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Economic Issues Associated with the West Australian Live Sheep Export Trade

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Pegasus Economics is a boutique economics and public policy consultancy firm that specialises in strategy and policy advice, economic analysis, trade practices, competition policy, regulatory instruments, accounting, financial management and organisation development.

This report has been commissioned by Animals Australia to examine the economic impact arising from the phasing out of the live sheep export trade.

The views and opinions expressed in this report are those of the authors.

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Front cover photograph shows sheep grazing on canola stubble near Gulgong in New South Wales.

Table of Contents

Executive Summary

Live Sheep Exports

- Australia's markets for the export of live sheep are predominantly located in the Middle East.
  - In 2016-17, the Middle East took more than 96 per cent of Australian live sheep exports (Australian Livestock Export Corporation Limited (LiveCorp), 2017, p. 76).
- Rather than being a market for sheep in general, the live sheep export trade is primarily a trade in heavy wethers.[1]
- Australia's live sheep export trade has been in trend decline since the 1980s.
  - Although live sheep exports have more recently peaked at over 6 million per annum during 2001 and 2002, they have been in fairly continuous decline since then, falling to below 2 million per annum since 2014.
- Most of the sheep for the Australian live export trade are sourced in Western Australia (WA), and are usually loaded in Fremantle (Deards, et al., 2014, p. 53).
- The WA sheep flock has been in trend decline since 1990, falling by 64 per cent from 38.4 million sheep to a current level of 13.7 million sheep.
- With the decline of the live sheep export trade, the relative significance of the trade for WA sheep farmers has also diminished.
- Even in the case of WA specialist sheep farmers the sale of sheep to the live export trade now only accounts for a relatively minor part of their enterprise. In the ten-year period from 2005-06 to 2015-16, sales of sheep by WA specialist sheep farmers only accounted for 19 per cent of total farm cash receipts on average. Sales of sheep by WA specialist sheep farmers to the live sheep export trade has also become a diminishing percentage of their overall sheep sales as the live sheep trade has declined, accounting for only 11.7 per cent of sheep sales by volume in 2015-16.
- WA mixed enterprise sheep farms generate around 70 per cent of their receipts from crops, and since 2010-11 have generated less than 5 per cent of their receipts from the sale of sheep. While the percentage of sheep sales to the live sheep export trade by WA mixed enterprise sheep farms has fluctuated dramatically, it was only 10 per cent in 2015-16.
- The largest customers for Australian live sheep exports historically have been the six Arab states bordering the Persian Gulf and the Gulf of Oman: Saudi Arabia, the United Arab Emirates (UAE), Qatar, Kuwait, Bahrain and Oman (the Gulf Cooperation Council (GCC) states).
  - No Australian live sheep exports are currently going to Saudi Arabia or Bahrain.
- One distinguishing feature of these GCC states has been the provision of food subsidies for imports of livestock.
  - Food subsidies are only available on animals slaughtered domestically in the GCC states and do not apply to processed sheep meat imports (Drum & Gunning-Trant, 2008, p. 15).

[1] Castrated male sheep with no 'ram-like' characteristics and with more than two permanent adult teeth (Meat & Livestock Australia Limited, 2016) that are typically aged between one and two years (Deards, et al., 2014, p. 9)

Viability of Live Sheep Exports

- Sheep exporters generally pay a price premium to farmers at saleyard auctions for heavy wethers.
    - The capacity of live sheep exporters to pay a price premium is directly related to food subsidies provided in recipient countries that in turn artificially increases demand for Australian live sheep exports and enables live sheep exporters to pay above market rates to procure sheep.
- The future of food subsidies, and in turn, the ongoing ability of live sheep exporters to continue to pay price premiums for wethers, is heavily dependent on the price received by GCC countries for their petroleum product exports.
    - Oil rents have enabled the Gulf states to establish lucrative welfare systems to distribute wealth to their national population in exchange for political passivity; however, the Gulf states' economies have long been considered unsustainable in the long term (Nosova, 2018).
    - This in turn leaves the Gulf states (and the beneficiaries of their subsidy schemes) vulnerable to any downturn in global energy markets.
- The downturn in global oil prices since June 2014 has seen the budgetary position of the Gulf states sharply deteriorate with the onset of large budget deficits.
    - This raises questions about the capacity of Gulf states to maintain food subsidies over the medium and longer term given existing budgetary pressures and mounting budget deficits.
    - Bahrain has already been forced to abandon food subsidies in the face of mounting fiscal pressures. Bahrain has exhibited substitutability between Australian live sheep exports and Australian mutton and lamb exports, with a preference being exhibited for lamb when oil prices are relatively high that switches across to mutton when oil prices are not so high. The value of processed sheep meat exports from Australia to Bahrain in 2016-17 was $46.5 million (Australian Bureau of Agricultural and Resource Economics and Sciences, 2017b).
- Any further downturn in international oil and gas prices could curtail live sheep exports to GCC states altogether due to mounting fiscal pressures.

Economic Impact of Phasing Out Live Sheep Exports

- There is no support for the contention that the live sheep export trade somehow underwrites domestic sheep prices.
- Given that Australia produces far more mutton than it consumes, it is international commodity prices for mutton that underwrite prices paid for sheep rather than live sheep exports.
- The available evidence suggests that on an economy-wide basis the impact arising from the phasing out of the live sheep export trade would be almost negligible in terms of its overall impact on the $248 billion Western Australian economy; however, marginally positive overall through an expansion of domestic sheep meat processing.
- While there is a price premium being paid by live sheep exporters to procure sheep at saleyard auctions, it was also found the heavier and better the condition of the sheep, the lower the price premium paid by live sheep exporters as compared to other purchasers.
- While there is a price premium paid by live sheep exporters for light weight lambs that almost dissipates altogether for lambs between 16.1 kg and 18 kg carcase weight (cwt), live

sheep exporters do not pay any price premiums for lambs above 18 kg cwt and on average pay less for these lambs than other purchasers.[2]

- While the cessation of the live sheep export trade will reduce overall demand to some extent by taking live sheep exporters out of the market, the price impact will be greatest in relation to wethers that are lighter and in worse condition; in other words, those least attractive to local processors.
- A crude weighted average suggests the price premium paid by live sheep exporters for wethers is in the order 33 cents per kg cwt, that roughly translates to $8 per head. The cessation of the live sheep export trade would thus translate into to a loss of around $9 million per annum for WA sheep farmers overall, that works out at just under $2,000 per sheep farmer.
    - This represents a loss of around 0.5 per cent of total cash receipts for specialist sheep farms and 0.17 per cent of total cash receipts for mixed enterprise sheep farms.
- In the event the live sheep export trade was phased out, sheep diverted away from the live export could be redirected towards several alternative options, including the following:
    - keep the wethers until cast (at the end of productive life) primarily to cut wool;
    - finish sheep earlier to meet lamb market specifications;
    - sell the wethers as store sheep to be fattened before sale for slaughter; or
    - keep the wethers until they reach the heavier weights required for the slaughter market.
- Each of these options present their own particular financial opportunities in order to alleviate the impact of any losses associated with the phasing out of the live sheep export trade.
    - Keeping wethers for wool productions will depend on the price of wool.
    - Finishing sheep early for lamb market specifications will depend on lamb prices.
    - Selling wethers as store sheep or keeping wethers until they reach heavier weights will ultimately depend on the demand by processors for sheep to produce mutton.
- In terms of the impact of the live sheep trade on overall demand, it is also important to note that live sheep exporters are rarely in the market to purchase young ewes, ewes and hoggets, and are not always in the market to procure sheep as they are often inactive for weeks and sometimes even months on end when they are not seeking to fill an export shipment.
- Furthermore, the cessation of the live sheep export trade will not remove the live sheep exporters entirely from the sheep market as some of them also own and operate sheep meat abattoirs in Western Australia.
- In terms of assessing the overall impact of the phasing out of the live sheep export trade, there appears to be trade-off between the interests of sheep farmers and sheep meat processors.
    - While sheep farmers would immediately lose any price premium paid by live sheep exporters for their wethers, sheep meat processors would increase their throughput, leading to economies of scale and increased profitability.
- There is evidence of ongoing chronic underutilisation of sheep meat processing capacity in Western Australia.

[2] Carcase weight (cwt) refers to the weight of the animal's carcase following the removal of head, feet, skin and internal organs (Meat & Livestock Australia Limited, 2016).

- On current utilisation levels, the industry has sufficient spare capacity to absorb the entire quantum of live sheep exported annually from Western Australia and still have spare capacity to process over another 1.4 million sheep.
- The WA meat processing industry faces a number of challenges, including the long-term decline in the WA sheep flock and the impact of higher wool prices that will be encouraging some sheep farmers to hold on to wethers for wool production.
    - Should live sheep exports continue, it is likely that the combination of these factors will place pressure on the number of sheep available for processing, endangering the continuing viability of WA sheep meat processors.
- The live sheep export trade to the Middle East and the subsequent processing of Australian sheep meat in the region, cannibalises domestically processed sheep meat exports from Australia that competes against it. Thus, live sheep exports also result in the export of meat processing and the associated employment and income generated overseas.
- The phasing out of the live sheep export trade will provide WA sheep meat processors with the opportunity to engage in further value adding activities.
    - Meat processors 'add value' by transforming livestock into meat and other co-products (Industry Commission, 1994, p. 240).
- The cessation of the live sheep export trade will provide for the redirection of some sheep to domestic processors that in turn will enable them to raise their capacity utilisation and employment levels.
- The cessation of the live sheep export trade could facilitate the engagement of around 350 full-time equivalent employees and be worth an additional $18 million from increased value adding.
    - It would also improve economies of scale in meat processing, making processed sheep meat products more price competitive.
    - An increase in employment due to the engagement of unemployed and/or underemployed people will generate higher economic growth and a reduction in unemployment benefits coupled with a reduced financial impost on taxpayers.
- In the event the Australian live sheep export trade ceased, an obvious place to look to supply more value added processed sheep meat product to would be the Middle East.
    - The Middle East is already Australia's largest export market for processed sheep meat products for both lamb and mutton in terms of value and volume (Australian Bureau of Agricultural and Resource Economics and Sciences, 2017b).
    - Australia currently exports over 2½ times the volume of carcase equivalent processed sheep meat into the Middle East than the total number of live sheep exports.
    - Since the early 1990s, GCC states along with Jordan have exhibited an increasing demand for processed sheep meat imports as live sheep imports have declined in trend terms, suggesting there is substitutability between processed sheep meat and live sheep imports.
- Live sheep exports are the least significant element of sheep meat product exports in terms of value for the Australian economy.
    - Since 2005-06, the relative significance of the live sheep export trade to overall sheep meat exports has been diminishing, falling from around 20 per cent to just over 8 per cent. The rapid decline in the value of live sheep exports during 2012-13 and 2013-14 was roughly matched by an expansion in mutton exports.

Conclusions

- With the decline of the live sheep export trade, the relative significance of the trade for WA sheep farmers has also diminished.
  - Even for WA specialist sheep farmers the sale of sheep to the live export trade now only accounts for a relatively minor part of their enterprise.
  - WA mixed enterprise sheep farms generate around 70 per cent of their receipts from crops, and the relative significance of sales to the live sheep export trade has also diminished.
- While sheep farmers currently receive a benefit from the live sheep export trade from the price premium paid by the live sheep exporters, the live sheep export trade does not underwrite domestic sheep prices that are largely determined by international commodity prices for mutton.
  - Arguably this price premium is underwritten by the food subsidies provided by importing country governments in the Middle East that may not be sustainable in the medium to longer term in any event due to budgetary pressures.
  - When the food subsidies in Bahrain were cut, the live sheep exports from Australia ceased altogether. However, with declines in the live sheep export trade from Australia, Bahrain has substituted by taking more Australian processed sheep meat products.
- While WA sheep farmers may collectively lose in the order $9 million per annum from the loss of the price premium, this detriment could be more than compensated for by increased value adding by WA sheep meat processors of an additional $18 million.
  - The cessation of the live sheep export trade could facilitate the engagement of around 350 full-time equivalent employees for WA sheep meat processors.
  - The loss of the price premium represents a loss of only between 0.17 and 0.5 per cent of total cash receipts for WA sheep farmers. Of course, farmers have various options available to mitigate the loss of the price premium, including finishing off sheep to a standard that would make them more attractive for local processors.
- Given expanding international demand for sheep meat products, it will be possible to find markets for mutton from sheep diverted away from the live sheep export trade.

1 Introduction

This report has been commissioned by Animals Australia to examine the economic impact of the phasing out of the live sheep export trade. As the live sheep export trade is dominated by sheep supplied by sheep farmers in Western Australia (WA), this report will primarily focus on the economic impact of phasing out the live sheep export trade on WA sheep farmers and meat processors.

2 Animal Welfare Issues

The Middle East region is the largest destination for Australian live sheep exports (Deards, et al., 2014, p. 22). However, the trade has a documented history of large-scale animal suffering (Bruce, 2012, p. 292).

Conditions on live export shipments regularly expose sheep to heat stress, which appears to be most severe for sheep transported from Australian winters to summer in the Middle East (Phillips, 2016, p. 84). The contributing factors to heat stress in the export of livestock from Australia in winter to the Middle East in summer are:

- high temperature and humidity; reduced variation in circadian temperature;
- high stocking densities which increase heat production and limit opportunities for sheep to mitigate heat load effects;
- the presence of excreta; and
- variable ventilation rates.

In one live export shipment of 75,508 sheep loaded from Adelaide and Fremantle that departed in August 2013 bound for Qatar and the United Arab Emirates, approximately 4,179 sheep died on route mainly due to heat stress (Department of Agriculture, 2014). Similarly, a shipment in July 2016 resulted in 3,027 sheep dead or unaccounted for and a further shipment in August 2017 reported 2,400 deaths (Department of Agriculture and Water Resources, 2018; Department of Agriculture and Water Resources, 2018a).

A study on the main causes of mortality in live sheep exported published by Meat & Livestock Australia (MLA) found that salmonella induced enteritis was the most common cause of mortality (34.4 per cent), followed by inanition (23.9 per cent), enteritis/inanition (18.2 per cent) and 9.5 per cent for heat stress (Makin, House, Perkins, & Curran, 2010).[3]

Over the years, evidence has also indicated that cruelty experienced by sheep does not stop with the transport ships (Bruce, 2012, p. 293). Sheep are housed in feedlots awaiting slaughter and in summer months temperatures and humidity can be extreme. All of the sheep exported to Persian Gulf countries are slaughtered while fully conscious.

3 Sheep and their Economic Application

3.1 Taxonomy of Sheep

Sheep can be categorised on the basis of sex and age (measured in terms of the number of adult teeth they possess on their lower front jaw). When born, sheep usually have no teeth (Cashburn, 2016). Within a week after birth, the milk teeth or temporary teeth appear in the front lower jaw and by the time the sheep is two months old these, eight in all, have erupted. These temporary

[3] Enteritis causes the swelling or inflammation of the small intestine (Fitzgibbon, 2015). Inanition is an exhausted state of prolonged under nutrition or starvation (Blood & Studdert, 1999).

teeth are eventually replaced by permanent incisors or adult teeth, which appear in pairs, commencing with the two central teeth, followed by one on either side at intervals, until the eight temporary teeth have been replaced. During the period the teeth are growing, sheep are referred to by the number of permanent incisors present, such as two-tooth, four-tooth, six-tooth, eight-tooth or full mouth. Sheep will usually be over two before they are six-tooth, and at least three before they are full mouth.

As sheep age, the adult teeth will start to spread, wear and eventually break (Schoenian, 2015). This progressive deterioration is known as 'broken mouth', the rate depending on the conditions under which the sheep has grazed (Cashburn, 2016).

Sheep can be divided into the following categories:

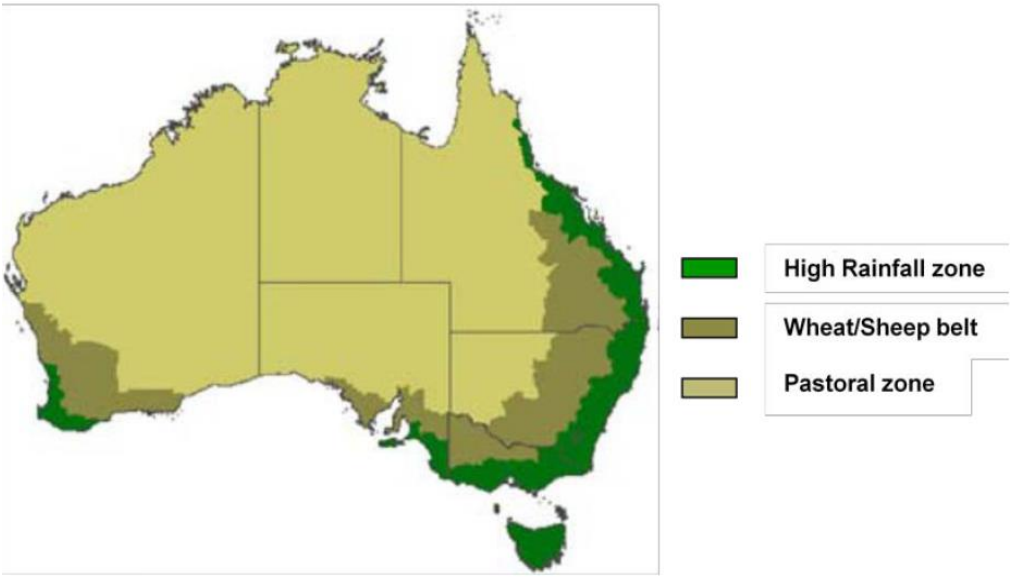
- Very young male and female sheep that are still sucking are referred to as young lamb (Meat & Livestock Australia Limited, 2016).
- Young male and female sheep that have been weaned, normally older than 5 months and typically under 14 months with no permanent adult teeth are referred to as lamb (Meat & Livestock Australia Limited, 2016; Jones, 2004, p. 1).
- Hoggets are castrated male and female sheep with no 'ram-like' characteristics and up to two permanent adult teeth (Meat & Livestock Australia Limited, 2016).
- Ewes are female sheep with more than two permanent adult teeth (Meat & Livestock Australia Limited, 2016).
- Wethers are castrated male sheep with no 'ram-like' characteristics and with more than two permanent adult teeth (Meat & Livestock Australia Limited, 2016).
- Rams are male sheep that have not been castrated and castrated male sheep that display 'ram-like' characteristics such as aggressive behaviour such as head butting.

3.2 Economics of Sheep Production

Sheep are farmed throughout the world, with most production constrained by temperature and rainfall to islands, coastal regions and the fringes of continental deserts (Sargison, 2008, p. 451). In some regions sheep are used to exploit pastures which are unsuitable for other agricultural purposes, while elsewhere sheep production is integrated into other agricultural systems to enable cost-effective and efficient grassland management or crop rotation.

In Australia, sheep farming is mostly concentrated around the wheat-sheep and high rainfall zones in New South Wales, Victoria, Western Australia and South Australia. Around half of Australia's sheep are located in the wheat-sheep zone where they are grazed on sown pasture in rotation with cereal crops (Australian Surveying and Land Information Group, 1990, p. 44). The high rainfall zones lie along the wetter, coastal side of the wheat-sheep belt, where the natural pastures are rich, and carry around one third of sheep. The inland pastoral zone lies on the drier, inland side of the wheat-sheep belt and carries around 20 per cent of sheep. A map of the main wool and sheep growing regions is provided below in Figure 1.

Figure 1: Australian Broadacre Zones and Regions



Source: Stoutjesdijk (2013, p. 9).

Sheep give rise to four products, namely:

- wool;
- sheep meat;
- skin; and
- milk.

Wool and sheep meat are the primary outputs from sheep farming, with market conditions for each commodity affecting the size and composition of the national sheep flock (Deards, et al., 2014, p. 6). Historically, the sheep meat industry has developed as a by-product of the wool industry (Jones, 2004, p. 1). Although the use of wool in textiles has faced major competition from synthetic fibres, world wool production is relatively stable at just over 2 million tonnes (Sargison, 2008, p. 451). Sheep are inferior as convertors of their feed to meat relative to poultry and pigs, largely because of the overhead costs of breeding stock and replacements, however, they can live and produce on land unfavourable to other forms of agriculture (Morris, 2009, p. 59).

Sheep skins are often considered a by-product of the sheep meat manufacturing process (Sargison, 2008, p. 451). While there are more sheep milked each day than cattle worldwide, sheep dairying is a relatively small industry in Australia (Biosecurity Tasmania, 2014, p. 1). Most sheep milk is primarily used in the manufacture of cheese (Sargison, 2008, p. 451).

Sheep meat produced from young sheep with no permanent adult teeth is referred to as lamb while sheep meat produced from more mature sheep (with at least one adult tooth) is referred to as mutton. The colour of lamb meat ranges from pale pink to pale red and is generally lean while its mild flavour makes it very versatile for a number of uses (Prakash, 2016). On the other hand, mutton has a deep red colour and is much fattier than lamb; its flavour is strong and gamey and the meat is often stewed to help tenderise it (Prakash, 2016). Mutton can have a distinctive odour and flavour that can be unattractive to consumers (Sheep CRC, 2008). Mutton typically attracts a lower price than lamb due to age, fat content, flavour, and eating quality (Meat & Livestock Australia, 2016b).

4 Australian Sheep Flock

The Australian sheep industry was initially founded on wool production from Spanish (Merino) sheep (Keogh, Henry, & Day, 2016, p. 38) that provided the economic impulse that opened up the Australian continent (Harman, 1971, p. 41). Up until the early 1960s, wool was one of Australia's most important primary product exports, and in the popular mythology of previous generations Australians perceived their economy as having been dependent on wool exports for much of its existence (Cashin & McDermott, 2002, p. 249); hence the old expression that "Australia is riding on the sheep's back."

The Australian sheep flock, currently at around 70.2 million (Australian Bureau of Statistics, 2018b), is the second largest in the world following mainland China with 162 million sheep in 2016.[4] The Australian sheep flock has peaked twice at 170 million in 1965 and again in 1990 (Australian Bureau of Statistics, 2013). The development of synthetic fibres in the years following the Second World War created growing competition and declining prices for Australian wool (Keogh, Henry, & Day, 2016, p. 38).

Wool produced has usually been sold at auction that traditionally operated as a free market of buyers and sellers (Michalk, 1990, p. 190). However, that changed with the establishment of the Reserve Price Scheme (RPS). The RPS was a buffer stock scheme designed to maintain minimum prices – the so-called Minimum Reserve Price (MRP) – for wool sold at auction, that was established in November 1970 (Haszler, 1994, p. 87). Under the RPS, the Australian wool industry paid a 'Wool Tax' on production, with the proceeds accumulating in a Market Support Fund that was used to finance buffer stock operations by the Australian Wool Corporation (AWC) (Bardsley, 1994, p. 1088).

Under the buffer stock operations, the AWC bought up wool offered at auction that failed to reach the reserve price in order to protect wool growers against unduly low prices resulting from temporary irregularities in demand at auction (Michalk, 1990, p. 190). When the Market Support Fund was exhausted buffer stock purchases were financed by commercial borrowing against the security of the stockpile accumulated by the AWC (Bardsley, 1994, p. 1088).

In 1987 Australian Government control over the scheme was reduced and the power to set the MRP was substantially delegated to Australian wool grower representatives (Bardsley, 1994, p. 1088). The price of wool soared following a run-down of stocks in I987, and the MRP set by the industry followed it up. The AWC then embarked on a massive program of price support. Accumulated grower funds were subsequently exhausted and the AWC borrowed to the limit of its capacity against the security of the stockpile (Bardsley, 1994, pp. 1088-1089).

In January 1991, the Australian Government announced the suspension (and later the abandonment) of the RPS that in turn triggered a wool price collapse, leaving the Australian wool industry with a stockpile of 4-6 million bales of wool (almost one year's normal production) and a debt of $2 7 billion (Bardsley, 1994, p. 1087).

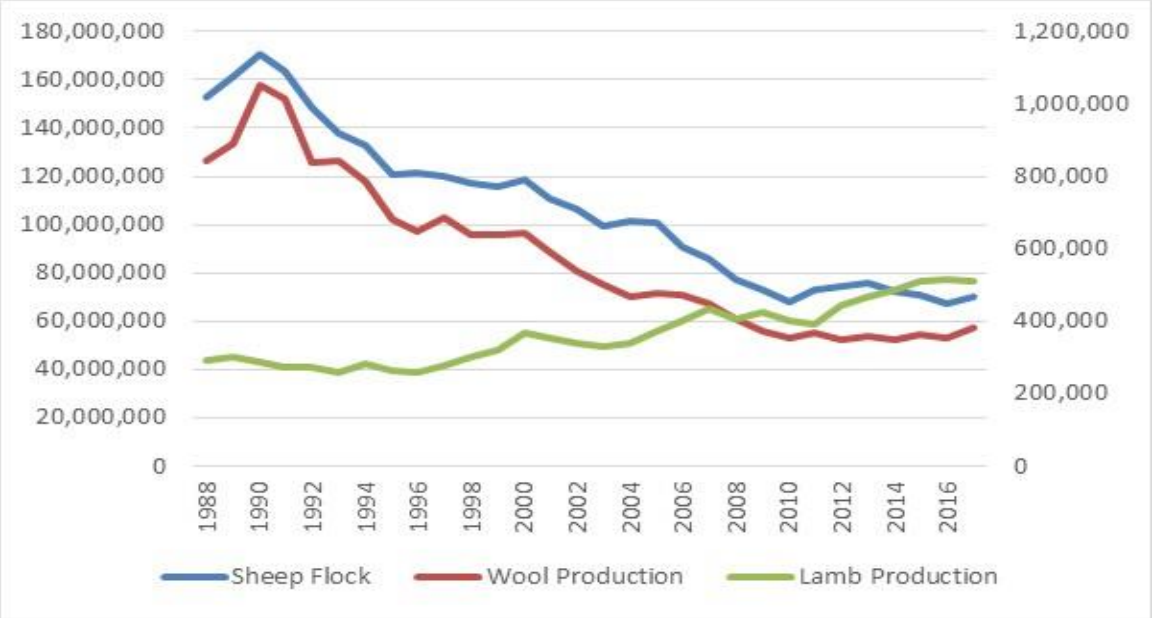
The Australian sheep flock has fallen considerably from its most recent peak of 170 million in 1990 precipitated by the collapse of wool prices and the RPS that in turn ushered in a period of structural adjustment that manifested itself in a number of ways. Overall, the number of sheep and farms carrying sheep declined (Australian Bureau of Agricultural and Resources Economics, 2004). The fall in wool prices, coupled with rising grain prices, saw a shift towards cropping by many farms and an expansion of cropping in more marginal areas (Dahl, Leith, & Gray, 2013, p. 207). The decline in wool production

[4] The estimate of the Chinese sheep flock comes from the United Nations FAOSTAT database.

was much greater than the fall in sheep numbers, reflecting the creation of a younger flock structure driven by a move towards lamb production (Australian Bureau of Agricultural and Resources Economics, 2004). The focus on lamb production contributed to a decline in the number of wethers in the Australian sheep flock and a concurrent increase in the proportion of ewes required for lamb production (Chow, K, 2013).

The fairly close relationship between Australian sheep flock numbers and wool production and the inverse relationship with lamb production is outlined in Figure 2 below. This suggests that farmers are not stagnant and can adjust their business mix in response to changing market conditions and circumstances.

Figure 2: Australian Sheep Flock Numbers, Australian Wool Production (tonnes) and Lamb Meat Production (cwt tonnes) – 1988 to 2017



Sources: Australian Bureau of Statistics (ABS) (2013; 2017; 2018; 2018a; 2018b).
cwt: refers to carcase weight, the weight of the animal's carcase following the removal of head, feet, skin and internal organs (Meat & Livestock Australia Limited, 2016).

The national sheep flock is currently rebuilding, reaching 70.2 million at the end of June 2017, up from 67.5 million at the end of June 2016.[5]

5 Australian Live Sheep Exports

Sheep procured for the live export trade are usually either sold at saleyard auction or sold on-farm through paddock sales.

With saleyard auctions, sheep are transported to a central saleyard and sold to the highest bidder with prices reflecting supply and demand in the market on the day (Meat & Livestock Australia Limited, 2016a). Saleyards are the main pathway for farmers with smaller flocks who sell animals of varying standard and type in small lots, and for disposal of poorer stock (Australian Meat Industry Council, 2015, p. 17).

With paddock sales, livestock are inspected on the vendor's property by the buyer or their agent and sold from the paddock with buyers preferring to purchase in large numbers (Meat & Livestock

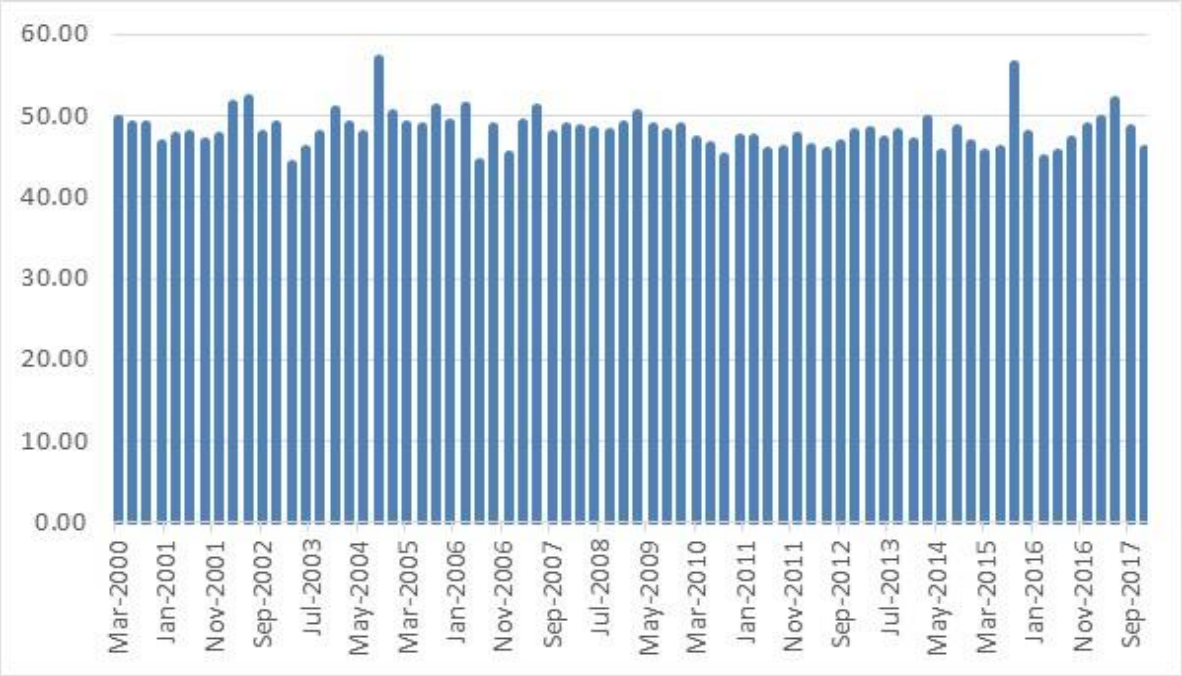
[5] See Australian Bureau of Statistics (ABS) (2017; 2018b).

Australia Limited, 2016a). In Western Australia, where most of the sheep for the live export trade are sourced, less than 5 per cent of sheep are procured through saleyard auctions, with the bulk purchased through paddock sales. Large buyers, such as meat processors and live exporters, prefer direct sales, rather than competing for stock via an auction (AuctionsPlus, 2015). Once procured, the sheep are usually transported to feedlots to await shipment to their final destination (Kingwell, et al., 2011, p. 22).

Rather than being a market for sheep in general, the live sheep export trade is primarily a trade in heavy wethers. Wethers are the most common type of Australian sheep exported live and are typically aged between one and two years (Deards, et al., 2014, p. 9). In 2012, 60.1 per cent of live sheep exports loaded from Fremantle, Adelaide and Portland were wethers, 22.9 per cent were male lambs, and 10 per cent were male hoggets and less mature rams (Norris & Norman, 2013, p. 8).

According to MLA (2001, p. 3), sheep for the live export trade should typically be as heavy and as fat as possible. A minimum of 50 kg liveweight seems to be preferred for wethers and 40 kg liveweight for hoggets.[6] The average liveweight of live export sheep since 2000 has been 48.2 kg.[7] The average quarterly liveweight of live export sheep since 2000 is provided in Figure 3 below.

Figure 3: Quarterly Average Liveweight of Live Export Sheep (kg) – March Quarter 2000 to December Quarter 2017



Source: ABS (2018a).

The main markets for Australian live sheep exports are countries in the Middle East. The live sheep export trade to the Middle East from Australia originally developed as an outlet for wool farmers seeking a market for their older wethers at the end of their wool-productive life (Kingwell, et al., 2011, pp. 4-5). However, MLA (2001, p. 3) has suggested that sheep need to have four permanent adult teeth or less for the Middle East live sheep trade, in turn inferring that sheep need to be no more than two years old to be eligible for live export.[8] A survey of WA sheep farmers in 2010 found that 80 per cent of producers supplying wethers indicated the average age supplied was up to

[6] Liveweight is the weight of the live animal (Meat & Livestock Australia Limited, 2016).
[7] See ABS (2018a).
[8] Sheep become six-tooth at between 27 and 29 months of age (Cashburn, 2016).

2 years old indicating the live sheep export trade is no longer an outlet for older/cull wethers (Kingwell, et al., 2011, p. 14).

While the production of prime lamb often needs to be a specialist enterprise, the production of wethers is usually combined with broadacre farming where sheep production is a sideline enterprise with cropping being their main management focus (Kingwell, et al., 2011, p. 40).

Australian live sheep exports grew substantially during the 1970s, as rising incomes and population growth resulted in increased meat demand in the Middle East (Deards, et al., 2014, p. 7). Sheep exports continued to grow in the 1980s, peaking at 7.3 million head in the 1983 calendar year (Deards, et al., 2014, p. 8).

However, Australia's live sheep export trade has been in trend decline since the 1980s. According to a report by the Australian Farm Institute (Keogh, Henry, & Day, 2016, p. 21):

> *The trade was interrupted by the turmoil associated with the cessation of the Wool Reserve Price Scheme in 1991 and associated initiatives such as the flock reduction scheme which resulted in the culling of 10 million sheep. It recovered somewhat during the mid-to-late 1990s, but the continuing decline in the size of the Australian sheep flock in combination with a switch by many woolgrowers to prime lamb production reduced the supply of merino wethers suitable for the live export trade, and annual sheep exports have been steadily declining since that time.*

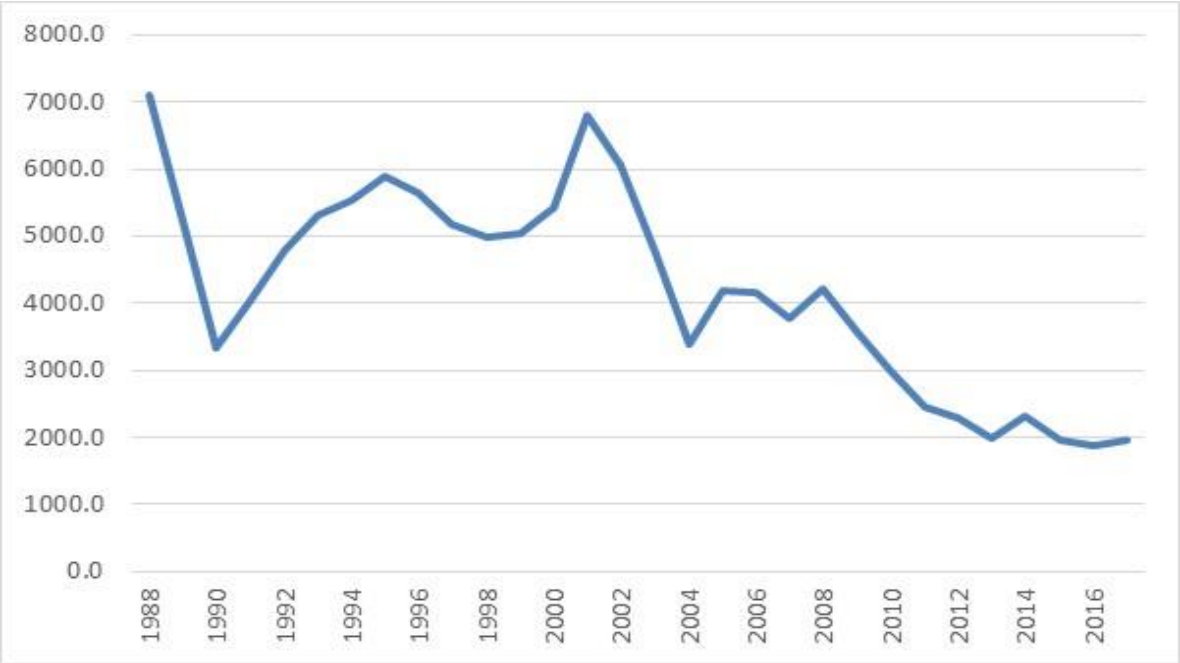
Similarly, according to a 2014 report published by the Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) (Deards, et al., 2014, p. viii):

> *Australia's live sheep exports have declined considerably since the 1980s, when annual exports frequently exceeded six million head each year.*

Australian live sheep exports declined in the 1990s, following disruptions in trade to several markets and a fall in the number of sheep available for export (Deards, et al., 2014, p. 8). Although live sheep exports have more recently peaked at over 6 million per annum during 2001 and 2002, they have been in fairly continuous decline since then, falling to below 2 million per annum since 2014. This is outlined in Figure 4 below.

For 2017-18 ABARES (2017, p. 65) is forecasting Australian live sheep exports to remain at around 1.9 million sheep. However, growth is expected to be constrained by continued flock rebuilding, limiting the availability of suitable sheep.

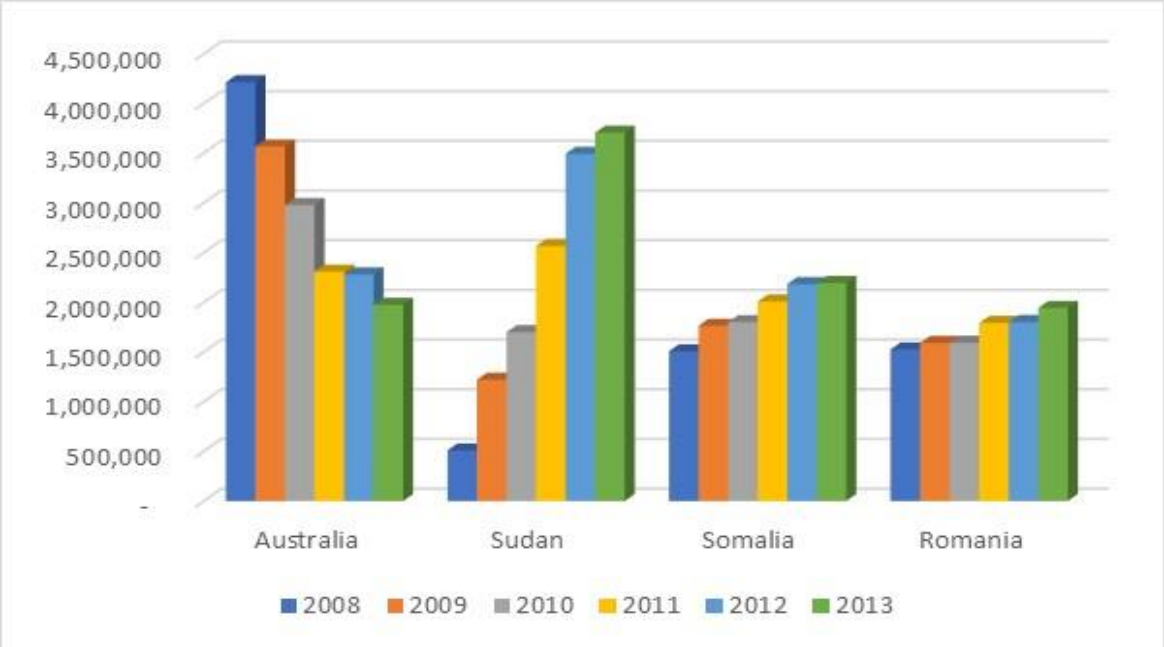
Figure 4: Australian Live Sheep Exports – 1988 to 2017 ('000)



Source: ABS (2018a).
Note: These figures also include sheep exported for breeding purposes although their numbers are fairly inconsequential.

With reduced supply from Australia, importing countries have switched to alternative suppliers including those located in North Africa, and in Eastern Europe (Keogh, Henry, & Day, 2016). While Australia was the largest live sheep exporter in the world up until 2010, it was overtaken by Sudan in 2011 and then later by Somalia in 2013, with Romania also increasing its live sheep exports. Together, Australia, Sudan, Somalia and Romania are the only countries to export in excess of 1 million live sheep annually, as outlined in Figure 5 below. While Australia's live sheep exports are trending downwards, the live sheep exports of Sudan, Somalia and Romania are all trending upwards.

Figure 5: Major Live Sheep Exporting Countries – 2008 to 2013



Source: United Nations FAOSTAT database.

The Australian live sheep export trade has been predominantly comprised of sheep sourced from Western Australia, as outlined in Figure 6 below. Since the beginning of 2015, live sheep sourced from Western Australia have made up around 88 per cent of the Australian live sheep export trade by volume.

Figure 6: Western Australian, Victorian, South Australian and New South Wales Monthly Live Sheep Exports – January 2015 to December 2017

Source: MLA (2018).
Note: These figures also include sheep exported for breeding purposes although their numbers are fairly inconsequential.

When supply of wethers in Western Australia is sufficient, voyages to the Middle East are usually loaded in Fremantle (Deards, et al., 2014, p. 53). It takes less time to reach the Middle East from Fremantle than Port Adelaide or Portland and the voyage is therefore less costly. Where consignments cannot be filled in Western Australia, or sheep can be purchased at sufficiently less cost elsewhere, exporters may purchase and load sheep from other locations, most commonly now South Australia. Live sheep exports were previously loaded from Devonport in Tasmania until 2006.

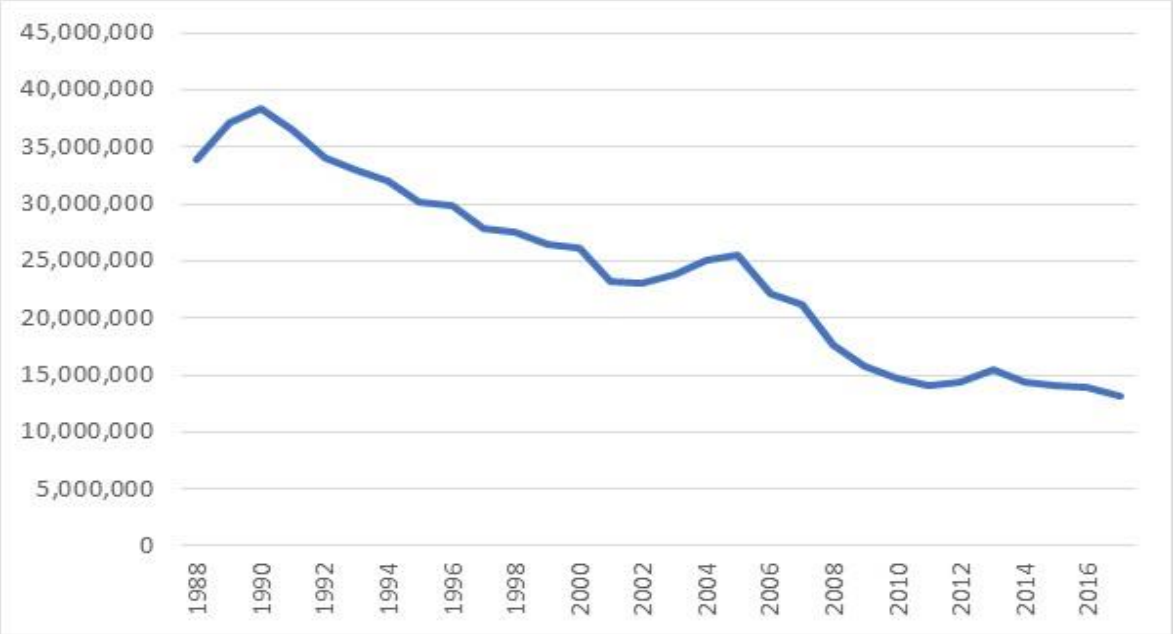
5.1 Western Australian Sheep Flock

In Western Australia sheep are primarily produced in the south west of the state on broadacre farms (Department of Agriculture and Food Western Australia, 2016a). Farms are mostly family owned enterprises where sheep are grazed on pastures grown in rotation with crops for grain production. Sheep graze the crop residues over summer and autumn and also assist in weed control (Ewing, Flugge, & Kingwell, 2005). Western Australian sheep are predominantly Merino.

Similar to the national sheep flock, the WA sheep flock has been in trend decline since 1990 as outlined in Figure 7 below. Since 1990, the WA sheep flock has fallen by 64 per cent from 38.4 million sheep to a current level of 13.7 million sheep. 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 breeding ewe component of the flock has increased significantly from 45 per cent in 1990 to 62 per cent in 2015, whilst at the same time the proportion of wethers in the flock has dramatically declined from 32 per cent to 9 per cent. This is largely due to the rising

importance of sheep meat, especially lamb, to the sheep farm enterprise and the reduced reliance on wool due to low prices following the stockpile era.

Figure 7: Western Australian sheep flock – 1988 to 2017



Source: ABS (2013; 2017; 2018b).

In 2004 when the WA sheep flock was around 25 million, a Ministerial Taskforce (Lindner, et al., 2004, p. 14) on the meat processing sector warned:

> *... the size of the sheep flock in WA has fallen to a level that some would suggest is critically low for a viable future.*

In March 2012 the then Department of Agriculture and Food Western Australia (DAFWA) (2012) and the Sheep Industry Leadership Council[9] established the *More Sheep Initiative* to address the critical issue of the decline in the WA sheep flock:

> *The State's sheep flock has dropped from 25 million to 14.5 million in six years – a level not experienced since the 1950s. Sheep numbers are at a tipping point where unless they are increased immediately Western Australia could lose markets, capacity and profitability.*

According to the then WA Minister for Agriculture and Food, Terry Redman (2012):

> *It is clear to industry that sheep numbers are precariously balanced with insufficient supply to meet demand and allow for flock rebuilding, risking a loss of processing capacity and markets as well.*

DAFWA (2012a) had previously contended:

> *Processors and live exporters require a bare minimum of 5.6 million sheep per year. This level of turn off is unsustainable from the current flock at current average marking rates. Also this is the level of turn off over the last couple of*

[9] The Sheep Industry Leadership Council was established in 2011 to develop and promote a shared vision for the Western Australian sheep industry.

years, and still the flock declines, highlighting the unsustainability of the current situation.[10]

In response to a question regarding whether WA could lose its grip on the bigger markets in Asia, the then Western Australian Minister for Agriculture and Food Ken Baston (2013) commented:

If we haven't got the animals to supply or to meet the market, then we can't go over there finding those markets.

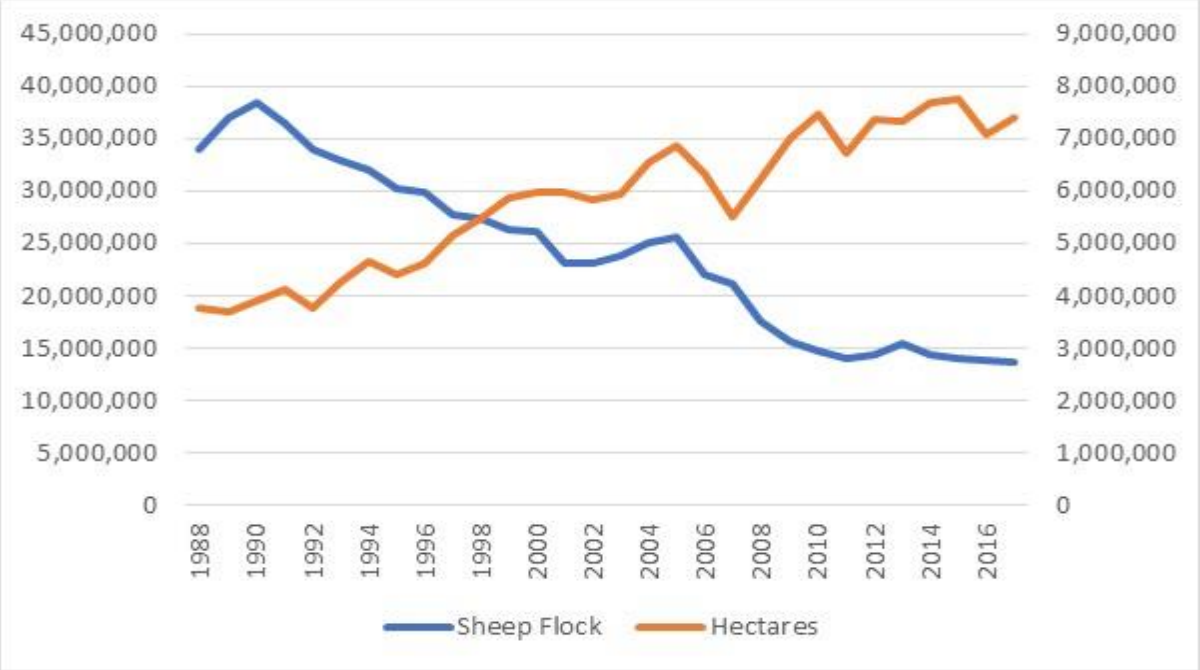
According to the then DAFWA director of sheep industry development Bruce Mullan in January 2017:

We're seeing a decline in the actual sheep population in the agricultural region because of a move towards grain production. (Wildie, 2017)

Mr Mullan also commented the trend was evident across the state and, if it continued, the sector would not be able to meet export demand (Wildie, 2017).

The inverse relationship between the declining WA sheep flock and the trend increase in the number of hectares devoted to wheat, barley and canola production in Western Australia is provided in Figure 8 below. It is worth noting the amount of land devoted to wheat, barley and canola production can be influenced year-to-year by climatic conditions such as drought and commodity prices.

Figure 8: Western Australian Sheep Flock Numbers and WA Hectares Devoted to Wheat, Barley and Canola Production – 1988 to 2017



Sources: ABS (2013; 2017; 2018b).
Note: Canola only included from 1998 but was not a significant broadacre crop before that time.

[10] This figure of 5.6 million sheep is composed of 3.3 million for processors and 2.3 million for the live export trade (Curtis & Hardy, 2012).

With the decline of the live sheep export trade, the relative significance of the trade for WA sheep farmers has also diminished. Even in the case of WA specialist sheep farmers the sale of sheep to the live export trade now only makes up only a relatively minor part of their enterprise.[11] In the ten-year period from 2005-06 to 2015-16, sales of sheep by WA specialist sheep farmers only accounted for 19 per cent of total farm cash receipts on average. Sales of sheep by WA specialist sheep farmers to the live sheep export trade has also become a diminishing percentage of their overall sheep sales as the live sheep trade has declined, accounting for only 11.7 per cent of sheep sales by volume in 2015-16. WA mixed enterprise sheep farms generate around 70 per cent of their receipts from crops, and since 2010-11 have generated less than 5 per cent of their receipts from the sale of sheep. While the percentage of sheep sales to the live sheep export trade by WA mixed enterprise sheep farms has fluctuated dramatically, it was only 10 per cent in 2015-16. Further details are provided in Appendix 2.

5.2 Do Live Sheep Exporters Pay a Price Premium?

It has been claimed the live sheep export trade delivers a price premium to sheep farmers. While overall this is true, the situation is far more complicated on a closer examination.

According to research commissioned by MLA:

> *The most obvious benefit for producers of involvement in the live export trade is the price premium they receive. For sheep producers, the price of shippers has averaged around $50 per head over the last few years. The same sheep sold on the domestic market would average around $25 per head, perhaps even less. (Clarke, Morison, & Yates, 2007, p. 89)*

Similarly, the 2004 WA Meat Processing Taskforce (Lindner, et al., 2004, p. 16) observed that higher prices were received in terms of $/head for sheep heading for the live export trade as compared to those to be processed domestically.

The Sapere (Davey, 2013) report commissioned by the World Society for the Protection of Animals (now World Animal Protection) found there was evidence of a price premium for farmers selling heavy wethers to the live sheep export trade of around 57 c/kg carcase weight (cwt) in nominal terms.

A detailed analysis has been undertaken of auction price data from MLA saleyard reports from December 2014 to December 2017 comparing the prices paid by live exporters and those paid by other purchasers when both live exporters and other purchasers procured sheep on the same day at the saleyard auction. It was found there is still a price premium being paid by live sheep exporters for wethers as compared to other purchasers, but the price premium dissipates with the quality of the sheep.

Fat score is the fat measurement on the carcase, based on the actual soft tissue depth at the Girth Rib (GR) site that is over the 12th rib of the sheep (Meat & Livestock Australia, 2017b, p. 2). The Australian sheep meat industry uses a 1 to 5 point soft tissue/fat scoring system to describe body condition in sheep and lambs (Gaden, Duddy, & Irwin, 2005, p. 63). Each fat score represents a 5mm band width (Meat & Livestock Australia, 2017b, p. 2). The fat scoring system is as follows:

- fat score 1 is very lean;

[11] See ABARES (2017c). Specialist sheep farmer is defined as a farmer who receives more than 50 per cent of their receipts from the sale of sheep, lambs or wool.

- fat score 2 is below average or lean;
- fat score 3 is average, ideal or prime;
- fat score 4 is above average or fat; and
- fat score 5 is very fat (AuctionsPlus Pty Limited, 2013, p. 7; Gaden, Duddy, & Irwin, 2005, p. 17).

Condition refers the amount of muscle and fat tissue that can be assessed over the skeleton (Gaden, Duddy, & Irwin, 2005, p. 17). The total amounts, and the relative proportions of each tissue, change as the animal moves from lean to fat condition. The actual soft tissue fat depth can be used as an indicator of condition. Thus, for sheep fat scores are generally interchangeable with condition scores (Gaden, Duddy, & Irwin, 2005, p. 2).

In turn, fat scores are used as a proxy to identify sheep that are too lean or fat to travel. Very lean animals have little in reserve to handle additional stresses such as time off feed, drafting, trucking and adaptation to a strange diet and to new surroundings (Gaden, Duddy, & Irwin, 2005, p. 15). Very fat animals have been associated with higher levels of mortality, particularly in shipments of longer duration and when travelling from a cool to a hot climate (Gaden, Duddy, & Irwin, 2005, p. 16).

It was found the price premium diminishes as the cwt increases and the fat score of the sheep moves up from 2 to 3. In other words, the heavier and better the condition of the sheep, the lower the price premium paid by live sheep exporters as compared to other purchasers. This is outlined in Table 1 below. This suggests the price premium paid by live sheep exporters is highest for wethers that are lighter and in worse condition, thus requiring further input in finishing them off to a level that would make them attractive to local processors.

While there is a price premium paid by live sheep exporters for light weight lambs with a fat score of 2, that almost dissipates for lambs between 16.1 kg and 18 kg cwt. Furthermore, live sheep exporters do not pay any price premiums for lambs above 18 kg with a fat score 3 and on average pay less for these lambs than other purchasers.

Table 1: Average Price Premium Paid by Live Sheep Exporters at Saleyard Auctions in Western Australia over Other Purchasers – December 2014 to December 2017 (c/kg cwt)

Category	cwt (kg)	Fat Score	Price Premium
Young Wether	14.1 - 18	2	64.6
Young Wether	14.1 - 18	3	56.3
Young Wether	18.1 - 24	2	38.4
Young Wether	18.1 - 24	3	30.4
Young Wether	24.1 +	3	14.4
Wether	18.1 - 24	2	52.3
Wether	18.1 - 24	3	35.8
Wether	24.1 +	3	21.4
Lamb	12.1 - 16	2	37.8
Lamb	16.1 - 18	2	3.1
Lamb	18.1 - 20	3	-53.4
Lamb	20.1 - 22	3	-21.4
Lamb	22.1 - 24	3	-18.6

Data Source: Meat & Livestock Australia.

A crude weighted average suggests the price premium paid by live sheep exporters for wethers is in the order 33 cents per kg cwt, that roughly translates to $8 per head.[12] The cessation of the live sheep export trade would thus translate into to a loss of around $9 million per annum for WA sheep farmers overall, that works out at just under $2,000 per sheep farmer.[13] This represents a loss of around 0.5 per cent of total cash receipts for specialist sheep farms and 0.17 per cent of total cash receipts for mixed enterprise sheep farms.[14]

While the cessation of the live sheep export trade will reduce overall demand to some extent as those seeking to procure sheep for live export will no longer participate in the market, the above analysis suggests the price impact will be greatest in relation to wethers that are lighter and in worse condition; in other words, those least attractive to local processors. In turn, this suggests that competition is strong to procure sheep at WA saleyard auctions at the quality end of the sheep meat market, consistent with comments by Roger Fletcher (Fletcher International Exports, 2015), Managing Director of Fletcher International Exports:

> *Competition is strong with 7-8 highly efficient meat export companies competing for livestock in most regional markets on any given day.*

In the event of the cessation of the live sheep export trade, DAFWA (Kingwell, et al., 2011, p. 37) has previously asserted that:

> *The reduced competition for purchasing sheep would place downward pressure on the sheep prices, therefore reducing margins for producers...*

However, in terms of the impact of the live sheep trade on overall demand, it is also important to note that live sheep exporters are rarely in the market to purchase young ewes, ewes and hoggets, are not always in the market to procure sheep as they are often inactive for weeks and sometimes even months on end when they are not seeking to fill an export shipment. Furthermore, the cessation of the live sheep export trade will not remove the live sheep exporters altogether from the sheep market as some of them also own and operate sheep meat abattoirs in Western Australia.

5.3 Do Live Sheep Exports Underwrite Farm Gate Prices?

It has also been contended the live sheep export trade underwrites farm gate prices for sheep. However, on close examination this claim does not stand up to scrutiny.

According to the Centre for International Economics (CIE) (2014, p. 6) in a report commissioned by the Wool Innovation Council:

> *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 …*

Similarly, the Sheepmeat Council of Australia (2012) has commented:

[12] The weightings based on saleyard auction data in Western Australia were amended to increase their negatively skewed distribution so as to arrive at an average cwt for live export wethers with a fat score of 3 of 23.4 kg that converts to a liveweight of 52 kg.
[13] Assumes 70 per cent of live sheep exports from Western Australia are wethers and that there were 4,507 sheep farmers in Western Australia as per ABS (2017).
[14] Based on total cash receipts for 2015-16 from ABARES (2017c).

The live export trade also underpins sheep prices received throughout the domestic markets in Australia.

The concept *Law of One Price* (LOP) relates to the impact of market arbitrage and trade on the prices of identical commodities that are exchanged in two or more different geographical markets (Persson, 2008). In an efficient market there must be, in effect, only one price of such commodities regardless of where they are traded. If the price of a product is different in two different markets, then an arbitrageur will purchase the asset in the cheaper market and sell it where prices are higher in order to generate a profit.

The LOP does not imply that prices in two separate geographical locations should be identical, just that any price differential should reflect transport and transaction costs. Transaction costs can be divided up into three main categories:

- information costs that arise *ex ante* to an exchange and include the costs of obtaining price and product information and the costs of identifying suitable trading partners;
- negotiating costs involved in undertaking the transaction and may include commission costs, the costs of physically negotiating an exchange and the costs of formally drawing up contracts; and
- monitoring or enforcement costs that occur *ex post* to a transaction and are the costs ensuring that the terms of the transaction are adhered to by other parties to the transaction (Hobbs, 1997, p. 1083).

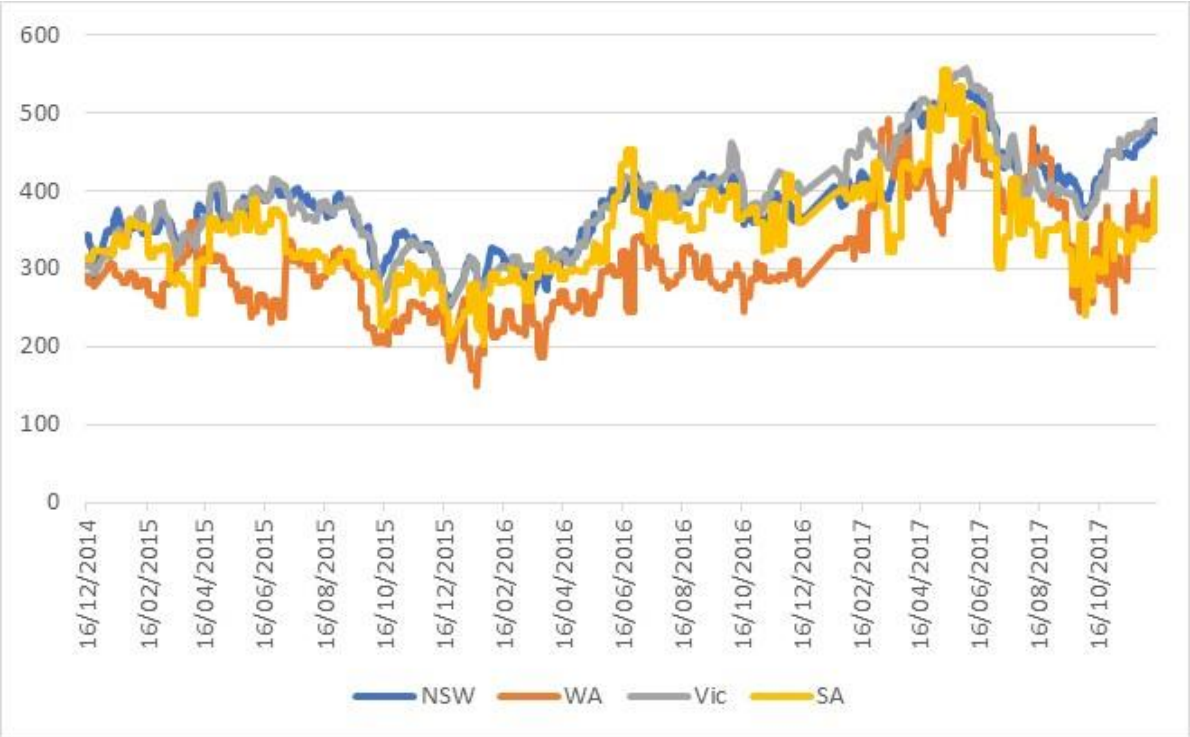
According to Lamont and Thaler (2003, p. 201), the logic as to why the law of one price must hold is simple: if the same asset is selling for two different prices simultaneously, then arbitrageurs will step in, correct the situation and make themselves a tidy profit at the same time. Despite the inherent logic surrounding the LOP, many studies fail to find significant support for the LOP in commodity markets (Pippenger & Phillips, 2008, p. 915). However, Pippenger and Phillips (2008, p. 924), conclude that once pitfalls in previous studies are accounted for, there is no empirical evidence that would lead them to reject the law of one price in commodity markets.[15]

The LOP suggests that prices received by sheep farmers in different regions of Australia should be similar. As a test of this general proposition, daily WA saleyard indicator prices for mutton with its very high exposure to the live sheep export trade, has been compared to those in South Australia and Victoria with varying degrees of exposure to the live sheep export trade and New South Wales, which has virtually no exposure to the live sheep export trade. In the period from January 2015 to December 2017, Western Australia accounted for 88 per cent of live sheep exports, South Australia for 10 per cent, Victoria for 1 per cent and New South Wales 0 per cent.[16]

If the contention that the live sheep export trade somehow underwrites sheep prices is true, then the prices paid at saleyard auctions for sheep in Western Australia with its high exposure to the live sheep export trade should bear no relationship to saleyard auction prices in New South Wales with virtually no exposure. The results are presented in Figure 9 below.

[15] According to Pippenger and Phillips (2008), those pitfalls are (1) using retail prices, (2) omitting transportation costs, (3) ignoring time, and (4) not using identical products.
[16] Rounded up to the nearest whole number, and as such does not add up to 100 per cent.

Figure 9: New South Wales, Victorian, South Australian and Western Australian Saleyard Indicator for Mutton (cents per kilogram (c/kg) carcase weight (cwt)) – 16 December 2014 to 14 December 2017



Source: Meat & Livestock Australia.

Figure 9 reveals that saleyard prices are similar across all four states regardless of their exposure to the live sheep export trade and generally move in the same direction, in turn suggesting the LOP holds.

As a further test of the LOP for mutton, Western Australian prices have been modelled as a function of New South Wales prices using dynamic ordinary least squares (DOLS) that yields a statistically valid relationship. In other words, Western Australian mutton prices with a high exposure to the live sheep export trade are highly correlated with New South Wales sheep mutton prices with virtually no exposure to the live sheep export trade. Further details are provided in Appendix 1.

On the basis of visual as well as econometric evidence, it is concluded that the LOP applies to sheep mutton prices across Australia and thus there is no support for the contention the live sheep export trade somehow underwrites domestic sheep prices. Rather than the live sheep export trade, this suggests that something else is underwriting mutton prices.

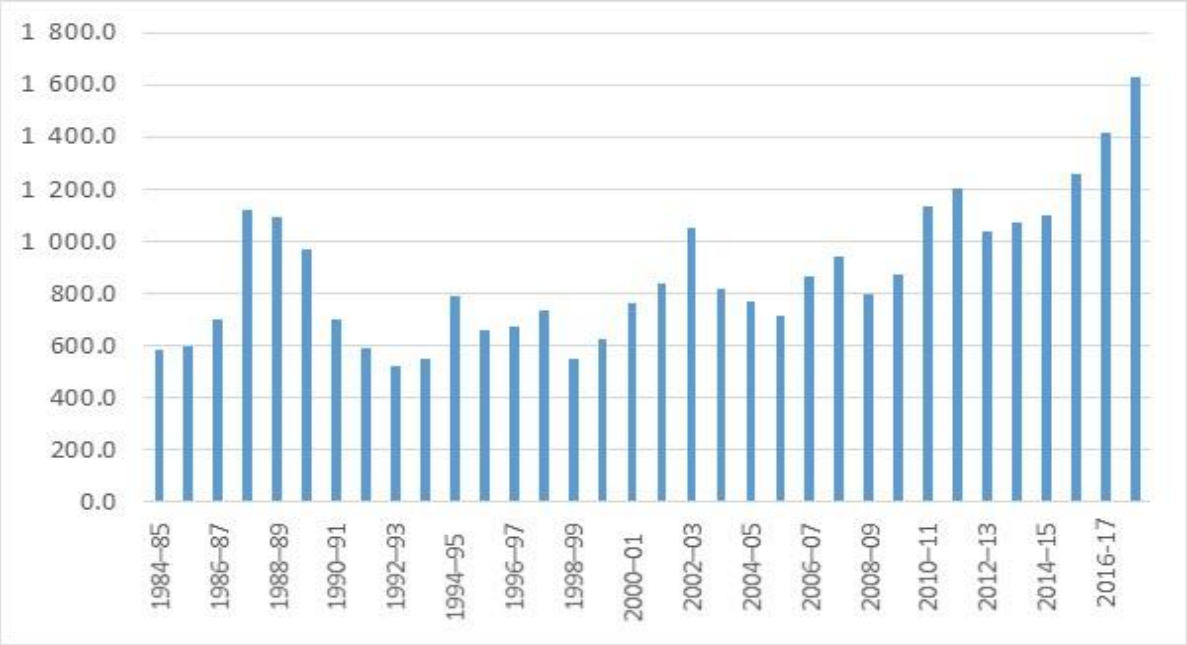
It is generally accepted there would not be a 100 per cent transfer from sales to the live sheep export trade across to their processed meat equivalent (Drum & Gunning-Trant, 2008, p. 25). In the event the live sheep export trade was phased out, sheep diverted away from live export could be redirected towards several alternative options, including the following:

1. keep the wethers until cast (at the end of productive life) primarily to cut wool;
2. finish sheep earlier to meet lamb market specifications;
3. sell the wethers as store sheep to be fattened before sale for slaughter; or
4. keep the wethers until they reach the heavier weights required for the slaughter market.

Where wethers are retained in the sheep production system for cutting wool, they are typically kept until 5 or 6 years of age and then sold (when they are called ‘cast for age‘) (Barber, 2009, p. 24). At this age these sheep have reached the end of their productive life and are sold into the meat

processing market. Option 1 depends upon wool market prices that are currently at record highs in nominal terms and forecast to go even higher. In 2017-18 the Australian Eastern Market Indicator (EMI) wool price is forecast to rise by 15 per cent to an average 1,630 cents per kilogram driven by higher prices for fine and superfine wools (Australian Bureau of Agricultural and Resource Economics and Sciences, 2017, p. 62). This is outlined below in Figure 10.

Figure 10: Australian Eastern Market Indicator (EMI) wool price – 1984-85 to 2017-18 (cents per kg of clean equivalent)

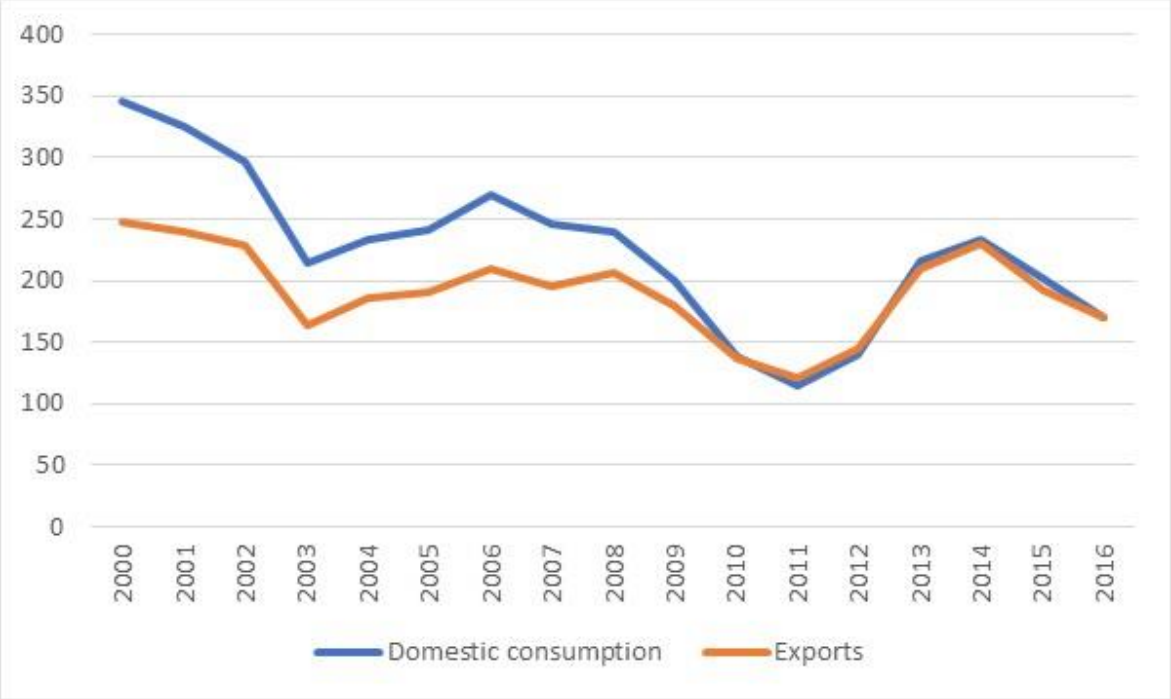


Sources: ABARES (2017b; 2017).
Note: Figure for 2016-17 is an ABARES projection and the figure for 2017-18 is an ABARES forecast.

The decision to sell into higher value lamb markets under option 2 means the sheep would need to be of a weight suitable for slaughter before the first adult teeth appear at around 14 months of age (Barber, 2009, p. 24).

The price received by sheep farmers under options 3 and 4 will ultimately depend on the demand by processors for sheep to produce mutton. As Australians consume very little mutton (Wong, Selvanathan, & Selvanathan, 2015, p. 1; Australian Bureau of Agricultural and Resource Economics and Sciences, 2017a, p. 110), processor demand for sheep to produce mutton will be driven by export markets for mutton. Australian production and export of mutton is provided in Figure 11 below.

Figure 11: Australian Production and Export of Mutton – 2000 to 2016 (cwt kilotonnes)



Source: ABARES (2017b).

Given that Australia produces far more mutton than it consumes, it is suggested that domestic sheep prices are more likely to be determined by international commodity prices for mutton than by the live sheep export trade. The Australian Competition and Consumer Commission (2007, p. iii) has previously opined on sheep meat prices that:

> *The ACCC considers that saleyard prices for cattle and sheep are determined by a number of supply and demand factors. In both sectors international demand is a key influence on saleyard prices and may place a constraint on domestic stock, particularly high-quality stock. The quality of livestock sold through saleyards is also a key determinant of saleyard prices: the higher the quality of stock, the higher the price it can command in both export and domestic markets.*

Similarly, the Australian Government Department of Agriculture (2015a, p. 26) has opined:

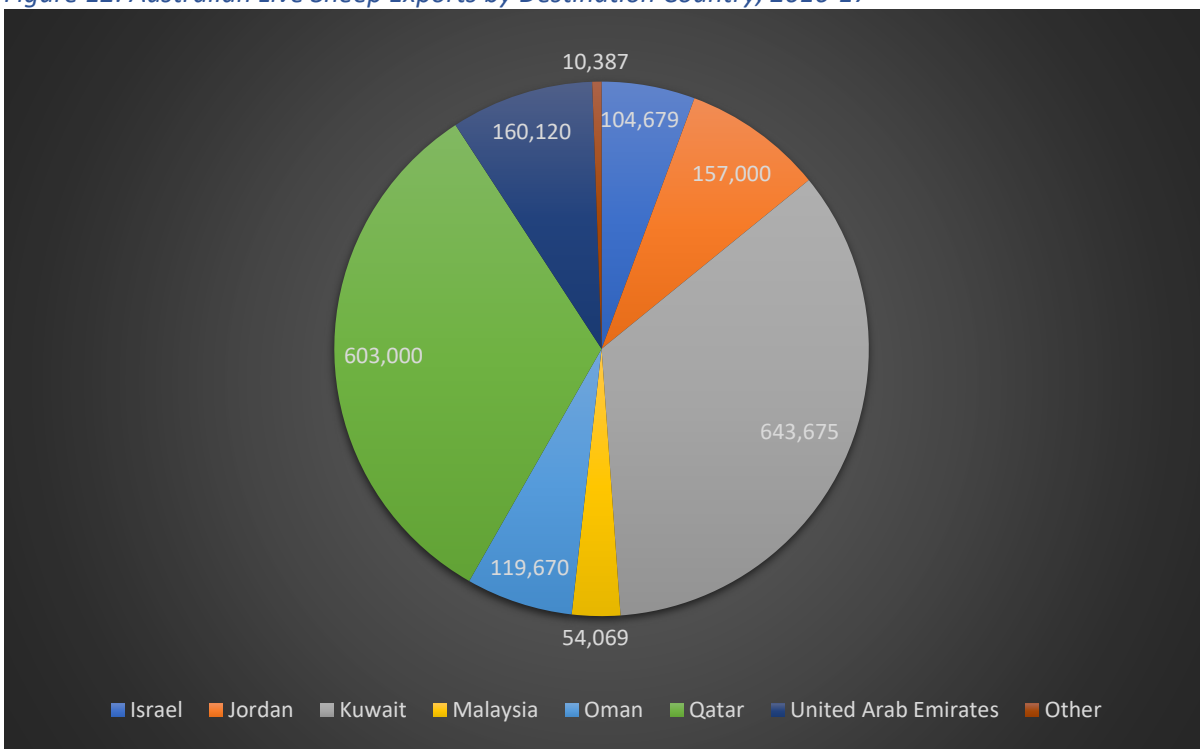
> *The potential for red meat exporters to influence livestock prices is constrained because the prices received for these meats are largely determined in international markets. In 2014, 71 per cent of Australian beef, lamb and mutton (by volume) was exported. World prices are a major factor influencing the prices these buyers pay for domestic livestock.*

Rather than prices paid by live sheep exporters, it is international commodity prices for mutton that underwrite prices paid for Australian sheep.

6 Live Sheep Export Markets

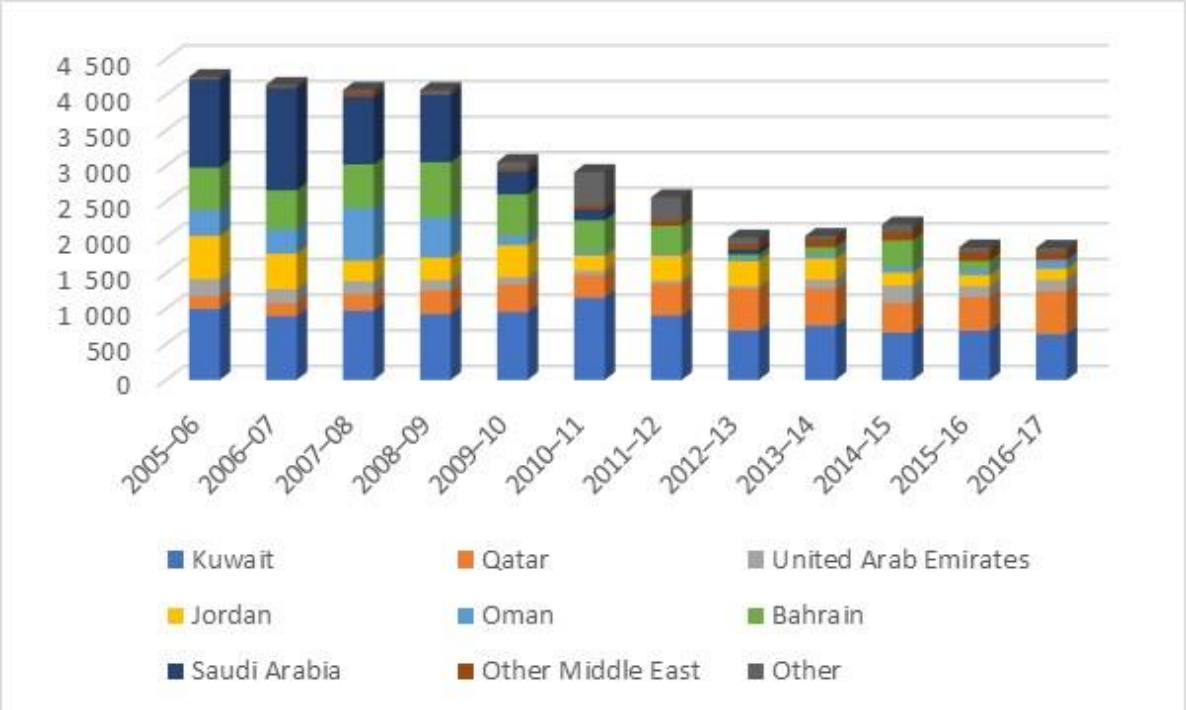
Australia's live sheep export markets are predominantly located in the Middle East, as outlined in Figures 12 and 13 below. In 2016-17, the Middle East took more than 96 per cent of Australian live sheep exports (Australian Livestock Export Corporation Limited (LiveCorp), 2017, p. 76).

Figure 12: Australian Live Sheep Exports by Destination Country, 2016-17



Source: LiveCorp (2017, p. 76).
Note: These figures include sheep exported for breeding purposes.

Figure 13: Australian live sheep exports by destination country, 2005/06 to 2016/17

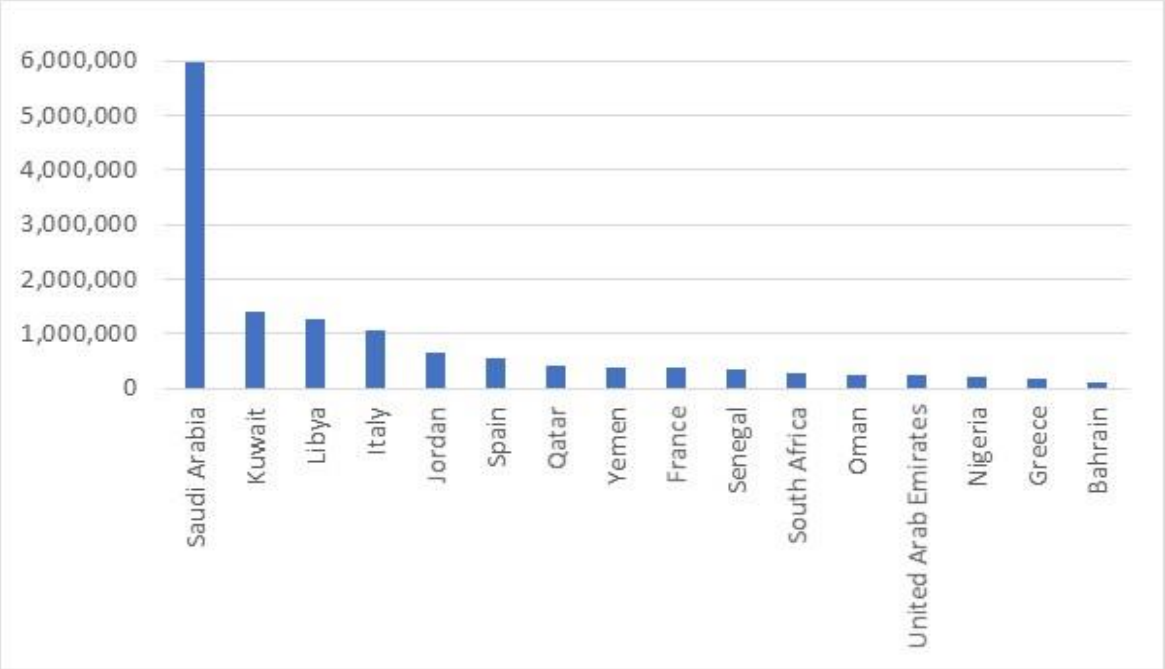


Sources: Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) (2017b); LiveCorp (2017, p. 76).
Note: These figures include sheep exported for breeding purposes.

The largest customers for Australian live sheep exports historically have been the six Arab states bordering the Persian Gulf and the Gulf of Oman: Saudi Arabia, the United Arab Emirates (UAE), Qatar, Kuwait, Bahrain and Oman. These six states together comprise the Gulf Cooperation Council

(GCC) which is a customs union that is moving towards becoming a common market. In 2013 all six members of the GCC were amongst the top sixteen live sheep importers in the world as outlined in Figure 14 below.

Figure 14: Top 16 Live Sheep Importing Countries – 2013



Source: United Nations FAOSTAT database.

In 2016-17, 82 per cent of Australian live sheep exports went to GCC countries. One distinguishing feature of the GCC states has been the provision of food subsidies for imports of livestock. A range of price control measures are deployed across the region, including the provision of subsidies to the marketers of imported products (Lahn, 2016, p. 4). Food subsidies are only available on animals slaughtered domestically in GCC states and do not apply to processed sheep meat imports (Drum & Gunning-Trant, 2008, p. 15). According to the Independent Review into Australia's livestock export trade undertaken by Bill Farmer (2011, p. 24):

> *… a number of countries, particularly in the Middle East, have subsidised meat for their citizens for some years in an effort to ease food security concerns. This has created additional demand for meat and, by extension, Australian livestock.*

According to the Managing Director of major sheep meat processing company Fletcher International Exports, Roger Fletcher:

> *The only reason why the trade existed is because it was heavily subsidised by their governments. (Clancy, 2013)*

Data on food subsidies in GCC countries is scarce and what information is available may be incomplete as the level of subsidies fluctuates as new measures are announced and withdrawn (Bailey & Willoughby, 2013, p. 6).

Saudi Arabia is the largest importer of live sheep in the world by a long way, importing almost 6 million sheep during 2013.[17] At the peak of the trade between Australia and Saudi Arabia,

[17] United Nations FAOSTAT database.

Saudi Arabia imported in excess of 1.4 million sheep from Australia in 2006-07. However, Saudi Arabia has proven to be an extremely fickle customer of Australian live sheep exports since 1989 with the trade having been suspended on several occasions following decisions by Saudi Arabian authorities to refuse acceptance of Australian shipments on often contentious biosecurity grounds.

Australian live sheep exports have been unable to access Saudi Arabia since the application of the Exporter Supply Chain Assurance Scheme (ESCAS) to Saudi Arabia on 1 September 2012 (Department of Agriculture, 2015, p. 35). The last shipment of Australian live sheep went to Saudi Arabia in August 2012 although this had been the first shipment in over 12 months. The inability of Australian live sheep exports to access Saudi Arabia are due to Saudi Arabia's concern that the implementation of ESCAS would impinge upon its sovereignty.

Under ESCAS the exporter must demonstrate, through a system of reporting and independent auditing:

- animal handling and slaughter meets World Organisation for Animal Health (OIE) animal welfare standards;
- the exporter has control of all supply chain arrangements for livestock transport, management and slaughter, and all livestock remain in the supply chain; and
- the exporter can trace or account for all livestock through the supply chain (Department of Agriculture, 2015, p. 2).

In Muslim countries, ESCAS has the biggest impact on the Haj and Ramadan religious occasions that involve the ritual slaughter of sheep in the family environment (Manton-Pearce, 2013, p. 24). The practical implications of ESCAS are that Muslims can no longer buy Australian sheep from the feedlots and slaughter them outside of an approved abattoir.

Despite the chequered history of Australian live sheep exports to Saudi Arabia, the Australian Livestock Export Corporation Ltd (LiveCorp) (2017, p. 57) is still investigating means by which the live export trade to Saudi Arabia can be re-established.[18] Similarly, the Chief Executive Officer of the Australian Livestock Exporters' Council Simon Westaway commented in November 2017 that:

> *Historically, the Saudi trade has played a significant role in our sheep exports, and we're working with the Federal Government to re-open that market … (The Maritime Executive, 2017)*

There have been no live sheep exports from Australia to Bahrain since October 2015 as a result of the decision by the Bahrain Government to remove import meat subsidies (Australian Livestock Export Corporation Limited (LiveCorp), 2016, p. 7). This move was prompted by the need on the part of the Bahrain Government to cut its rising subsidy bill (Lahn, 2016, p. 14).

In Bahrain, import meat subsidies were previously provided by the Bahrain Government through payments to the Bahrain Livestock Corporation, the main distributor of meat in Bahrain (Al A'ali, 2017). The removal of import meat subsidies resulted in Australian live sheep imports no longer being a competitive alternative to locally sourced sheep and chilled product (Australian Livestock Export Corporation Limited (LiveCorp), 2017, p. 7).

[18] LiveCorp (2017) a not-for-profit service provider to the livestock export industry charged with responsibility to deliver marketing and research, development and extension (RD&E) outcomes on behalf of Australia's livestock exporters funded through levies from Australian livestock exporters.

Like Saudi Arabia, Bahrain had also proven to be a fickle customer of Australian live sheep exports. In late August 2012 Bahrain refused a shipment of around 22,000 live sheep over concerns that some of the sheep had scabby mouth (Valdini, 2012). In September 2012 the Australian Livestock Exporters Council imposed a voluntary ban on live sheep exports to Bahrain (Varischetti, 2012). Australian live sheep exports did not resume until February 2014 (Deards, et al., 2014, p. 29) and were terminated altogether with the cessation of government subsidies.

Kuwait is currently the largest importer of Australian live sheep. Kuwait provides food subsidies to some of its residents. According to the Kuwaiti Ministry of Commerce and Industry, currently around 1.7 million people are registered with the subsidised supplies system and the total sum of subsidies they will receive in the current financial year will amount to 150.5 million Kuwaiti Dinars (KD) ($658 million) (Saleh, 2017). The total population included in the subsidised supplies system comprises 1.1 million citizens (at a cost of KD 98.4 million or $430 million), 90,300 GCC nationals (at a cost of KD 7.7 million or almost $34 million), 97,900 stateless people (at a cost of KD 8.2 million or almost $36 million) and 413,400 domestic helpers with a total annual cost of KD 34 million (almost $149 million). The extent of food subsidies provided by the Kuwaiti Government has been significantly reduced from the level of 360.25 KD (almost $1.576 billion) provided in 2015-16 (Central Statistical Bureau, 2017).

The second largest importer of Australian live sheep is Qatar. Widam Food Company (Widam) (2017) has a contractual relationship with the Qatari Government to import Australian livestock and sell it to the Qatari market at a price fixed by the Government. Under the contract between Widam and the Qatari Government, the Government pays a certain amount of compensation to Widam for each kilogram of meat sold. In 2015, the payment by the Qatari Government to the Widam was 372.5 million Qatari riyal (QR) ($134.1 million), which fell to 341.1 million QR in 2016 ($122.8 million). In the 9 months to the end of September 30 2017, the Qatari Government paid Widam (2017a) 323.8 million QR ($116.6 million).

The third largest importer of Australian live sheep is the UAE. In 2012 the Abu Dhabi Government, one of the seven emirates that makes up the UAE, spent 449 UAE dirhams (around $161 million) on food subsidies (International Monetary Fund, 2013, p. 49). Food subsidies are also provided through the UAE Government organisation, the Khalifa Bin Zayed Al Nahyan Foundation (2015, p. 62) that aims to lessen the burden of living borne by the UAE people amongst other objectives. The Foundation has opened a number of centres for the distribution of subsidised foods deemed essential for daily consumption at affordable prices for low-income citizens. Approximately 126,698 families benefitted from food subsidies provided by the Foundation between 2012 and 2015.

Oman is the sixth largest importer of Australian live sheep. Oman has recently slashed the level of food subsidies that it provides from 6.8 million Omani Rials (OMR) ($23.3 million) in 2015 to 3.8 million OMR in 2016 ($13 million) (Times News Service, 2017).

Although not a GCC country, Jordan is the fourth largest importer of Australian live sheep. Jordan is expected to spend some 180 million Jordanian Dinar JD ($334.8 million) on food subsidies in 2017, rising to 194 million JD ($360.8 million) in 2018 (International Monetary Fund, 2017, p. 45).

6.1 Fiscal Sustainability of Food Subsidies in the Middle East

The capacity of live sheep exporters to pay a price premium at sale yard auctions is arguably directly linked to the provision of food subsidies provided by recipient countries that in turn artificially

increases demand for Australian live sheep exports and enables them to pay above market rates to procure sheep. The sustainability of these subsidies is in grave doubt.

It has been suggested the provision of food subsidies plays an important part in the social compact of many Middle Eastern states, especially those that are absolute monarchies. According to Michael Peel (2013) writing in the *Financial Times*:

> *Large consumer subsidies in areas from housing to food have become an important part of the social contract between the Gulf's autocratic leaders and their citizens. While many officials in the region see the need to reduce the subsidy bill, they are wary of the impact of doing so and have in some cases given more handouts over the past two-and-a-half years in an effort to preclude the dissent that has triggered uprisings across the Middle East.*

The policy efficacy of the provision of government food subsidies has long been considered to be of dubious value. According to the World Bank:

> *… consumer price subsidies, far from being a thing of the past, continue to be used despite their past record of meagre benefits to the poor, high fiscal costs, corruption episodes, and questionable nutritional effects. (Poverty Reduction and Equity Group at the World Bank, 2013, p. 1)*

> *… the long-held consensus regarding food consumer subsidies … is that, unless properly targeted, these subsidies are not effective in helping the poor and may distort market prices and agriculture production as well as entail a hefty fiscal bill. (Poverty Reduction and Equity Group at the World Bank, 2013, p. 5)*

According to a Chatham House briefing paper (Bailey & Willoughby, 2013, p. 9)

> *Economy-wide food price controls are expensive, and potentially counterproductive in the longer term. To the extent that they encourage the consumption of unhealthy, energy-dense foods, they may also aggravate obesity and related health issues.*

The budgetary position of GCC states is heavily reliant on revenue from petroleum product exports, namely crude oil and natural gas. Oil rents have enabled the Gulf states to establish lucrative welfare systems to distribute wealth to their national population in exchange for political passivity; however, the Gulf states' economies have long been considered unsustainable in the long term (Nosova, 2018). This in turn leaves the Gulf states (and the beneficiaries of their subsidy schemes) vulnerable to any downturn in global energy markets. Gustav Boëthius (2011, p. 2) from the Middle East Institute at the National University of Singapore has previously warned:

> *A high reliance on oil and gas exports results in a heavy fiscal dependence on the global energy market. This market is particularly volatile and this volatility exposes the GCC economies to high levels of risk.*

A paper published by the European Central Bank has outlined the fiscal policy challenges facing petroleum exporting countries in the following terms:

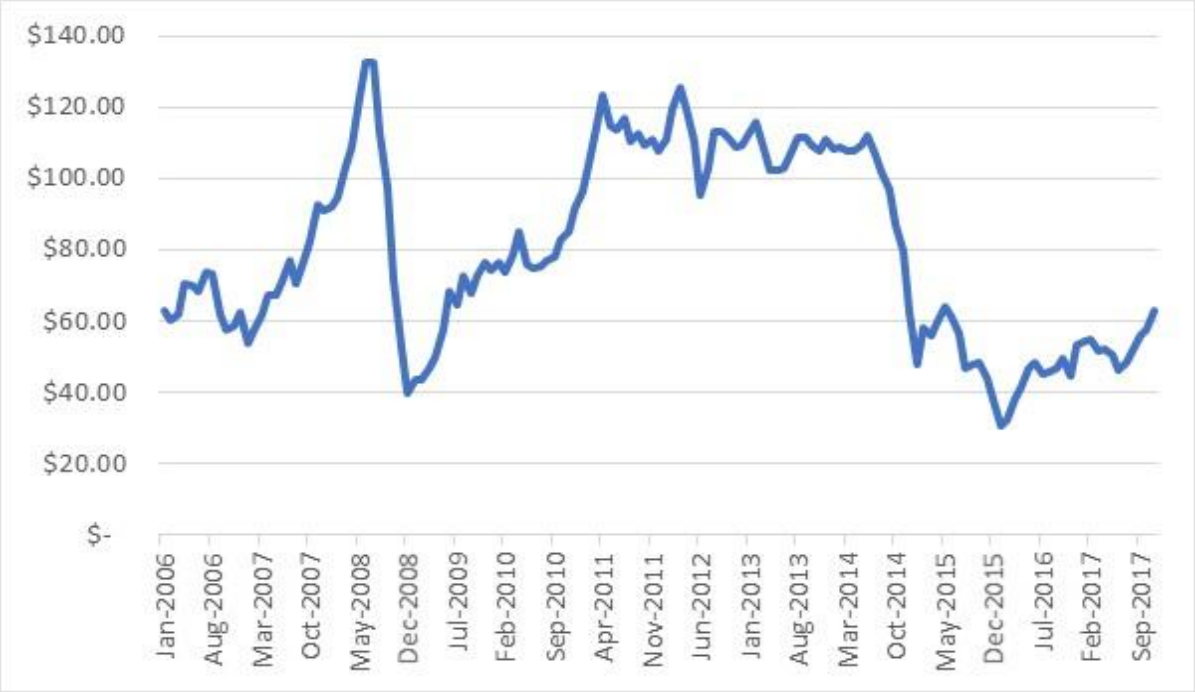
> *Fiscal policy in oil-exporting countries is facing a number of specific challenges, stemming mainly from the fact that oil revenues, which constitute the bulk of government revenues in oil-centred economies, are exhaustible, volatile, uncertain and largely originate from external demand. These specific features of oil revenues pose challenges in the long term with regard*

to intergenerational equity and fiscal sustainability … (Sturm, Gurtner, & Gonzalez Alegre, 2009, p. 5)

Multiple recommendations from various international organisations and consultancies have been issued stating the necessity for the GCC countries to diversify their sources of income and reduce the growing budget spending, which has become a serious economic burden expected to result in budget deficit and fiscal crisis (Nosova, 2018).

Since peaking at around $US114 a barrel in June 2014, oil prices have plummeted, plateauing just above $US30 a barrel in January 2016 before staging a modest recovery to current levels of around $US60 a barrel.[19] This is outlined below in Figure 15.

Figure 15: Brent Crude Oil Monthly Spot Price – January 2006 to November 2017 ($US per barrel)



Source: U.S. Energy Information Administration.

The price of oil is expected to remain in the band of between $US50 and $US70 a barrel for the foreseeable future (International Energy Agency, 2017). While demand growth for oil is expected to remain robust up until the mid-2020s, it is likely to slow markedly thereafter as greater efficiency and fuel switching bring down oil use for passenger vehicles even though the global car fleet is expected to double between now and 2040.

The downturn in global oil prices since June 2014 has seen the budgetary position of the Gulf states sharply deteriorate with the onset of large budget deficits. This leaves a question mark over the capacity of Gulf states to maintain food subsidies over the medium and longer term given existing budgetary pressures and mounting budget deficits.

Saudi Arabia is currently undertaking a substantial program of fiscal consolidation whereby its budget deficit is expected to decline from 17.2 per cent of gross domestic product (GDP) in 2016 to 8.6 percent of GDP in 2017 and to just under 1 percent of GDP by 2022 with the deficits to be

[19] Based on the price of Brent (Europe) crude oil prices, a heavily traded crude oil price marker.

financed by a combination of asset drawdowns and domestic and international borrowing (International Monetary Fund, 2017b; International Monetary Fund, 2017h).[20]

Bahrain has already been forced to abandon food subsidies in the face of mounting fiscal pressures, and ran a budget deficit of 17.8 per cent of GDP in 2016, which is expected to moderate to 13.2 per cent of GDP in 2017 (International Monetary Fund, 2017c; International Monetary Fund, 2017h).

In 2015 Kuwait, for the first time in 15 years, incurred a budget deficit of 17.5 per cent of GDP after decades of high oil prices (Central Intelligence Agency, 2017; International Monetary Fund, 2017a). Kuwait is expected to run a budget deficit of 15.9 per cent of GDP in 2017 and to make little progress in reining it in in the years ahead, with a budget deficit of 14.3 per cent of the GDP projected in 2022 with the ongoing deficits to be financed through a combination of domestic borrowing, external borrowing, and a drawdown of assets (International Monetary Fund, 2017a). The IMF (2017a) has suggested removal of subsidies would be an obvious place for Kuwait to get its public expenditures under control:

> *Reducing subsidies—including for energy products—and transfers is a key potential source of savings and efficiency gains. The government has taken important initial steps over the past couple of years to advance energy and utility price reforms and rationalise other subsidies and transfers, including for medical treatments abroad. Nonetheless, the total subsidy and transfer bill remains large. In addition to being costly, subsidies and transfers encourage excessive consumption and inefficient allocation of capital. Because that they are not targeted, they benefit the wealthiest more than the vulnerable.*

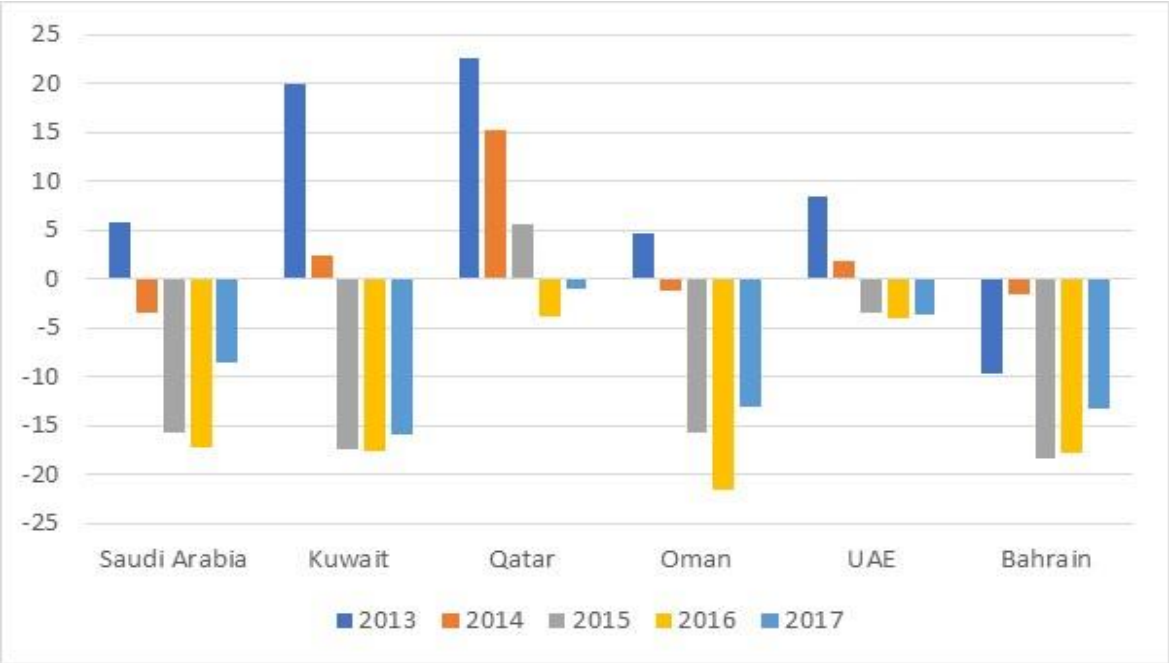
Qatar is currently undertaking a program of fiscal consolidation, underpinned by expenditure cuts and an increase in non-oil revenues, with the budget deficit projected to decline to 1.0 per cent of GDP in 2017 from 3.9 per cent in 2016 (International Monetary Fund, 2017f; International Monetary Fund, 2017h).

The United Arab Emirates is also undertaking a program of fiscal consolidation, with the budget deficit expected to contract from 4.1 per cent of GDP in 2016 to 3.7 per cent of GDP in 2017 (International Monetary Fund, 2017d), with the deficits to be mainly financed through withdrawals from the sovereign wealth funds and external borrowing (International Monetary Fund, 2017g; International Monetary Fund, 2017h). Finally, Oman is also undertaking an ambitious program of fiscal consolidation with the budget deficit expected to reduce from 21.6 per cent of the GDP in 2016 to 13 per cent in 2017 (International Monetary Fund, 2017e; International Monetary Fund, 2017h).

A summary of the budget position of the GCC states is provided below in Figure 16.

[20] GDP is a measure of national income.

Figure 16: Budget Balance of the GCC States as a Percentage of GDP



Sources: International Monetary Fund (2017a; 2017h).

The future of food subsidies, and in turn, the ongoing ability of live sheep exporters to continue to pay price premiums for wethers, is heavily dependent on the price received by GCC countries for their petroleum product exports. In turn, any further downturn in international oil and gas prices could curtail live sheep exports to GCC states altogether due to mounting fiscal pressures.

7 Capacity of Western Australian Meat Processors

There is evidence of chronic ongoing underutilisation of sheep meat processing capacity in Western Australia.

According to the 2004 WA Meat Processing Taskforce, the live export trade has been one of the more significant reasons for excess capacity in the WA meat processing sector (Lindner, et al., 2004, p. 9). As a consequence of the live export trade, the WA meat processing sector has experienced lower levels of throughput and capacity utilisation than it would have in the absence of live export (Lindner, et al., 2004, p. 9). In 2002, it was estimated that the underutilisation of WA meat processing capacity for sheep was in the order of 55 per cent (Lindner, et al., 2004, p. 19).

A survey of the WA major meat processing facilities in 2011 found the level of utilisation was around 59 per cent (Kingwell, et al., 2011, p. 42). Based on a partial survey conducted by DAFWA (Kingwell, et al., 2011, p. 42) of the major meat processing facilities, it was estimated there was processing capacity for at least around 4.9 million sheep per annum.

Sheep processing capacity for WA abattoirs is estimated conservatively at around 6.7 million sheep per annum based on a potential weekly throughput of 129,500. This is outlined in Table 2 below. For those abattoirs that have only quoted a daily processing capacity, this assumes a 5 day working week that could potentially be extended into the weekend.

Table 2 Estimated Processing Capacity of WA abattoirs to Slaughter Sheep per week

Abattoir	Capacity per week
Fletchers (Narikup)	48,000
WAMMCO (Katanning)	22,000
V&V Walsh (Bunbury)	17,500
Beaufort River Meats (Woodanilling)	12,500
Geraldton Meat Exports (Geraldton)	10,000
Myrup (Esperence)	8,000
Hillside (Narogin)	6,500
Goodchild (Australind)	5,000
Total	129,500

Sources: Kingwell, et al. (2011), (Ayton Baesjou Planning, 2013, p. 3), Beef Central (2017), MacTiernan (2017), Wellard (no date), Condon (2016), Burton (2017), Livestock Shipping Services (2014), Goodchild Meats (2013).
Note: Based on publicly available sources. Assumes abattoirs only operate 5 days per week where daily processing capacity has been quoted, includes both lamb and mutton. While the Myrup abattoir (formerly the Shark Lake abattoir) has been closed since May 2017, it is expected to be operational again by February 2018.

Based on the number of lamb and sheep slaughtered in 2016, WA sheep meat processors were running at around 63 per cent of capacity. In the year to the end of December 2017 it appears that WA sheep meat processors were only running at around 56 per cent of capacity.[21] This is consistent with discussions with meat processors consulted for this project who commented processing capacity was hovering at around the 55 to 60 per cent level with many processors running only one shift a day when they could be running two shifts.

All of the abattoirs listed in Table 2 above are export licenced except Goodchild. According to the Western Australian Meat Industry Authority (2016), a number of additional abattoirs are able to process sheep meat, including:

- Corrigin Meatworks (Corrigin);
- Dardanup Butchering Company (Picton); and
- Hagan Bros (Greenough).

At its peak, WA abattoirs slaughtered just over 5.9 million sheep (lamb and muttton combined) in 2000, which had fallen to around 2.7 million by 2012. Growth largely driven by an increase in lamb slaughtering since 2012 saw the combined slaughter of sheep increase to 4.2 million during 2016, however, the number of sheep slaughtered subsided during 2017 to 3.7 million.[22]. This is outlined in Figure 17 below.

[21] See ABS (2018).
[22] Ibid.

Figure 17: WA Slaughtering of Lamb, Mutton and Sheep – 1988 to 2017 (000')

Source: ABS (2018).

The major WA abattoir for mutton production is Fletchers at Narrikup, near Albany while the major abattoir for lamb is in Katanning and is managed by Western Australian Meat Marketing Cooperative Limited (WAMMCo), which operates as a producer-owned cooperative (Department of Agriculture and Food Western Australia, 2009, p. 19).

Given that DAWFA (Kingwell, et al., 2011, p. 42) has previously found evidence of significant economies of scale in sheep meat processing,[23] the chronic under-utilisation of sheep meat processing capacity in Western Australia represents an opportunity cost for WA sheep meat exporters. Costs could be reduced for producers if the available processing capacity was more fully utilised.

The WA meat processing industry is currently operating well below its capacity. On current utilisation levels, the industry has sufficient spare capacity to absorb the entire quantum of live sheep exported annually from Western Australia and still have spare capacity to process over another 1.4 million sheep.[24] Given expanding international demand for sheep meat products, finding markets for processed mutton should not prove insurmountable.[25] Even supporters of the live sheep export trade concede it will be possible to find markets for processed sheep meat products arising from sheep diverted away from the live sheep export trade.[26]

The WA meat processing industry faces a number of challenges, including the long-term decline in the WA sheep flock and the impact of higher wool prices that will be encouraging some sheep farmers to hold on to wethers for wool production. Should live sheep exports continue, it is likely that the combination of these factors will place pressure on the number of sheep available for processing, endangering the continuing viability of WA sheep meat processors.

[23] Economies of scale occur when average costs decline as output decreases.
[24] Based on live sheep exports to the year ended December 2017 and meat processing to the year ended December 2017.
[25] See Appendix 2 for further details.
[26] Ibid.

While the availability of suitable labour was previously an issue facing the WA meat processing sector during the construction phase of the mining boom, this is no longer a problem.

8 Economic Impact from Phasing Out of the Live Sheep Export

8.1 Economy-wide and Regional Impacts

The available evidence suggests that on an economy-wide basis the impact arising from the phasing out of the live sheep export trade would be almost negligible in terms of its overall impact on the $248 billion Western Australian economy; however, marginally positive overall through an expansion of domestic sheep meat processing.[27]

Based on computable general equilibrium (CGE) modelling of the impact on the Western Australian economy from reducing live sheep exports performed by DAFWA (Kingwell, et al., 2011, p. 42) concluded:

> *As might be expected, the economy-wide impacts are relatively minor, causing small percentage changes in the state's gross state product (GSP), employment, export values and the [consumer price index].*

DAFWA (Kingwell, et al., 2011, pp. 42-43) went on to observe that the main impacts arising from any reduction or cessation in the export of live sheep are likely to be felt most strongly within the sheep supply chain rather than across a wider group of sectors or more generally throughout the economy. DAFWA's observations in this regard arguably still remain valid, especially as the significance of the live sheep export trade has diminished even further since the DAFWA analysis was undertaken.

In a report commissioned by Australian Wool Innovation, the Centre for International Economics (CIE) (2014, p. 7) found the overall impact arising from the closure of the live sheep export trade would be small on sheep farmers on a national basis:

> *To put these national results in perspective, the expected impact on wool production and gross value of production is relatively small compared to other economic drivers such as variations in the exchange rate and seasonal conditions.*

An ABARES report (Deards, et al., 2014, p. 56) estimated the live sheep export industry provided direct employment to 1,775 people. However, the ABARES assumptions were based on general labour intensities for sheep farming, the majority of which involve sheep breeding businesses that are far more complicated and time consuming than running export wethers on crop stubbles (Francis, 2014a). Such farmers instead are operating low maintenance sheep systems with far lower employment requirements. Given the diminished significance of the live sheep export trade for WA sheep farmers, the employment consequences arising from the phasing out of the live sheep export trade for farm employment would not be significant.

Consideration of any loss of employment from the cessation of the live sheep export trade should also make allowance for the additional employment opportunities that this would provide for the WA sheep meat processing sector, that is currently only operating at between 55 to 60 per cent of capacity. This is discussed further in section 8.2 below.

[27] See ABS (2017a). This assessment does not take into account the direct impact on the live sheep export supply chain itself.

Within the sheep supply chain, the biggest impact would presumably be felt in terms of the prices sheep farmers receive on the sale of their sheep. There have been mixed views on the impact the live sheep trade has on sheep prices and the consequences arising from its cessation.

In a 2009 review of the live sheep export trade for the RSPCA, ACIL Tasman (Barber, 2009, p. 12) contended that overall, there was 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. However, this assumption has been criticised by others.

In a report commissioned by the Australian Livestock Export Corporation (LiveCorp) and MLA, the CIE (2011, p. 15) commented:

> *In our view, the ACIL Tasman study is underpinned by a highly optimistic outlook on the potential for the lamb and mutton industry to maintain current prices. That is, the study does not allow for an additional fall in prices beyond current market differentials between live export and processing markets.*

Similarly, DAFWA (Kingwell, et al., 2011, p. 9) has commented:

> *... ACIL-Tasman made assumptions that led to their finding that cessation of the live trade would have little impact on farm businesses. They made the bold assumption that lamb and mutton prices would not change as a result of the closure of the export trade and so, of course, there is little surprise in their study's conclusion of little impact on farm businesses of closure of the live trade.*

In our view, and for the reasons argued in sections 5 and 6 of this report, the prices paid for Australian sheep are underwritten by international commodity prices for mutton rather than the prices paid for Australian live sheep exports. The prices paid by live sheep exporters may at present also be supported by unsustainable food subsidies offered by some of the GCC states. To the extent that cessation of the trade would have a price impact, the impact would be greatest for those sheep that are lighter and in worse condition.

8.2 Opportunities for Further Value Adding

While some have claimed the live export trade is complementary to domestic meat processing (Keogh, Henry, & Day, 2016), this view has been contested by some in the meat processing sector. According to Tom Macguire, General Manager of Corporate Services at red meat processor Teys Australia:

> *There is no doubt that the live export industry cannibalises the value-add which meat processing otherwise generates for the Australian economy. (Cranston, 2011)*

Essentially, domestically processed sheep meat product exports to the Middle East are in direct competition against Australian live sheep exports that are processed in the Middle East. Thus, live sheep exports also result in the export of meat processing and the associated employment and income generated overseas.

In terms of assessing the overall impact of the phasing out of the live sheep export trade, there appears to be a trade-off between the interests of sheep farmers and sheep meat processors. While sheep farmers would immediately lose any price premium paid by live sheep exporters for their

wethers, sheep meat processors would increase their throughput, leading to economies of scale and increased profitability, as outlined by DAWFA (Kingwell, et al., 2011, p. 42):

> *The implications for processors if the trade were to cease is that they would become more profitable with more sheep to slaughter, assuming there is a market for the product in the frozen or chilled product.*

According to Victorian prime lamb farmer Patrick Francis (2014), the live sheep export trade faces questions surrounding its economics given the product is a generic, non-value-added commodity. In stark contrast, the phasing out of the live sheep export trade will provide WA sheep meat processors with the opportunity to engage in further value adding activities.

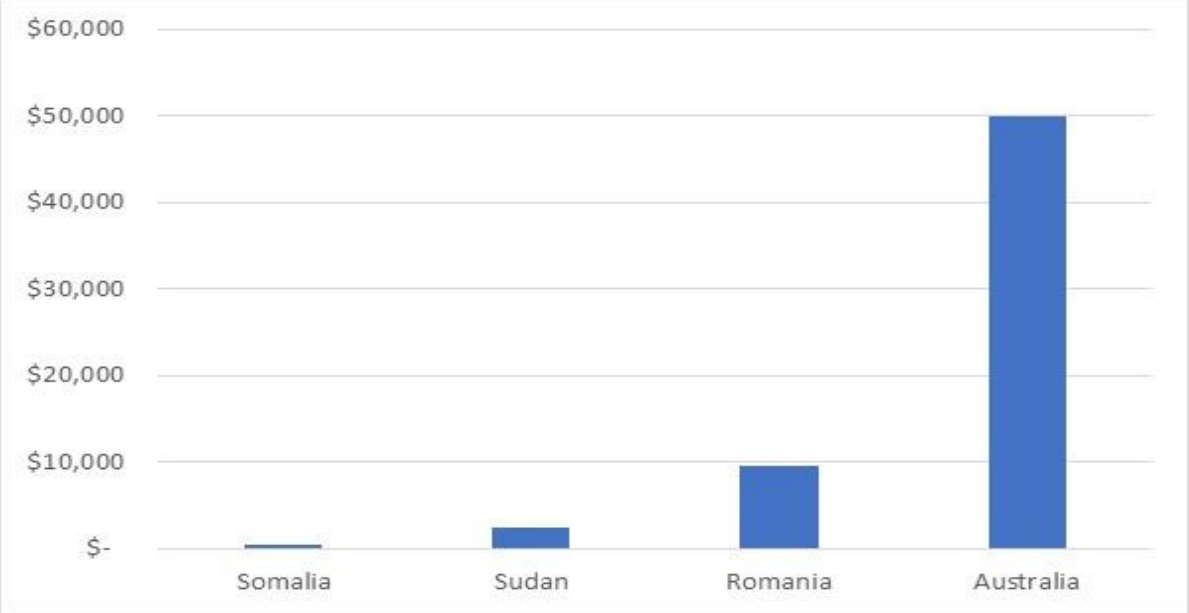
Meat processors 'add value' by transforming livestock into meat and other co-products (Industry Commission, 1994, p. 240). Value added is calculated as the revenue from sales less the cost of purchased materials (including livestock) and services (Industry Commission, 1994, pp. 35-36). Value added is the value of an abattoir's output which is available to reward the factors of production employed – the employees, management and capital (Industry Commission, 1994, p. 35). It is thus the sum available from which profits and wages must be derived (Industry Commission, 1994, p. 240). According to the former Industry Commission (1994, p. 36), labour accounts for 97 per cent of the value added for meat processors.

The cessation of the live sheep export trade will provide for the redirection of some sheep to domestic processors that in turn will enable them to raise their capacity utilisation and employment levels. Based on discussions with sheep meat processors for this project, the cessation of the live sheep export trade could facilitate the engagement of around 350 full-time equivalent employees, and be worth an additional $18 million from increased value adding. It would also improve economies of scale in meat processing, making processed sheep meat products more price competitive. An increase in employment due to the engagement of unemployed and/or underemployed people will generate higher economic growth and a reduction in unemployment benefits coupled with a reduced financial impost on taxpayers.

The additional value added is based on an immediate cessation of the live sheep export trade with most sheep redirected towards local processing. However, the phasing out of the live sheep export trade at a set fixed date in the future would enable sheep farmers to adjust their business mix as they saw fit in order to best mitigate the impact arising from the cessation.

Further value adding of sheep through meat processing would also appear to be the sensible strategy for Australia to pursue. Australia's main competitors in the live export trade to the Middle East are Sudan, Somalia and Romania. Based on per capita income, The World Bank (2017) categorises Somalia as a low-income country, Sudan as a lower-middle-income country, and Romania as an upper-middle-income country. In contrast, Australia is categorised as a high-income country. The disparity in per capita income between Australia and its main rivals in the live sheep export trade to the Middle East is provided in Figure 18 below.

Figure 18: GDP per capita on a Purchasing Power Parity basis for Major Live Sheep Exporters to the Middle East – 2016 ($US)



Source: The World Bank.

Per capita income in Australia is at least five time greater than in our main live sheep export competitors. This in turn suggests that real wage rates in Australia are considerably higher than in the other main live sheep exporting countries.

Comparison of the level of real wages provides some insight into the types of competitive strategies that Australian sheep farmers should be pursuing in marketing of their sheep. According to Professor Karl Aiginger (2006, pp. 169-170) of the Austrian Institute of Economic Research:

> *Striving for "price competitiveness" – the ability to produce at low cost – is important for low income countries. For richer countries, price competitiveness continues to be important, if the country supplies low value added, homogenous products. For these goods, a firm or a country can compete only if its price is equal to or less than that of the other producers.*

The substantial labour cost differential between Australia with other main live sheep exporting countries suggests that it will be extremely difficult for Australia to maintain a competitive advantage in terms of price competitiveness. Arguably, Australia already doesn't maintain any price competitiveness in live sheep export markets due to the provision of government subsidies in importing countries. Thus according to Professor Karl Aiginger (2000, p. 6):

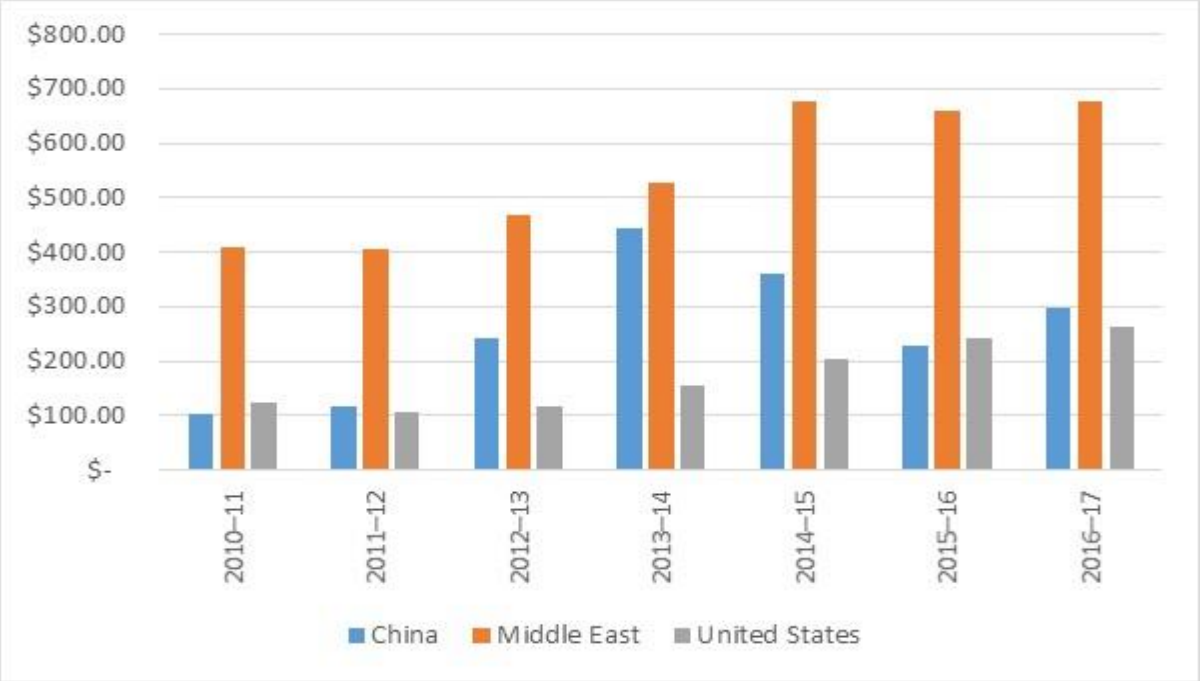
> *Higher quality is a necessary precondition for high cost producers to stay competitive. Producing the same quality at a higher price or at lower margins is not feasible in the long run.*

Essentially as a high wage country Australia shouldn't be competing in low value added products with low wage countries as it is not a sustainable proposition.

In the event the Australian live sheep export trade ceased, an obvious place to look to supply more value added processed sheep meat products to would be the Middle East. The Middle East is already Australia's largest export market for processed sheep meat products for both lamb and mutton in

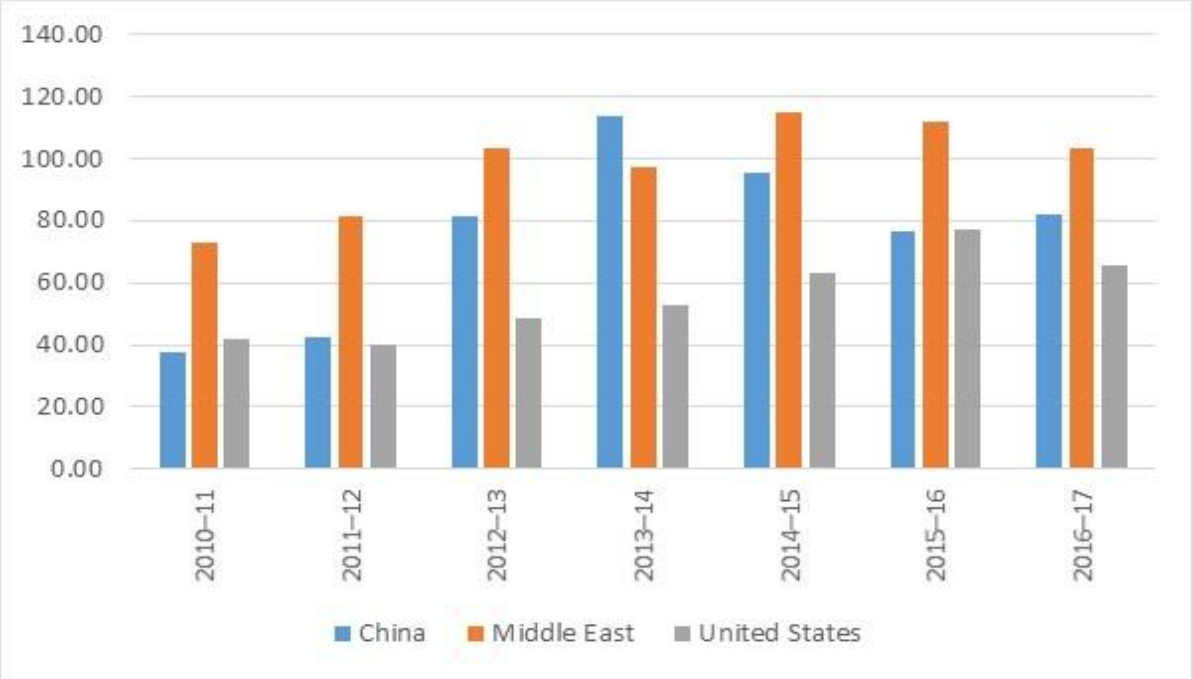
terms of value and volume (Australian Bureau of Agricultural and Resource Economics and Sciences, 2017b). This is outlined in Figures 19 and 20 below.

Figure 19: Australian Major Sheep Meat Markets by Value – 2010-11 to 2016-17 ($ million)



Source: ABARES (2017b).

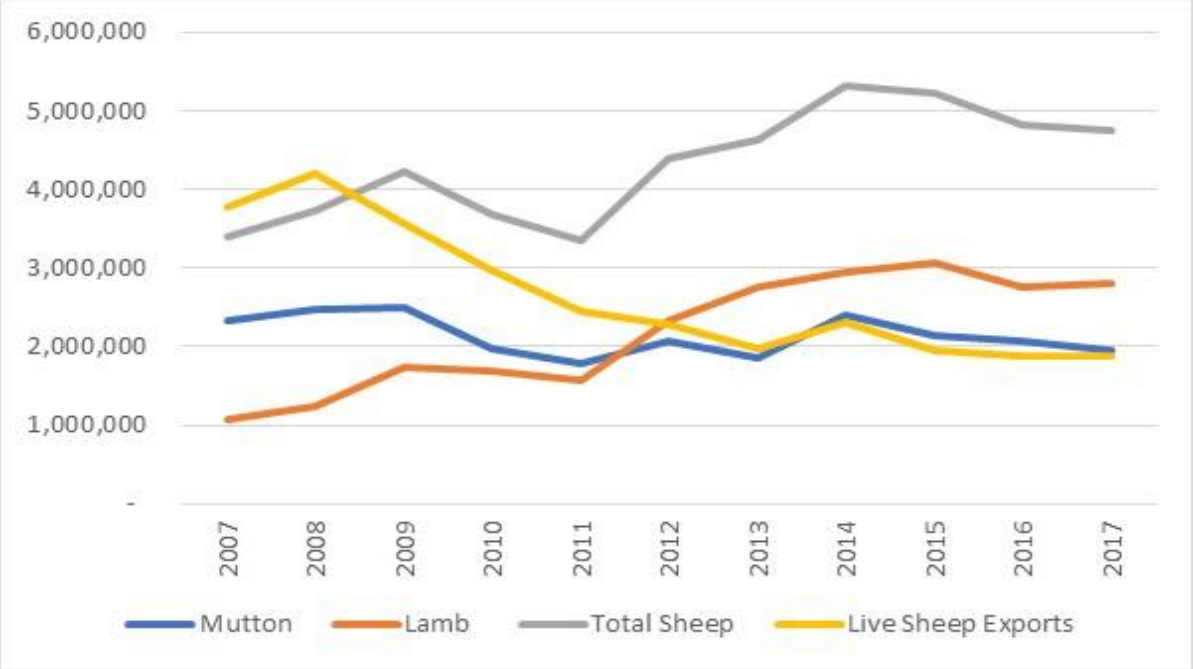
Figure 20: Australian Major Sheep Meat Markets by Volume – 2010-11 to 2016-17 (kilotonnes)



Source: ABARES (2017b).

Australia currently exports over 2½ times the volume of carcase equivalent processed sheep meat into the Middle East than the total number of live sheep exports. This is outlined in Figure 21 below.

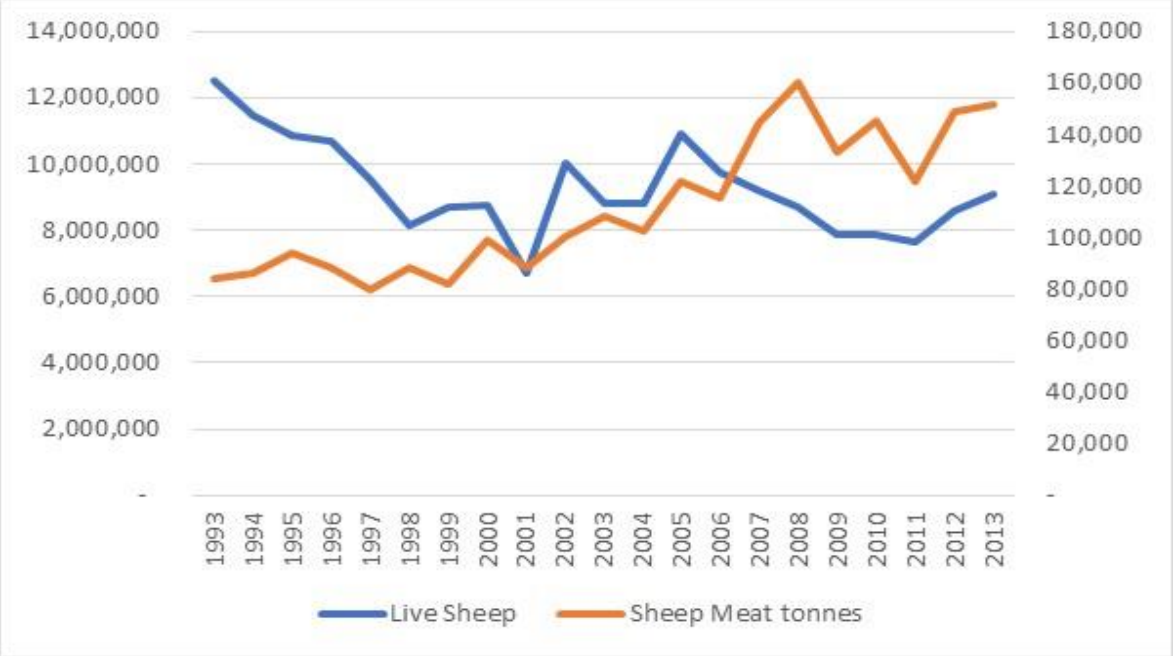
Figure 21: Carcase Equivalent Exports of Mutton, Lamb and Total Sheep and Live Sheep Exports – 2007 to 2017



Sources: Department of Agriculture, Fisheries and Forestry red meat export statistics from 2007 to 2017 and the MLA Market Information Statistics Database for calendar year average carcase weights for mutton and lamb.

Since the early 1990s, GCC states along with Jordan have exhibited an increasing demand for processed sheep meat imports as live sheep imports have declined in trend terms, suggesting there is substitutability between processed sheep meat and live sheep imports. This is exhibited in Figure 22 below.

Figure 22: Live Sheep and Processed Sheep Meat Imports to GCC States and Jordan – 1993 to 2013

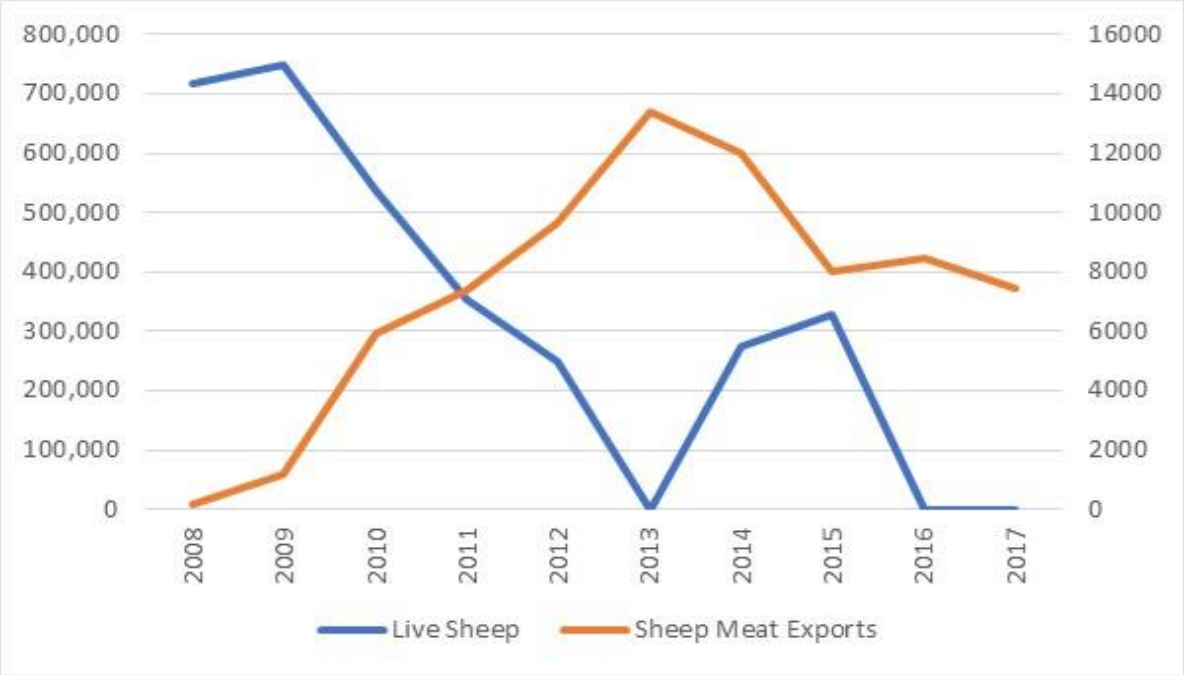


Source: United Nations FAOSTAT database.

Bahrain has exhibited substitutability between Australian live sheep exports and Australian mutton and lamb exports, with a preference being exhibited for lamb when oil prices are relatively high that

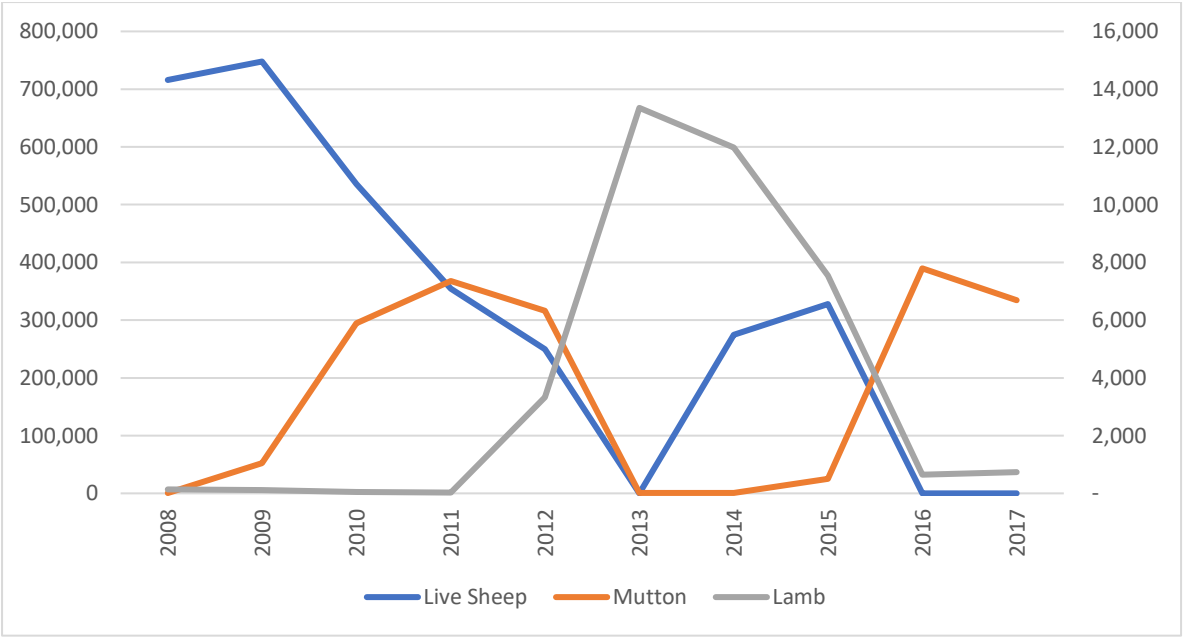
switches across to mutton when oil prices are not so high. This is outlined in Figures 23 and 24 below.

Figure 23: Australian Live Sheep Exports and Sheep Meat Exports ('000 tonnes) to Bahrain – 2008 to 2017



Sources: Department of Agriculture, Fisheries and Forestry red meat export statistics from 2008 to 2017 and the MLA Market Information Statistics Database.

Figure 24: Australian Live Sheep Exports and Mutton and Lamb Meat Exports ('000 tonnes) to Bahrain – 2008 to 2017



Sources: Department of Agriculture, Fisheries and Forestry red meat export statistics from 2008 to 2017 and the MLA Market Information Statistics Database.

While GCC countries generally have zero tariffs applying to chilled meat, there is a 5 per cent tariff on frozen and processed meat and offal (Meat & Livestock Australia, 2017a, p. 2). Unlike the live

sheep export trade, processed sheep meat exports to GCC states are not dependent on food subsidies and are often subjected to tariffs.

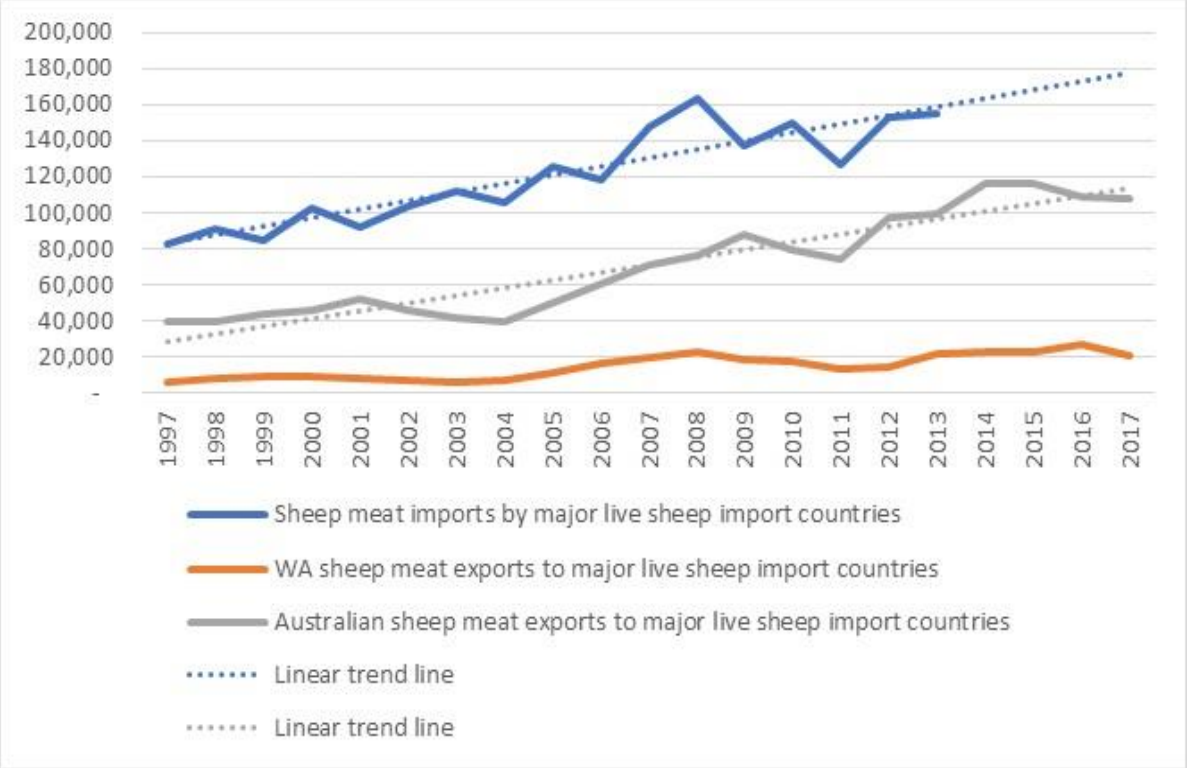
GCC nations have developed substantial refrigeration capacity to support the import and distribution of chilled and frozen food products (Market Vision Research & Consulting Services FZ-LLC, 2011, p. 2). In relation to household refrigeration, Market Vision and Consulting Services (2011, p. 19) has observed:

> *Consumption of meat in households is facilitated by a high penetration of domestic refrigerators in the GCC. In the high heat experienced in the summer months, often close to 50 degrees Centigrade at the peak, it would be inconceivable to store food at homes without refrigeration.*
>
> *Refrigerator ownership in consumer households across the GCC is 99%; in the UAE, Bahrain, Kuwait and Qatar it is near universal at 99.5%.*
>
> *Freezers also have a high penetration (73%) among consumer households in these countries.*

The traditional method of selling live sheep in the Middle East is in the 'souk', or traditional market, where animals are sold and slaughtered for their buyers (Drum & Gunning-Trant, 2008, p. 15). The animal is slaughtered in full view of the client and the meat from that animal is returned to the client.

Despite the traditional means of meat retailing in the Middle East, major live sheep import countries have significantly increased their consumption of processed sheep meat products (including mutton and lamb). Australian exports of processed sheep meat products to the Middle East have been expanding in trend terms at a similar rate as the overall level of sheep meat imports to the region, although Western Australia has not really been part of this trend probably due to a combination of live sheep exports and a declining sheep flock. This is outlined in Figure 25 below.

Figure 25: Processed Sheep Meat Imports by Major Live Sheep Import Countries, Western Australian and Australian Exports of Processed Sheep Meat Products to the Middle East (tonnes)



Source: Department of Agriculture, Fisheries and Forestry red meat export statistics from 1997 to 2017 and the Food and Agricultural Organization of the United Nations FAOSTAT database
Note: Includes lamb and mutton. Major live sheep import countries is composed of Bahrain, Israel, Jordan, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates. Trend lines added by the author.

According to the Australian Meat Industry Council (AMIC) (2014, p. 6), there has been a continuous shift towards western-style dining across the Middle East region:

> *Thirty years ago the Middle East took close to 6 million head of live sheep and quantities of live cattle. This catered to the cultural and religious traditions of the region, lack of refrigeration and also reflected the level of sophistication and development at the time and traditional lifestyles.*
>
> *There has been a generational shift in the region over the past 15 years. … The younger generation is well educated, often in western schools and thus has adopted western lifestyles. This includes purchasing chilled and frozen meat from the large European-style supermarkets rather than buying livestock and having it killed at a local slaughterhouse.*

Similarly, Roger Fletcher has commented that increases in processed sheep meat exports were in line with the expansion of supermarkets in some of the GCC countries like Bahrain, Dubai, the UAE and Saudi Arabia (Meat & Livestock Australia, 2014). According to Mr Fletcher, it was predominantly the growth of supermarkets and the move away from wet markets that was driving demand for processed sheep meat to GCC countries.

The trend increase in consumption of processed sheep meat products in the Middle East suggests further export opportunities exist for processed sheep meat exports for sheep redirected away from the live sheep export trade.

The increase in consumption of processed sheep meat products is likely to continue given strong population growth across the CCG states. From 2015 to 2030 the population of the CCG states is expected to grow by 26 per cent, from 52.7 million to 66.6 million (United Nations, Department of Economic and Social Affairs, Population Division, 2017).

The 2012 Nuffield Scholar Dr Kelly Manton-Pearce (2013, pp. 28-29) has also suggested that India could provide a potential market for processed young wethers redirected from the live sheep export trade:

> *… the Indians have a taste preference for older sheep rather than lamb which also presents a value adding opportunity. A strong prospect as discussed and confirmed in conversations with Indian traders would be to direct our Merino hogget wethers into this market. This class of sheep are the traditional sheep that would have gone on a live export boat to the Middle East. Developing a WA slaughter market specific to the Indian market is a potential avenue for a risk management strategy rather than having a total reliance on live exports.*

However, Australian sheep meat faces a significant trade barrier in being able to access the Indian market through the imposition of a 30 per cent tariff at the present time.

Another option for additional value adding is through further processing at the meat processing stage. Mutton (like all red meat) benefits from traditional dry aging, where naturally occurring bacteria break down the connective tissue and enhance the flavour and texture of the meat (Kennard, 2016, p. 11). Dry ageing all classes of sheep meat (lamb and mutton) has been found to increase tenderness, roasted and buttery flavours, and decrease negative traits such as bloodiness, boiled, livery and metallic flavours (Burvill, 2016, p. 2). In turn, the dry ageing of mutton could add a significant price premium to this traditionally lower value type of sheep meat – to a point where mutton cuts may be able to be sold for more than regular wet aged lamb (Burvill, 2016, p. 19). Dry aged mutton could potentially be marketed as a higher value product throughout the world.

9 Significance of Live Sheep Exports to the Sheep Meat Trade

Ongoing instances of animal cruelty that have plagued the live export trade pose a reputational risk to the rest of Australian agriculture that risks being tarred with the same brush.[28] While the Australian Government has attempted to improve animal welfare standards through the adoption of the Australian standards for the export of livestock (ASEL) and the ESCAS and thus ameliorate the reputational risk to Australian agriculture, it cannot eliminate it entirely. As Benjamin Franklin once said:

> *It takes many good deeds to build a good reputation, and only one bad one to lose it. (Eccles, Newquist, & Schatz, 2007, p. 106)*

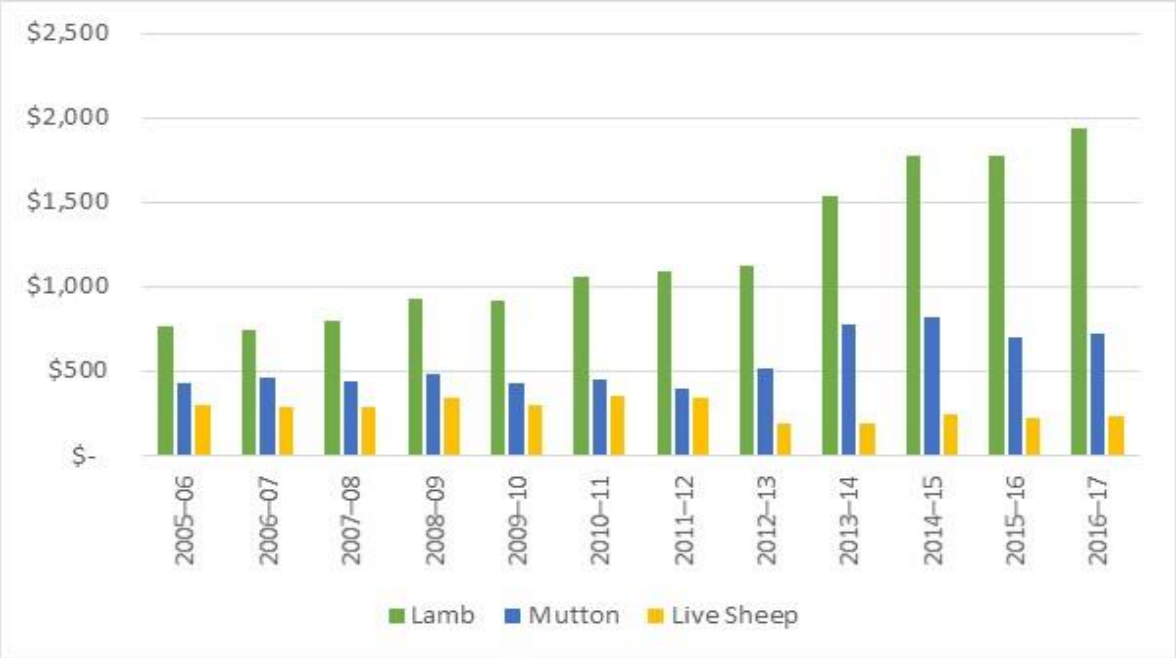
Arguably, the parts of Australian agriculture most at risk from another animal cruelty incident associated with the live sheep export trade are sheep producers not engaged in the live export trade. This is consistent with the findings of 2003 Livestock Export Review chaired by Dr John Keniry that was commissioned by the Australian Government:

[28] Reputational risk has been defined as a negative event that will impact stakeholders' perception of a company (Gillen, 2009).

> *The Review concluded that there must be recognition that the livestock export industry cannot afford more bad outcomes and therefore all higher risk voyages should be eliminated. In those circumstances where there is clear evidence of a risk that demonstrably contributes to adverse outcomes on a predictable basis, exports should not be permitted. (Keniry, Bond, Caple, Gosse, & Rogers, 2003, p. 42)*

Live sheep exports are the least significant element of sheep meat product exports in terms of value for the Australian economy. This is outlined below in Figure 26.

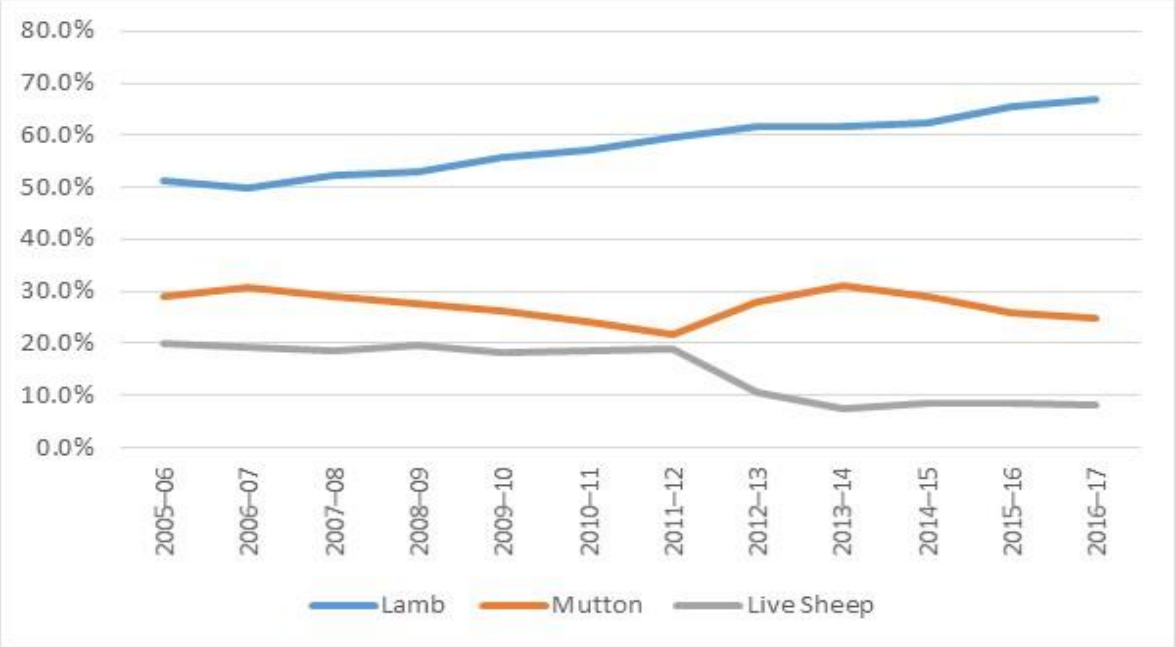
Figure 26: Value of Australian Lamb, Mutton and Live Sheep Exports (free on board) – 2005-06 to 2016-17 ($ million)



Source: ABARES (2017b).

Since 2005-06, the relative significance of the live sheep export trade to overall sheep meat exports has been diminishing, falling from around 20 per cent to just over 8 per cent. The rapid decline in the value of live sheep exports during 2012-13 and 2013-14 was roughly matched by an expansion in mutton exports, as outlined in Figure 27 below.

Figure 27: Percentage Contribution of Lamb, Mutton and Live Sheep Exports to the Total Value of Sheep Meat Exports – 2005-06 to 2016-17



Source: ABARES (2017b).

10 Conclusions

While Australia's live sheep export trade has been in trend decline since the 1980s, Australian exports of processed sheep meat products have significantly expanded in trend terms over the last 20 years.

With the decline of the live sheep export trade, the relative significance of the trade for WA sheep farmers has also diminished. Even in the case of WA specialist sheep farmers the sale of sheep to the live export trade now only makes up only a relatively minor part of their enterprise. WA mixed enterprise sheep farms generate around 70 per cent of their receipts from crops, and the relative significance of sales to the live sheep export trade has also diminished.

In the event the live sheep export trade was phased out, sheep diverted away from the live export trade could be redirected towards several alternative options. Each of these options present their own particular financial opportunities in order to alleviate the impact of any losses associated with the phasing out of the live sheep export trade.

Sheep meat processors in Western Australia suffer from chronic ongoing underutilisation of processing capacity. Continuing live sheep exports coupled with a declining WA sheep flock and high wool prices will put pressure on the number of sheep available for processing, in turn endangering the continuing viability of WA sheep meat processors.

On the other hand, the phasing out of the live sheep export trade will provide WA sheep meat processors with the opportunity to engage in further value adding activities. The cessation of the live sheep export trade will provide for the redirection of some sheep to domestic processors that will enable them to raise their capacity utilisation and employment levels. The cessation of the live sheep export trade could facilitate the engagement of around 350 full-time equivalent employees, and be worth an additional $18 million from increased value adding. The additional value added is based on an immediate cessation of the live sheep export trade with most sheep redirected towards local processing. However, the phasing out of the live sheep export trade at a set fixed date in the

future would enable sheep farmers to adjust their business mix as they saw fit in order to best mitigate the impact arising from the cessation.

While WA sheep farmers currently receive a benefit from the live sheep export trade from the price premium paid by the live sheep exporters, the live sheep export trade does not underwrite domestic sheep prices that are largely determined by international commodity prices for mutton. The price premium is arguably supported by the food subsidies provided by importing country governments in the Middle East. However, these subsidies are not sustainable in the medium to longer term. When the food subsidies in Bahrain were cut, the live sheep exports from Australia ceased altogether.

While WA sheep farmers may collectively lose in the order $9 million per annum from the loss of the price premium, this detriment could be more than compensated for by increased value adding by WA sheep meat processors of an additional $18 million. The loss of the price premium represents a loss of only between 0.17 and 0.5 per cent of total cash receipts for WA sheep farmers. Of course, farmers have various options available to mitigate the loss of the price premium, including finishing off sheep to a standard that would make them more attractive for local processors.

Given expanding international demand for sheep meat products, it will be possible to find markets for mutton from sheep diverted away from the live sheep export trade.

Appendix 1: Modelling Sheep Meat Prices

The following equation has been estimated for the indicator price of WA mutton (*WAM*) as a function of a constant term (β_0), the indicator price of New South Wales mutton (*NSWM*), an error term (ε) and a subscript (t) representing the time period:

$$WAM_t = \beta_0 + \beta_1 NSWM_t + \varepsilon_t \qquad (1)$$

A series is stationary if its mean and variance is time invariant. However, any series that is not stationary is said to be nonstationary or to contain a unit root. If a first difference is taken of a nonstationary time series and found to be stationary then the series is said to be integrated of the first order or I(1), or to contain one unit root.

The price series *WAM* and *NSWM* along with their first differences were tested for stationarity using the Augmented Dickey-Fuller (ADF) test and the Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test. The ADF test performs the test of a null hypothesis that a series contains a unit root against the alternative hypothesis that the series is stationary. The KPSS test performs the test that a series is stationary as the null hypothesis against the alternative hypothesis for the presence of a unit root. Results from the ADF and KPSS tests are provided in Tables 3 and 4 below.

Table 3: Augmented Dickey-Fuller (ADF) test with three specifications

Variable	ADF test	ADF with a constant	ADF test with a constant and linear time trend
WAM	-0.008* (0.680)	-1.758* (0.402)	-2.482* (0.337)
ΔWAM	-13.941# (0.000)	-13.931# (0.000)	-13.924# (0.000)
NSWM	-0.438* (0.525)	-1.258* (0.650)	-2.195* (0.491)
ΔNSWM	-14.202# (0.000)	-14.183# (0.000)	-14.198# (0.000)

Note: Figures in brackets are the corresponding probabilities. * indicates the null hypothesis of a unit root has been accepted at the 5 per cent level. # indicates the null hypothesis of a unit root has been rejected at the 5 per cent level.

Table 4: Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test with two specifications

Variable	KPSS with a constant	KPSS test with a constant and linear time trend
WAM	1.593#	0.352#
ΔWAM	0.084*	0.041*
NSWM	1.714#	0.319#
ΔNSWM	0.144*	0.048*

Note: * indicates that the null hypothesis of a stationary series has been accepted at the 5 per cent level. # indicates that the null hypothesis of a stationary series has been rejected at the 5 per cent level.

As one would expect in relation to commodity price time series data, the two price series tested proved to be nonstationary and integrated of the first order.

Estimates of relationships between nonstationary variables could lead to spurious regression by suggesting significant relationships between wholly unrelated variables (Granger & Newbold, 1974).

A standard approach to addressing the problem of nonstationary data has been to specify models as relationships between differences. However, the major drawback from this approach is that a model based solely on difference terms can only capture the short-run dynamics in a process and therefore fails to identify any long-run relationships between the variables.

Given the two price series under consideration are integrated of the same order, it is likely the linear combination of these variables will be stationary. Granger (1981) coined the term cointegration to describe a stationary combination of nonstationary variables.

Dynamic ordinary least squares (DOLS) was used to estimate the model described above. DOLS enables a cointegrating relationship to be modelled as a single equation, rather than the two equation error-correction model (ECM) approach where the residuals from the long-run equilibrium regression are entered into the ECM in the place of the levels terms as proposed by Engle and Granger (1987).

The model was estimated using the heteroskedasticity and autocorrelation-consistent (HAC) standard errors as developed by Newey and West (1987). This will ensure the standard errors are robust in the event of both heteroskedasticity and autocorrelation of an unknown form.

The model estimated was tested for cointegration using various diagnostic tests and found to be cointegrated without exception.[29] Eviews 8.1 was used for the modelling.

Table 5: DOLS regression for equation (1) (HAC t-statistic probabilities in brackets)

Variable	Equation (1)
Constant (β_0)	-51.790 (0.009)
NSWM	0.931 (0.000)
R-squared	0.608
Adjusted R-squared	0.605

The R-squared and adjusted R-squared for equation (1) indicates the model fits the data reasonably well. The estimated t-statistics on the independent variables indicate that these coefficients are statistically significant at less than the 1 per cent level.

[29] The Engle-Granger and Phillips-Ouliaris residual-based tests for cointegration were used along with Hansen's Instability Test and Park's Added Variables Test.

Appendix 2: Recent studies on the impact of the cessation of the live sheep export trade

Centre for International Economics

In a report prepared for the Wool Innovation Council, CIE (2014) used 2011-12 as the base year in which to analyse the impact of the abolition of live sheep exports. CIE found that Australia-wide, the closure of the live sheep export trade would result in falls in average saleyard prices across Australia by:

- $4.07 per head or 4.5 per cent for lambs; and
- $13.20 per head or 24.4 per cent for older sheep.

Overall, CIE (2014, p. 7) found that impacts arising from the closure of the live sheep export trade would be small on sheep farmers at the national level:

> *To put these national results in perspective, the expected impact on wool production and gross value of production is relatively small compared to other economic drivers such as variations in the exchange rate and seasonal conditions.*

However, CIE (2014, pp. 7-8) found "the impact in Western Australia would be devastating", resulting in price falls of:

- $32 per head for lambs or a fall in the saleyard price of 35.1 per cent**;** and
- $36 per head for sheep or a fall in the saleyard price of 66.2 per cent.

CIE (2014) also found that both the national and WA sheep flock and wool clip would decline while wool prices would increase. In comparing and contrasting the impact of the abolition of the live sheep export trade between sheep farmers in the eastern states and Western Australia, CIE (2014, p. 17) observed:

> *There will be negative impacts on prices in eastern states, but significantly less than for the west because of the small size of the live exports relative to the rest of the market for sheep.*

In relation to Western Australian wool growers, CIE (2014, p. 8) concluded that:

> *The bottom line is that WA 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 analysis that most of the impact arising from the abolition of the live sheep export trade will fall most heavily on WA sheep farmers is not unreasonable given that in excess of 80 per cent of the sheep procured for the trade are sourced from Western Australia. As Victorian prime lamb farmer Patrick Francis (2014) has put it:

> *In reality the questions surrounding phasing out live sheep exports centers directly around impacts on WA sheep farmers. Eastern states sheep farmers rely very little on the live trade and if it no longer existed would have virtually no impact on business profitability.*

However, CIE's analysis of the impact on WA sheep farmers is predicated on a number of underlying assumptions that are highly contestable. Arguably the most contentious is:

> *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. (Centre for International Economics, 2014, p. 8)*

> *Closure of the trade will have a profound impact on WA woolgrowers and sheepmeat producers. In absence of the trade and an additional market for sheep, prices for slaughter sheep and for stores will be set by the eastern states (South Australian) price less an appropriate transport margin for transport between South and West Australia. (Centre for International Economics, 2014, p. 14)*

In an earlier report on the live export trade prepared for LiveCorp and Meat and Livestock Australia, CIE (2011, p. 7) assumed that a dramatic fall in farm gate prices for older sheep would be driven by additional transport costs that would be incurred due to a shortage of processing capacity in Western Australia – which would substantially reduce the average farm gate return to WA sheep producers. However, CIE (2014, p. 14) conceded in its most recent report that:

> *… at current turnoff levels and investment in the mining sector slowing and making more labour available, sufficient slaughter capacity is unlikely to be an issue going forward.*

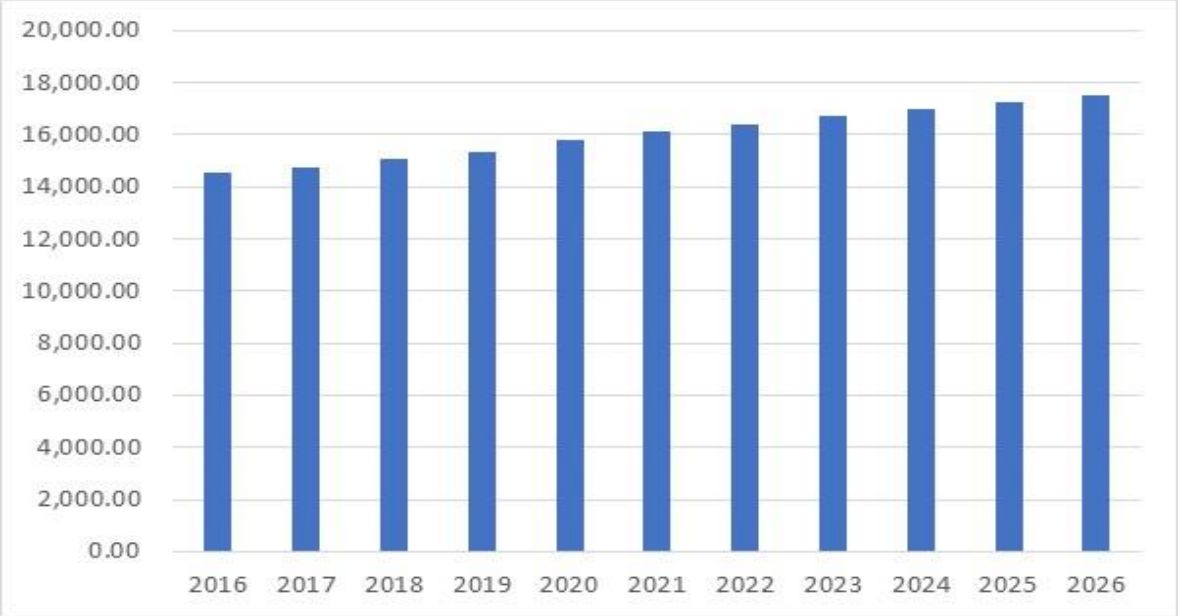
However, CIE provides no justification as to why the pricing assumption from its 2011 report underpinned by a lack of WA processing capacity for sheep diverted away from the live sheep export trade is still valid in its 2014 study even though it readily concedes that a lack of processing capacity in WA is no longer an issue. It appears that CIE is effectively assuming that a significant amount of sheep diverted away from the live export trade in Western Australia will still be diverted to the eastern states for processing even though there is significant spare processing capacity as outlined in section 7 above.

Underlying the CIE analysis of a massive price fall for sheep diverted away from the live export trade in WA appears to be a presumption that processors will struggle to find markets for mutton. Presumably those markets would be export markets as Australians spend and consume very little mutton (Wong, Selvanathan, & Selvanathan, 2015, p. 1; Australian Bureau of Agricultural and Resource Economics and Sciences, 2017a, p. 110). Mutton generally enjoys strong demand in countries with high Muslim populations and where consumers have more limited purchasing power (Colby, 2016, p. 8). However, finding markets for sheep meat diverted away from the live sheep export trade should not prove an insurmountable task. CIE (2011, p. 41) has previously conceded that overseas markets could absorb Australian lamb and mutton diverted away from the live sheep export trade in the short and medium term when live sheep exports were significantly greater than they are at present.

The Organisation for Economic Co-operation and Development (OECD) and the Food and Agriculture Organization of the United Nations (FAO) (2017) are forecasting that world sheep meat consumption (including both lamb and mutton) will increase from 14.6 million carcase weight equivalent (cwe) tonnes in 2016 to 17.5 million cwe tonnes in 2026 – an increase of over 20 per cent. According to the

OECD and FAO, sheep meat consumption is expected to continue to expand in several countries, such as China and those where the population traditionally consumes sheep meat, such as the Middle East, given the expansion of their middle classes and population in general. This is outlined in Figure 28 below.

Figure 28: Global Forecasts for the Consumption of Sheep Meat – 2016 to 2026 (carcase weight equivalent 000' tonnes)

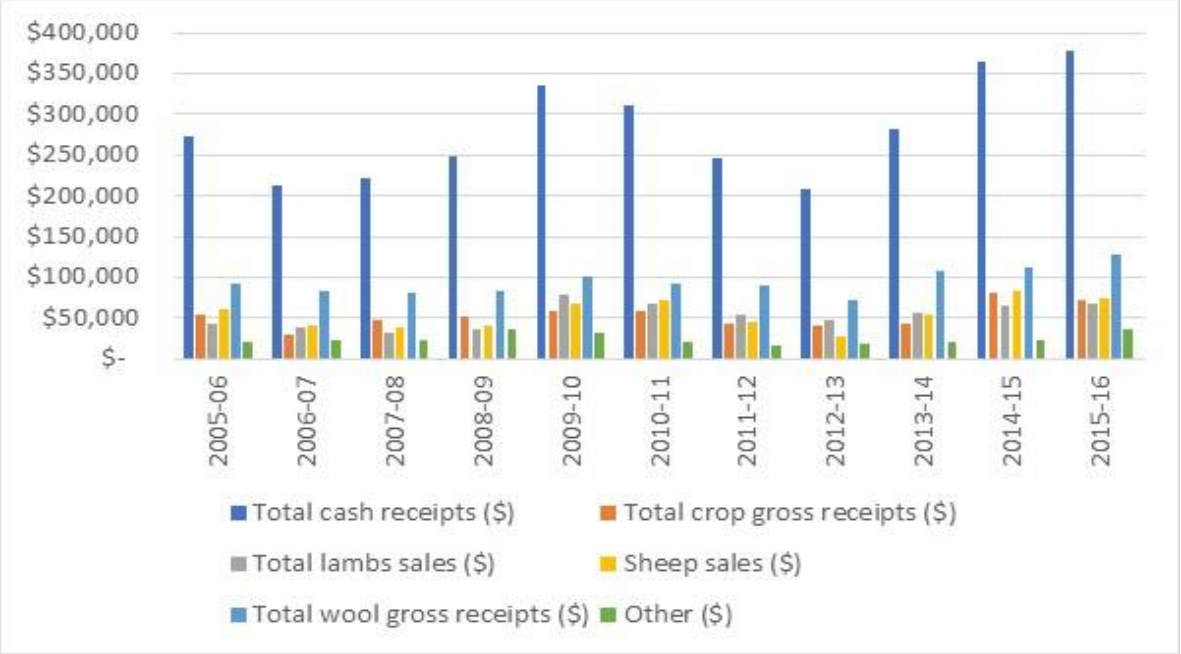


Source: OECD and FAO (2017).

CIE (2014, p. 8) have also contended that WA woolgrowers, and particularly specialist woolgrowers, have limited capacity to transform their enterprise mix away from sheep. However, even in the case of specialist sheep farmers in WA the sale of sheep to the live export trade makes up only a relatively minor part of their enterprise. On average, in the ten-year period from 2005-06 to 2015-16, sales of sheep by specialist sheep farmers in WA only accounted for 19 per cent of total farm cash receipts on average.[30] This is outlined in Figures 29 and 30 below.

[30] See ABARES (2017c).

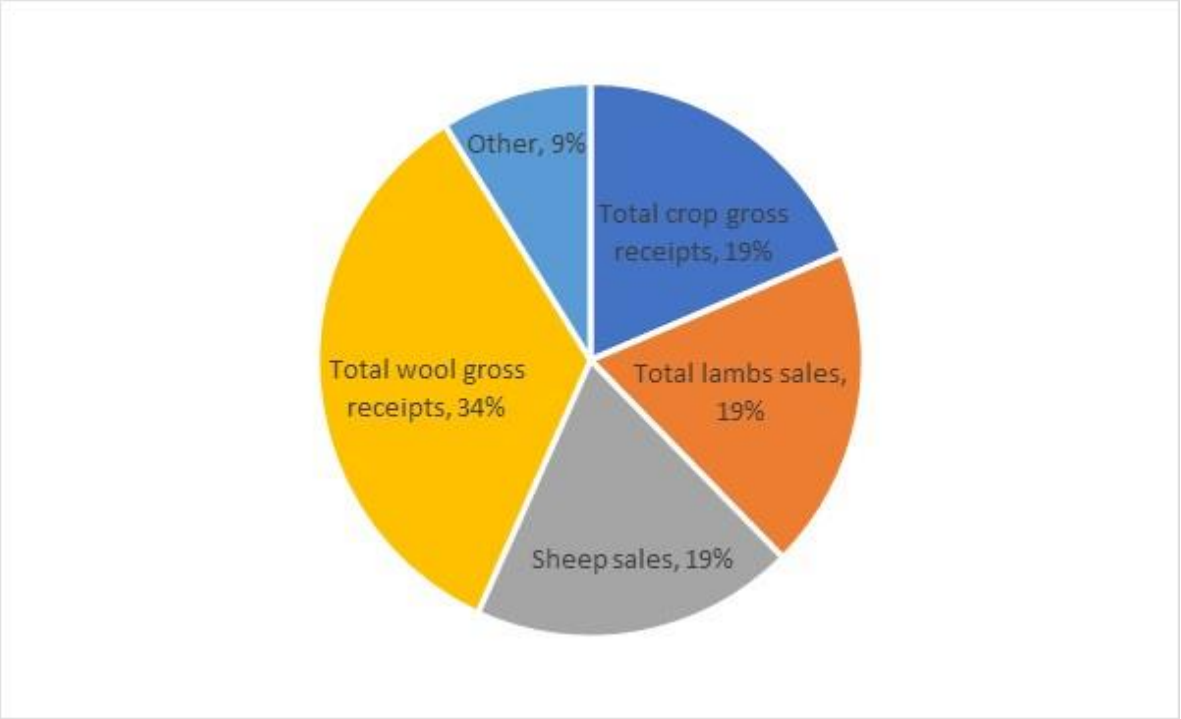
Figure 29: Average Farm Cash Receipts for a Western Australian Specialist Sheep Farmer – 2005-06 to 2015-16



Source: ABARES (2017c).

Note: Specialist sheep farmer is defined as a farmer who receives more than 50 per cent of their receipts from the sale of sheep, lambs or wool.

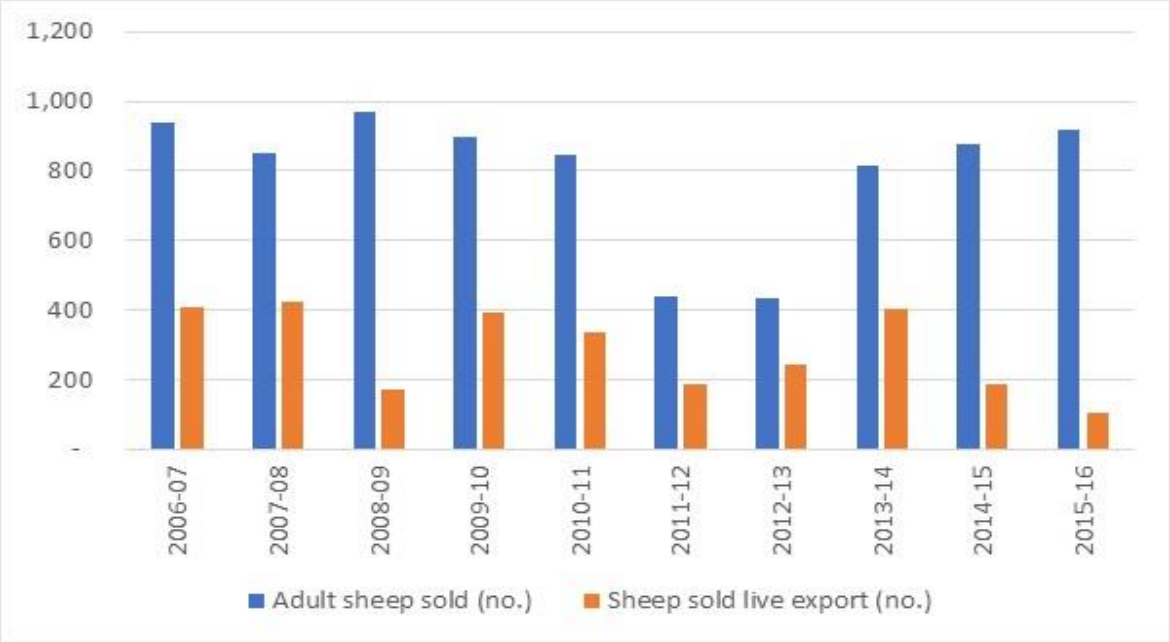
Figure 30: Average Percentage Farm Cash Receipts for Western Australian Specialist Sheep Farmers – 2005-06 to 2015-16



Source: ABARES (2017c).

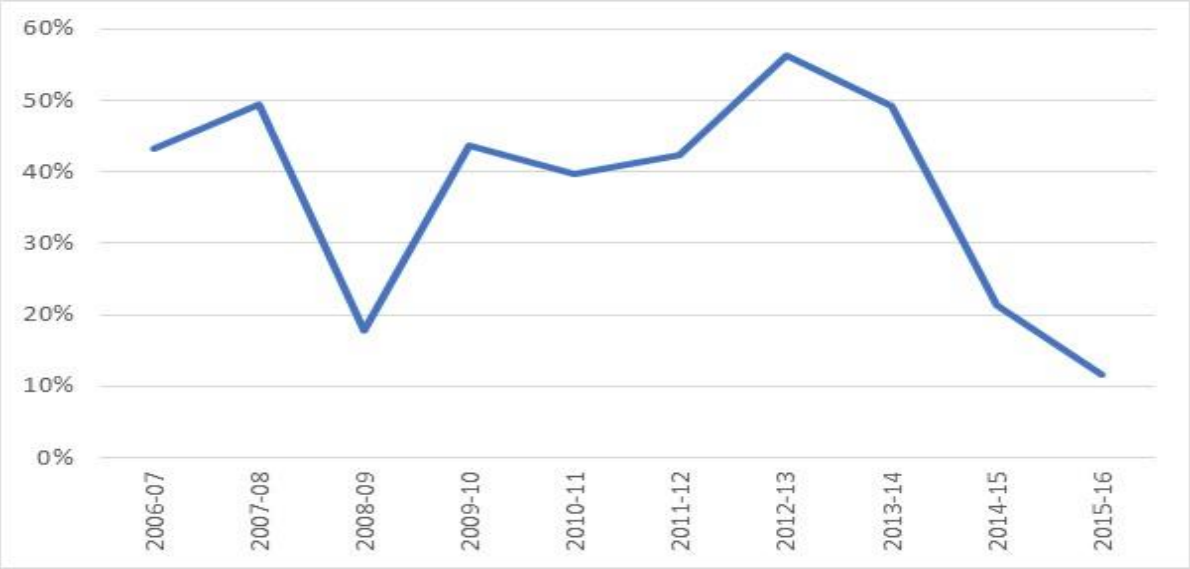
Sales of sheep by WA specialist sheep farmers to the live sheep export trade has also become a diminishing percentage of their overall sheep sales as the live sheep trade has declined.[31] This is outlined in Figures 31 and 32 below.

Figure 31: Total Sales of Sheep and Sales to Live Sheep Exporters on Average for Western Australian Specialist Sheep Farmer – 2006-07 to 2015-16



Source: ABARES (2017c).

Figure 32: Percentage of Total Sheep Sales to the Live Sheep Export Trade on Average for Western Australian Specialist Sheep Farmer – 2006-07 to 2015-16



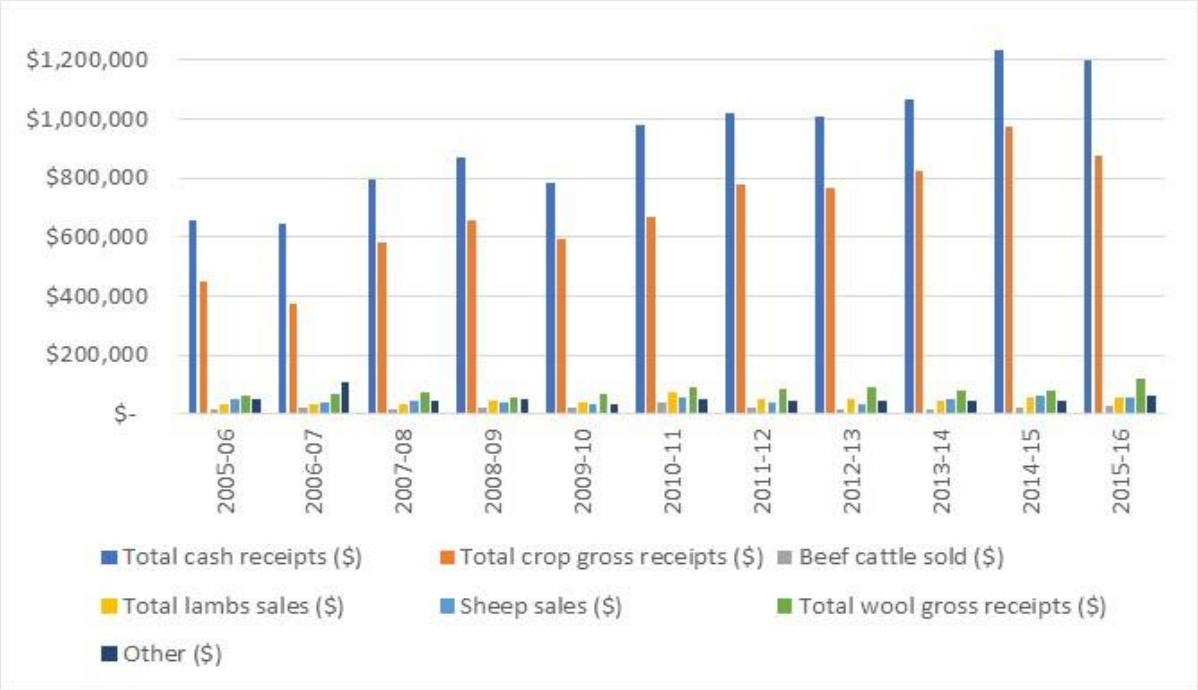
Source: ABARES (2017c).

Mixed enterprise sheep farms in WA generate around 70 per cent of their receipts from crops, and since 2010-11 have generated less than 5 per cent of their receipts from the sale of sheep.[32] This is outlined in Figure 33 below. While the percentage of sheep sales to the live sheep export trade by

[31] Ibid.
[32] Ibid.

mixed enterprise sheep farms in WA has fluctuated dramatically, it was only around 9 per cent in 2014-15 and 10 per cent in 2015-16.[33]

Figure 33: Average Farm Cash Receipts for a Western Australian Mixed Enterprise Sheep Farmer – 2005-06 to 2015-16



Source: ABARES (2017c).

CIE's analysis of the impact on WA sheep farmers appears to be at odds with more recent information on WA sheep meat processing capacity and the experience of WA woolgrowers in transforming their enterprise mix away from sheep.

A rather glaring oversight with the CIE (2014) report is that it did not examine the impact on WA sheep meat processors arising from the closure of the live sheep export trade even though CIE (2011) broached the subject in its earlier report. A review of the live export trade conducted by DAFWA (Kingwell, et al., 2011, p. 10) reflected on CIE's 2011 report in the following terms:

> *The CIE study also found that processors would benefit from the cessation of live exports. Although the CIE do not highlight this finding; nonetheless it is a key finding.*

In its earlier report, CIE (2011, p. 53) found the gross value of production of sheep meat processors would increase by $38 million in the event of the cessation of the live sheep export trade.

Australian Farm Institute

The Australian Farm Institute (AFI) (Keogh, Henry, & Day, 2016) undertook an analysis on the potential impact arising from the abolition of the live export sheep and cattle. The AFI study examined a number of case-study farm businesses and analysed the financial impact on those businesses arising from the cessation of the live export trade.

In relation to the live sheep export trade, two case studies were included:

[33] Ibid.

- Case Study B involved a 4,800 hectare (11,861 acres) mixed cropping property located in the WA wheat belt with the livestock enterprise involving 1,315 merino ewes and offspring (Keogh, Henry, & Day, 2016, p. 74); and
- Case Study C involved a farm of 1,265 hectares (3,125 acres) located near Penshurst in the Western Districts of Victoria with a sheep enterprise comprised of a merino based self-replacing flock running around 1,800 breeding ewes (Keogh, Henry, & Day, 2016, pp. 77-78).

In Case Study B, a regular line of wethers was sold to the live export trade (Keogh, Henry, & Day, 2016, p. 75). However, with the cessation of the live sheep export trade three alternative scenarios were considered:

- sell mature wethers as stores at Muchea livestock centre;
- retain wethers to a higher weight and then sell them to the abattoirs; or
- sell the wethers as store sheep to be fattened before sale for slaughter.

Under Case Study B, retaining the sheep to a higher weight could impact on the cropping rotation and operations. In the absence of live exports, saleyards and abattoirs could also receive an influx of sheep being turned off at the end of this period, dampening prices (Keogh, Henry, & Day, 2016, p. 75). On the other hand, if the wethers were retained, an estimated additional 120 hectares would be required for grazing during the winter months for the whole flock. The AFI report found the sales of excess stock of wethers raised as the by-product of a wool production system to the live export trade would have been more lucrative than the alternative options.

Overall from Case Study B it was found that:

> *As the sheep enterprise is only a small percentage of the overall picture of this farm business, the different options available for the sale of wethers does not have a big influence on the profitability of the farm business, but the live export market is extremely complementary from an operational perspective. (Keogh, Henry, & Day, 2016, p. 76)*

In Case Study B:

- Overall profitability is not greatly affected by the availability of the live sheep export market as the sheep enterprise accounts for only 5 per cent of the overall enterprise income, with revenue reduced by $2,000 (Keogh, Henry, & Day, 2016, p. 76).
- Farm operations would need to be changed if the wethers were kept on until they reached the heavier weights required for the slaughter market (Keogh, Henry, & Day, 2016, p. 76). This in turn would require a reduction in cropping area, supplementary feeding or the availability of agistment. This would have a direct impact onto the variable cost of the enterprise (and even the cropping enterprises) and would only be viable if it resulted in the generation of additional income.
- Sheep enterprises are more labour intensive than cropping enterprises, and retaining wethers to slaughter weight may require additional labour (Keogh, Henry, & Day, 2016, p. 76).

The findings from Case Study B that farm revenue would be reduced by $2,000 from the abolition of the live export trade is very similar to the estimated outcome in section 5.2 above.

Under Case Study C, the live export market for wethers provides the business with the flexibility of selling older wethers to live sheep exporters at Portland (Keogh, Henry, & Day, 2016, p. 78). Selling 734 wethers to live exporters provides additional income of $5,919 ($8.06 per head profit).

According to the AFI report, the live sheep export trade provides a price premium return for a secondary product, this being older wethers retained for wool production (Keogh, Henry, & Day, 2016, p. 78). This assumption appears somewhat dated in light of material presented in section 5 above that suggests the live sheep export trade is now heavily weighted towards younger wethers. While the AFI report acknowledged that saleyards and sometimes processors do offer an alternate market, it asserts that in previous years they have offered consistently lower prices for sheep.

While there is no point of comparison offered by AFI between the price offered by the saleyard auction or processors with the live sheep export trade, the major problem with Case Study C is that recent changes in the procurement of sheep for the live sheep export trade suggests that it may not be all that applicable anymore. This is because there were no large scale export shipments of live sheep from Portland in Victoria between July 2015 and November 2017.[34] With such long breaks between the procurement of sheep by live exporters suggests the live sheep export trade can no longer be relied upon as a regular and steady source of income for Victorian sheep farmers.

[34] See MLA (2018).

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