

Economics and Marketing:

Understanding Dressing Percentage of Slaughter Cattle

Introduction

Dressing percentage is one of many factors affecting the value of a slaughter animal. A basic knowledge of dressing percentage is important in understanding slaughter cattle pricing systems and pricing variability. This module explains why dressing percentage is important and discusses the factors that affect it.

Dressing Percentage in Perspective

Dressing percentage is calculated by dividing the warm carcass weight by the shrunk live weight of the animal and expressing the result as a percentage. For example, suppose that an animal delivered to the packing plant weighs 1300 pounds. After being killed, the hide, head, feet and gut are removed. The warm carcass then weighs 767 pounds. The dressing percent of this animal would be 767 divided by 1300 multiplied by 100 equaling 59 percent. This “59 percent” represents the meat and skeletal portion of an animal compared to its live weight. Note that the animal is weighed after transportation to the packing plant so that live weight is a shrunk weight. Also note that the carcass is weighed warm as opposed to cold. The dressing percentage for a cold carcass can be 2.0 percentage point lower than the warm carcass dressing percentage for the same carcass.

The industry is interested in animal dressing percentage because it establishes the weight upon which payment is calculated for animals sold on a live weight basis. For example, a 0.5 percent difference in the dressing percentage between steer A and B shown in **Table 1**, results in a \$12.02 difference in price per animal. The higher yielding animal is worth an extra \$0.92 per cwt on a live weight basis.

Table 1. Effect of Dressing Percentages on Animal Value

	Steer A	Steer B	Calculation Method
Shrunk liveweight, lbs.	1300	1300	Delivered to plant weight
Warm carcass weight, lbs.	767	760	
Dressing percent	59.0%	58.5%	(Warm carcass weight / liveweight) x 100
Carcass price, \$/lb.	\$1.85	\$1.85	
Total value per head	\$1418.95	\$1406.93	Carcass weight X carcass price

Live price per cwt	\$109.15	\$108.23	Value per cwt, liveweight basis
--------------------	----------	----------	---------------------------------

A higher dressing percentage will not always yield higher dollar returns, so dressing percentages should be considered in relation to other carcass quality factors. For example, suppose a yield grade (YG) 3 steer carcass – one with the lowest grader-estimated lean meat yield of 53 % or less - had a dressing percentage that is 1.5 percent higher than an **YG1** steer carcass. However, because the industry does not want over-fat carcasses, showed by the YG 3 rating, prices will be discounted. Therefore for the YG3 steer, even though the dressing percentage is higher and the carcass weight is heavier, the total return could be less. See **Table 2**, below for an example.

Dressing percentages are highly variable because they are influenced by factors such as live weight, fat level, age, gender, diet, breed, distance trucked, and the type of market where cattle are sold.

Table 2. Effect of Changing Grade and Dressing Percent on Animal Value

	Steer A Yield Grade 1	Steer B Yield Grade 3	Calculation Method
Slaughter live weight, lb.	1300	1360	Delivered to plant weight
Warm carcass weight, lb.	760	816	
Dressing percent	58.5%	60.0%	(Warm carcass weight liveweight) x 100
Carcass price, \$/lb.	\$1.85	\$1.75 ¹	
Total value per head	\$1406.93	\$1428.00	Carcass weight x carcass price
Live price per cwt	\$108.23	\$105.00	Value per head liveweight – per cwt

\$0.10/cwt discount for A3

Effect of live weight and fat level on dressing percentage

Dressing percentages increase as live weight or as fat depth increases in feedlot cattle. As feedlot cattle approach finishing weights and condition, the amount of body fat increases at a faster rate than other body components including muscle, bone, hide, viscera or internal organs, and gut contents. Body fat is deposited within the body cavity, within the muscle or meat – called marbling, - and immediately under the hide. Since much of this body fat stays with the carcass at slaughter, increasing body fat results in higher dressing percentages.

Breed Effects

Meaningful comparisons of dressing percentages among breeds are difficult to make without knowing the reasons for the differences. For example, one breed may typically have a higher dressing percentage because that breed tends to carry more finish at a given weight. If body fat is trimmed off, then the dressing percentage may be similar to other breeds. Dairy cattle commonly yield three percentage points less in dressing percentage than beef cattle. Dairy cattle tend to lack both finish and muscularity, and therefore, have a lower dressing percentage.

While dressing percentage differences can be related to mature size, there are other factors such as the weight of the hide, head, feet and viscera, which all have an impact. Breeds such as Hereford or Simmental, which tend to have a heavier hide, head, feet and viscera will have a lower dressing percentage since these body parts are excluded from the carcass weight. By contrast, Angus or Limousin breeds tend to have higher dressing percentages because of the relatively smaller portion of their live weight composed of hide, head, feet and viscera.

Gender Effects

Heifers usually have a 1.5 to 2.0 percentage point lower dressing percentage than steers at a similar fat level. As a whole, heifers tend to carry more waste fat in the udder, around the internal organs and on the carcass than do steers. The difference in dressing percentage between steers and heifers narrows as heifers become fatter than steers. Since heifers mature earlier, they are usually marketed 100 to 150 pounds lighter than steers.

There is a risk that heifers are pregnant at the time of slaughter. Pregnant heifers have a lower dressing percentage than open heifers. The drop in dressing percentage relates to the size of the fetus, the uterus and embryonic tissue and fluids.

At similar weights, steers have more heart and lung and abdominal and kidney fat than bulls. Steers can be expected to have a lower dressing percentage than bulls at similar external fat levels because fat distribution on steers and bulls are different.

Table 3. Relationship of Age, Liveweight, and Fat Level to Dressing Percentage

Slaughter age in days	352	390	467	478
Shrunk liveweight, lb.	995	1100	1278	1384
Warm carcass weight, lb.	576	651	766	843
Minimum fat level, cm	0.84	0.99	1.09	1.17
Dressing percent	58.0	59.2	59.9	60.9

Source: University of Alberta

Diet Effects

Cattle on a high roughage diet, such as hay, silage or pasture, have a lower dressing percentage than cattle on a high proportion grain diet, even if the cattle are marketed at very

similar fat levels. At the Lethbridge Research Station, the entire digestive tract of slaughtered steers was weighed. Gut fill, as a percent of live weight, was higher in steers on a hay diet than steers on a grain diet. In this trial, steers on the grain diet had an 8 percent higher dressing percentage than steers on the hay diet. But when carcass weights were based on body weights, excluding gut fills, there was no difference between steers on either diet.

Other studies have compared Charolais-, Hereford- and Limousin-cross dairy steers on either fast gaining (mostly grain) or slow gaining (mostly roughage) rations. Dressing percentages averaged 2 percentage points higher for the steers on fast gaining rations. Similarly, another study indicated that compared heifers fed ground alfalfa hay (with or without barley grain) and heifers fed a 90 percent barley grain diet, dressing percentages increased with the grain level fed.

Similarly, another study, that compared heifers fed ground alfalfa hay (with or without barley grain) and heifers fed a 90 percent barley grain diet, showed dressing percentages increased with the grain level fed.

A study at the University of Alberta also fed bulls and steers a diet containing either 20, 50 or 80 percent roughage and slaughtered the cattle at either 990 or 1265 pounds live weight. Researchers found that dressing percentages decreased with increasing roughage levels in the diet. The reasons for the decrease were the increased gut fill and reduced amounts of carcass fat with higher roughage levels. Study results are shown in **Table 4**, below.

Table 4. Effects of Diet on Dressing Percentage and Fat Depth

Treatment	Number	Dressing (%)	Fat Depth (cm)
Slaughter weight 990 lb.			
20% roughage	12	56.9	0.68
50% roughage	12	56.9	0.57
80% roughage	12	55.1	0.49
Slaughter weight 1265 lb.			
20% roughage	11	60.3	1.30
50% roughage	12	59.2	1.12
80% roughage	12	57.2	0.87

Source: University of Alberta

The Pembina Forage Association marketed 18 steers weighing from 995 to 1220 pounds directly off a grass pasture. The steers had been on pasture for approximately 100 days. All carcasses graded A1 except for one carcass, which was discounted for being a dark cutter. The dressing percentages varied from 52.9 to 56.9 percent with the average being 54.5 percent. If feedlot finished steer carcasses dress from 57 to 59 percent, then this data suggests there can be a 3.5 percentage point reduction in dressing percentages of carcasses marketed directly from pasture.

The number of days an animal spends in the feedlot on a high grain diet influences the dressing percentage. The feedlot industry suggests that even after a minimum 60 days in the feedlot, dressing percentages will be 2 percent lower than for the more ideal 90 days.

Cull cows marketed directly after weaning a calf may dress out between 48 and 51 percent. These same cows, after a 60-day high-energy feeding period, could have a dressing percentage as high as 53 to 55 percent.

Seasonal Effects

Dressing percentages will vary by 1.5 to 3 percentage point throughout the year. The period of highest dressing percentages occurs from May through August. This is a period when feedlot conditions are dry, when calves have been on feed for an extended time and when calves have a light hair coat. Dressing percentages start declining in September as cattle hair coats thicken and more tag accumulates. Also, yearlings that have been in the feedlot for only 60 to 80 days start coming to market in the late fall. The lowest dressing percentages tend to occur in December and January. Marketings during this period consist mainly of yearlings that have been in the feedlot for less than 100 days, and which have a heavy hair coat and accumulated tag. Dressing percentages increase through March and April as animals shed their winter hair coat and last year's calves begin coming to market. Last year's calves have been on higher grain diets for periods greater than 150 days. Any weather conditions that affect the hair coat of an animal can have an impact on that animal's dressing percentage. For example, rainy weather can dramatically lower dressing percentages, especially if the hair coat is thick.

Canadian and the US Differences

The dressing percentage of cattle marketed in Canada will differ from that of similar animals marketed in the United States. The US carcass weight includes the weight of the kidney, pelvic and heart fat, which is not included in the Canadian carcass weight. Dressing percentages for equivalent animals are, therefore, 2.5 to 3.0 percent higher in the United States than in Canada.

Cattle marketed in the United States, with a typical grade split of 30% Choice, 70% Select to 50% Choice, 50% Select will have a dressing percentage of 2.5 percentage points higher than Canadian grade A1/A2 and 3.0 percentage points higher than Canadian grade A2/A3.

Other Factors

Marketing procedures affect beef carcass yields. A feedlot that is 30 km from a packing plant can have higher dressing percentages than a feedlot 400 km from the plant. The difference in dressing percentages will be related to the difference in shrinkage that occurs while the animals are being transported. If the shrinkage is only gut shrinkage and not tissue or carcass shrinkage, then the difference in dressing percentages is not important for animals sold on a rail grade basis.

Studies at the Lacombe Research Station demonstrated that slaughter weight steers and heifers that fast for 48 or 72 hours prior to slaughter had warm carcass yields nearly 1.0 to 1.5 percent lower than equivalent cattle slaughtered after a 24-hour fast. This weight loss was attributed to losses in carcass lean, fat and water. Management practices such as quiet, efficient sorting and loading, limiting time in transit, loading trucks to recommended weight, and

proper delivery timing at the plant will help reduce the interval that cattle are without feed, and lessen the stress level for long haul animals. This ultimately increases the value of the animal.

Other factors may affect carcass yield, but these are controlled by the packing plant rather than the feedlot, and therefore, the producer price is not directly influenced by these practices. For example, intermittent cold water spray chilling of the carcass can reduce carcass shrink age by 0.7 to 1.5 percent. Shrouding carcasses can reduce the loss to evaporation by 0.75 to 2.0 percent. Even carcass spacing within coolers and the feeding of an electrolyte solution to the animal prior to slaughter has shown to influence carcass shrinkage.

Summary

The factors affecting dressing percentage are summarized in **Table 5**. The results will vary, but the numbers provide a general indication of the influence of these factors. Although the dressing percentage and carcass weight of A2 and A3 grades tends to be higher than for A1 grade, this does not necessarily mean a higher return for the animal. Dressing percentages are highly variable, and influenced by factors such as days on feed, the season and the market where an animal is sold. Producers should analyze sale weights from feedlots to better understand how these factors influence dressing percentages.

Table 5. Example Dressing Percentages for Various Frame Sizes, Sexes and Grades

Frame	Sex (Weight)	YG1	Grade YG2 Dressing Percentages	YG3
Large	Steer (1200 lb.)	58.5	59.2	59.8
	Heifer (1050 lb.)	57.0	57.7	58.3
Medium	Steer (1125 lb.)	58.0	58.5	59.0
	Heifer (975 lb.)	56.5	57.0	57.5
Small	Steer (1050 lb.)	57.5	57.75	58.0
	Heifer (900 lb.)	56.0	56.26	56.5

Note: Dressing percentages given above decline by 2 percentage points for livestock on feed 60 days, by one percentage point for cattle on feed 80 days and are unchanged when cattle are on feed 100 days.

On average, dressing percentages are 0.75 percentage points lower in March, April, September and October; and are 1.5 percentage points lower in November, December, January and February.

Literature Cited

Bailey, C.B.M. 1984. *Gut fill affects liveweight gains*. Weekly Letter #2606, Lethbridge Research Station, Agriculture Canada.

Beacom, S.E. 1984. *A comparison of four systems for finishing beef heifers*. Research Report, Melfort Research Station, Agriculture Canada, p. 63-71.

Berg, R.T. and R.M. Butterfield. 1976. *New concepts of cattle growth*. Sydney University Press. Press Bldg., University of Sydney, Australia.

Fahmy, M.H. 1986. *Performance of crossbred beef and dairy steers finished on fast and slow gain feeding regimes*. Ag. Can. Canadex publication 420.10.

Johnson, R.D., M.C. Hunt, D.M. Allen, C.L. Kastner, R.J. Danler, and C.C. Shrock. 1988. *Moisture uptake during washing and spray chilling of Holstein and beef type steer carcasses*. J. Anim. Sci. 66:2180-2184.

Jones, S.D.M., M.A. Price, and G.W. Mathison. 1978. *The effects of dietary roughage level on the growth and productivity of intensively fed bulls*. 57th Annual University of Alberta Feeders Day Report, p. 22-25.

Jones, S.D.M., J.A. Newman, A.K.W. Tong, A.H. Martin, and W.M. Robertson. 1984. *Feedlot performance, carcass composition and efficiency of muscle gain in bulls and steers of different mature size slaughtered at similar levels of fatness*. Can. J. Anim. Sci. 64:621.

Jones, S.D.M., A.L. Schaeffer, A.K.W. Tong, and B.C. Vincent. 1988. *The effects of fasting and transportation on beef cattle. 2. Body component changes, carcass composition and meat quality*. Livestock Prod'n Sci. 20:25-35.

Price, M.A. 1976. *Dressing Percent - What does it mean*. Ag. Can. Canadex publication 420.50.

Price, M.A. 1977. *The effects of increasing market weight on beef production*. 56th Annual University of Alberta Feeders Day Report, p. 64-66.

Schaeffer, A.L., S.D.M. Jones, A.K.W. Tong and B.A. Young. 1989. *Effect of transport and electrolyte supplementation on ion concentration, carcass yield and quality in bulls*. Can. J. Anim. Sci. In press.