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MEAT & LIVESTOCK AUSTRALIA

Cost of production

Australian beef cattle and sheep producers 2012–13 to 2014–15

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Key points

This report presents and discusses cost of production estimates for beef cattle and sheep producers for the three years 2012–13, 2013–14 and 2014–15.

Cost of beef production

- Total costs of production averaged over the three years ending 2014–15 were similar in southern and northern Australia, at 174 cents per kilogram live weight in southern Australia and 175 cents in northern Australia. Northern Australia includes Queensland, the Northern Territory and the Kimberley, Pilbara and Murchison–Gascoyne regions of Western Australia. All other regions are included in southern Australia.

- The composition of production costs differed between southern and northern Australia over the three years ending 2014–15. Fertiliser and unpaid family and partner labour accounted or a larger share of total costs in southern Australia and finance costs, fodder and freight a larger share in the north.

- The on-farm cost of beef production on a per kilogram live weight basis increased between 2012–13 and 2014–15, as producers increased farm expenditure in 2014–15 in response to the much higher prices received for beef cattle. Between 2008–09 and 2012–13, producers pared back expenditure on beef inputs to a minimum in response to low beef cattle prices in an attempt to maintain operating margins (receipts per kilogram less costs of production).

- Higher beef cattle prices in 2014–15 resulted in operating margins increasing relative to the very low margins recorded in 2013–14. However, expenditure on farm inputs increased, so operating margins were similar to those recorded in 2012–13.

- The largest increase in production costs occurred in northern Australia, where many beef producers were also subject to dry seasonal conditions in 2013–14 and 2014–15. This resulted in increased expenditure on fodder and freight. Overall, the total cost of production increased between 2012–13 and 2014–15 by 33 cents per kilogram live weight in northern Australia and by 25 cents in southern Australia.

- Total costs of production per kilogram in southern and northern Australia declined as herd size increased. Reflecting this, the operating margin of beef production increased as the scale of beef production increased. Small beef farms (those with less than 400 beef cattle) generally covered their cash operating costs but most did not cover capital depreciation or the value of unpaid family and partner labour.

- Beef-producing farms with high operating margins predominantly had low costs of production. On average they had larger herds, higher branding rates, lower death rates and relatively lower debt; they were operated by younger farmers; and less of the operator's household income was earned off-farm. In southern Australia, these farms were also more likely to be mixed enterprise farms. In northern Australia, they sold a higher proportion of cattle direct to processors and were also more likely to sell cattle for live export.

Cost of sheep production

- The average on-farm cost of sheep production expressed on a per kilogram live weight basis remained largely unchanged between 2012–13 and 2014–15. Nationally, the total cost of sheep production averaged 304 cents per kilogram live weight for sheep producers and 288 cents per kilogram for slaughter lamb producers for the three years ending 2014–15.

- For slaughter lamb producers, the average cost of production declined as the scale of lamb production increased. The total cost of production for the smallest slaughter lamb producers (those selling 200 to 500 lambs) averaged 346 cents per kilogram compared with 251 cents for the largest slaughter lamb producers (those selling more than 2 000 lambs). Operating margins increased as the scale of slaughter lamb production increased, reflecting the decline in costs relative to the value of sheep meat and wool produced.

- In contrast to the results for beef producers, the smallest slaughter lamb producers on average generated revenue sufficient to cover all finance costs, capital depreciation and most or all of the value of unpaid family and partner labour.

- Sheep producers with a high operating margins were predominantly farms with low costs of production (similar to beef producers). On average, when compared with other sheep producers, these farms had a larger overall scale of operation; sold higher numbers of lambs for slaughter; had higher lamb-marking percentages; had higher wool cuts per head; received slightly higher prices for the lambs, sheep and wool sold; had higher labour use efficiency; had lower debt; were operated by younger farmers; and earned less of their household income off-farm. These farms were more likely to be slaughter lamb producers and to sell a large number of lambs. However, they were less likely to be highly reliant on slaughter lamb production (to derive more than 50 per cent of their revenue from slaughter lamb production).

Economies of size

- The average cost of production for beef cattle and sheep producers for the period 2012–13 to 2014–15 decreased as production size increased, which indicates that significant economies of size exist in beef and sheep meat production. Hooper (2009) found similar results in 2007–08 cost of production data. These economies provide an incentive to expand beef and sheep meat production to enhance profitability.

- Economies of size for sheep producers appear to result mainly from larger sheep enterprises using farm capital and labour more efficiently, rather than from significant reductions in cash operating costs. However, for beef producers, cash operating costs (both fixed and variable) for larger herd size producers were lower than those for smaller producers and they used farm capital and labour more efficiently.

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1 Introduction

Information on the cost of beef cattle and sheep meat production enables individual producers to compare their herd or flock performance with the industry generally. If costs are higher than average, producers can gain insights into possible improvements.

ABARES collects data on broadacre farms annually through its Australian Agricultural and Grazing Industries Survey (AAGIS). Meat & Livestock Australia (MLA) commissioned ABARES to provide industry-wide costs of beef cattle and sheep production and to assess the results against those of its online cost of production tool (MLA Cost of Production Tool). Producers use this to calculate their cost of production for beef cattle and sheep.

ABARES included supplementary questions in the AAGIS for 2007–08, 2008–09, 2012–13, 2013–14 and 2014–15 to apportion production costs to individual farm enterprises. ABARES used the data to calculate and tabulate cost of production across the beef and sheep industries for each year of collection and to report change over time.

Data on the cost of beef cattle and sheep production based on the MLA supplement to the AAGIS surveys were reported for 2007–08 in the ABARES client report to MLA *Cost of production in 2007–08—sheep and beef cattle producers* (Hooper 2009). Cost of production data for beef cattle producers were reported in *Australian beef: financial performance of beef cattle producing farms, 2011–12 to 2013–14* (Thompson & Martin 2014). Further estimates of beef cost of production for 2012–13 and 2013–14 were published in the report *Australian beef: financial performance of beef cattle producing farms, 2012–13 to 2014–15* (Martin 2015).

2 Beef industry

Beef cattle producing farms

Farm businesses with fewer than 100 head of beef cattle were excluded from the analysis in this report. Farm businesses with fewer than 100 head of cattle represent just 2 per cent of the national beef cattle herd and contribute around 3 per cent to the total value of beef cattle sales.

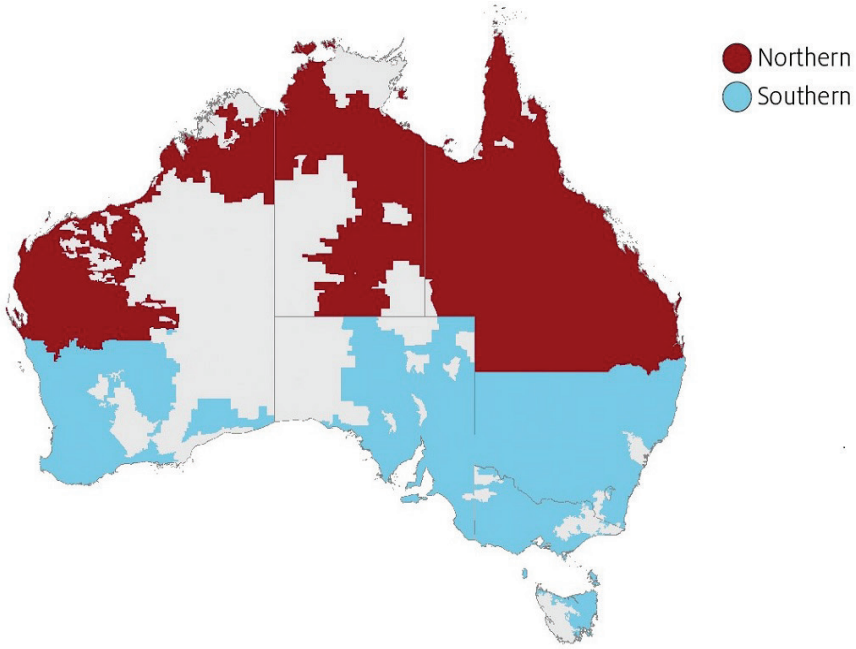
Around 27 300 Australian broadacre farms each run more than 100 beef cattle. In this report these farms are classified as beef cattle producing farms.

Farm businesses that finish more than 5 000 cattle on grain have been excluded from this report to remove specialist feedlots.

Around two-thirds of beef cattle producing farms derive more than 50 per cent of their farm receipts from sales of beef cattle. In this report, these producers are referred to as specialist beef cattle producers and the remaining one-third of farms are referred to as mixed enterprise beef cattle producers.

Beef production systems, environmental conditions, industry infrastructure and proximity to markets are markedly different for northern and southern Australia. Consequently, ABARES undertook the Australian beef industry analysis separately for each region. The beef industry for northern Australia includes Queensland, the Northern Territory and the Kimberley, Pilbara and Murchison–Gascoyne regions of Western Australia. All other regions are in southern Australia (Map 1).

Map 1 Australian beef cattle industry



Note: Regions based on aggregations of Australian Bureau of Statistics SA2 areas.

Box 1 Calculation of the per kilogram (live weight) cost of beef and sheep production

The Australian Agricultural and Grazing Industries Survey (AAGIS) of Australian broadacre farms collects detailed financial, physical and production data. ABARES included additional questions in the 2007–08, 2008–09, 2012–13 and 2013–14 surveys so it could calculate the per kilogram live weight cost of beef cattle and sheep production.

These additional questions covered the live weight of cattle, calves, sheep and lambs sold or transferred off-farm and the proportion of key variable costs attributable to beef, sheep and cropping enterprises on mixed enterprise farms. Key variable costs included: crop and pasture chemicals, fertiliser, fodder, fuel, repairs and maintenance, contracts paid, veterinary and livestock materials, and hired and family labour.

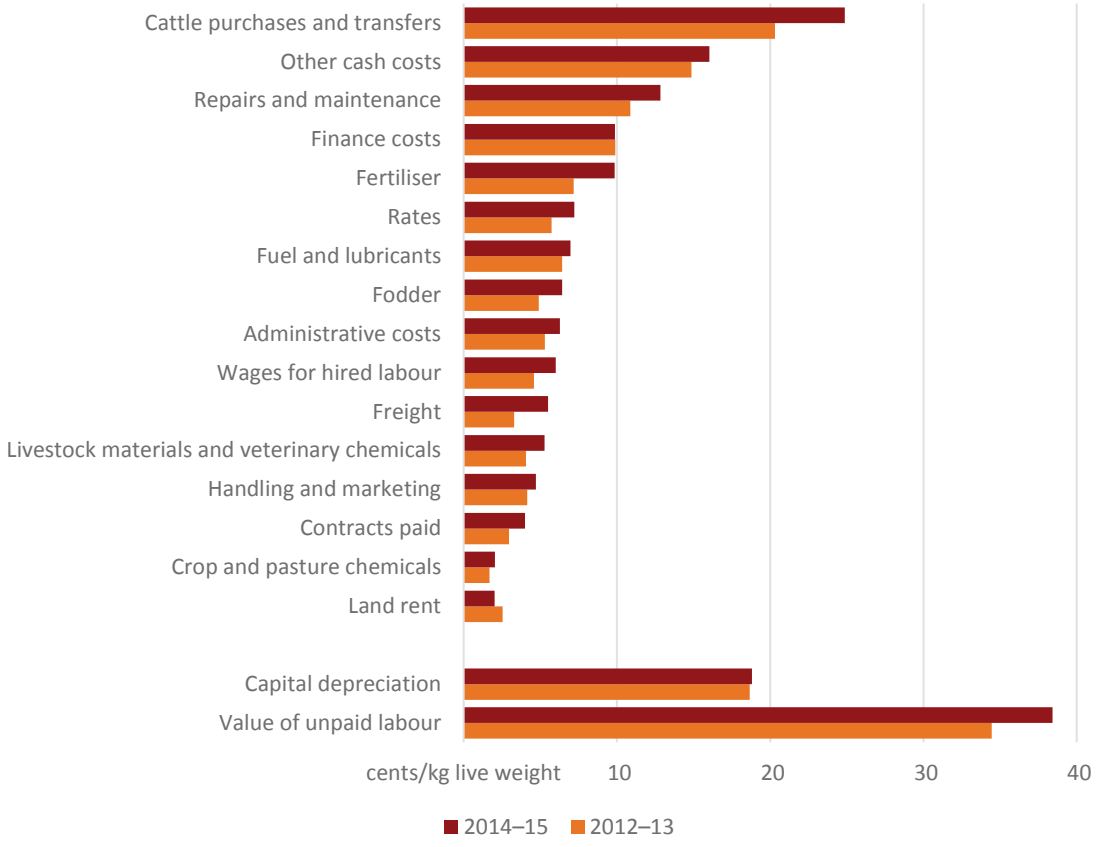
Fixed (overhead) costs such as accountancy, telephone, insurance and capital depreciation were attributed to enterprises on the basis of their share of total farm cash receipts.

ABARES calculated total live weight of beef and sheep production by adjusting the total live weight sold and transferred off-farm for changes in total live weight of the herd at the beginning and end of each financial year. It calculated total live weight of the herd at the beginning and end of each financial year by applying average live weights to the categories of cattle on hand (calves, heifers, cows, bulls, steers, ewes, lambs, wethers and rams) at the beginning and end of each financial year.

Per kilogram live weight costs of production were calculated by dividing the beef or sheep enterprise share of costs by the total live weight of beef or sheep produced. The methodology used did not disaggregate wool production costs from sheep and lamb production costs.

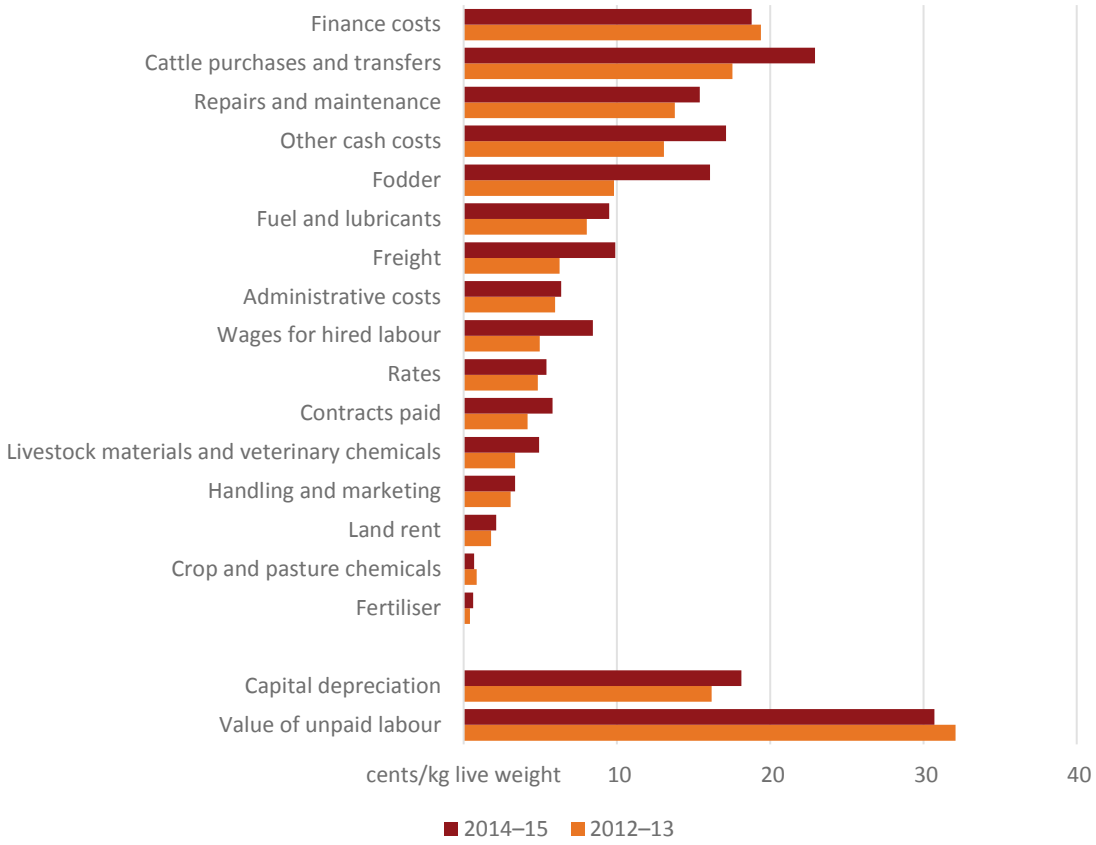
The ABARES methodology differs from that of the MLA online tool because ABARES does not deduct the number of purchased animals from the number of animals sold to calculate net sales. Rather, ABARES includes the cost of acquiring these animals in the farm's cost of production—and the MLA tool excludes this cost item.

Figure 1 Production costs, beef cattle producers, southern Australia, 2012–13 and 2014–15



Source: ABARES Australian Agricultural and Grazing Industries Survey

Figure 2 Production costs, beef cattle producers, northern Australia, 2012–13 and 2014–15



Source: ABARES Australian Agricultural and Grazing Industries Survey

Cost of beef production

The on-farm cost of beef production expressed on a per kilogram live weight basis increased between 2013–14 and 2014–15 (Table 1). Between 2008–09 and 2013–14, prices for beef cattle declined and producers pared back expenditure on beef inputs to a minimum in an attempt to maintain operating margins (Martin 2015). In 2014–15 average prices for beef cattle increased by 25 per cent compared with 2013–14, which increased cash flow. In response, producers in northern Australia and southern Australia increased expenditure across several inputs in 2014–15. For example, expenditure on repairs and maintenance increased by 18 per cent in 2014–15, in real terms, in both northern and southern Australia and fertiliser expenditure increased by 36 per cent in southern Australia (Figure 1 and Figure 2).

Higher beef cattle prices resulted in expenditure on cattle purchases increasing by 20 per cent in southern Australia and by over 35 per cent in northern Australia. In addition, dry seasonal conditions in northern Australia in 2013–14 and 2014–15 resulted in expenditure on fodder increasing by 65 per cent between 2012–13 and 2014–15.

Operating margins (receipts per kilogram less costs of production) increased in 2014–15 relative to the very low margins recorded in 2013–14. However, higher expenditure on farm inputs resulted in similar operating margins to those recorded in 2012–13.

Table 1 Per kilogram live weight cost of beef production and operating margins, beef cattle producing farms, 2012–13 to 2014–15

average per farm

Production and price	unit	Southern Australia						Northern Australia					
		2012–13		2013–14		2014–15		2012–13		2013–14		2014–15	
Total live weight of cattle produced	tonnes	90	(5)	86	(7)	94	(4)	174	(5)	240	(5)	191	(6)
Average price received	c/kg	160	(3)	146	(2)	182	(2)	161	(2)	151	(2)	187	(2)
Production costs													
Total cash costs excluding finance costs	c/kg	99	(4)	101	(4)	120	(3)	97	(4)	111	(6)	130	(5)
Total cash costs including finance costs	c/kg	109	(4)	112	(4)	130	(3)	116	(3)	127	(6)	149	(5)
Total cash, finance and depreciation costs	c/kg	127	(4)	131	(3)	149	(3)	133	(3)	142	(5)	167	(4)
Total costs (cash costs, finance, depreciation and the value of unpaid labour)	c/kg	162	(4)	171	(4)	187	(3)	165	(3)	165	(5)	198	(4)
Operating margin over:													
Cash costs	c/kg	61	(7)	45	(8)	62	(6)	64	(5)	40	(15)	57	(11)
Cash and finance costs	c/kg	52	(8)	34	(11)	52	(8)	44	(9)	23	(28)	38	(18)
Cash, finance and depreciation costs	c/kg	33	(14)	15	(27)	34	(14)	28	(14)	9	(79)	20	(35)
All costs including unpaid labour costs	c/kg	–2	(334)	–25	(24)	–5	(117)	–4	(122)	–14	(51)	–11	(69)

Note: Figures in parentheses are standard errors expressed as a percentage of the estimate. Estimates have been rounded to the nearest whole number and are presented in 2015–16 dollars.
Source: ABARES Australian Agricultural and Grazing Industries Survey

Table 2 Per kilogram live weight cost of beef production by herd size, beef cattle producing farms, southern Australia, 2012–13 to 2014–15

average per farm

Production and price	unit	100 to 200 head		200 to 400 head		400 to 800 head		more than 800 head		average	
Total live weight of cattle produced	tonnes	35	(5)	61	(3)	125	(4)	345	(16)	90	(5)
Average price received	c/kg	155	(3)	156	(2)	163	(2)	173	(6)	163	(2)
Production costs											
Cattle purchases	c/kg	23	(15)	20	(10)	25	(16)	21	(41)	22	(14)
Repairs and maintenance	c/kg	16	(8)	13	(6)	10	(7)	10	(17)	12	(6)
Fertiliser	c/kg	10	(15)	7	(11)	7	(8)	9	(17)	8	(7)
Fuel and lubricants	c/kg	11	(7)	8	(6)	5	(6)	5	(14)	7	(5)
Rates	c/kg	9	(9)	8	(6)	5	(6)	4	(16)	6	(6)
Fodder	c/kg	8	(13)	8	(11)	4	(10)	6	(19)	6	(8)
Administration	c/kg	9	(11)	7	(7)	5	(7)	4	(15)	6	(6)
Hired labour	c/kg	3	(18)	2	(16)	4	(13)	10	(13)	5	(6)
Freight	c/kg	4	(10)	3	(9)	4	(7)	6	(13)	4	(5)
Livestock materials and veterinary chemicals	c/kg	6	(12)	4	(9)	4	(11)	4	(17)	4	(7)
Handling and marketing	c/kg	3	(14)	4	(11)	5	(9)	4	(14)	4	(6)
Contracts paid	c/kg	5	(20)	3	(13)	3	(13)	3	(22)	3	(9)
Land rent	c/kg	2	(22)	2	(23)	2	(19)	2	(24)	2	(12)
Crop and pasture chemicals	c/kg	3	(17)	2	(14)	1	(14)	2	(15)	2	(8)
Other cash costs	c/kg	19	(7)	19	(6)	15	(6)	12	(16)	16	(6)
Finance costs	c/kg	7	(17)	9	(11)	10	(8)	11	(13)	10	(6)
Capital depreciation	c/kg	25	(6)	25	(6)	17	(5)	13	(10)	19	(5)
Unpaid owner–manager, partner and family labour	c/kg	71	(6)	60	(6)	31	(6)	13	(17)	38	(6)

Note: Figures in parentheses are standard errors expressed as a percentage of the estimate. Estimates have been rounded to the nearest whole number and are presented in 2015–16 dollars.
Source: ABARES Australian Agricultural and Grazing Industries Survey

Table 3 Per kilogram live weight cost of beef production and operating margins by herd size, beef cattle producing farms, southern Australia, 2012–13 to 2014–15

average per farm

Production costs	unit	100 to 200 head		200 to 400 head		400 to 800 head		more than 800 head		average	
Total cash costs excluding finance costs	c/kg	130	(5)	110	(4)	100	(4)	102	(5)	107	(2)
Total cash costs including finance costs	c/kg	137	(5)	120	(4)	110	(4)	113	(5)	117	(2)
Total cash, finance and depreciation costs	c/kg	162	(5)	144	(4)	127	(3)	126	(6)	136	(3)
Total costs (all cash costs, finance, depreciation and the value of unpaid labour)	c/kg	233	(4)	204	(4)	158	(3)	139	(6)	174	(3)
Operating margin over:											
Cash costs	c/kg	25	(22)	45	(10)	63	(6)	71	(9)	56	(4)
Cash and finance costs	c/kg	18	(32)	36	(13)	53	(7)	60	(10)	46	(5)
Cash, finance and depreciation costs	c/kg	–6	(102)	11	(48)	35	(11)	46	(11)	27	(9)
All costs including unpaid labour costs	c/kg	–78	(12)	–48	(14)	4	(98)	33	(14)	–10	(33)

Note: Figures in parentheses are standard errors expressed as a percentage of the estimate. Estimates have been rounded to the nearest whole number and are presented in 2015–16 dollars.
Source: ABARES Australian Agricultural and Grazing Industries Survey.

Table 4 Per kilogram live weight cost of beef production by herd size, beef cattle producing farms, northern Australia, 2012–13 to 2014–15

average per farm

Production and price	unit	100 to 400 head		400 to 1 600 head		1 600 to 5 400 head		more than 5 400 head		average	
Total live weight of cattle produced	tonnes	39	(7)	121	(4)	351	(3)	1 557	(6)	201	(3)
Average price received	c/kg	152	(4)	174	(2)	172	(2)	155	(3)	165	(1)
Production costs											
Cattle purchases	c/kg	27	(14)	20	(11)	15	(10)	21	(22)	19	(9)
Repairs and maintenance	c/kg	20	(11)	17	(7)	14	(5)	11	(8)	14	(4)
Fodder	c/kg	18	(16)	17	(9)	12	(9)	12	(19)	14	(7)
Fuel and lubricants	c/kg	12	(8)	10	(5)	8	(5)	8	(6)	9	(3)
Freight	c/kg	4	(15)	6	(7)	8	(6)	11	(8)	8	(4)
Hired labour	c/kg	1	(44)	3	(20)	7	(9)	12	(6)	7	(5)
Administration	c/kg	9	(8)	7	(6)	6	(6)	4	(10)	6	(4)
Contracts paid	c/kg	2	(25)	5	(12)	5	(9)	6	(8)	5	(5)
Rates	c/kg	10	(9)	6	(5)	5	(4)	3	(19)	5	(5)
Livestock materials and veterinary chemicals	c/kg	5	(14)	4	(8)	4	(7)	4	(10)	4	(5)
Handling and marketing	c/kg	4	(17)	3	(10)	3	(10)	3	(11)	3	(6)
Land rent	c/kg	1	(25)	3	(15)	3	(15)	2	(11)	2	(8)
Crop and pasture chemicals	c/kg	1	(20)	1	(17)	1	(20)	0	(37)	1	(12)
Fertiliser	c/kg	2	(18)	1	(25)	0	(47)	0	(42)	0	(16)
Other cash costs	c/kg	27	(9)	16	(5)	15	(6)	13	(9)	15	(4)
Finance costs	c/kg	14	(21)	19	(8)	23	(8)	14	(11)	18	(5)
Capital depreciation	c/kg	27	(7)	22	(5)	17	(4)	9	(7)	16	(3)
Unpaid owner–manager, partner and family labour	c/kg	110	(7)	45	(6)	22	(4)	5	(8)	28	(3)

Note: Figures in parentheses are standard errors expressed as a percentage of the estimate. Estimates have been rounded to the nearest whole number and are presented in 2015–16 dollars.
Source: ABARES Australian Agricultural and Grazing Industries Survey

Table 5 Per kilogram live weight cost of beef production and operating margins by herd size, beef cattle producing farms, northern Australia, 2012–13 to 2014–15

average per farm

Production costs	unit	100 to 400 head		400 to 1 600 head		1 600 to 5 400 head		more than 5 400 head		average	
Total cash costs excluding finance costs	c/kg	144	(7)	116	(4)	106	(4)	112	(6)	113	(2)
Total cash costs including finance costs	c/kg	158	(7)	135	(4)	128	(4)	126	(5)	131	(2)
Total cash, finance and depreciation costs	c/kg	184	(7)	156	(4)	145	(3)	135	(5)	147	(2)
Total costs (all cash costs, finance, depreciation and the value of unpaid labour)	c/kg	294	(6)	201	(4)	168	(3)	140	(5)	175	(2)
Operating margin over:											
Cash costs	c/kg	8	(130)	58	(9)	66	(6)	43	(11)	52	(5)
Cash and finance costs	c/kg	–6	(183)	39	(15)	44	(10)	29	(17)	34	(8)
Cash, finance and depreciation costs	c/kg	–33	(37)	18	(36)	27	(17)	20	(26)	18	(16)
All costs including unpaid labour costs	c/kg	–142	(12)	–27	(28)	4	(107)	14	(36)	–10	(32)

Note: Figures in parentheses are standard errors expressed as a percentage of the estimate. Estimates have been rounded to the nearest whole number and are presented in 2015–16 dollars.
Source: ABARES Australian Agricultural and Grazing Industries Survey

Table 6 Per kilogram live weight cost of production and operating margins, beef cattle producing farms, 2012–13 to 2014–15

average per farm

Production and price	unit	New South Wales		Victoria		Queensland		South Australia		Western Australia		Tasmania		Northern Territory	
Total live weight of cattle produced	tonnes	89	(3)	70	(5)	179	(3)	141	(10)	131	(7)	121	(8)	1 027	(8)
Average price received	c/kg	168	(2)	165	(3)	166	(1)	162	(4)	163	(5)	165	(3)	164	(3)
Production costs															
Total cash costs excluding finance costs	c/kg	109	(3)	109	(5)	114	(3)	103	(7)	112	(9)	111	(5)	108	(4)
Total cash costs including finance costs	c/kg	121	(3)	115	(4)	134	(3)	123	(7)	119	(9)	121	(5)	114	(4)
Total cash, finance and depreciation costs	c/kg	140	(3)	137	(4)	151	(2)	139	(7)	137	(8)	135	(5)	124	(4)
Total costs (all cash costs, finance, depreciation and the value of unpaid labour)	c/kg	177	(3)	192	(4)	182	(2)	158	(7)	162	(7)	165	(5)	130	(4)
Operating margin over:															
Cash costs	c/kg	59	(5)	56	(9)	52	(5)	59	(12)	51	(16)	54	(9)	56	(12)
Cash and finance costs	c/kg	46	(7)	50	(10)	32	(10)	39	(17)	44	(20)	44	(12)	49	(13)
Cash, finance and depreciation costs	c/kg	28	(13)	28	(20)	15	(22)	23	(33)	26	(33)	30	(18)	40	(17)
All costs including unpaid labour costs	c/kg	–9	(49)	–27	(24)	–17	(22)	4	(736)	1	(99)	0	(99)	34	(20)

Note: Figures in parentheses are standard errors expressed as a percentage of the estimate. Estimates have been rounded to the nearest whole number and are presented in 2015–16 dollars.
Source: ABARES Australian Agricultural and Grazing Industries Survey

The on-farm costs of beef production vary across farm businesses depending on herd size, the farm's location, the quality of farm management and the specific climatic and other production conditions during the year.

In the short term, farm businesses need only generate sufficient receipts to cover cash operating costs to continue to operate an enterprise without needing to draw on receipts from other enterprises or to borrow or use financial assets to cover cash shortfalls. Cash costs include all expenditure on materials, services and labour such as fodder, rates, irrigation water, fuel, fertiliser, accountancy, electricity, veterinary chemicals and repairs incurred in the production of farm income. Cash costs do not include expenditure on items of farm capital such as the purchase of vehicles, machinery, land, structures or improvements or the value of labour and other inputs where no direct cash expenditure is made.

Over a longer period, farm businesses need to replace farm capital (such as vehicles, machinery, plant, sheds and fencing) to maintain productivity as capital wears out. This cost is mostly captured in capital depreciation, but repairs and maintenance included in cash costs also include replacement and upgrade of some farm capital. Farms typically vary their expenditure on capital items depending on need, available cash flow and access to finance. In some years, farms invest more than the calculated depreciation and in others much less. A farm business that continuously invests less than the calculated depreciation will lose production capacity over the medium to long term.

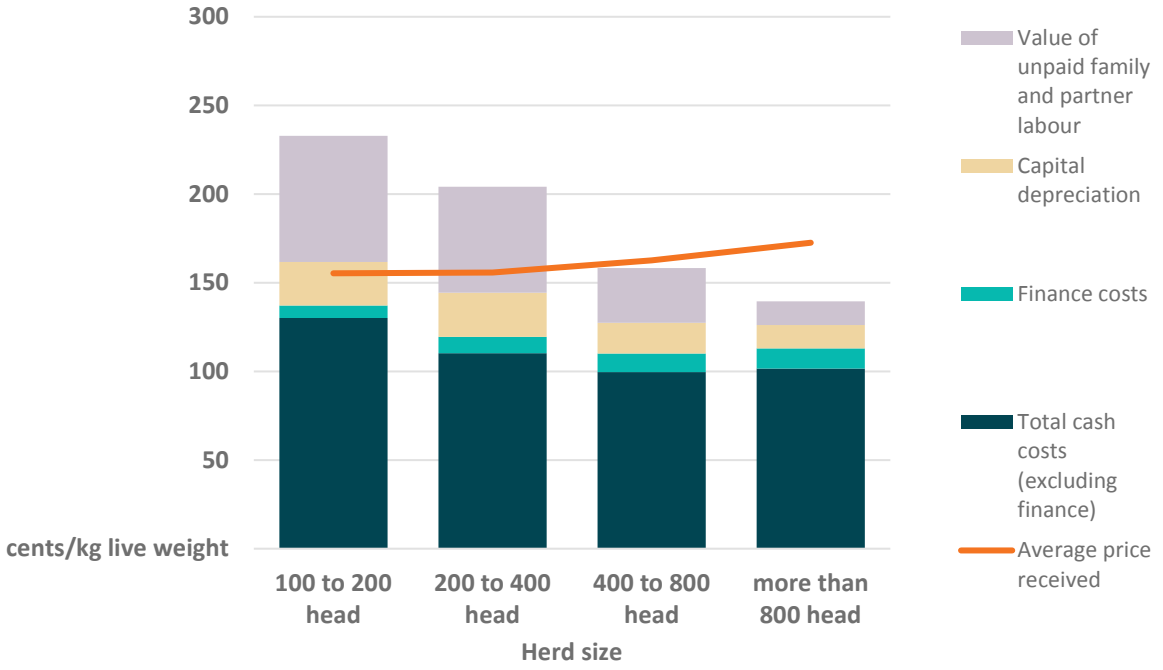
ABARES includes the value of unpaid labour in its measurement of farm financial performance. In 2014–15 more than 95 per cent of Australian beef cattle producing farms were family operated. Family-operated farms use a large amount of owner, partner and family labour. Typically, these farms do not pay wages or salaries to family and partners who provide labour for the farm's operation. Valuation of this labour input enables the performance of all farm businesses to be compared equally regardless of the (paid or unpaid) labour arrangements in place. Valuation of unpaid labour also captures the requirement for the farm's operators to receive a fair return for their labour input. ABARES values unpaid labour inputs at standard industry award wage rates.

On average over the three years ending 2014–15, the smallest herd size producers (farms with fewer than 200 head of beef cattle in southern Australia and farms with fewer than 400 head in northern Australia) had much higher cash costs of production per kilogram live weight produced than farms with larger herd sizes (Figure 2, Figure 3, Table 2, Table 3, Table 4 and Table 5). On average, these small herd size farms had higher fixed (overhead) cash costs and higher variable costs per kilogram live weight produced.

Nevertheless, on average, producers in all herd size categories in both northern and southern Australia covered cash costs of production. However, producers in northern Australia carrying fewer than 400 head of cattle covered cash costs of production but did not fully cover cash and finance costs.

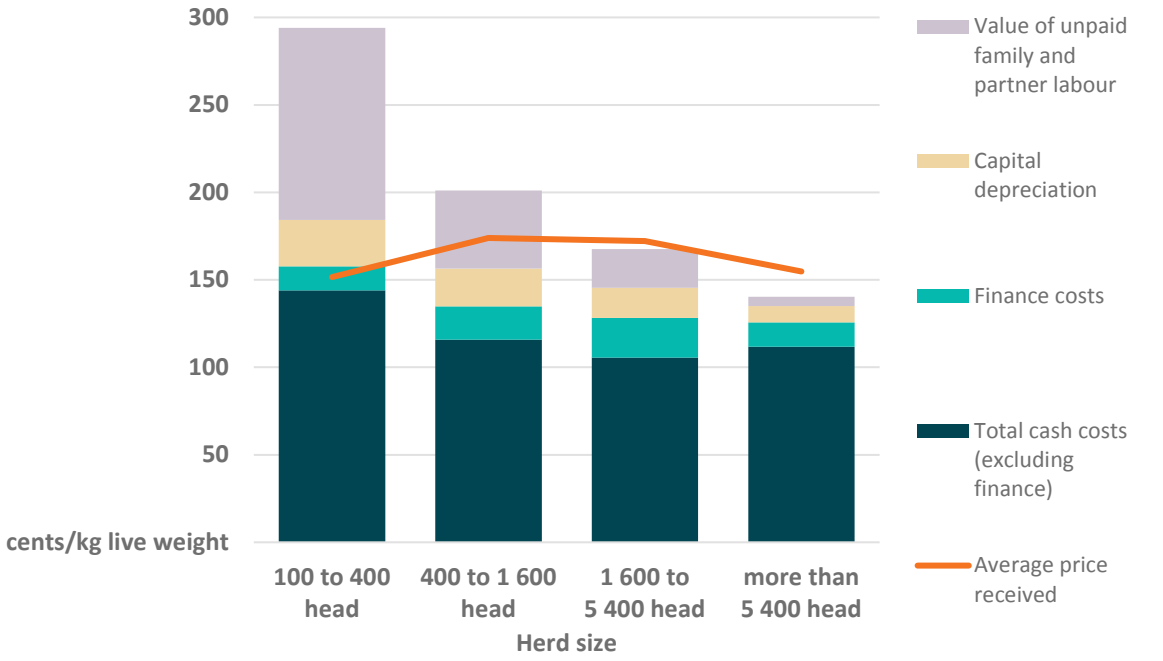
Inclusion of the cost of capital depreciation and the value of unpaid owner–manager, partner and family labour adds substantially to the estimate of total beef production costs, particularly for small herd size producers. The total cost per kilogram live weight produced for farms with fewer than 400 head of beef cattle in both northern and southern Australia is estimated to have been well above the price received per kilogram of beef (live weight) sold.

Figure 3 Production costs, beef cattle producing farms, by herd size, southern Australia, average 2012–13 to 2014–15



Source: ABARES Australian Agricultural and Grazing Industries Survey

Figure 4 Production costs, beef cattle producing farms, by herd size, northern Australia, average 2012–13 to 2014–15



Source: ABARES Australian Agricultural and Grazing Industries Survey

Many small herd size farms have income from other farm enterprises and off-farm sources that provide most of the income to meet the operators' living expenses. Small herd size producers, particularly small specialist beef producers with no other farm enterprise, have high

per kilogram production costs. Unpaid labour costs are particularly high for these farms. In addition, the costs of farm vehicles, plant and machinery, shire rates, maintenance and insurance of farm buildings, improvements and any included household expenditure are spread over relatively little output.

For larger herd size farms (those with more than 400 head of beef cattle) the price received for beef cattle was sufficient to cover finance costs, capital depreciation and most or all of the value of unpaid family and partner labour (Figure 3 and Figure 4).

The average price received per kilogram of beef was slightly lower for the largest herd size farms in northern Australia (Figure 3). This in part reflects the impact of dry seasonal conditions in northern Australia in 2013–14 and 2014–15, when reduced availability of feed and water resulted in increased turn-off of unfinished cattle and breeding cows.

In southern Australia, the average price received per kilogram of beef produced increased slightly with herd size (Figure 3). This may indicate that farms with larger herd sizes in southern Australia produced better quality or better finished beef cattle during this period.

These results, and those published for 2007–08 (Hooper 2009), suggest that beef production in both northern and southern Australia benefits from economies of size. The average cost of production declines consistently with increased herd size.

Over the three years ending 2014–15, total costs of production were similar in northern and southern Australia—averaging 174 cents per kilogram live weight produced in southern Australia (Table 3) and 175 cents in northern Australia (Table 5).

This result contrasts with the 2007–08 results, which recorded a lower average total cost of production in northern Australia compared to southern Australia. The average total cost of production in 2007–08 dollars was reported as 153 cents per kilogram in the north and 165 cents in the south (or 186 cents and 200 cents, respectively, in 2015–16 dollars). This change mainly reflects the different impact of drought on the two data sets. Drought increased costs for southern beef producers in 2007–08 and for northern producers for the three years ending 2014–15.

Average costs of beef production in each state partly reflect the distribution of farms by herd size. Victoria has the highest proportion of small herd size farms (Martin 2015) and the highest average total cost of production, at 192 cents per kilogram for the three years to 2014–15 (Table 6). In contrast, the Northern Territory has a high proportion of very large herd sizes and the lowest total cost of production, at 130 cents per kilogram. A higher proportion of cattle in the Northern Territory were turned off for live export. Costs of production for cattle sold for live export are generally lower, because cattle from northern Australia are sold at a younger age and at lighter weights for live export than they are for domestic slaughter (Gleeson, Martin & Mifsud 2012).

The total cost of beef production for Queensland was relatively high, averaging 182 cents per kilogram for the three years from 2012–13 to 2014–15. Several factors contributed to relatively high production costs in Queensland during this period. Firstly, Queensland has many large herd size farms but also a large proportion of relatively small beef herd farms, particularly near coastal and cropping areas. Many of these farms have high cash costs relative to the quantity of beef they produce. Secondly, a high proportion of Queensland beef producers were subject to dry seasonal conditions over the three years from 2012–13 to 2014–15. This resulted in increased cash costs, particularly for fodder and freight. Finally, many beef farms in Queensland

have relatively high debt levels. Finance costs (interest payments on debt) accounted for 11 per cent of the total costs of beef production in Queensland (or 20 cents per kilogram), averaged over the three years from 2012–13 to 2014–15. This was the highest among the states.

Farms with high operating margins

ABARES ranked farms in the AAGIS from 2012–13 to 2014–15 using the margin of price received per kilogram over total costs per kilogram live weight produced. Farms were classified into two groups: the first was the third of producers with the highest operating margin and the second was all other farms.

Over the three years, farms with high operating margins were predominantly those with low costs of production, larger herds, higher herd productivity, higher branding rates and lower death rates (post branding). These farms also carried less debt relative to their business size—consuming a smaller proportion of their farm receipts to service borrowing. High operating margin farms also worked land with a higher value, on average, which may reflect the greater productive capacity of their land. These farms were also operated by younger owner–managers, and operators of high-margin farms earned less of their household disposable income off-farm (Table 7).

In southern Australia, farms with high operating margins were more likely to be mixed enterprise farms, to earn less from off-farm employment and to sell on average slightly heavier weight cattle.

In northern Australia, farms with high operating margins sold a higher proportion of cattle direct to processors (over the hooks) and for live export and on average received slightly higher prices per kilogram for cattle sold.

Table 7 Characteristics of high operating margin beef cattle producing farms, 2012–13 to 2014–15 a

average per farm/percentage of farms

Characteristic	unit	Southern Australia					Northern Australia				
		High margin		All others			High margin		All others		
Low cost of production farms **b**	%	76	(3)	11	(15)	**c**	77	(4)	7	(27)	**c**
Average beef cattle number	no.	584	(4)	326	(3)	**c**	2457	(5)	1054	(4)	**c**
Specialist producers	%	51	(7)	72	(2)	**c**	87	(2)	91	(1)	–
Mixed enterprise producers	%	49	(7)	28	(6)	**c**	13	(15)	9	(13)	–
Branding rate	%	89	(1)	86	(1)	**c**	74	(1)	65	(2)	**c**
Death rate	%	1.5	(17)	2.3	(4)	**c**	2.4	(7)	3.8	(6)	**c**
Net turn-off rate	%	34	(3)	41	(2)	**c**	25	(4)	32	(3)	**c**
Average sale weight	kg	498	(4)	476	(1)	**c**	454	(2)	430	(1)	–
Average price per kg live weight sold	cents	167	(3)	154	(2)	–	168	(2)	154	(2)	**c**
Cattle sold over hooks	%	22	(23)	17	(10)	–	44	(6)	31	(7)	**c**
Cattle sold for live export	%	3	(23)	1	(18)	–	14	(7)	8	(11)	**c**
Cattle finished on grain	%	2	(259)	3	(22)	–	4	(193)	5	(20)	–
Debt-to-receipts ratio	%	93	(6)	115	(5)	**c**	132	(8)	183	(6)	**c**
Land value per large stock unit	%	3771	(3)	4547	(3)	**c**	2440	(4)	3283	(4)	**c**
Age of owner–manager	years	60	(1)	63	(1)	**c**	58	(2)	63	(1)	**c**
Off-farm wages of owner–manager and partner	$	17 700	(13)	29 700	(11)	**c**	12 300	(28)	11 000	(17)	–
Share of owner–manager and partner disposable income earned off-farm	%	30	(9)	65	(7)	**c**	22	(24)	62	(12)	**c**

a Farms classified to the third of producers with the highest margin of price received over total costs per kilogram live weight produced. **b** Farms classified to the third of producers with the lowest total cost per kilogram live weight produced. **c** Difference between estimates are significant from zero at the 95 per cent confidence level.
Note: Figures in parentheses are standard errors expressed as a percentage of the estimate provided. Estimates have been rounded.
Source: ABARES Australian Agricultural and Grazing Industries Survey

3 Sheep industry

Sheep producing farms

Farm businesses with fewer than 800 head of sheep were excluded from the analysis in this report. The threshold of 800 sheep was chosen because it was comparable in enterprise size and resource use to the threshold of 100 head of cattle used for the analysis of beef costs of production. Farm businesses with fewer than 800 sheep account for just 4 per cent of the national flock and contribute around 5 per cent to the total value of sheep, lamb and wool sales.

Around 22 000 Australian broadacre farms each ran more than 800 sheep in 2014–15. This report classifies these farms as sheep producing farms.

Slaughter lamb producers

Around 90 per cent of sheep producing farms (19 900 farms) sold more than 200 lambs for slaughter in 2014–15. In this report, these producers are referred to as slaughter lamb producers.

Around 13 per cent of slaughter lamb producers (2 500 farms) derived more than 50 per cent of their farm receipts from sales of slaughter lambs in 2014–15. These farms are referred to as specialist slaughter lamb producers in this report.

Cost of sheep production

The methodology used to calculate production costs for beef cattle producing farms (Box 1) was also used for sheep producing farms in the AAGIS in the three years 2012–13, 2013–14 and 2014–15.

Between 2013–14 and 2014–15, prices for sheep, lambs and wool increased. However, the on-farm cost of sheep production expressed on a per kilogram live weight basis did not change between 2012–13 and 2014–15 (in real terms). Nationally, total costs of sheep production averaged 304 cents per kilogram live weight for sheep producers and 288 cents per kilogram for slaughter lamb producers (Table 8) for the three years ending 2014–15.

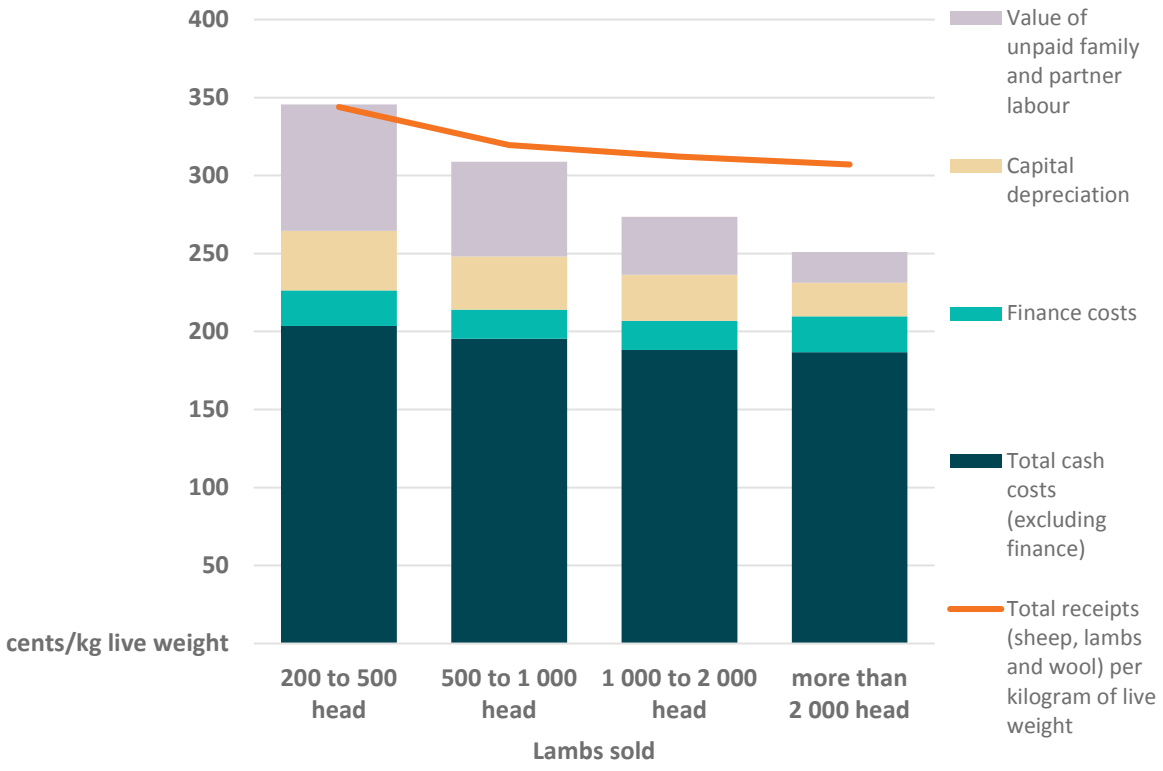
Relatively constant costs of production for sheep producers over this period contrast with the large increase in the per kilogram costs of beef production from 2013–14 to 2014–15 (see Cost of beef production). Beef prices rose from 2012–13, from historical lows. Sheep and lamb prices were lower in 2012–13 than in the previous four years but were still relatively high compared to prices received in the previous decade (Ashton et al 2016). On average sheep producers have more revenue sources (more farm enterprises) to buffer downturns in the revenue of an individual enterprise than beef cattle producers.

Revenue from sheep production comes from three sources: adult sheep, lambs and wool. On average, over the period 2012–13 to 2014–15, sheep producers generated 325 cents worth of output per kilogram live weight produced and slaughter lamb producers 318 cents (Table 8). The proportion of revenue generated from sheep meat (live weight) production averaged 59 per cent for all sheep producers and 62 per cent for slaughter lamb producers, rising to 66 per cent for the largest slaughter lamb producers (selling more than 2 000 lambs). The reduced contribution of wool to sheep enterprise revenue for larger slaughter lamb producers is a result of lower average wool prices received by larger producers. This resulted in the total value of sheep enterprise output declining as lamb production increased (Figure 5 and Table 8).

The value of sheep production declined as lamb production increased, but the average cost of production declined at a faster rate. Over the period 2012–13 to 2014–15, the total cost of production (including the value of unpaid labour) for the smallest slaughter lamb enterprises averaged 346 cents per kilogram compared with 251 cents per kilogram for slaughter lamb producers selling more than 2 000 lambs. As production increases, cash costs of production reduce by a relatively small amount but capital depreciation costs and, particularly, input of unpaid family and partner labour show a larger reduction.

Results for the sheep industry contrasted with results for the beef industry. Most small beef enterprises did not cover the value of unpaid labour or capital depreciation. However, the smallest slaughter lamb producers (those selling 200 to 500 lambs) had receipts sufficient to cover all finance costs, capital depreciation and most or all of the value of unpaid family and partner labour.

Figure 5 Production costs, slaughter lamb producers, by number of lambs sold, 2012–13 to 2014–15



Source: ABARES Australian Agricultural and Grazing Industries Survey

Operating margins (receipts per kilogram less costs of production) increased as the scale of slaughter lamb production increased, reflecting the decline in costs relative to the value of sheep products per kilogram live weight produced. Operating margins over all costs averaged –2 cents per kilogram for farms selling 200 to 500 lambs for slaughter and increased to 56 cents per kilogram for farms selling more than 2 000 lambs.

These results are similar to those for 2007–08 (Hooper 2009). They suggest that significant economies of size in the sheep meat industry provide producers with a strong economic incentive to expand sheep meat production and enhance profitability. Generally, increases in the scale of sheep enterprises bring only small reductions in cash operating costs per kilogram—in

both variable and fixed cash costs (overhead costs such as administrative costs, insurance and rates). Results for sheep producing farms differ slightly from the results for beef producing farms. Larger reductions in cash operating costs per kilogram were observed as the scale of operation increased (see Cost of beef production). Economies of size for sheep producers mainly arise from greater efficiency in the use of farm capital and labour as the scale of the sheep enterprise increases.

Farms with high operating margins

The methodology used for beef cattle producing farms (see Cost of beef production) was also used to classify sheep producing farms into two groups: high operating margin farms and all other farms.

Averaged over the three years to 2014–15, sheep producing farms with high operating margins predominantly had low costs of production, had larger sheep flocks, sold a larger number of lambs and had higher flock productivity—including higher lamb marking percentages and higher wool cut per head shorn. Compared with other sheep producing farms, these farms had a much larger overall scale of operations, much higher labour use efficiency and significantly higher stocking rates (Table 10).

These farms also carried less debt relative to their business size and consumed a smaller proportion of their farm receipts to service borrowing. High operating margin farms were also operated by younger owner–managers, the operators earned less from off-farm employment and a lower proportion of household disposable income was earned off-farm.

Farms with high operating margins were more likely to be slaughter lamb producers but less likely to be specialist slaughter lamb producers (highly reliant on slaughter lamb production). High operating margin farms were more likely to be located in the cropping (wheat–sheep) zone and less likely to be located in the high rainfall zone. Farms with high operating margins were much more likely to have increased the size of their sheep flock over the three years to 2014–15 than other farms.

Farms with high operating margins did not sell lambs or sheep at higher live weights than other farms, but they did receive significantly higher prices. They also received significantly higher prices on average for the wool they sold.

Table 8 Per kilogram live weight cost of sheep production, sheep producers, 2012–13 to 2014–15

average per farm

Production	unit	Slaughter lamb producers								All sheep producers	
		200 to 500lambs sold		500 to 1 000 lambs sold		1 000 to 2 000 lambs sold		more than 2 000 lambs sold		average	
Total live weight of sheep produced	tonnes	18	(8)	21	(6)	37	(8)	66	(6)	28	(4)	26	(3)
Total live weight of lambs produced	tonnes	17	(3)	31	(2)	63	(3)	145	(3)	44	(2)	36	(2)
Receipts per kilogram live weight produced													
Sheep and lambs	c/kg	189	(3)	196	(2)	194	(1)	204	(2)	197	(1)	193	(1)
Wool	c/kg	155	(4)	123	(3)	119	(3)	103	(3)	121	(2)	131	(2)
Total	c/kg	344	(2)	320	(1)	312	(1)	307	(1)	318	(1)	325	(1)
Production costs													
Sheep and lamb purchases	c/kg	20	(9)	22	(7)	25	(6)	30	(6)	25	(5)	25	(4)
Shearing and crutching costs	c/kg	30	(5)	25	(4)	28	(3)	25	(3)	27	(2)	29	(2)
Administration	c/kg	11	(6)	10	(4)	7	(4)	6	(5)	8	(3)	9	(2)
Hired labour	c/kg	4	(15)	7	(11)	8	(8)	13	(7)	8	(5)	8	(4)
Crop and pasture chemicals	c/kg	5	(14)	5	(8)	5	(9)	4	(8)	5	(5)	5	(5)
Fertiliser	c/kg	12	(9)	10	(10)	11	(7)	10	(7)	11	(5)	11	(4)
Fodder	c/kg	9	(14)	12	(12)	10	(15)	10	(10)	10	(14)	10	(7)
Freight	c/kg	8	(7)	7	(5)	8	(6)	7	(5)	8	(3)	8	(3)
Handling and marketing	c/kg	7	(9)	9	(6)	11	(7)	10	(5)	10	(4)	10	(3)
Fuel and lubricants	c/kg	14	(6)	11	(4)	9	(4)	8	(4)	10	(3)	11	(2)
Livestock and veterinary chemicals	c/kg	14	(7)	13	(6)	13	(5)	10	(5)	12	(3)	12	(3)

Note: Figures in parentheses are standard errors expressed as a percentage of the estimate. Estimates have been rounded to the nearest whole number and are presented in 2015-16 dollars.
Source: ABARES Australian Agricultural and Grazing Industries Survey

Table 8 Per kilogram live weight cost of sheep production and operating margins, sheep producers, 2012–13 to 2014–15 continued

average per farm

Production costs	unit	Slaughter lamb producers										All sheep producers	
		200 to 500 lambs sold		500 to 1 000 lambs sold		1 000 to 2 000 lambs sold		more than 2 000 lambs sold		average			
Contracts paid	c/kg	4	(17)	4	(13)	4	(11)	5	(9)	5	(7)	5	(6)
Land rent	c/kg	6	(19)	6	(13)	6	(12)	7	(9)	6	(8)	6	(6)
Rates	c/kg	11	(6)	10	(6)	8	(5)	7	(5)	9	(3)	9	(2)
Repairs and maintenance	c/kg	19	(6)	18	(5)	15	(6)	14	(6)	16	(3)	17	(3)
Other cash costs	c/kg	30	(6)	27	(3)	21	(3)	19	(3)	23	(2)	24	(2)
Finance costs	c/kg	23	(9)	19	(6)	19	(6)	23	(6)	21	(4)	21	(3)
Capital depreciation	c/kg	38	(4)	34	(3)	30	(3)	22	(3)	30	(2)	32	(2)
Value of unpaid labour	c/kg	81	(5)	61	(3)	37	(4)	20	(5)	46	(3)	52	(2)
Total cash costs excluding finance costs	c/kg	204	(3)	195	(2)	188	(2)	187	(2)	192	(1)	199	(1)
Total cash costs including finance costs	c/kg	226	(3)	214	(2)	207	(2)	210	(2)	213	(1)	220	(1)
Total cash, finance and depreciation costs	c/kg	265	(3)	248	(2)	236	(2)	231	(2)	243	(1)	252	(1)
Total costs (all cash costs, finance, depreciation and the value of unpaid labour)	c/kg	346	(3)	309	(2)	274	(2)	251	(2)	288	(1)	304	(1)
Operating margin over:													
Cash costs	c/kg	140	(5)	124	(4)	124	(3)	120	(3)	126	(2)	125	(2)
Cash and finance costs	c/kg	118	(6)	105	(5)	105	(4)	97	(4)	105	(3)	104	(3)
Cash, finance and depreciation costs	c/kg	79	(10)	71	(7)	76	(5)	76	(6)	75	(4)	73	(4)
All costs including unpaid labour costs	c/kg	–2	(650)	11	(54)	38	(11)	56	(8)	30	(11)	21	(14)

Note: Figures in parentheses are standard errors expressed as a percentage of the estimate. Estimates have been rounded to the nearest whole number and are presented in 2015–16 dollars.
Source: ABARES Australian Agricultural and Grazing Industries Survey

Table 9 Per kilogram live weight cost of sheep production and operating margins, slaughter lamb producers, 2012–13 to 2014–15

average per farm

Receipts per kilogram live weight	unit	New South Wales		Victoria		Queensland		South Australia		Western Australia		Tasmania	
Sheep and lambs	c/kg	208	(1)	204	(2)	205	(8)	193	(2)	167	(3)	198	(2)
Wool	c/kg	118	(3)	112	(5)	121	(18)	126	(4)	131	(3)	151	(6)
Total	c/kg	326	(1)	316	(2)	326	(6)	319	(2)	298	(2)	349	(3)
Production costs													
Total cash costs excluding finance costs	c/kg	191	(2)	192	(3)	214	(13)	196	(3)	190	(3)	199	(4)
Total cash costs including finance costs	c/kg	212	(2)	211	(3)	246	(14)	216	(3)	209	(3)	229	(4)
Total cash, finance and depreciation costs	c/kg	241	(2)	244	(3)	285	(13)	251	(3)	235	(3)	251	(4)
Total costs (all cash costs, finance, depreciation and the value of unpaid labour)	c/kg	287	(2)	302	(2)	349	(13)	291	(3)	273	(3)	292	(4)
Operating margin over:													
Cash costs	c/kg	135	(3)	124	(4)	123	(20)	123	(4)	108	(6)	149	(5)
Cash and finance costs	c/kg	114	(4)	105	(5)	81	(31)	103	(6)	89	(7)	119	(7)
Cash, finance and depreciation costs	c/kg	85	(5)	72	(8)	41	(57)	68	(9)	63	(10)	98	(9)
All costs including unpaid labour costs	c/kg	40	(13)	14	(44)	–23	(99)	28	(24)	26	(28)	57	(16)

Note: Figures in parentheses are standard errors expressed as a percentage of the estimate. Estimates have been rounded to the nearest whole number and are presented in 2015–16 dollars.
Source: ABARES Australian Agricultural and Grazing Industries Survey

Table 10 Characteristics of high operating margin sheep producers, 2012–13 to 2014–15 a

average per farm/percentage of sheep producers

Characteristic	unit	High margin		All others		
Low cost sheep meat producers b	%	65	(4)	16	(10)	**c**
Average sheep number	no.	3 700	(3)	2 200	(2)	**c**
Total size of operation in sheep equivalents	no.	13 100	(3)	8 700	(2)	**c**
Slaughter lamb producer	%	85	(2)	73	(2)	**c**
Specialist slaughter lamb producers	%	7	(18)	11	(11)	**c**
Specialist wool and sheep producers	%	20	(11)	22	(7)	–
Mixed enterprise sheep and beef or sheep and crops producers	%	73	(5)	67	(5)	–
High rainfall zone	%	26	(7)	39	(4)	**c**
Cropping zone	%	48	(4)	35	(5)	**c**
Pastoral zone	%	13	(12)	16	(9)	–
Age of owner–manager	years	57	(1)	59	(1)	**c**
Total lambs sold	no.	1 000	(4)	700	(3)	**c**
Proportion of lambs sold for slaughter	%	92	(4)	93	(3)	–
Lamb marking percentage	%	94	(1)	87	(1)	**c**
Wool cut per head shorn	kg	4.3	(1)	4.0	(1)	**c**
Wool price	cents/kg	711	(1)	687	(1)	**c**
Sale weight of adult sheep	kg	54	(1)	56	(3)	–
Adult sheep price	cents/kg	150	(4)	128	(3)	**c**
Sale weight of slaughter lambs	kg	47	(1)	46	(1)	–
Slaughter lamb price	cents/kg	248	(1)	228	(1)	**c**
Sheep and lamb net turn-off rate	%	40	(2)	43	(2)	–
Change in number of sheep (per year)	%	5	(15)	–4	(24)	**c**
Stocking rate in sheep equivalents per hectare	no.	3.5	(10)	2.6	(6)	**c**
Sheep equivalents per labour unit	no.	6 100	(2)	4 700	(2)	**c**
Equity ratio	%	89	(1)	85	(1)	**c**
Debt to receipts ratio	%	83	(4)	127	(3)	**c**
Interest paid to receipts ratio	%	5	(4)	8	(3)	**c**
Overhead cash costs ratio	%	34	(2)	34	(1)	–
Off-farm wages of owner–manager and partner	$	16 900	(10)	22 300	(8)	**c**
Share of owner–manager and partner disposable income earned off-farm	%	15	(9)	44	(6)	**c**

a Farms classified to the third of producers with the highest margin of price received over total costs per kilogram live weight produced. **b** Farms classified to the third of producers with the lowest total cost per kilogram live weight produced. **C** Difference between estimates are significant from zero at the 95 per cent confidence level.

Note: Figures in parentheses are standard errors expressed as a percentage of the estimate provided. Estimates have been rounded.

Source: ABARES Australian Agricultural and Grazing Industries Survey

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