value of the various sheep enterprises would fall by between \$2 per sheep to \$6 per sheep in the enterprise where no wethers are retained past 2 years. Overall, ACIL Tasman selected a value of \$2 per sheep for the weighted average reduction in the value of sheep following removal of the live sheep trade (p.38).

In our view the assumption that cessation of the live sheep trade reduces the value of a sheep by \$2 is unreasonably low and contrary to information available to ACIL Tasman from its own decision tree analysis.

ACIL Tasman then state that (at p. 38):

To estimate the farm level effects of the cessation of the trade, the one-off adjustments are multiplied by the average number of each type of sheep per farm. If the adjustment values are applied to the opening sheep numbers used in Table 5, the change in sheep value is \$10,986. When aggregated across WA at current sheep numbers the change in flock value is \$74,449,130.

The sheep numbers referred to by ACIL Tasman were those ACIL Tasman indicated were of a typical flock consisting of ewes (maidens to 5 year olds), wether hoggets and ewe and wether weaners. Cessation of the live sheep trade was assumed to reduce the value of each type of sheep by \$2.

To demonstrate why this assumption is implausibly low, we first reproduced the decision tree for a merino cross bred lamb operation in the ACIL Tasman analysis (see Chart 1 below, which replicates ACIL Tasman's Chart 14). We chose this decision tree because it incorporates the greatest variety of sheep enterprises included in the ACIL Tasman analysis. For example, it includes the retained wether option and the option of selling wethers less than 2 years. It also includes the option of retaining merino ewes. These can be culled, bred to merinos or bred to a meat sheep to produce a cross bred lamb.

This decision tree diagram contains almost all the values that are required to value "the typical flock". For example, the value of the merino ewes can be found from the red value at the centre of the decision tree (i.e. \$58.33). Likewise, the value of weaning ewes is \$73.52 and weaning wethers \$43.13. A hogget wether would be valued \$36.95, although we believe that the decision tree on the "Retain" branch requires another branch to be added to include wethers that are retained for wool production and then sold to slaughter.

Next we re-ran the decision tree without the live sheep option (see Chart 2, which reproduces ACIL Tasman's Chart 15) and extracted from Chart 2 the values for the sheep required to value the typical WA flock. Because of the removal of the live sheep trade the values of the different livestock calculated in the decision tree has fallen.

The value of a ewe has fallen by \$2.32 to \$56.01. The value of weaning ewes has actually increased by \$1.03 to \$74.55 and the value of weaning wethers and wether hoggets had fallen by \$5.65 to \$37.48.

Chart 1 Economic Insights' reproduction of ACIL Tasman's decision tree for a merino cross bred breeding operation

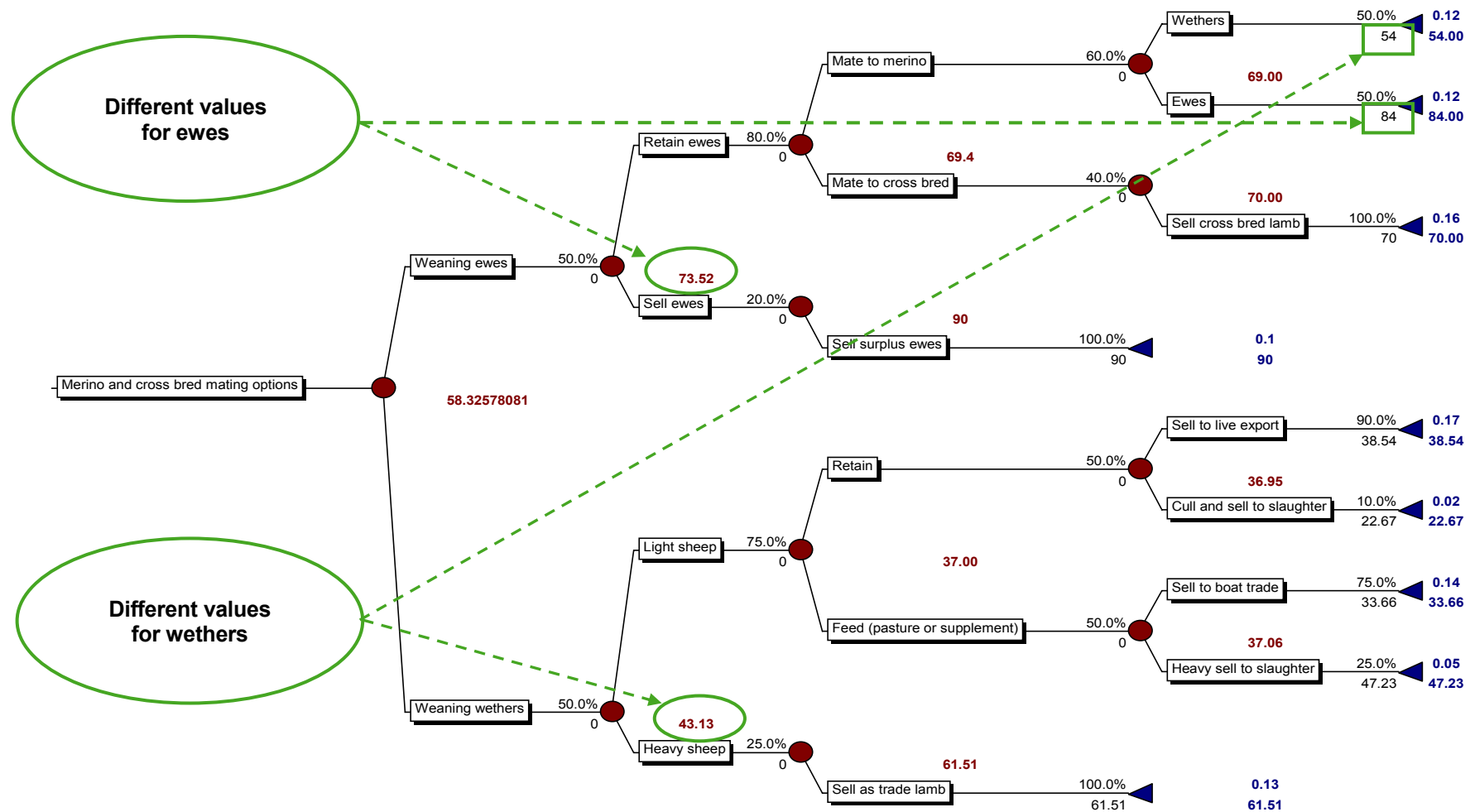
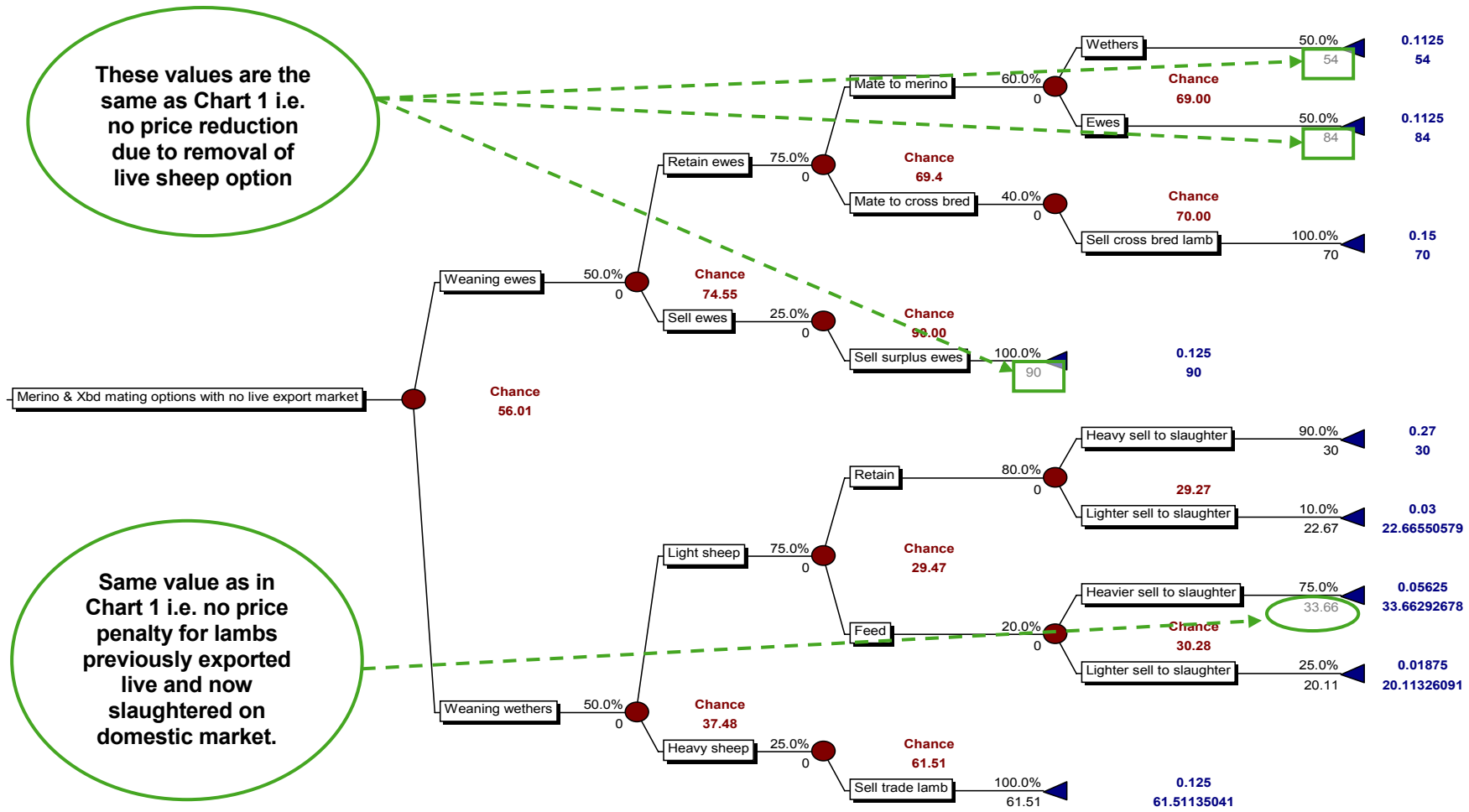


Chart 2 Economic Insights' reproduction of ACIL Tasman's decision tree for a merino cross bred breeding operation, without live export operations



Next we reproduced ACIL Tasman’s valuation of the typical WA flock (see Table 1 below). We also include in Table 1 the aggregation of the farm number to the WA aggregate number ACIL Tasman undertook.

ACIL Tasman indicated that they obtained the Western Australian aggregate number by aggregating⁴ “across WA at current sheep numbers”. However, the ACIL Tasman report does not appear to include the data used to undertake this aggregation.

For this study we therefore “backed out” the number implicit to the ACIL Tasman calculation by dividing their result for WA as a whole by their estimate of the farm level effect (73,422,023/10,982 = 6,776.73). We call this number the “ACIL Tasman raising factor”.

Table 1 ACIL Tasman’s valuation of typical Western Australian flock

| Stock type | Number | Unit value, ACIL Tasman | ACIL Tasman alternate unit value | ACIL Tasman difference in flock value |
|---------------------------------------|-----------------|--------------------------------|---|--|
| Ewes | | | | |
| Maidens | 600.00 | 52.00 | 50.00 | 1,200.00 |
| 2 year | 567.00 | 52.00 | 50.00 | 1,134.00 |
| 3 year | 536.00 | 52.00 | 50.00 | 1,072.00 |
| 4 year | 507.00 | 52.00 | 50.00 | 1,014.00 |
| 5 year | 479.00 | 52.00 | 50.00 | 958.00 |
| Total Ewes | 2,689.00 | 0.00 | 0.00 | 5,378.00 |
| Wethers | | | | |
| Hoggets | 672.00 | 52.00 | 50.00 | 1,344.00 |
| Weaners | | | | |
| Ewes | 1,065.00 | 55.00 | 53.00 | 2,130.00 |
| Wethers | 1,065.00 | 55.00 | 53.00 | 2,130.00 |
| Total Weaners | 2,130.00 | 0.00 | 0.00 | 4,260.00 |
| Rams | | | | |
| Merino | 51.00 | 500.00 | 0.00 | 0.00 |
| Total All Sheep | 5,542.00 | 0.00 | 0.00 | 10,982.00 |
| ACIL Tasman raising factor | | | | 6,776.73 |
| ACIL Tasman effect on WA flock | | | | 74,422,023.09 |

In Table 2 we build into the valuation of the effects of removal of the live sheep trade the values for livestock with and with out the trade derived directly from the decision trees. This gave a total loss in value of \$14,936. Dividing this number by the total number of sheep in ACIL Tasman’s typical flock (5,542 sheep) gives a drop in sheep values of \$2.7 per head. This compares to the \$2 per head used by ACIL Tasman.

⁴ ACIL Tasman 2009, *The Value of Live Sheep Exports from Western Australia*, March, p. 38.

Table 2 Alternate valuation of a typical Western Australian flock using Chart 14 and Chart 15 values

| Stock type | Number | Decision tree value with live exports | Decision tree value without live exports | Difference in flock value |
|---------------------------------------|---------------|--|---|----------------------------------|
| Ewes | | | | |
| Maidens | 600 | 58.33 | 56.01 | 1,386.74 |
| 2 year | 567 | 58.33 | 56.01 | 1,310.47 |
| 3 year | 536 | 58.33 | 56.01 | 1,238.82 |
| 4 year | 507 | 58.33 | 56.01 | 1,171.80 |
| 5 year | 479 | 58.33 | 56.01 | 1,107.08 |
| Total Ewes | 2,689 | | | |
| Wethers | | | | |
| Hoggets | 672 | 43.13 | 37.48 | 3,798.46 |
| Weaners | | | | |
| Ewes | 1,065 | 73.52 | 74.55 | -1,096.95 |
| Wethers | 1,065 | 43.13 | 37.48 | 6,019.88 |
| Total Weaners | 2,130 | | | 4,922.93 |
| Rams | | | | |
| Merino | 51 | 500.00 | 500.00 | 0.00 |
| Total All Sheep | 5,542 | | | 14,936.29 |
| ACIL Tasman raising factor | | | | 6,776.73 |
| ACIL Tasman effect on WA flock | | | | 101,219,185.91 |

Extrapolating this value to the Western Australian flock the estimate of the effect of cessation of the trade rises from approximately \$74 million to just over \$100 million (see Table 2).

It would seem that the values chosen by ACIL Tasman to value the typical Western Australian flock are at odds with the expected values for sheep types contained in ACIL Tasman's own decision tree analysis.

We do not believe that the valuation provided in Table 2 using the ACIL Tasman decision tree results is a valid valuation of the effects of removing the live sheep trade. This is because we have concerns with the livestock unit values implicit in Chart 15 and Chart 14. In particular we believe that ACIL Tasman have not adjusted down the value of some sheep that were previously exported live and in the analysis end up being slaughtered on the domestic market. This can be done by creating a farm budget for these sheep and in the budget we would adopt a lower value per kilogram for the sheep because they can longer be exported live.

In addition, in Chart 14 and Chart 15 there appear to be inconsistencies between the expected values of different sheep types calculated by the decision trees and the values for

the same sheep fed into the ACIL Tasman decision trees. We outline these concerns in more detail in the following section.

3.2. INCONSISTENT SPECIFICATION OF LIVESTOCK VALUES

If one looks at the second last column on the right hand side of the ACIL Tasman decision trees you see the values fed into the decision tree. In most cases these are values derived from the budgets prepared by ACIL Tasman. For example, if you look at the values for ewes and wethers built into ACIL Tasman's Chart 14 (reproduced as Chart 1 in this report) and Chart 15 (reproduced as Chart 2 in this report) we see that:

- as shown in Chart 1 by the green circles and dotted lines, the values of a ewe and a wether fed into the decision trees are inconsistent with the values for the same stock calculated by the decision trees; and
- as shown by the green circle and dotted lines at the top of Chart 2, the values of a ewe and a wether fed into the decision tree in the without live sheep trade, are the same as the respective values fed into the decision trees in Chart 1 which is the with live sheep trade case. That is, removing the live trade does not lower the assumed value of a ewe and wether fed into the decision trees. History shows that this is not what happens when a trade is restricted or removed.⁵

In addition, as shown by the green circle and dotted line at the bottom of Chart 1 (which reproduces ACIL Tasman's Chart 15) the lambs that do not make the domestic trade specification and are exported live as lambs are valued at \$33 per head when the live sheep market is in operation. In ACIL Tasman's Chart 15 (reproduced as Chart 2 in this report) which presents the decision tree without live exports these lambs are assumed to be slaughtered on the domestic market. However, they are still valued at \$33 per head in ACIL Tasman Chart 15 (reproduced as Chart 2 in this report). That is, the cessation of the live sheep trade is assumed to have no effect on the value of these lambs yet elsewhere in their study ACIL Tasman allow sheep prices to fall following removal of the live sheep trade.

Following the ACIL Tasman methodology, we created a budget for the lambs that were previously exported live but end up being slaughtered on the domestic market following cessation of the live sheep trade. In this budget we retained all values for the export lambs in the original ACIL Tasman budget except for the carcass value of the lamb. ACIL Tasman assumed the unit carcass value of the second draft of lambs exported was \$2.20 per kilogram.

To reveal the sensitivity of ACIL Tasman's results to this assumption, we conservatively assumed this value would fall to \$2.00 per kilogram if the lambs were diverted onto the domestic market. That is, live exports of lambs were conservatively assumed to provide 20 cents per kilogram price advantage⁶ per carcass kilogram over domestic slaughter of these lambs.

⁵ For example, the re-entry of Saudi Arabia into the live export market in 2000/01 led to a significant increase in the price of "shippers" — see, Michael Clarke, Julian Morison and Warwick Yates 2007, *The Live Export Industry: Assessing the Value of the Livestock Export Industry to Regional Australia*, report prepared for Meat and Livestock Australia, p. 88.

⁶ ACIL Tasman provide a budget for "Wethers that are heavy but do not make a lamb specification without additional feeding or preferential treatment and then sold to the live export trade" (p. B4) and a budget for "Wethers that are heavy but do not make a lamb specification without additional feeding or preferential

We found that lowering the carcass price for the lambs that would otherwise be exported live from \$2.20 to \$2.00 per kilogram reduces the net present value of these lambs from \$34 (calculated by ACIL Tasman) to \$29.39.

Industry should verify the sheep and lamb prices built into the ACIL Tasman analysis and verify the price reduction per sheep/lamb ACIL Tasman assume as a result of diversion of sheep/lambs from the live trade to the domestic slaughter trade.

To examine the effects of the inconsistent values for ewes and wethers implicit in the ACIL Tasman study and to examine the effects of lower prices for live export lambs diverted back onto the domestic market, we recalculated ACIL Tasman's decision trees setting the values for ewes and wethers at the values calculated by the decision trees.

This required an iterative solution of the decision trees.

To ensure a valid comparison of the live sheep versus no live sheep option we solved both ACIL Tasman's Chart 14 and 15 iteratively and ensuring consistent values for ewes and wethers in the decision trees. The results are presented in Chart 3 and Chart 4, respectively.

As can be seen from these charts, the values of the ewes and wethers calculated by the decision trees is the same as the terminal values fed into the decision trees. The decision trees are therefore internally consistent.

treatment and then sold to slaughter" (p.B5). We suspect that these budgets relate to the same sheep. If this is correct, the price penalty for not exporting the lambs live appears to be \$ 0.47 a kilogram or a 20% reduction in value per kilogram if the lambs are not exported live.

Chart 3 Decision tree for a merino cross bred breeding operation, with live export operations with consistent values for ewes and wethers

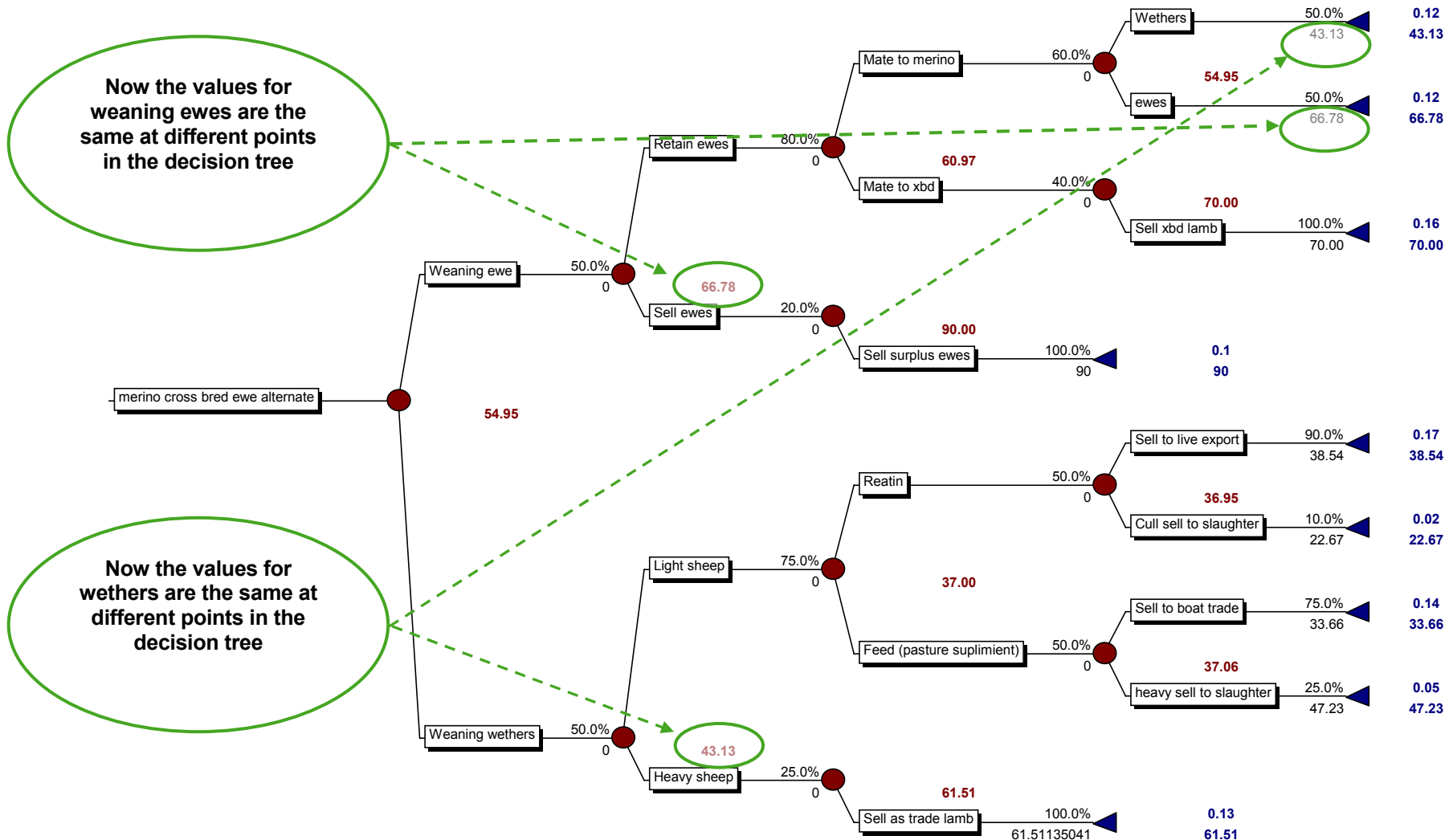
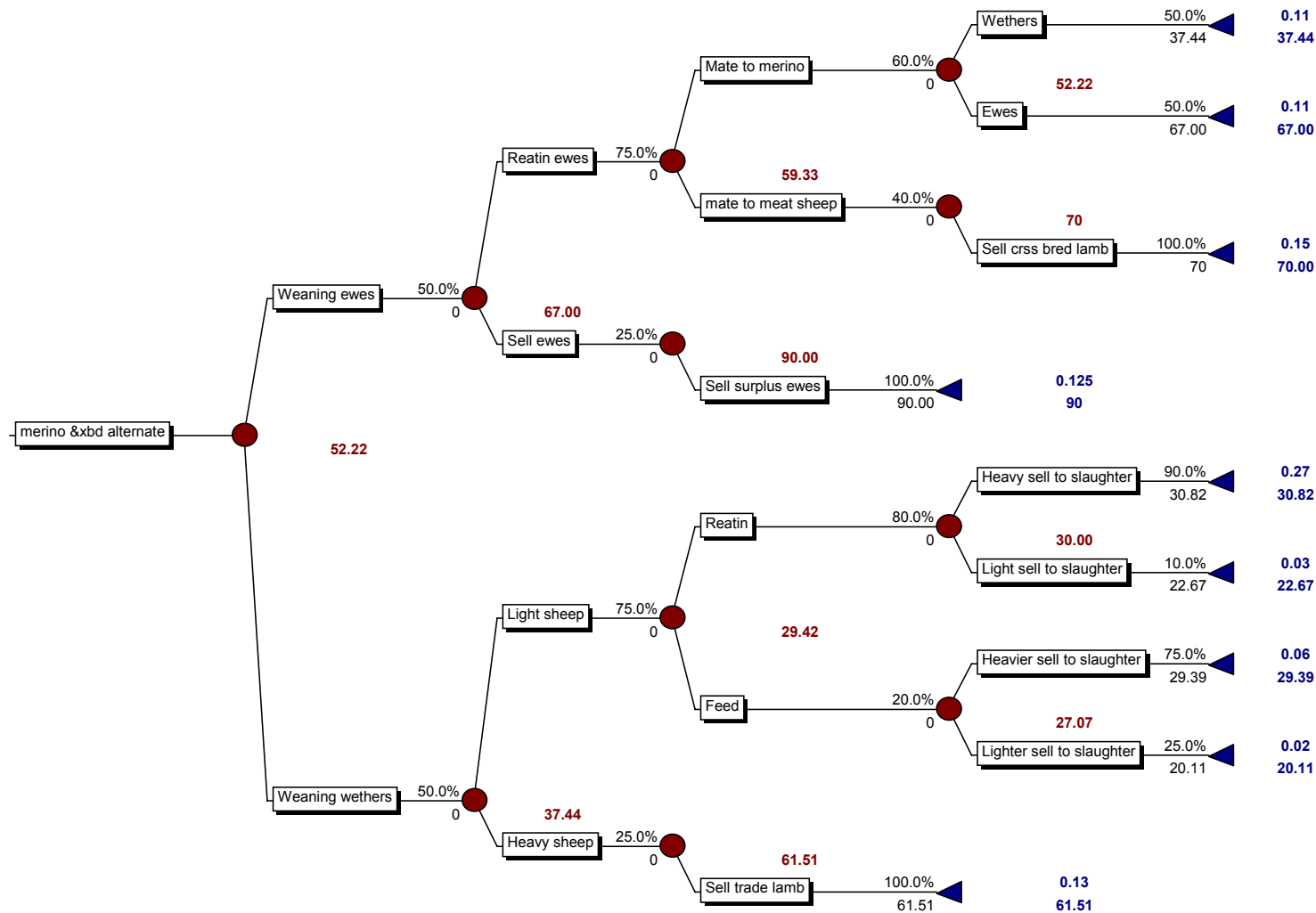


Chart 4 Decision tree for a merino cross bred breeding operation, without live export operations, with consistent values for ewes and wethers



We then repeated the valuation of the typical WA flock using the ACIL Tasman methodology but with the values for the various types of stock derived from the updated decision trees. We found that the use of a more consistent set of livestock values increased the value of the loss of the live export trade to just over \$115 million (see Table 3).

Table 3 Valuation of a typical Western Australian flock using consistent values for ewes and wethers

| Stock type | Number | Decision tree value with live exports | Decision tree value without live exports | Difference in flock value |
|---------------------------------------|--------------|---------------------------------------|--|---------------------------|
| Ewes | | | | |
| Maidens | 600 | 54.95 | 52.22 | 1,641.38 |
| 2 year | 567 | 54.95 | 52.22 | 1,551.11 |
| 3 year | 536 | 54.95 | 52.22 | 1,466.30 |
| 4 year | 507 | 54.95 | 52.22 | 1,386.97 |
| 5 year | 479 | 54.95 | 52.22 | 1,310.37 |
| Total Ewes | 2,689 | | | |
| Wethers | | | | |
| Hoggets | 672 | 43.13 | 37.44 | 3,824.75 |
| Weaners | | | | |
| Ewes | 1,065 | 66.78 | 67.00 | -234.63 |
| Wethers | 1,065 | 43.13 | 37.44 | 6,061.54 |
| Total Weaners | 2,130 | | | 5,826.91 |
| Rams | | | | |
| Merino | 51 | 0.00 | 500.00 | |
| Total All Sheep | 5,542 | | | 17,007.78 |
| ACIL Tasman raising factor | | | | 6,776.73 |
| ACIL Tasman effect on WA flock | | | | 115,257,075.19 |

Another concern that we have with the ACIL Tasman analysis is the assumption that removal of the live sheep trade would not affect the price of mutton and lamb received by producers. We examine this issue in the following section.

4. ASSUMPTION OF NO EFFECT ON MUTTON AND LAMB PRICES

In their study ACIL Tasman considered the effect that diversion of stock from the live sheep trade to the domestic market could have on the price of mutton and lamb on the domestic market. ACIL Tasman concludes (at p. 12) that:

Overall, there is unlikely to be a dramatic or sustained impact on the price of mutton or lamb in Australia if the live export market could no longer be accessed by Australian producers.

We do not agree with this assessment for two reasons.

First, even a small reduction in the price of mutton and lamb could significantly reduce the value of the Western Australian flock. For example, using ACIL Tasman's budgets for a Ewe enterprise we calculated that a 2 per cent reduction in the price of mutton would lower the value of a ewe by 40 cents a head. For the ACIL Tasman typical flock this would translate into a reduction in flock value of approximately \$2,200 per flock which scales up to just over \$15 million for the Western Australian sheep industry.

Given the size of this impact for a very small reduction in mutton prices, it seems essential to incorporate possible mutton and lamb price effects of diverting sheep from the live export market back onto the domestic market. This is especially so in light of recent work presented by Mountera et al in which a model of Australia's livestock and wool industry was developed. This model assumes medium term export demand elasticities for Australian mutton and lamb of -5.0 and -2.0, respectively.⁷ These elasticities imply that there would be some price impacts from the diversion of live sheep into the mutton and lamb trade.

The paper by Mountera et al. also provides data on domestic meat demand elasticities and meat supply elasticities for livestock products. Using this data and data on demand, supply and exports of mutton and lamb⁸ we developed a simple model of world demand for Australian mutton and lamb.

The parameters and data used to construct these simple models are given in Table 4.

Table 4 Data used to construct the simple net trade model for Australian mutton and lamb: 2008-09

| Cost category | Unit | Mutton | Lamb |
|----------------------------|----------------------|--------|-------|
| Domestic supply elasticity | % | 1.0 | 1.2 |
| Domestic demand elasticity | % | -1.4 | -1.5 |
| Export supply elasticity | % | 1.6 | 1.9 |
| Export demand elasticity | % | -5.0 | -2.5 |
| Quantity domestic demand | 000 t carcass weight | 46.8 | 238.4 |
| Quantity domestic supply | 000 t carcass weight | 235.3 | 422.9 |
| Quantity exports | 000 t carcass weight | 188.5 | 184.5 |

In the simple net trade model for Australian lamb there are three equations. One equation links Australian export supply of lamb to the price of Australian lamb. The second equation links export demand for Australian lamb to the price of Australian lamb. A third equation

⁷ Stuart Mountera, Garry Griffith, Roley Piggott, Euan Fleming and Xueyan Zhao 2007, 'Economic Evaluation of New Technologies and Promotions in the Australian Sheep and Wool Industries', paper prepared for the 51st Australian Agricultural and Resource Economics Society Annual Conference, Queenstown, New Zealand, 13-16 February 2007. Financial support for this research was provided by the Australian Sheep Industry CRC.

⁸ Sally Fletcher, Ben Buetre and Kristopher Morey 2009, *The value of the red meat industry to Australia 2009*, ABARE research report 09.13, June & Meat and livestock Australia 2009, Statistical review July 2008 – June 2009, p. 21.

requires that export demand for Australian lamb equals the quantity of lamb exported from Australia.

To simulate cessation of live sheep exports the carcass weight equivalent of the lambs exported live is assumed to initially shift the export supply curve. The model then solves for the change in the Australian lamb price that brings the market back into equilibrium.

In equilibrium, the cessation of live exports lowers Australian lamb prices. This increases domestic and export demand for lamb.

The net trade model for Australian mutton has the same structure as the net trade model for Australian lamb but the equations have the parameters for mutton given in Table 4.

To estimate the lamb and mutton carcass equivalent of live sheep exported we note that ACIL Tasman indicates that there were 2,700,000 sheep and lambs exported from Western Australian in 2007-08 (p. 22). For illustrative purposes, suppose half of these sheep were lambs and half were wethers. At a carcass weight of approximately 22 kilograms, this many live sheep diverted onto the domestic market would increase lamb and mutton supply each by 62,100 tonnes per annum.

According to the net trade model an increase in domestic supply of this order would decrease lamb and mutton prices by 3.67 percent and 4.62 percent, respectively.

We re-ran the decision trees with these price declines (see Chart 5). Comparing the values for different sheep in (Chart 5) with the values for the same sheep prior to removal of the live sheep trade (Chart 3) we calculated that allowing for the cessation of live exports to lower mutton and lamb prices would decrease sheep and lamb prices by:

- \$5.98 per head for ewes ($\$54.95 - \$48.92 = \6.04);
- \$7.57 per head for wether hoggets ($\$43.13 - \$35.49 = \$7.64$);
- \$4.39 per head for weaner ewes ($\$66.78 - \$62.34 = \$4.44$); and
- \$7.57 per head for weaner hoggets ($\$43.13 - \$35.49 = \$7.64$).

At these values, cessation of live sheep exports imposes a loss in revenue to producers of about \$230 million (see Table 5).

Chart 5 Decision tree for a merino cross bred breeding operation, without live export operations, but with consistent values for ewes and wethers and with mutton and lamb prices falling

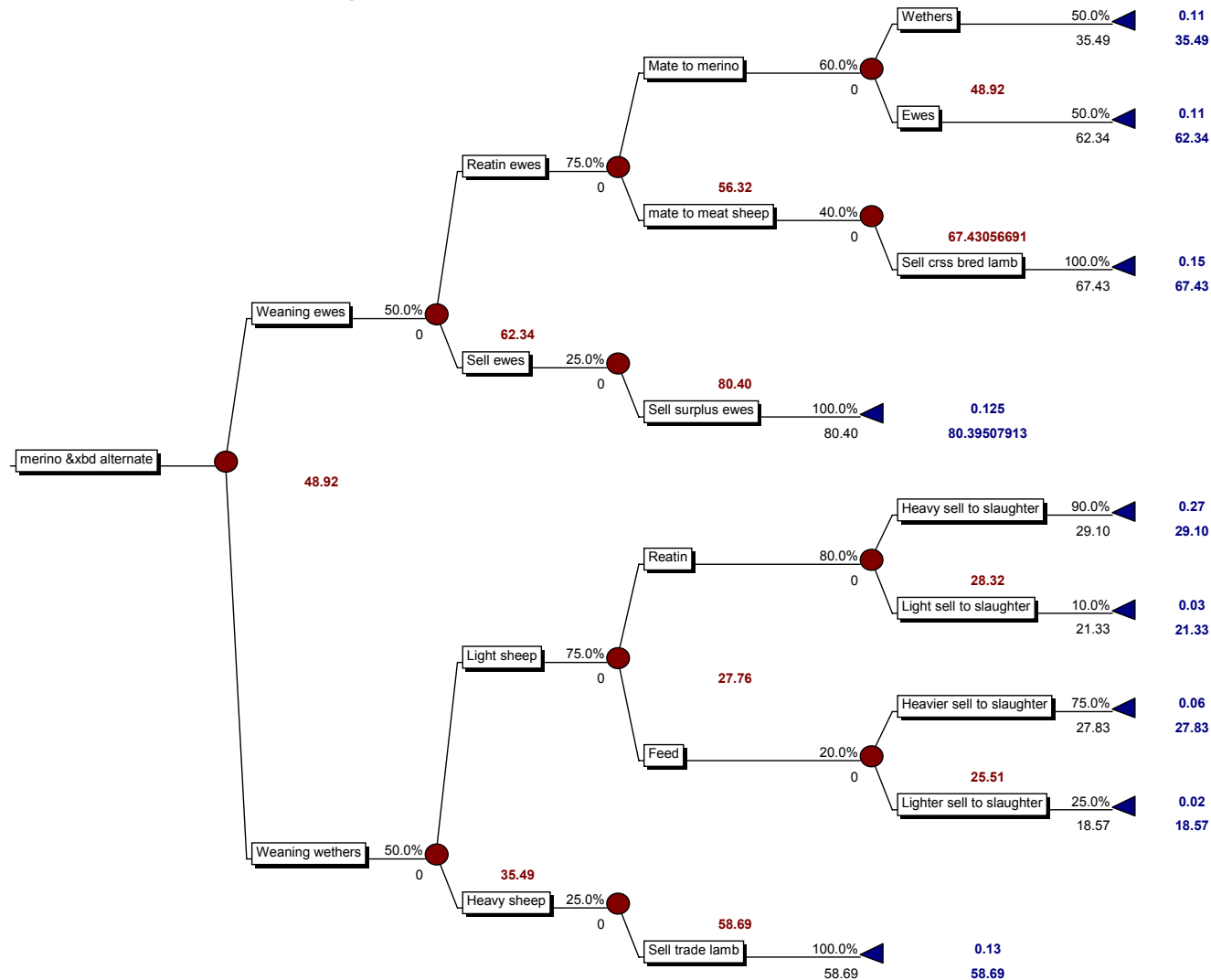


Table 5 Valuation of a typical Western Australian flock allowing for price effects associated with removal of live sheep exports

| Stock type | Number | Decision tree value with live exports | Decision tree value without live exports | Difference in flock value |
|---------------------------------------|---------------|--|---|----------------------------------|
| Ewes | | | | |
| Maidens | 600 | 54.95 | 48.92 | 3,622.92 |
| 2 year | 567 | 54.95 | 48.92 | 3,423.66 |
| 3 year | 536 | 54.95 | 48.92 | 3,236.47 |
| 4 year | 507 | 54.95 | 48.92 | 3,061.36 |
| 5 year | 479 | 54.95 | 48.92 | 2,892.29 |
| Total Ewes | 2,689 | | | |
| Wethers | | | | |
| Hoggets | 672 | 43.13 | 35.49 | 5,133.43 |
| Weaners | | | | |
| Ewes | | | | |
| Wethers | 1065 | 66.78 | 62.34 | 4,725.78 |
| Total Weaners | 1065 | 43.13 | 35.49 | 8,135.57 |
| Rams | | | | |
| Merino | 51 | 0.00 | 500.00 | |
| Total All Sheep | 5,542 | | | 34,231.49 |
| ACIL Tasman raising factor | | | | 6,776.73 |
| ACIL Tasman effect on WA flock | | | | 231,977,467 |

We do not believe that the results generated from the simple net trade model are particularly robust in that the net trade model is a relatively simple approximation of the world sheep meat market.⁹ Rather we use the results from the net trade model to illustrate the proposition that when evaluating the effects of removal of live sheep exports some attempt must be made to incorporate the effects of increased mutton and lamb supply on the respective prices received by farmers for these products.

5. INTERPRETATION OF ECONOMIC INSIGHTS' RESULTS

The updated calculations presented in this report have the potential to provide a more reliable estimate of the impact of the value of cessation of live sheep exports from WA than the ACIL Tasman study on a standalone basis. However, we would be reluctant to accept even the updated numbers as reliable estimates as there are a large number of assumptions and data points in the ACIL Tasman methodology that remain to be validated/tested by industry.

⁹ For example, the model does not allow for a cross price effect between live sheep prices and demand for mutton and lamb. The model also does not incorporate barriers to trade in sheep meats in overseas countries.

Subject to the qualification regarding the data and assumptions, the updated calculations indicate that the cessation of live sheep exports from WA could lower the value of the flock by about \$230 million (Table 5). If the flock has an average life of 5 years, this is equivalent to an annual reduction in the flock value of about \$57 million, assuming a real weighted average cost of capital of about 7 per cent.

The annual reduction of the value of the WA flock of about \$57 million is approximately 12 per cent of the value of sheep and lamb slaughtering plus the value of live sheep exports, the value of which ACIL Tasman has forecast to be \$467 million in 2006-07 (see p. 22 of ACIL Tasman report).

The estimate of \$57 million is below that obtained by Clarke, Yates, and Morison, who found that cessation of live sheep exports would induce an “On- farm loss (Livex)” of \$ 120 million in the medium (5 year) term.¹⁰

However, the study by Clarke, Yates, and Morison was undertaken at a time when the sheep market was less buoyant than it is now. This is reflected in the assumptions made by Clarke, Yates, and Morison regarding the effects of cessation of the live trade on sheep and lamb values. They assumed that:¹¹

- the price of sheep previously destined for live export would fall by \$35 per head;
- the sale of sheep previously destined for live export would total approximately 1 million (80% processed in WA and 20% transported to the eastern states). The majority of the remaining 2.3 million sheep would be destroyed; and
- in response to the increased supply of sheep destined for the domestic market, the price of sheep would fall by \$0.34/kg and the price of lambs would fall by \$0.14 per kg live weight for all producers.

Thus the higher annual medium term loss identified by Clarke, Yates, and Morison probably reflects the assumptions they made regarding higher price impacts of cessation of the live sheep trade that reflected market circumstances at the time.

This highlights a very important point regarding the ACIL Tasman study. The estimates they obtained reflect the market conditions assumed to prevail in the year live exports were assumed to cease. If there are buoyant times in the time period selected for analysis the cost of cessation of live exports will be lower than if a less buoyant year had been selected.

The solution to the bias created by the selection of a particular year for analysis is to choose a “representative year” or an average year based on the selection of a time period that included both good and bad years.

¹⁰ Clarke, M, W Yates, and J Morison 2007, *Live Exports: assessing the value of the live export industry to regional Australia*, MLA and LiveCorp, p. 4.

¹¹ Clarke, M, W Yates, and J Morison 2007, *Live Exports: assessing the value of the live export industry to regional Australia*, MLA and LiveCorp, p. 96.

6. CONCLUSION

The approach implemented by ACIL Tasman was reasonably comprehensive and is useful as a ‘first step’ in the evaluation of the effects of removal of the live sheep trade in WA – if applied and documented correctly.

To take the ACIL Tasman methodology forward so that it can provide reliable estimates of the effects of cessation of the live sheep trade we believe that:

- the year chosen to base the analysis on needs to be assessed to ensure it represents a “typical year” facing the sheep meat industry in WA;
- if the year ACIL Tasman’s analysis is based on is accepted as a “typical year” facing the sheep meat industry in WA;
 - the data on different sheep values, with and without the live export trade, used in the ACIL Tasman study need to be verified/validated; and
 - assumptions regarding flock structures and the marketing options available to farmers, as represented by the proportions of stock entering different market segments, used in the ACIL Tasman study need to be verified/validated; and
- The ACIL Tasman analysis needs to be extended to allow the cessation of the live sheep trade to effect sheep meat and mutton prices.

In light of the significant improvements required to the ACIL Tasman methodology we do not believe the ACIL Tasman study provides a reliable estimate of the effects of cessation of the live sheep trade in WA. Indeed, on the basis of the review presented in this report, we strongly suspect that the ACIL Tasman study grossly underestimates the cost associated with cessation of live sheep exports from WA.