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Impact on Western Australia's sheep supply chain of the termination of live sheep exports

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Abstract

Western Australia (WA) supplies around three-quarters of Australia's exports of live sheep. The number of sheep exported live from WA has ranged from 4.5 million to 2.4 million with the trend in numbers exported being downwards. The future of this export trade appears to be increasingly vulnerable and uncertain, primarily because of the influence of animal welfare lobbyists. This paper uses scenario analysis to assess the impact on WA's sheep supply chain of the termination of the live sheep export trade. The supply chain comprises three sub-sectors: farm production, processing/wholesale and retailing/export. The impacts of the trade termination on each of these sub-sectors are reported. These impacts are strongly linked to how producers respond to termination of the trade. If producers choose to exit the industry or reduce their sheep production in response to the likely lower prices that would follow a reduction in the live export trade, then the abattoirs eventually will suffer through reduced throughput and their support industries will have reduced demand for their services. Meat processors will benefit initially through access to sheep that previously would have been exported live, but these processors may not necessarily benefit in the longer term if the sheep population declines. Further, markets that currently accept live sheep may not necessarily accept the equivalent volume of chilled and frozen sheep meat and may not pay equivalent prices to those currently paid for live sheep. There are cultural, religious and economic preferences for live sheep in some Middle East markets so a simple substitution of chilled and frozen sheep meat for live sheep is not possible in some major markets.

Keywords

Live sheep export, animal welfare, regional economic impacts, industry value chains

1 Introduction

Around 37 percent of WA's sheep turn-off is exported annually mainly to Middle Eastern countries (LiveCorp 2011; ACIL Tasman 2009; Trhulj 2008). Southern WA dominates Australian live sheep exports, with 73 percent of all sheep exports being shipped from Fremantle in 2009/10 (ALE 2011).

In spite of the strong demand for Australian live sheep and relatively high prices received by farmers for sheep meat sold on domestic and overseas markets, sheep numbers in WA have

declined over much of the last two decades (Curtis 2011a). Since the early 1990s WA's sheep population has declined by more than 60 percent, reducing the number of sheep available to be exported live (Curtis 2011b). However, because of similar reductions in sheep numbers elsewhere in Australia over the same period, the live sheep trade has remained strongly dependent on WA.

In spite of the on-going importance of live sheep exports to WA sheep farmers, this trade's future is uncertain; mostly due to the growing strength of animal welfare lobbyists. By illustration, the airing of the ABC program 'Four Corners' on 30th May 2011 of the mistreatment of Australian cattle in Indonesian abattoirs led to the temporary suspension of the live export of feeder and slaughter cattle to Indonesia (DAFF 2011), and unleashed a great deal of public concern about the live export of all Australian livestock (Keen 2011; Millman and Tuton 2011). In addition to the suspension, the Australian Government commissioned an independent review into the livestock export trade (the Farmer Review) and established two industry government working groups – one for cattle and another for sheep and goats.

To inform the policy debate and discussion about the uncertain future of the live sheep trade from WA requires analysis of the current value of the export trade and scenario analyses of impacts of cessation of the trade. To that end, this paper investigates the economic characteristics of the trade and concentrates on scenario analyses of closure of the live sheep trade.

2 WA's live sheep export industry

From the 1970s to the early 1990s, WA's live sheep trade was based on the export of cast-for-age merino wethers. This suited many farmers who were interested mainly in wool production and required an outlet for wethers at the end of their productive life. It also suited traders in most Middle East countries as older wethers were heavier than young wethers, and the traders could buy on a per-head basis yet sell the meat on a weight basis.

Following the collapse of the reserve price scheme for wool in 1991 and a subsequent period of depressed wool prices during the 1990s, many farmers switched from wool production into more cropping (Kingwell et al 2003). Supporting this transition were other influences including: (i) a period of high grain prices in the mid-1990s and late 2000s, (ii) availability of productivity-improving innovations to support crop production, (iii) some very favourable years for grain production in the 1990s and, (iv) some consecutive dry years in the 2000s that made retaining sheep an expensive business strategy. Accordingly sheep numbers in WA declined from 38.4 million in 1990/91 to 14.7 million in 2009/10 (ABS 2011). Over nearly the same period the number of live sheep exported from WA fell from a peak of 4.5 million in 1993 to 2.4 million in 2010, resulting in a downward trend in numbers exported (Figure 1) (Curtis 2011a). The severe drought in 2010 in WA added further downward pressure on sheep numbers and meant that sheep available for live exports would continue to be in short supply.

The age of sheep exported live fell during the late 1990s and into the 2000s because of the shortage of sheep and changing flock structures that increasingly favoured lamb rather than wool production. The strong competition for sheep together with limited supply and a market preference for younger sheep saw sheep prices rise substantially in the early 2000s and again

in the late 2000s (Figure 2). These economic fundamentals have remained in place despite the appreciation of the Australian dollar.

Figure 1. WA live sheep exports

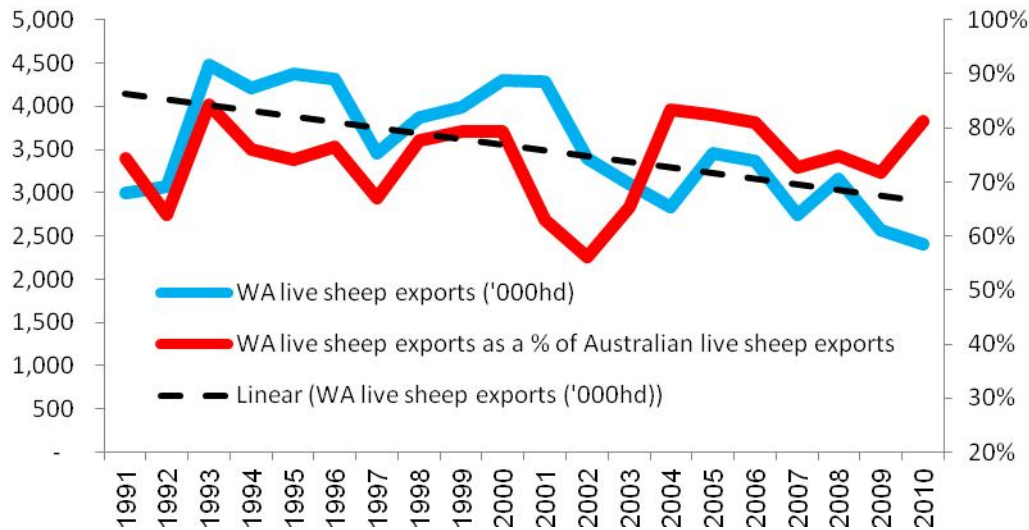
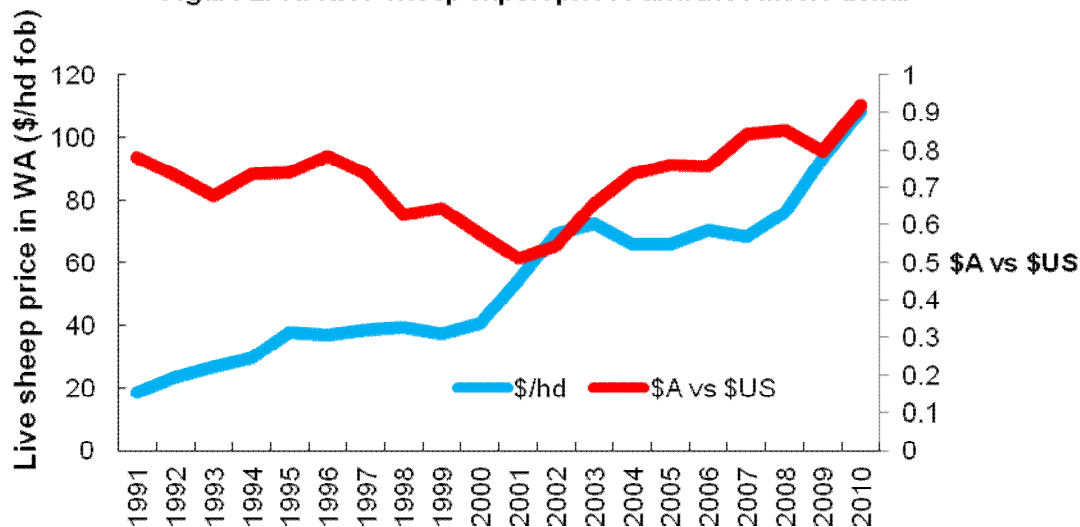


Figure 2. WA live sheep export prices and the Aussie dollar



2.1 Previous problems with the live sheep export trade

There have been a number of problems with live sheep exports over the past 20 or so years, the most notable being in 1990 with the temporary suspension of exports to Kuwait; the suspension to Saudi Arabia between 1990 and 1999; the suspension of exports from Portland in 2002; and the Cormo Express incident in 2003(Lind 2003) which led to the suspension of exports to Saudi Arabia until mid-2005.

Greater regulation of the industry through the Australian Standards for the Export of Livestock (ASEL) was introduced in 2004 (Thorner 2008). There has been further tightening of regulations for livestock ships in Marine Order 43 (AMSA 2004). These

changes, combined with the shift towards exporting younger animals that are less prone to death, have led to sheep death rates during sea transport from WA to be approximately 1 percent. However, perceptions and beliefs in adverse animal welfare issues continue to surround the live sheep export trade (Lind 2003).

The next section outlines a modelling framework used to explore the economic ramifications of changes to the live sheep export trade from WA.

3 Methods

To understand the economic impacts of the termination of the live sheep trade on the three major sectors (production, processing/wholesale and retailing/export) of the sheep supply chain, a WA sheep supply value chain model has been developed (see figure 3). In constructing this value chain model key data and information were sourced from DAFWA, ABS, DAFF, ABARE, MLA, and LiveCorp. To validate the model, results from the model were verified by industry experts and key authorities.

3.1 The sheep supply chain

The WA sheep supply chain considers three sectors; Production, Processing/Wholesale and Retail/Export. Each sector is further described.

The Production Sector

WA's sheep flock in 2009/10 of 14.7 million animals supported disposals of 5.81 million head (40 percent) for processing and export. Farmers, livestock agents, stockmen, auction/sale yard staff, road transport agents, fodder and water suppliers, and veterinary services are key participants in this sector.

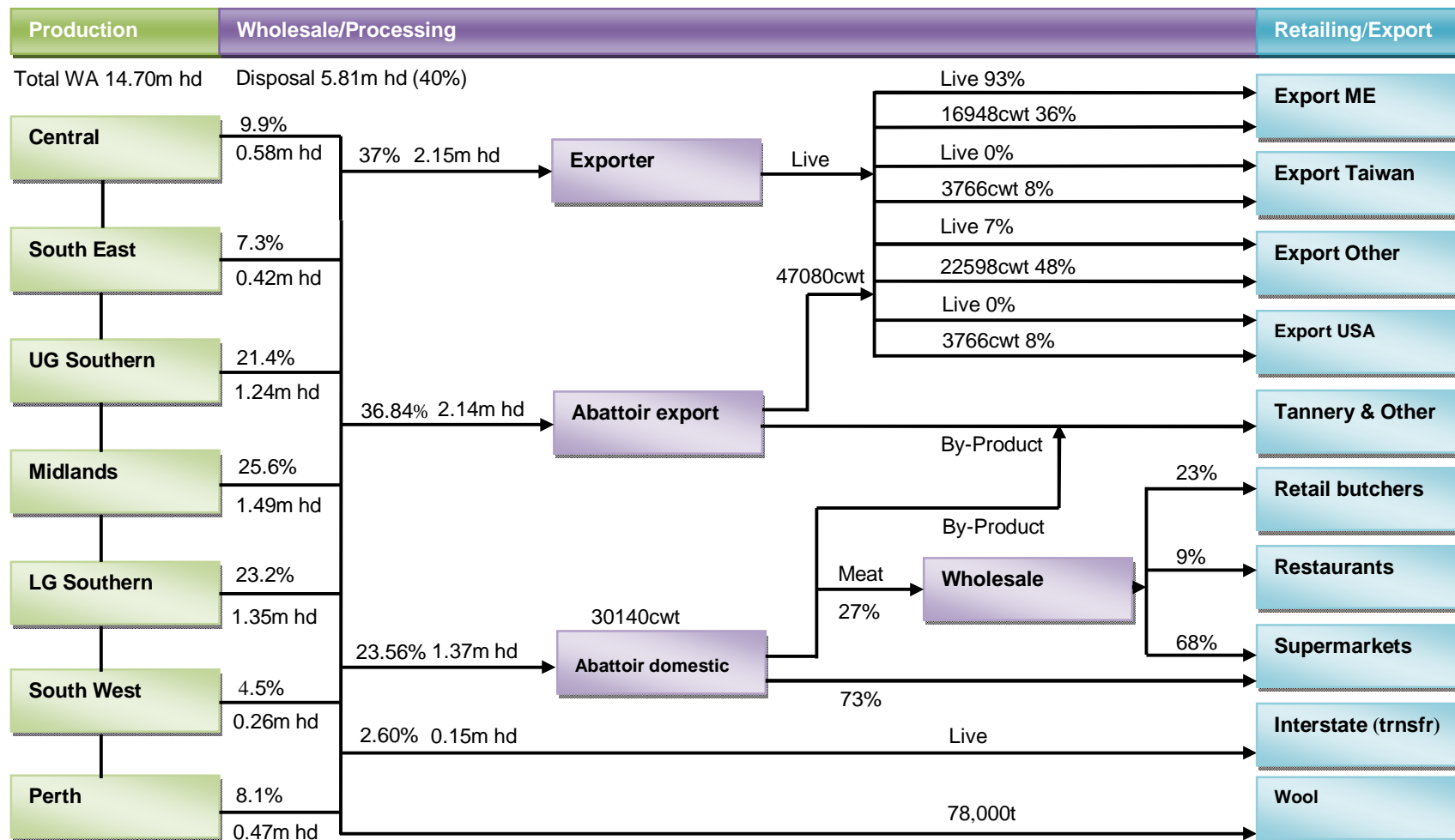
The Processing/Wholesale Sector

The sheep feedlot sector tends to be more seasonal and ad hoc in nature. Hence, most sheep come directly from farms into the processing/wholesale sector that consists of three major sub-sectors; export abattoirs, domestic abattoirs, and wholesalers. In 2009/10 live export accounted for 2.15 million head (37 percent) of sheep disposals. Export abattoirs received 2.14 million head (36 percent), domestic abattoirs received 1.37 million head (24 percent) for processing, and the rest, 0.15 million head (~3 percent), were transported interstate. Businesses involved in the processing sector, besides the processors, are road transport (auction/farm to abattoir, abattoir to retailers), packaging services, and by-product exporters.

The Retailing/Export Sector

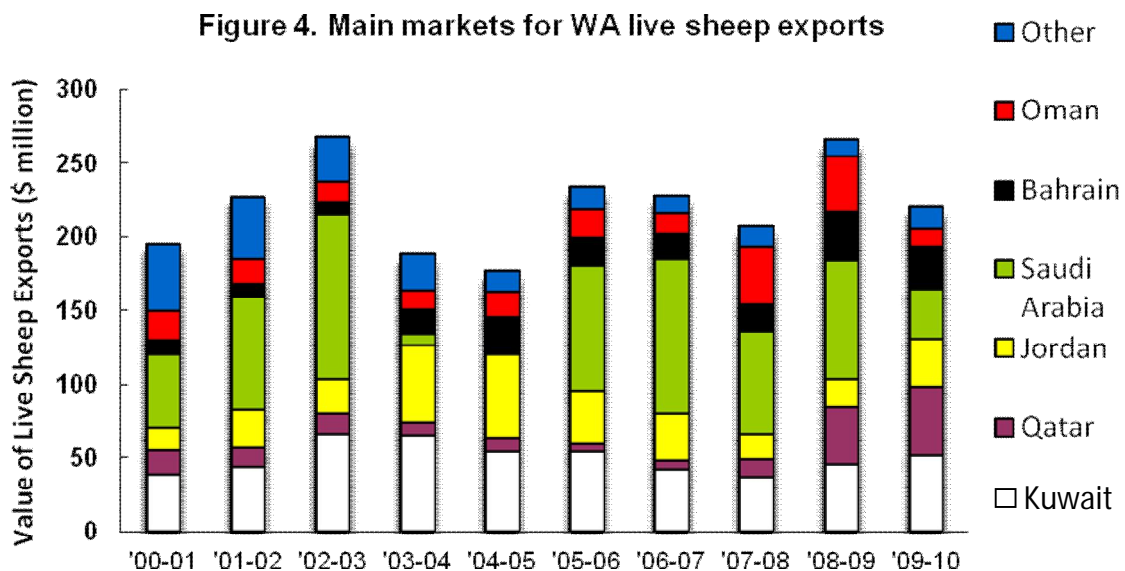
The sheep and sheep meat export markets for WA can be divided into four main destinations: 'Middle East', 'Taiwan', 'United States of America', and 'Other regions'. In 2009-10 live exports of 2 million head (93 percent) went to Middle Eastern countries. Kuwait, Qatar, Jordan, Saudi Arabia, and Bahrain were the largest destinations, accounting for 26 percent, 18 percent, 16 percent, 14 percent, 13 percent, respectively. The rest of the live sheep, 0.15 million head (7 percent) went to other overseas countries.

Figure 3: The WA sheep value chain in 2009/10



The main export market for sheep meat is the Middle East where 16,948cwt¹ (36 percent) were sent in 2009/10. Exports to Taiwan and USA were both 3,766cwt (8 percent). The rest of the export meat (48 percent) went to other countries. Most meat and meat products from domestic abattoirs are transported to supermarkets by the supermarkets' own cold transport systems. The remaining portion is packaged and transported by wholesalers to retail butchers, restaurants and some other supermarkets. Hides and other by-products from this sector go to tanneries and other by-product exporters and retailers. Approximately 78,000 tonnes of wool was produced from the 14.7 million sheep in WA in 2009/10.

Live sheep exports from WA generate annual export income in the range of \$175 million to \$275 million (Figure 4) (Kingwell et al 2011a; Trhulj 2008). The principal markets for these sheep are Middle Eastern countries: Kuwait, Bahrain, Qatar, Jordan, Saudi Arabia, and Oman (Trhulj 2008). Saudi Arabia has often been the largest importer of live sheep from WA. The downward trend in numbers of sheep exported (see Figure 1) has been largely offset by an increase in the price paid for these sheep (see Figure 2) such that WA's sheep export earnings have remained above \$200 million in recent years.



A large number of dependant businesses are involved in the sheep and sheep meat export sector. For live sheep export: livestock agents, transporters, veterinary service providers, pre-export assembly service providers close to port, fodder manufacturers, growers and retailers, shearing contractors, port authorities, stevedores and provedores, ship agents, ship owners, government agencies (AQIS, AMSA), and auditing and accounting service providers are involved. Additionally the meat export sector includes packaging services, quarantine services, export agents, and the involvement of government agencies.

The model was applied in scenario analysis where live export was terminated. The scenario assumed the WA sheep industry evolved to be solely based on domestic processing with sheep meat sold on domestic and overseas markets. The scenario assumed WA abattoirs

¹ cwt stands for carcass weight tonne

could process the entire supply of sheep from WA farms. This scenario was contrasted against the current situation where live sheep remains feasible and is commercially attractive.

Based on the sheep export markets identified in Figure 4 and in Table 1 a projected alternative supply chain scenario without live export trade was developed in Table 2 that drew on the opinions of industry and trade experts. The existing live export markets in the Middle East and in the other areas were considered to be the markets capable of receiving the increased meat processed through export abattoirs. The interstate transfer of sheep increased slightly.

Table 2 shows the four major live sheep/sheep meat export destinations are the Middle East, Taiwan, USA and 'Other markets'. The Middle East and 'Other markets' are the current destinations for the 2.15 million live sheep exported every year. In the case of live sheep export termination these 2.15 million sheep are redistributed to the processing sector and then on to export and domestic markets. In Table 2, export abattoirs are shown to take the bulk of sheep previously exported live (70.2 percent of total turn off) for slaughter and meat export. The detailed shares of meat exports by destination are given in Appendix A.

The sheep meat produced by the export abattoirs is expected to be exported to the existing live export markets (Figure 5). An estimated 62 percent of total boxed meat are expected to be exported to the Middle East, and a further 10 percent to Taiwan and USA, and the rest, 28 per cent goes to existing 'Other markets' unless new meat export markets are established. Given the current capacity of the domestic abattoir sector a maximum of 0.10 million additional sheep can be slaughtered for the domestic market, with a consequent 5 percent domestic meat price reduction and 10 percent reduction in sheep saleyard prices. Ramifications and estimated industry gains and losses are discussed in the next section.

4 Results and Discussion

Figure 5 depicts the ways in which the meat from sheep that formerly would have been exported live are now sold internationally as sheep meat. Increased sheep meat sales to Middle East and 'Other markets' are projected to occur.

Comparison of the results in Tables 1 and 2 shows that the disruption or termination of the trade would have an immediate impact on those dependant on the live export trade (Drum and Gunning-Trant 2008). The supply of animals normally destined for live export would be shifted to domestic markets, via abattoirs, or additional animals would be retained on farm for more years of wool production. Purchasers of sheep for live export would be absent from sheep markets, thereby reducing competition for the purchase of sheep would place downward pressure on the sheep prices, therefore reducing margins for producers whilst improving margins for processors, at least in the short and medium term.

Most studies forecast that any termination of the live sheep export trade will reduce prices received by farmers for sheep (CIE 2011; ALE 2011; Georges et al 1985), principally due to less market competition.

Table 1: Sheep and sheep meat distribution chain with live export trade

Sectors	Product type	Live Export	Abattoir Export	Abattoir Domestic	Interstate	Wholesale	Export Middle East	Export Taiwan	Export USA	Export Other	Retail S.market	Consumer	Total
Farm	Live*	37%(2.15)	36.4%(2.14)	24%(1.37)	2.6%(0.15)								100
Live Export	Live						93%(2)	0%	0%	7% (0.15)			100
Abattoir Export	Meat**						36%(16948)	8%(3766)	8%(3766)	48%(22598)			100
Abattoir Domestic	Meat					27%(8138)					73%(22002)		100
Interstate	Live											100	100
Wholesale	Meat											100	100

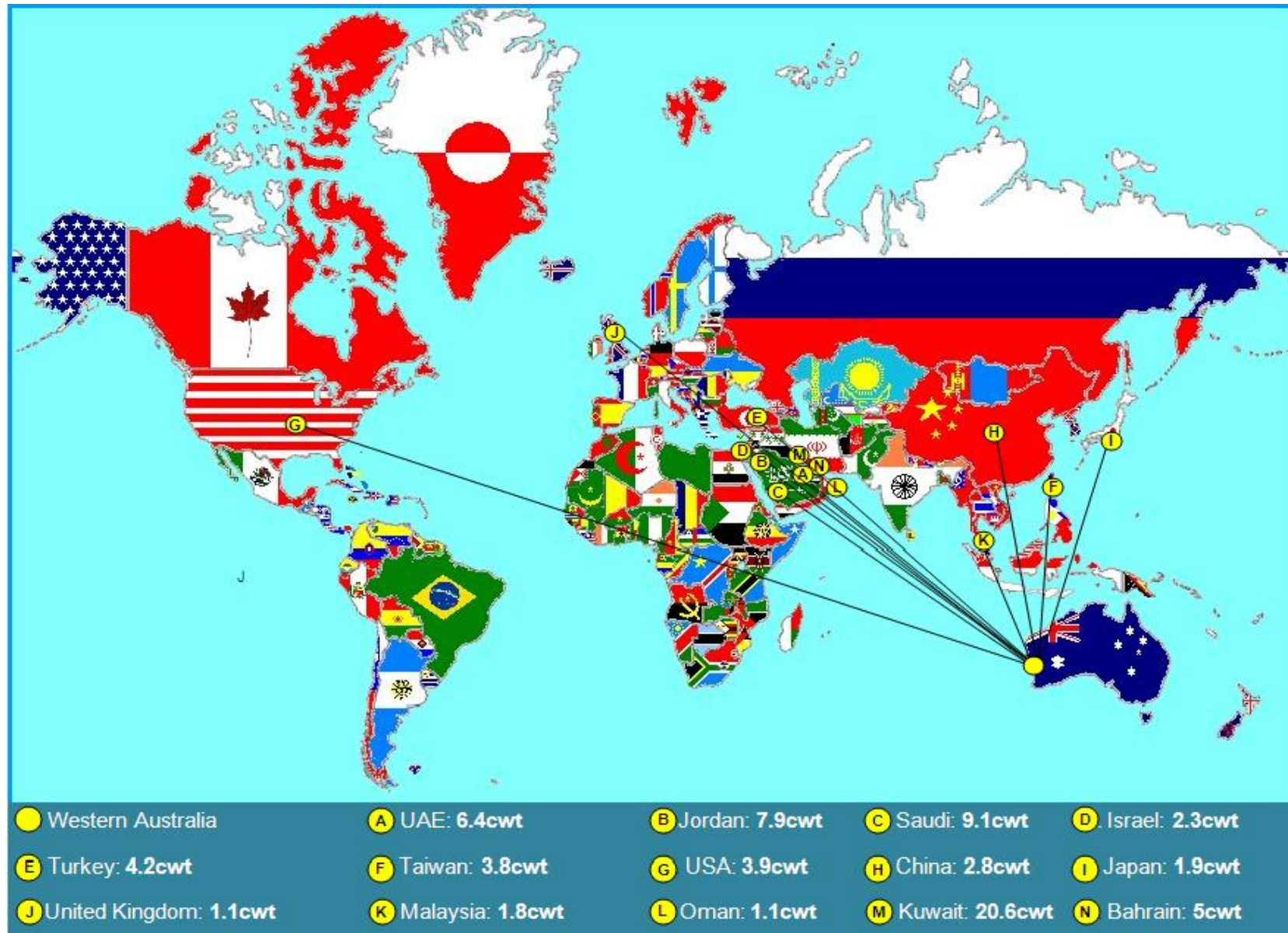
Table 2: Sheep and sheep meat distribution chain without live export trade and full domestic slaughter

Sectors	Product type	Live Export	Abattoir Export	Abattoir Domestic	Interstate	Wholesale	Export Middle East	Export Taiwan	Export USA	Export Other	Retail S.market	Consumer	Total
Farm	Live*	0%	70.2%(4.08)	25.3%(1.47)	4.5%(0.26)								100
Live Export	Live						0%	0%	0%	0%			0
Abattoir Export	Meat**						62%(55651)	5%(4488)	5%(4488)	28%(25133)			100
Abattoir Domestic	Meat					27%(8732)					73%(23608)		100
Interstate	Live											100	100
Wholesale	Meat											100	100

Note: Live* accounts 'million head' and meat** accounts 'carcase weight tonne'

The sheep price reduces by 10 percent and the meat price is lowered by 5 percent

Figure 5: Projected market destinations for WA sheep meat assuming no live export

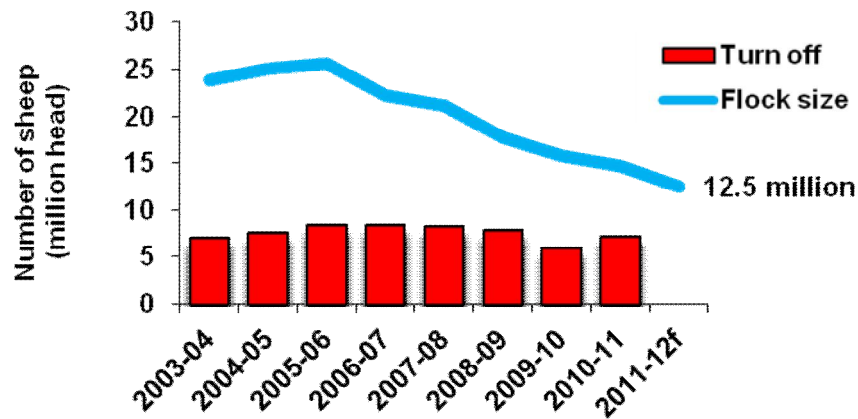


Note: map reproduced from Louis Lafferty

Sheep numbers in WA would probably decline further in response to lower prices. However the response by industry participants depends on a number of factors; the alternative options for producers would have to yield more profits than the margins generated by sheep production. The regions in WA most vulnerable to the termination of the live sheep trade are the Great Southern and Midland regions where sheep production is often a main enterprise and the costs of adjusting out of sheep production into another enterprise such as additional cereal production could be high.

In recent years there has already been a significant structural change within the sheep sector and sheep numbers have declined significantly largely due to the perceived greater relative profitability of other enterprises, difficulties in finding and retaining skilled labour for sheep management and the incidence of severe or repetitious drought. Figure 6 shows how sheep numbers in WA have declined greatly since the mid-2000s (Curtis 2011b).

Figure 6: Changes in WA’s sheep population



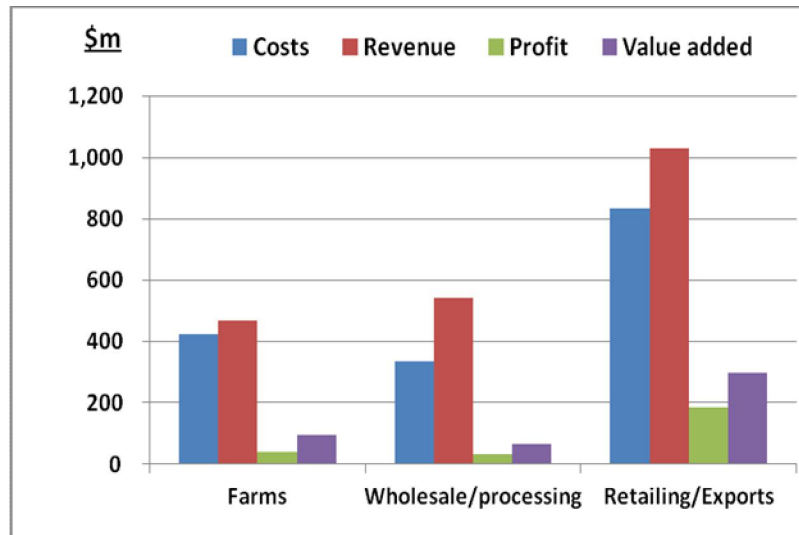
One reason why many farmers prefer to produce shipping wethers is the price certainty they receive. By contrast, when lambs are delivered to processors there is some uncertainty as to whether all the lambs will meet the processors’ specification requirements. The final price the farmer receives for lambs is conditional on the level and frequency of price discounts applied to the farmer’s draft of lambs following their processing. This price uncertainty reduces the attractiveness of lamb production to some farmers. Some farmers also distrust processors (ECEI 2011; OECD 2000) because they feel, from historical experience, that the processors have taken undue advantage of them when previous disruptions of the live sheep trade have occurred.

If termination in the live sheep trade occurs then businesses already focused on lamb production are likely to face lower profits due to a likely reduction in lamb prices. This price reduction would be attributable to the cessation of the demand for ram lambs and other older sheep from live sheep exporters. Further, in the medium term there would be a switch of sheep industry resources out of shipping wether production into lamb production (Kingwell et al 2011a) and this would increase the supply of lambs, thereby lowering the price received by growers. Also where farm businesses are greatly tied to the live sheep trade then their costs of adjustment into lamb production or some other substitute enterprise could be sufficiently high to erode profits during any transition period. Overall, the farms currently most vulnerable to the termination of the live sheep export trade will be sheep dominant farms with little

capacity or appetite to switch away from sheep production into more profitable cropping enterprises. Also farms that face high transition costs will be disadvantaged.

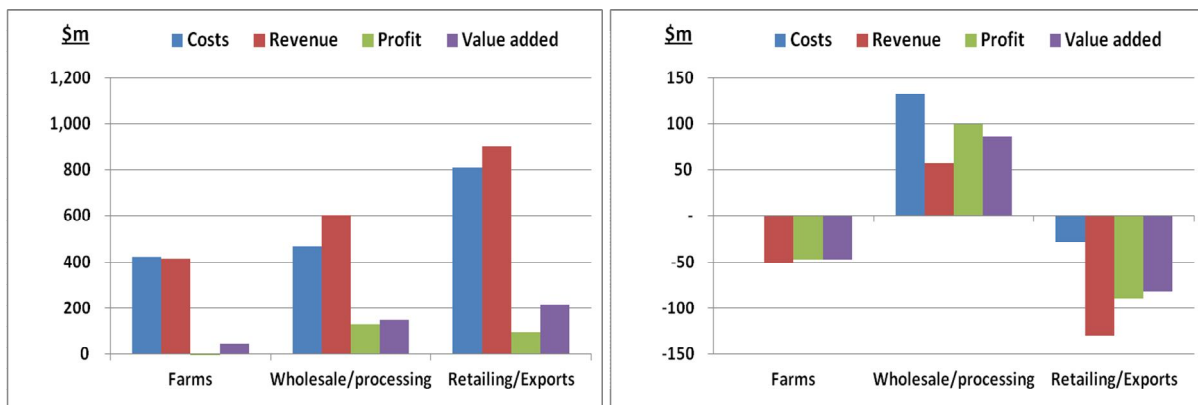
If the live sheep export trade is terminated then not only will farmers be affected but also other participants in sheep supply chains. Figure 7 displays the key financial measures for the three sub-sectors of the WA sheep supply chain: farms, wholesale/processing and retailing/export for 2009/10.

Figure 7: Key financial measures for the 3 sub-sectors of the WA sheep industry supply chain in 2009/10



If the live sheep export trade was terminated then these sub-sectors would be differently affected as shown in Figure 8.

Figure 8: Effects of the termination of the live sheep export trade on sectoral components of the WA sheep supply chain



Financial measures for the 3 sub-sectors assuming the live sheep export trade is terminated

Changes in financial measures for the 3 sub-sectors assuming the live sheep export trade is terminated

The gains and losses in the second panel of Figure 8 show that all sub-sectors of the WA sheep supply chain experience a decline in their profit, revenue and value adding. The retail/exporting sector suffers the permanent loss of income from live sheep exports, plus lower retail prices affect revenues and profits. Lower sale prices disadvantage farmers and, compared to the processing sub-sector, they are worse affected.

Sheep that previously would have been exported live are forced to flow through the domestic meat processing sector. This causes a lower domestic price for sheep meat and consequently a slight lessening of the CPI and a slight lessening of export revenues as more sheep meat is consumed within Australia. CIE (2011) found that the sheep meat processing sector would initially be a principal beneficiary of live sheep export termination. However, these benefits could be temporary if farmers strategically shift out of sheep production in response to its lesser profitability compared to alternative enterprises such as grain production (Kingwell et al 2011). If WA's sheep population was to subsequently decline then the throughput of abattoirs could decline (ALE 2011) causing reduced profits for processors.

A key issue for processors is whether or not markets that currently receive live sheep would accept frozen or chilled product as a substitute. The current view is that such a substitution will not occur easily. Much uncertainty surrounds the reliability of Middle East markets (ALE 2011). To profitably export an extra 50 percent of frozen or chilled product to these markets is viewed as problematic for a complex mix of political, religious, cultural, economic, and technological reasons (ALE 2011).

5. Conclusion

The study indicates that WA sheep supply chains would be disadvantaged by termination of the live sheep export trade. Lamb and mutton prices would reduce and, although sheep meat processors would initially benefit, eventually production responses by farmers could lead to a reduction in the sheep population in WA and then processors would face throughput problems.

Farmers, overall, would be disadvantaged by the termination of the live sheep export trade. They would experience a fall in the prices they receive for sheep they sell. Depending on the nature of a farmer's sheep enterprise (e.g. prime lamb focus or wool production focus) and the ease of switching into alternative enterprises a farmer could be greatly or slightly affected by the termination of the live sheep export trade. Sheep producers who are locked into sheep production and are highly reliant on profits from sheep meat production are particularly vulnerable. However, many other producers who engage in mixed-enterprise production that includes sheep or cattle production, may be able to transition to alternative enterprises and either lessen their losses or in some cases potentially gain.

The impacts on other participants in the supply chain are strongly linked to how producers respond to the termination of the live export trade (ALE 2011). If producers choose to exit the industry or reduce their animal production in response to likely lower prices that would follow a termination in the live export trade, then the abattoirs eventually will suffer through reduced throughput and their support industries will also experience reduced profits through reduced demand for their services. Meat processors are beneficiaries in the near and medium term, but not necessarily in the long term if WA's sheep population diminishes and resources are switched into alternative enterprises.

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Appendix A: Meat export projections for no live export of sheep – based on 2009/10 data

Country of destinations	Current export distribution				Projected export distribution (new equilibrium)				
	Live sheep ('000')	Share of live export	Sheep meat (cwt)	Share of meat export	No live trade	Meat to be taken by countries instead of live sheep	Share of meat to be taken instead of live sheep	Total sheep meat (cwt)	Share of total meat export
Saudi Arabia	108	5.0%	6,235	13.2%	-	2,365	5.0%	8,600	9.10%
Bahrain	215	10.0%	-	-	-	4,730	10.0%	4,730	5.00%
United Arab Emirates	26	1.2%	5,481	11.6%	-	567	1.2%	6,048	6.40%
United States of America	-	-	3,694	7.9%	-	-	-	3,694	3.90%
Taiwan	-	-	3,628	7.7%	-	-	-	3,628	3.80%
Jordan	200	9.3%	3,040	6.5%	-	4,399	9.3%	7,439	7.90%
China	-	-	2,643	5.6%	-	-	-	2,643	2.80%
Japan	-	-	1,761	3.7%	-	-	-	1,761	1.90%
Egypt	-	-	1,374	2.9%	-	-	-	1,374	1.50%
Malaysia	22	1.0%	1,226	2.6%	-	473	1.0%	1,699	1.80%
Kuwait	834	38.8%	1,131	2.4%	-	18,352	38.8%	19,483	20.60%
United Kingdom	-	-	1,044	2.2%	-	-	-	1,044	1.10%
Mauritius	-	-	842	1.8%	-	-	-	842	0.90%
Russia	-	-	739	1.6%	-	-	-	739	0.80%
Qatar	350	16.3%	792	1.7%	-	7,710	16.3%	8,502	9.00%
Turkey	178	8.3%	-	-	-	3,926	8.3%	3,926	4.20%
Israel	97	4.5%	49	0.1%	-	2,129	4.5%	2,178	2.30%
Oman	24	1.1%	544	1.1%	-	520	1.1%	1,064	1.10%
Jamaica	-	-	264	0.6%	-	-	-	264	0.30%
Other	96	4.5%	12,593	26.8%	-	2,129	4.5%	14,722	15.60%
Total	2,150	100%	47,080	100%	0	47,300	100%	94,380	100%

Note: Current export distribution is calculated based on 2009/10 data. Country of destination is presented based on the countries that receive most WA live sheep and sheep meat. The proposed export distribution is calculated by redistributing the live sheep equivalent to carcass weight meat (the percentage of live sheep in column 3 converted into meat and distributed exactly as live sheep percent in column 8). Column 7 shows sheep meat converted from live sheep in column 2. For example, 2150 thousand head of sheep (last row column 2) approximately can produce 47,300cwt of meat (last row column 4). The proposed meat export in column 9 is the total turn-off for export (live and meat) in 2009/10. Live export 2,150 thousand head and export abattoir 2,140 thousand head produces approximately 94,380cwt (column 9) of total meat which is the projected total WA meat export.