



Review of Assumptions in Reports on the Live Sheep Export Industry



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Front cover photograph shows a sheep near Lakes Entrance in Victoria.

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1. Introduction

Pegasus Economics (Pegasus) has been commissioned by the Department of Agriculture, Fisheries and Forestry to provide commentary on the underlying assumptions or findings/conclusions of the following reports:

- *The economic impacts of regulating live sheep exports - research report 21.01* – February 2021 – Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES), (Nelson, et al., 2021)
- *The economic contribution and benefits of the Northern live export cattle industry* – August 2022 – ACIL Allen (2022)
- *Contribution of live exports to the Australian Wool Industry* – March 2014 – The Centre for International Economics (CIE) (2014)
- *Contribution of live exports to Woolgrower's income - An Update* – July 2018 – CIE (2018)
- *The Economic Importance to Western Australia of Live Animal Exports* – July 2011 – Kingwell, R., Cunningham, P., Nath, T., Anderton, L., Xayavong, V., Curis, K., . . . Feldman, D., Department of Agriculture and Food Western Australia, (Kingwell, et al., 2011)
- *Live Sheep Export – Brief Report* – April 2018 – Mecardo (2018)
- *Value analysis of the Australian Live Sheep Export Trade* – September 2019 – Mecardo (Dalglish, M; Agar, O, 2019)
- *Impact of the live sheep export trade's self-imposed moratorium and regulatory changes* – January 2020 – Mecardo (Dalglish, Agar, & Herrmann, 2020)
- *Economic Issues Associated with the Live Sheep Export Trade* – March 2018 – Pegasus Economics (Davey & Fisher, 2018)
- *Economic Implications of Phasing Out the Live Sheep Export Trade* - April 2022 – Pegasus Economics (Davey & Fisher, Live Sheep Export Trade: Review of the Draft Regulation Impact Statement, 2020)
- *Implications of management decisions on the WA sheep flock in response to changing markets.* – April 2019 – Pritchett, K, Department of Primary Industries and Regional Development, Western Australia (Pritchett, 2019)

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2. *The economic contribution and benefits of the Northern live export cattle industry - ACIL Allens 2022*

There is a question as to how relevant the findings in this report are to the live sheep export trade as there is little relationship between the live sheep export industry and the Northern live cattle export industry.

While live cattle have been exported alongside live sheep on livestock carriers destined for the Middle East, such voyages commence exclusively out of the Port of Fremantle in the south-west Western Australia and usually carry cattle from the Southern Agricultural Region of Western Australia rather than Northern Australia.

Cattle from Northern Australia are highly unlikely to find their way to the Middle East for live export. Farmers in Northern Australia prefer cattle with traits derived from *Bos indicus* breeds such as

Brahman, because these cattle perform better in the higher temperatures associated with the tropical climate, lose less condition when transported long distances, and possess greater tick resistance (Australian Competition and Consumer Commission, 2017, p. 22). In turn, *Bos indicus* breeds from Northern Australia are generally exported to south-east Asian countries such as Indonesia, Vietnam, Malaysia and the Philippines (LiveCorp, 2023).

Cattle from the Southern Agricultural Region of Western Australia tend to be predominantly *Bos taurus* or European breeds such as Angus and Hereford (Department of Primary Industries and Regional Development, 2021; LiveCorp, 2023). These cattle are sold to a variety of Middle Eastern countries such as Israel (LiveCorp, 2023).

3. *Contribution of live exports to the Australian Wool Industry – CIE 2014 and Contribution of live exports to Woolgrower's income - An Update – July 2018 – CIE 2018*

There are three assumptions made by CIE (2014) that are worth noting.

The first assumption is that the live sheep export industry underwrite sheep saleyard prices across Australia. According to CIE (2014, p. 6):

It has been widely recognised that the export of live sheep underwrites the saleyard price of lambs and sheep nationally, and in particular Western Australia, and so contributes to the red meat industry, however, the contribution of the live trade to the wool industry is not well understood.

ABARES (Nelson, et al., 2021, p. 17) has noted studies funded by industry tend not to recognise that prices are set in world markets, as appears to be the case in this instance.

The second assumption made by CIE (2014, p. 24) is that WA sheep farmers have limited options available to them if the live sheep export trade is no longer available to them:

The bottom line is that woolgrowers, and particularly specialist woolgrowers, have limited capacity to transform their enterprise mix away from sheep. This is why the option value of the live trade is so important, in providing another channel to dispose of cull wethers for a good return.

CIE's assumption in this regard differs from the historical trend since 1990 as WA farmers have diversified their enterprises away from sheep focusing upon wool production. Low wool prices following the collapse of the wool reserve price scheme in 1991 encouraged farmers to switch from sheep to cropping (Department of Agriculture, 2019, p. 10). The fall in wool prices, coupled with rising grain prices, saw a shift towards cropping by many farms and an expansion of cropping into more marginal areas (Dahl, Leith, & Gray, 2013, p. 207). Since the 1990s, the WA sheep flock has undergone significant change in structure and composition (Department of Agriculture and Food Western Australia, 2016, p. 3). The WA sheep flock has evolved in response to market demand from being a wool dominant flock to a dual-purpose flock producing both wool and sheep meat (Pritchett, 2019, p. 2).

According to Kingwell et.al. (2011, p. 37), further conversion of WA farming land from sheep to cropping is possible. According to Pritchard (2019), WA sheep farmers have options of increasing their cropping program, increasing lamb production, increasing wool production, and transferring sheep interstate if the live sheep export trade is no longer available.

Also, the live sheep export trade has long since ceased being an outlet for cull wethers (wethers at end of their wool production life). Meat & Livestock Australia (MLA) (2001, p. 3) suggested that

sheep intended for the Middle East live sheep trade should have four permanent adult teeth or less, implying that sheep had to be no more than two years old, in turn inferring the live sheep export trade was no longer an outlet for cull wethers.

The third assumption made by CIE (2014, p. 8) is that sheep prices would default to prices in the eastern states less the cost of transport:

Without live exports to underpin prices, the Western Australian price paid by processors would default to the eastern states (South Australian) price less the transport cost. This transport cost will be most likely in the range of \$25 to \$30 per head, which until the supply side adjusts further, will be borne by wool and sheep producers.

CIE (2018, p. 3) also made the same assumption in its 2018 report:

Without live exports to set prices, the Western Australian price paid by processors could default to the eastern states (South Australian) price less the transport cost. This transport cost will be most likely be \$30 per head, which until the supply side adjusts further, will be borne by wool and sheep producers.

This arguably represents an upper limit on price falls and appears to be the main factor driving the results of the price modelling in both CIE reports. Underlying this assumption is the presumption that WA sheep meat processor exercise a high degree of buyer power against WA sheep farmers in their purchase of sheep. Buyer power has been described in the following terms:

...“buyer power” refers to the circumstance in which the demand side of a market is sufficiently concentrated that buyers can exercise market power over sellers. A buyer has market power if the buyer can force sellers to reduce price below the level that would emerge in a competitive market. (Noll, 2005, p. 589)

If WA sheep meat processors do not exercise a high degree of buyer power, then WA sheep prices may not fall by as much as the prices in the eastern states less the cost of transport from WA. Perhaps recognising this possibility, CIE (2018, p. 16) also reported on results for an alternative scenario:

... recognising the uncertainties around transport distances and seasonal dynamics, the contribution of the trade was also calculated using a transport charge of \$10 per head.

ABARES (Nelson, et al., 2021, pp. 17-18) has observed in relation to several reports on the live sheep export industry funded by industry groups, including both the 2014 and 2018 CIE reports, that they tend not to recognise that lamb and sheep prices are set in world markets, or that short-term price falls in Western Australia are limited to \$20 per head by the cost of trucking sheep to eastern state markets.

Additionally, the assumed figure to transport sheep per head to eastern states of \$25 to \$30 used in the 2014 and 2018 CIE reports appears to be on the high side. According to ABARES (Nelson, et al., 2021), the average cost of transporting sheep to the eastern states for processing was only around \$20 per head.

4. *Live Sheep Export – Brief Report – Mecardo 2018*

There are a number of assumptions underlying the modelling contained in this report that are worth noting.

The report appears to assume that prices in WA for lamb and sheep meat are determined by the local supply factors. According to Mecardo (2018, p. 7):

The relationship between WA slaughter and the export price was used to create a regression-based model to determine the potential price impact on WA lamb and sheep markets from a change to annual WA slaughter levels. ... Using the historic variance from actual figures to the model forecast we were able to provide a potential range for percentage price declines impacting upon WA producers of lamb and sheep caused by the imposition of a live export ban.

ABARES (Nelson, et al., 2021, p. 17) has noted studies funded by industry tend not to recognise that prices are set in world markets.

Dr Trevor Breusch (2018, p. 7), formerly a Professor of Econometrics at the Australian National University, questioned the rigor of the economic analysis in the Mecardo report:

I come to the view that the Mecardo report is more a document of persuasion than an expert analysis of the cost to the industry of banning live sheep export.

Dr Breusch (2018, p. 7) summarised his criticism of the Mecardo modelling in the following terms:

A proper forecast of the effects would allow for adjustments both in the quantity supplied to the market each period and the expansion of markets interstate or internationally. New markets take time to develop and would not be reflected simply in the historical year-by-year shifts in slaughter quantity and price that form the basis of this report. Even within the narrow approach adopted, the forecast is based on a statistical relationship that is inconsistent with the choice of variables. The failure to account for other variables, including lags, further removes the approach from proper policy analysis.

Dr Breusch (2018, p. 6) expressed the view that the report did not provide a sound basis for decision-making:

This naïve statistical model in the Mecardo report is unsuitable for the policy evaluation in which it is employed.

Dr Breusch (2018, p. 2) described the Mecardo analysis as “very superficial and unworthy as a guide to policy.” and has described the assumption that export prices are determined solely by local supply in WA as implausible.

Mecardo (2018, p. 8) acknowledged that the possibility of transporting WA sheep to the eastern states imposed a price floor on how far WA sheep prices could fall:

As the WA market does not operate in isolation, the assumption was used that once percentage price declines in WA reached a point at which it was economically viable to ship the excess supply of WA sheep and lamb across to the Eastern states, producers would take advantage of this opportunity to minimize their losses.

However, in relation to this Mecardo report ABARES (Nelson, et al., 2021, p. 17) observed there was little or no recognition of the option for WA sheep farmers to transport sheep to high-value markets in eastern Australia.

5. *Value analysis of the Australian Live Sheep Export Trade - Mecardo 2019*

Mecardo (Dalglish, M; Agar, O, 2019, p. 2) estimated the on-farm employment related to live sheep export based on data obtained from the 2017-18 Australian Agricultural and Grazing Industries Survey (AAGIS) published by the ABARES. This analysis assumes knowledge of the labour intensity of sheep farming and the allocation of labour between different sheep outputs, although details on those assumptions have not been provided in the report.

Mecardo uses an employment multiplier to gross up the number of on-farm jobs it attributes to the live sheep export industry to the wider economy (Dalglish, M; Agar, O, 2019).¹ The employment multiplier figure is derived from the *State of the Industry Report 2018: The Australian red meat and livestock industry* publication (Meat & Livestock Australia and Ernst & Young, 2018, p. 12). The report takes the total direct and indirect estimated employment of the red meat and livestock industry in 2016-17 of 438,100 and divides that by the direct employment of the meat production sector (composed of meat livestock producers and feedlots) of 132,100 in 2016-17 to derive an employment multiplier of 3.32 (Dalglish, M; Agar, O, 2019, p. 6n).

There are several assumptions associated with Mecardo's estimate of the level of employment attributed to the live sheep export trade that are worth noting.

In the first instance, around 80% of the labour worked on all sheep farms in WA is performed by the farmer and other farm family members – the so-called imputed labour cost where there is no actual monetary outlay on wages (based on AAGIS data). According to an ABARES report on the financial performance of lamb producing farms (Litchfield, 2020, p. 38):

A large amount of unpaid labour is used in family-operated sheep-producing farms, particularly smaller farms.

Secondly, there are a couple of issues associated with the derivation of the employment multiplier used by Mecardo:

- 13.6% of the total number of jobs 'created' by the livestock meat production sector by livestock farms and feedlots actually relate to employment in the meat processing, wholesaling and retailing sectors, all of which are presumably outside of the scope of the live sheep export production chain.
- The *State of the Industry Report 2018: The Australian red meat and livestock industry* publication states that for the livestock meat production sector, 1.2 additional indirect jobs were created for each direct job (Meat & Livestock Australia and Ernst & Young, 2018, p. 12). On this basis, Mecardo should have used an employment multiplier of 2.2 instead of the 3.32 that it did use.

Even if one were to accept Mecardo's figure of direct employment on-farm in WA of 798 in 2017-18, then total direct and indirect employment in WA relating to the live sheep export supply chain would be reduced to less than 1,800.

¹ Economic multipliers (e.g. for income, output, employment, value added, or imports) are typically derived from input-output tables (The Treasury (NSW Government), 2017, p. 63) that are produced as a by-product from the compilation of the national accounts.

Thirdly, Mecardo calculated its estimate of the direct and indirect levels of employment attributed to the live sheep export supply chain in WA based on 2017-18 when the level of live sheep exports from WA was 1.6 million, in excess of three times the level of live sheep exports during the 2022 calendar year. If Mecardo's estimate of direct employment on-farm of 798 in 2017-18 in WA associated with the live sheep export supply chain is taken at face value and the correct employment multiplier applied to the current size of the live sheep export industry, then the total level of employment associated with the live sheep export supply chain in WA would amount to around 550.

Fourthly, the Mecardo report also takes no account of jobs that would be created in the event the live sheep industry was phased out. According to the Department of Agriculture (2019, p. 46), switching from live exports to lamb production is likely to have only minor impacts on employment in the sheep industry because the production of prime lambs requires more labour per sheep than producing sheep for live export. The Department of Agriculture (2019, p. 46) has also observed that overall total WA employment will likely increase if the live sheep export trade is curtailed as a result of increased employment in the meat processing sector.

6. Impact of the live sheep export trade's self-imposed moratorium and regulatory changes - Mecardo 2020

Mecardo's stakeholder engagement provides insights not otherwise available, but the number of interviews conducted is very low and there are doubts about its statistical validity. For two industries, only one interview was conducted; for an additional three industries, only two interviews were conducted. In no cases were interview transcripts provided. It is, therefore, very difficult to assess how representative the respondents chosen were, or how faithfully respondent attitudes have been reproduced in the report.

While this report contains much useful information on the broader supply chain impacts of the live sheep export trade, several elements of the modelling in the report are worth noting.

The key assumption driving results in this report is that in the absence of the live sheep trade there would be a 30-50% approximate reduction in prices at the saleyard in WA (Dalgleish, Agar, & Herrmann, 2020, pp. 5-6). Mecardo sourced this key assumption from CIE (2018).

ABARES (Nelson, et al., 2021, pp. 17-18) has observed that this report (and many others) tends not to recognise that lamb and sheep prices are set in world markets, or that short-term price falls in Western Australia are limited to \$20 per head by the cost of trucking sheep to eastern state markets.

ABARES (Nelson, et al., 2021, p. 17) contends that the report is likely to overstate the impact of restricting live exports for two reasons. First, a 30% to 50% reduction in saleyard prices was assumed based on a report by CIE (2018), despite a footnote in the Mecardo report recognising that saleyard prices were observed to fall by only 15% to 30% (Dalgleish, Agar, & Herrmann, 2020, p. 5n). Second, there is no recognition of the likely short-term nature of these price impacts or the likelihood that prices will rise as an expansion of domestic meat processing reduces processing costs.

Transparency around the modelling in this report is also an issue. According to Mecardo (Dalgleish, Agar, & Herrmann, 2020, p. 5):

Multifactorial regression modelling of annual live sheep export volumes and the relationship between the live export trade, flock size and slaughter, both nationally and within Western Australia, was used to estimate monthly live export sheep volumes if the industry was not subject to the 2018 suspension and the 2019 moratorium.

Details on what sort of modelling was conducted and the robustness of the results has not been provided, so the veracity of the modelling exercise cannot be independently verified.

7. *Economic Issues Associated with the Live Sheep Export Trade – Pegasus Economics 2018 and Economic Implications of Phasing Out the Live Sheep Export Trade - Pegasus Economics 2022*

Pegasus Economics assumed in its 2018 report that its estimates of the price premium paid by live sheep exporters would be equivalent to the effect of a termination of the live sheep export trade. This assumption was subsequently disproved by actual saleyard data following disruptions of the trade from 2018 onwards.

ABARES (Nelson, et al., 2021, p. 16) also observed that the economic impact estimated by Pegasus Economics on the phasing out of the live sheep export industry was likely to underestimate the impact because Western Australia's short and unreliable growing season meant that bringing these sheep to prime lamb standard for domestic processing was likely to require some purchased feed, adding both feed costs as well as additional labour costs to sheep farms in WA.

Pegasus Economics (Davey, Fisher, & Morley, 2022, p. 22) subsequently found a statistically significant negative price impact on lamb and mutton prices received by sheep farmers in WA saleyards relative to the eastern states following the prohibition on the live sheep export trade during the Northern Hemisphere summer at WA saleyards. However, Pegasus Economics at that time found no evidence for any statistically significant negative price impact arising from the Northern Hemisphere summer prohibition in relation to prices received by WA sheep farmers for heavy trade lamb and heavy mutton sold over the hooks as compared to NSW sheep farmers. Extrapolating on these results for WA saleyard sheep throughput, Pegasus Economics (Davey, Fisher, & Morley, 2022, p. 22) suggested an aggregate price impact on WA sheep farmers in the order of:

- \$14.5 million in 2018-19 (in real 2020 prices)
- \$13.2 million in 2019-20 (in real 2020 prices)
- \$11.8 million in 2020-21 (in real 2020 prices).

This worked out to an average cost through the reduction in sheep sale receipts per WA sheep farmer in the order of less than \$2,800 (in real 2020 prices) in 2020-21.

More recently, Pegasus Economics (Davey & Fisher, 2023) has revised its estimate of the price impact on WA sheep farmers arising from the prohibition on the live sheep export trade during the Northern Hemisphere summer. Pegasus Economics (Davey & Fisher, 2023, p. 29) found a statistically significant negative price impact on lamb prices received by sheep farmers in WA saleyards, and WA over the hooks prices for heavy trade lamb and medium sheep relative to NSW following the prohibition on the live sheep export trade during the Northern Hemisphere summer at WA saleyards. Extrapolating these results across the entire turn-off for WA sheep during 2021-22 suggests that the prohibition during the Northern Hemisphere summer cost WA sheep farmers in the order of \$27 million (in 2021-22 constant prices) from lower sheep prices received, that comes out at around \$6,300 per WA sheep farm (Davey & Fisher, 2023, p. 29).

8. *The economic impacts of regulating live sheep exports - ABARES 2021*

This report provides a brief summation of the economics of the live sheep export industry.

The findings in the report are derived from what the authors describe as a plausible scenario:

To create a plausible scenario, the number of sheep for live export was assumed to halve if trade was restricted to the cooler months in the northern hemisphere. This scenario assumes a sudden disruption to trade. This is a worst-case scenario that increases the short-term costs of transitioning to expanded lamb production. (Nelson, et al., 2021, p. 5)

While the report has outlined its assumptions in broad terms, the report is not transparent in terms of its underlying assumptions. The ABARES report has been criticised by Pegasus Economics (Davey, Fisher, & Morley, 2022, p. 21) as something of a 'black box' as there is not a lot of transparency surrounding its assumptions and underpinnings.

9. *The Economic Importance to Western Australia of Live Animal Exports - Kingwell et al., 2011*

One section of this report deals with the potential economic impact arising from the cessation of the live sheep export trade (Kingwell, et al., 2011, pp. 37-44).

This analysis assumes that prices for all categories of sheep will decline in the event the live sheep export trade were to cease (Kingwell, et al., 2011, pp. 37-39). However, the report does not specify by how much sheep prices could be expected to fall, or how different price impacts might alter the conclusions drawn from the analysis.

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