Seasonality in Steer Feeding Profitability, Prices, and Performance

Kansas State University Agricultural Experiment Station and Cooperative Extension Service

A wide variety of factors can affect the profitability of feeding cattle. For example, fed cattle prices, feeder cattle prices, corn prices, interest rates, feed conversions, and daily gains are all important determinants of cattle feeding profitability (Albright et al.). In turn, cattle feeders that anticipate changes in these factors can do a better job of managing risk in their operations. This bulletin documents seasonal variation in steer feeding profitability, cattle feeding performance factors, cattle prices, and corn prices in Kansas. Results from this study indicate the following:

- Steers placed on feed in late winter and early spring were generally less profitable than same-weight steers placed on feed in late spring and early summer, although seasonal profit patterns varied somewhat by placement weight.
- Fed cattle prices were generally highest in late winter and early spring and lowest during the summer. Corn prices were usually lowest in the fall and reached their seasonal price peak by late spring. Lightweight feeder steer prices were highest in late winter and early spring and lowest during the fall. Heavyweight feeder steer prices were highest in midwinter and midsummer and reached their seasonal low in the spring.
- Feeding cost of gain varied seasonally. Cattle placed on feed in March and April generally had the lowest feeding cost of gain, whereas cattle placed on feed from September through November tended to have the highest feeding cost of gain.
- Feed conversion and average daily gains also varied seasonally. Cattle placed on feed in the first half of the year tended to have the lowest feed conversions, whereas cattle placed on feed in the fall generally required more pounds of feed to produce a pound of gain. Average daily gains were generally lowest for steers placed on feed from September through December. Steers placed on feed in the winter, spring, and early summer had much higher average daily gains than those placed on feed the last four months of the year.

Introduction

This study examines feedlot closeout data for steers placed on feed at weights ranging from 600 to 899 pounds. Individual pen closeout data for steers placed on feed from January 1980 through December 1994 were collected from two western Kansas custom feedyards. Analysis of the closeout data suggests significant changes in feed efficiency and growth rates occurred in the mid-1980s. As a result, this bulletin reports an analysis of 7,593 pens of steers placed on feed from January 1984 through December 1994. Results are divided into three placement weight categories (600 to 699, 700 to 799 and 800 to 899 pounds) to examine differences in profitability and cattle performance characteristics across weight groups. Information collected from steer closeouts includes placement date, feeder purchase price, placement weight, days on feed, total weight gain, average daily weight gain, sale weight, sale price, feed conversion (as fed), feeding cost per pound of gain, and sale date.

None of the fed steer closeouts included corn prices or interest rates and, in addition, some closeouts were missing feeder or slaughter steer prices. Therefore, data obtained from the closeouts were augmented by information obtained from several sources. Average monthly Kansas corn prices were obtained from *Agricultural Prices*, a monthly publication of Kansas Agricultural Statistics, and interest rates for feeder cattle loans were obtained from the Kansas City Federal Reserve Bank. When the feeder steer price was missing from a closeout, the average Dodge City cattle auction price reported by the USDA's Agricultural Marketing Service (AMS) for steers of that weight group the week the steers were placed on feed was used. Similarly, when the slaughter steer sale price was missing on a closeout, the average western Kansas fed steer price reported by AMS was used. Additionally, monthly prices for various weights of feeder steers, slaughter steers, and corn were obtained from the USDA and Kansas Agricultural Statistics to examine seasonal variation in the prices of these commodities. Table 1 reports summary statistics for selected prices, costs, and performance factors by placement weight category.

The summary statistics reveal a number of important distinctions among the three placement weight categories. Over the 11-year time period, average profits ranged from $21.04 per head for steers placed weighing 800 to 899 pounds to $25.93 per head for steers weighing 600 to 699 pounds. The average number of days on feed varied from 119 days for the 800- to 899-pound class to 150 days for the 600- to 699-pound class.

Average feed conversions rose as placement weights increased. Conversions ranged from 8.16 pounds of feed per pound of gain for the 600- to 699-pound placements to 8.56 for the 800- to 899-pound placements.

Cattle placed on feed at heavier weights tended to gain weight more rapidly and were slaughtered at heavier weights. Steers placed on feed at 800 to 899 pounds gained an average of 3.29 pounds per day compared to 3.08 pounds per day for 600- to 699-pound steers. Slaughter weight for steers placed

on feed at 600 to 699 pounds averaged 1,130 pounds compared to 1,231 pounds for 800- to 899-pound placements. Finally, feeding cost of gain, which includes all costs except interest on the feeder animal's purchase price, ranged from $48.26 to $49.98 per hundredweight over the 11-year period, depending on the steers' placement weights.

Steer Feeding Profitability

Monthly average profits for steers placed on feed at 700 to 799 pounds over the 1984 to 1994 period are shown in Figure 1, and the annual average profits are depicted in Figure 2. Profits were calculated as gross revenue from the sale of the finished steer minus the cost of the feeder steer, all feeding costs, and interest on the feeder steer and interest on one-half of the feeding costs. Monthly average profits ranged from a high of $138 per head for steers placed in January 1987 to a low of –$113.86 for steers placed in January 1993. The annual average feeding profits for 700- to 799-pound steers ranged from a high of $63 to a low of –$36 per head.

Net returns to steer feeding are subject to risks from fluctuating feeder and fed cattle prices, feed prices, cattle performance, and interest rates. Producers need to consider these risks as they develop budget projections and consider placing cattle on feed. Higher feeder cattle purchase prices, feed prices, and interest rates, as well as poor cattle feeding performance, all increase costs and, if everything else is constant, reduce profitability for cattle feeders. Declines in fed cattle prices result in lower gross revenues for cattle feeders and, all else held constant, also result in lower net returns.

Seasonality of Profitability

Figures 3 through 5 illustrate the seasonal patterns of steer feeding profits (dollars per head) for each placement weight category by month placed on feed. The standard deviations of steer feeding profits reported here provide a measure of how variable steer feeding profits were by placement month. The standard deviation lines define a range within which profits are likely to fall approximately 68 percent of the time.

Figure 3 reveals that average profit levels for feeding 600- to 699-pound steers are seasonally low for steers placed on feed from February through May. On average, there is a peak for June placements, and another seasonal increase from October through January. Variability of steer feeding profits for 600- to 699-pound placements is lowest for summer through early fall placements. Profit variability is greatest for 600- to 699-pound steers placed on feed during the winter and spring.

Figures 4 and 5 depict seasonal steer feeding profits and standard deviations for steers placed at 700 to 799 and 800 to 899 pounds, respectively. Average profit levels for feeding 700 to 799 pound steers are lowest for February and March placements, and highest for early summer placements. The variability of profits is typically the lowest for summer placements, and the highest for January

Table 1. Averages and Standard Deviations of Selected Steer Feeding Factors for Steers Placed on Feed Between January, 1984 and December, 1994.

	Placement Weight (lbs.)					
	600–699		700–799		800–899	
Variable	Average	Std. Dev.	Average	Std. Dev.	Average	Std. Dev.
Net Return ($/head)	25.93	58.34	21.33	57.25	21.04	57.48
Fed Price ($/cwt.)	70.63	7.55	69.81	7.21	69.99	7.02
Feeder Price ($/cwt.)	78.61	10.61	75.72	10.36	74.16	10.35
Placement Weight (lbs.)	662	27	751	28	837	27
Days on Feed	150	20	129	17	119	15
Sale Weight (lbs.)	1130	63	1172	63	1231	62
Feed Conversion (Feed/Gain)	8.16	0.93	8.24	0.94	8.56	1.08
Avg. Daily Gain (lbs.)	3.08	0.4	3.23	0.37	3.29	0.39
Cost Per Cwt. Gain ($/cwt.)	48.26	6.27	48.41	6.42	49.98	7.14
Corn Price ($/bu.)	2.42	0.39	2.39	0.38	2.36	0.38
Hay Price ($/ton)	75.04	17.14	72.84	17.84	72.87	18.57
Number of Pens	1515		3852		1993	

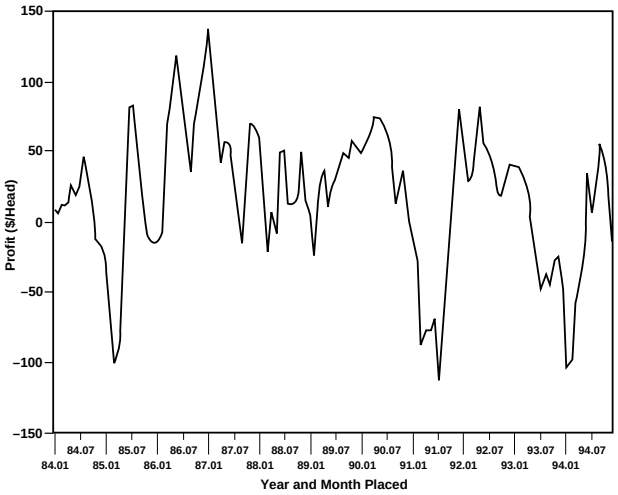


Figure 1. Monthly Average Steer Feeding Profit For Steers Placed at 700–799 lbs.

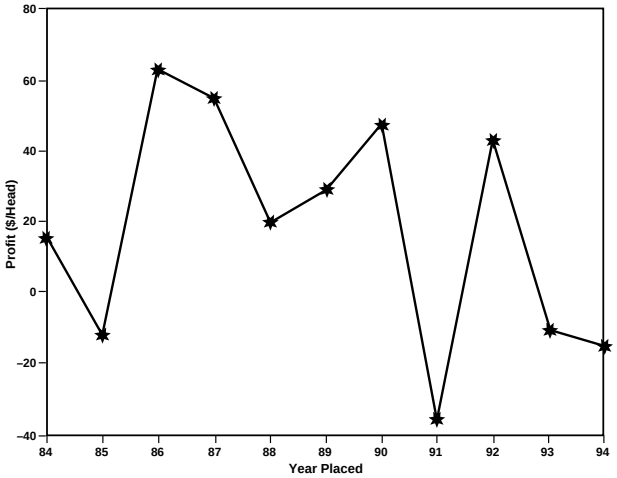


Figure 2. Average Annual Steer Feeding Profit For Steers Placed at 700–799 lbs.

through April placements. Profits for the heavyweight steers, on average, reach a seasonal low for March placements, then increase to a seasonal peak for steers placed in June and July. Variability is lowest for summer placements, and highest for January through April placements. Increased profit variability means there is greater profit risk in those months compared to months with lower profit variability.

The values used to create figures 3 through 5 are reported in Tables 2 through 5. Each table provides information for a different placement weight category. The information in the tables can be used when formulating budget projections and as an aid in considering when to place cattle of various weights. For example, when comparing potential placements of 700- to 799-pound steers on feed in July vs. October, Table 3 indicates that average daily gains for the steers placed in July are, on average about 15 percent higher than for steers placed on feed in October (3.42 pounds per day compared to 2.96 pounds per day). Similarly, the same-weight steers placed on feed in July require approximately 13 percent less feed per pound of gain than steers placed on feed in October. This information can be incorporated directly into budgets used to project break-even prices for cattle placed on feed at various dates during the year.

Economic factors affecting steer feeding profitability also have seasonal traits that contribute to profit variability. Figures 6 through 11 depict seasonal indexes for Kansas corn prices, Dodge City feeder cattle prices, and western Kansas fed steer prices, respectively, over the 11 years of the study. To provide a measure of variability associated with each seasonal index, plots of the seasonal index plus and minus one standard deviation also are included on each graph. The actual seasonal price pattern in any given year is likely to fall within the band identified by the index plus or minus the standard deviation about two-thirds of the time.

The Kansas cash corn price seasonal index indicates corn prices generally bottom at harvest

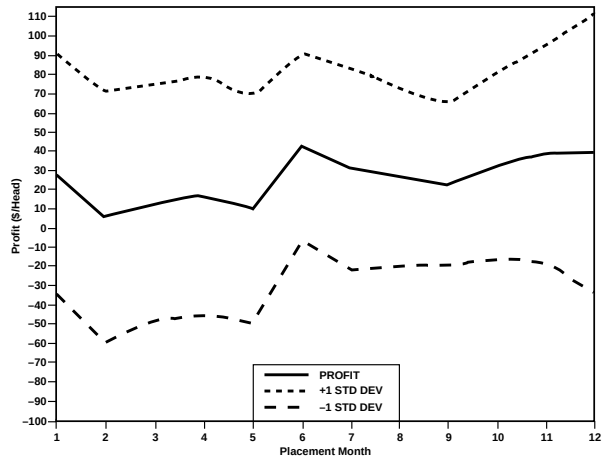


Figure 3. Seasonal Steer Feeding Profit and Standard Deviations for Steers Placed at 600–699 lbs.

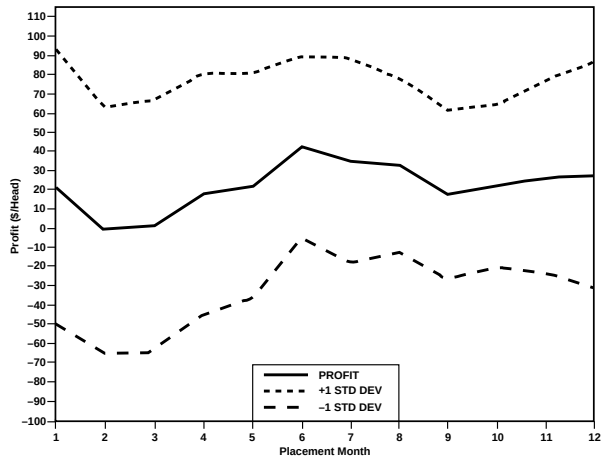


Figure 4. Seasonal Steer Feeding Profit and Standard Deviation for Steers Placed at 700–799 lbs.

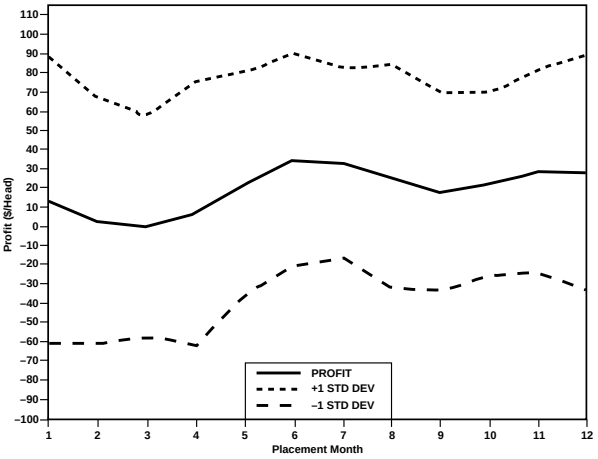


Figure 5. Seasonal Steer Feeding Profit and Deviation for Steers Placed at 800–899 lbs.

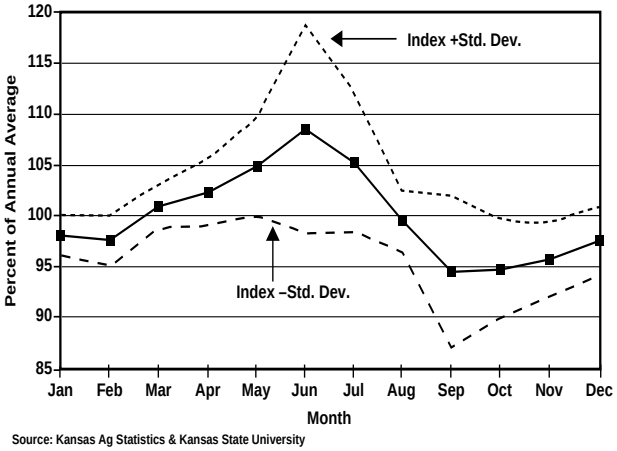


Figure 6. Kansas Corn Price Index 1984–1994.

time in September and October and gradually work their way higher through June. From 1984 through 1994, Kansas cash corn prices averaged 4 to 5 percent below the annual average in September and October. Corn prices tended to increase throughout the storage season until the following June, when cash prices tended to be greater than the annual average price by 8 to 9 percent.

Feeder steer prices have different seasonal patterns depending on their weight. Monthly average prices reported by AMS for Dodge City were used to construct seasonal price indexes for four weight categories of feeders; 500- to 600-pound, 600 to 700-pound, 700- to 800-pound, and 800- to 1000-pound steers. Figures 7 through 10 depict the price indexes for 500- to 600-pound, 600- to 700-pound, 700- to 800-pound and 800- to 1,000-pound feeder steers, respectively. The price indexes reveal how prices vary within a year around the annual average price for that year. Specifically, the index number indicates whether price in a given month is expected to be greater or less than the annual average for a particular year. For example, the price index for 500- to 600-pound steers in April is 103.6, indicating the steer price in April is expected to be 3.6 percent greater the annual average price.

Prices of lightweight cattle, such as 500- to 600-pound steers, follow a pronounced seasonal pattern. Lightweight steer prices typically increase in late winter and early spring and remain seasonally strong through the spring. Prices begin to decline in the summer and reach their seasonal lows in October through December. Strong demand for lightweight cattle suitable for spring grazing and a seasonally small supply of lightweight cattle

Table 2. Average monthly values for feeding costs, performance factors, and number of pens of steers placed on feed weighing between 600 and 699 lbs. (1984–1994).

Placement Month	Number of Pens	Cost of Gain	Feed Conv. (feed/gain)	Average Daily Gain (lbs.)	Profit ($/head)[a]	Std. Dev. of Profit ($/head)
January	169	46.54	7.79	3.17	27.73	62.55
February	116	45.79	7.66	3.30	6.38	65.54
March	148	46.01	7.65	3.38	12.80	61.22
April	81	46.70	7.76	3.38	16.69	62.28
May	109	47.86	7.87	3.21	10.14	58.41
June	55	46.85	7.70	3.30	42.02	48.74
July	81	47.78	8.16	3.14	31.04	52.39
August	129	48.84	8.30	3.05	26.67	46.39
September	134	51.13	8.74	2.82	22.89	42.11
October	181	52.03	8.96	2.74	32.83	48.41
November	165	49.86	8.49	2.88	38.76	56.50
December	147	46.79	8.16	3.00	39.63	73.18

[a] Profit reflects the average profit per head for steers placed on feed during that month.

Table 3. Average monthly values for feeding costs, performance factors, and number of pens of steers placed on feed weighing between 700 and 799 lbs. (1984–1994).

Placement Month	Number of Pens	Cost of Gain	Feed Conv. (feed/gain)	Average Daily Gain (lbs.)	Profit ($/head)[a]	Std. Dev. of Profit ($/head)
January	307	48.61	8.22	3.17	21.2	71.14
February	303	46.80	7.89	3.34	–0.64	63.75
March	405	47.07	7.93	3.34	1.06	64.95
April	346	46.56	7.82	3.38	17.81	62.10
May	412	46.98	7.91	3.30	22.24	58.27
June	274	46.71	7.94	3.37	41.89	47.14
July	310	46.92	7.88	3.42	35.06	52.79
August	321	47.22	8.16	3.32	32.79	45.02
September	312	50.86	8.79	3.07	17.54	43.88
October	356	51.97	9.05	2.96	22.22	42.31
November	252	52.55	8.99	2.97	26.93	50.21
December	254	50.07	8.67	3.01	27.85	58.83

[a] Profit reflects the average profit per head for steers placed on feed during that month.

in the spring are the two principal reasons lightweight cattle prices reach their seasonal peak in the spring. On the other hand, demand for lightweight cattle is lower, and supplies of cattle in this category are larger, in October through December, which explains why lightweight steer prices generally reach their low in the fall.

Heavier-weight feeder steers follow a much different price pattern than lightweight steers. Compared to lightweight steers, the seasonal price pattern for heavyweight steers is not as pronounced. For example, the seasonal price index for 600- to 700-pound steers reaches its low point in October at 98.9 and peaks in August at 101.6.

The seasonal price pattern for 700- to 800-pound steers is more pronounced than the pattern for 600- to 700-pound steers. Prices for 700- to 800-pound steers peak in January and February, bottom out in the spring during April through June, recover modestly during the summer and rise above the annual average the last two months of the year. On average, prices for 700- to 800-pound steers move from approximately 1.4 percent above the annual average in February to 3 percent below the annual average in May.

Prices for steers weighing 800 to 1000 pounds follow a seasonal price pattern similar to that observed for 700- to 800-pound steers. Prices tend to peak during the winter, drop sharply in the spring, recover in midsummer, and remain near the annual average during the rest of the year.

Monthly average prices reported by AMS for the western Kansas direct trade in 1,100- to 1,300-pound fed steers were used to construct a seasonal price index for fed steers (Figure 11). Fed steer prices are generally greater than the annual average price from November through May and less than the annual average from June through

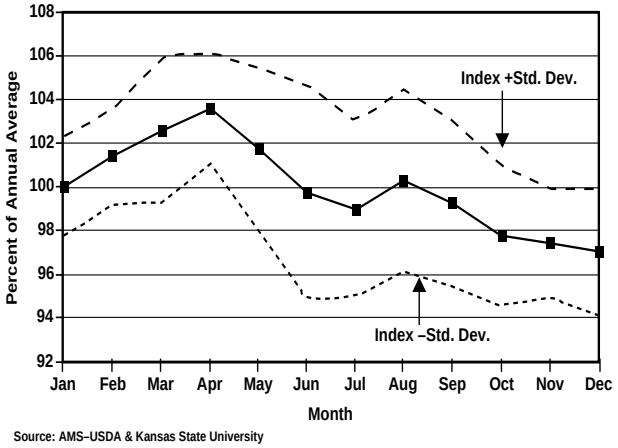


Figure 7. Dodge City 500–600 lb. Feeder Steer Price Index 1984–1994.

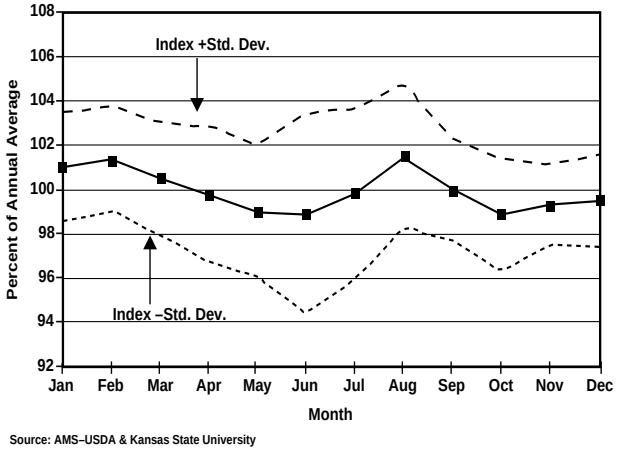
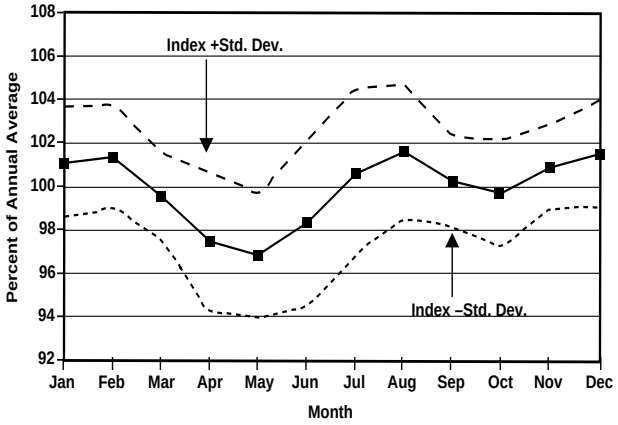
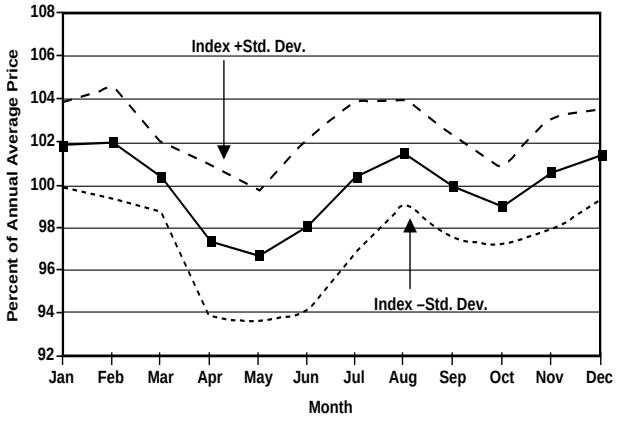


Figure 8. Dodge City 600–700 lb. Feeder Steer Price Index 1984–1994.



Source: AMS–USDA & Kansas State University

Figure 9. Dodge City 700–800 lb. Feeder Steer Price Index 1984–1994.



Source: AMS–USDA & Kansas State University

Figure 10. Dodge City 800–1,000 lb. Feeder Steer Price Index 1984–1994.

October. Prices for 1,100- to 1,300-pound steers in the western Kansas direct trade tend to reach their seasonal peak in March and April, when prices are 3 to 4 percent greater than the annual average, and bottom out in July through September, when prices average 3 to 4 percent less than the annual average.

Feeding Cost of Gain vs. Total Cost of Gain

Total cost of gain is a function of input costs and cattle performance. Input costs include feed costs, veterinary costs, processing and yardage fees, interest charges on both the feeder animal's purchase price and on other costs, plus miscellaneous charges. In contrast, feeding cost of gain, as defined in this study, includes all these costs, except interest charges on the feeder animal's purchase price.

Feeding cost of gain is widely used in the cattle feeding industry to compare the economic feeding performance of cattle. Feeding cost of gain reflects the effect of cattle feeding management and the animal's genetic performance potential, but omits the effect of purchase management strategies.

The single factor that has the greatest effect on feeding cost of gain is feed cost. In turn, total feed cost is determined by feed grain prices, forage prices, and animal performance. Higher grain and forage prices lead to higher total feed cost. Animal performance factors that affect feeding cost of gain include feed conversion, daily gain, and death loss percentage. Increases in feed conversion or death loss cause feeding cost of gain to increase. In addition, health problems, which increase veterinary costs and reduce animal performance, increase cost of gain. Conversely, feeding cost of gain declines

Table 4. Average monthly values for feeding costs, performance factors, and number of pens of steers placed on feed weighing between 800 and 899 lbs. (1984–1994).

Placement Month	Number of Pens	Cost of Gain	Feed Conv. (feed/gain)	Average Daily Gain (lbs.)	Profit ($/head)[a]	Std. Dev. of Profit ($/head)
January	104	52.23	8.63	3.21	13.41	74.14
February	94	49.95	8.35	3.28	2.85	64.00
March	118	49.05	8.19	3.39	–0.07	57.25
April	159	49.40	8.25	3.36	6.74	67.89
May	205	48.58	8.17	3.32	22.08	57.57
June	165	48.72	8.13	3.42	34.51	54.92
July	213	47.12	8.03	3.55	32.36	49.08
August	224	48.79	8.43	3.41	25.49	57.84
September	238	50.22	8.81	3.24	18.09	51.57
October	220	52.83	9.36	3.07	22.14	47.19
November	166	53.44	9.32	3.08	28.72	52.45
December	87	50.89	9.02	3.09	27.98	61.16

[a] Profit reflects the average profit per head for steers placed on feed during that month

as average daily gain increases. Figure 12 depicts monthly average feeding cost of gain by placement month for 700- to 799-pound steers.

Seasonality of Feeding Cost of Gain

Seasonal patterns for feeding cost of gain, by placement weight category, are illustrated in Figure 13. The average monthly cost of gain values are reported as indexes by the month the cattle were placed on feed. An index value of 100 is equal to the annual average for each placement weight category. A monthly index value of 107 indicates that value is 7 percent greater than the annual average for that weight class. For example, the cost of gain index value for 700- to 799-pound steers placed on feed during October is 107, which means October steer placements of that weight, on average, had a cost of gain 7 percent greater than the annual average for that weight class.

Seasonality of feeding cost of gain is useful information from a management perspective. Feeding cost of gain generally falls below average for spring and early summer steer placements, whereas steers placed on feed from September through November typically have above-average costs of gain. There are, however, distinct differences across placement weight categories. For example, feeding cost of gain for 600- to 700-pound and 700- to 800-pound steers placed on feed during the winter is generally below average, whereas feeding cost of gain for the 800- to 900-pound class is well above average during January.

Performance factors affecting cost of gain also have marked seasonal patterns which, in turn, influence cost of gain seasonality. Figure 14 illustrates the seasonal index of feed conversions for the various steer placement weight categories. Feed conversion indicates how many pounds of feed (measured on an as fed basis), on average, are required to produce a pound of gain. Lower feed conversions generally result in lower costs of gain and higher feed conversions are associated with higher gain costs. Feed conversions follow seasonal patterns similar to those observed for cost of gain. In general, steers placed from February through August had the lowest average feed conversions, although there was some variability depending on placement weight.

Average daily gain (ADG) is another performance factor that contributes to gain costs. Figure 15 depicts average daily gain seasonal indexes for all steer placement weight categories. Average daily gain is inversely related to cost of gain due to increased yardage costs and generally poor feeding performance for slower gaining steers. Steers placed on feed in the fall had the lowest ADG's across all placement weight categories, but the rest of the seasonal pattern for ADG varied somewhat by placement weight category. For example, ADG for lightweight steers peaked in late winter and early spring, but ADG for steers placed on feed at heavier weights peaked in early summer.

Differences in ADG across placement months indicate the importance of seasonally adjusting ADG when projecting the cost of finishing cattle. Failure to adjust for seasonal performance differences may lead to erroneous break-even calculations and inaccurate slaughter date estimates.

Conclusions

This Kansas State University study documents recent seasonal trends in cattle performance and economic factors that influence steer feeding profitability. Individual pen closeout data for steers placed on feed from January 1984 through December 1994 at two western Kansas custom feedyards are analyzed in this study.

Results indicate cattle placed on feed in March and April generally have the lowest feeding cost of gain, whereas cattle placed on feed from September

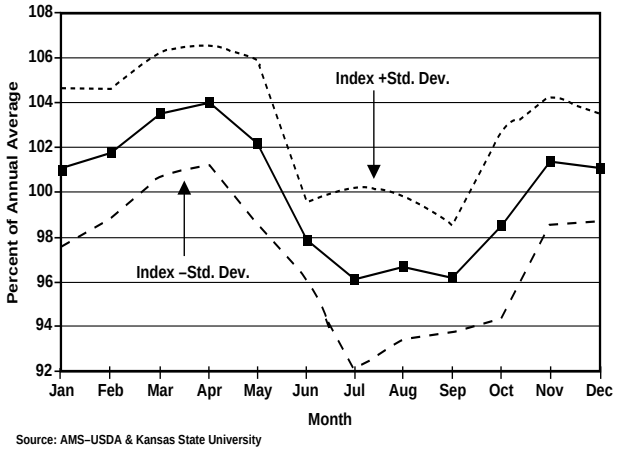


Figure 11. W. Kansas 1,100–1,300 lb. Feeder Steer Price Index 1984–1994.

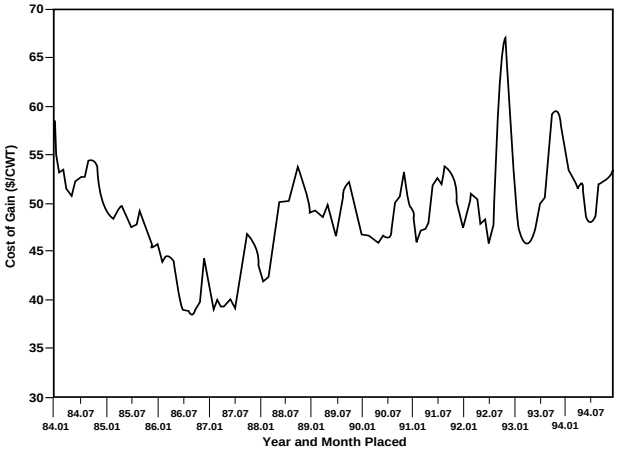


Figure 12. Monthly Average Steer Feeding Cost of Gain for Steers Placed at 700–799 lbs.

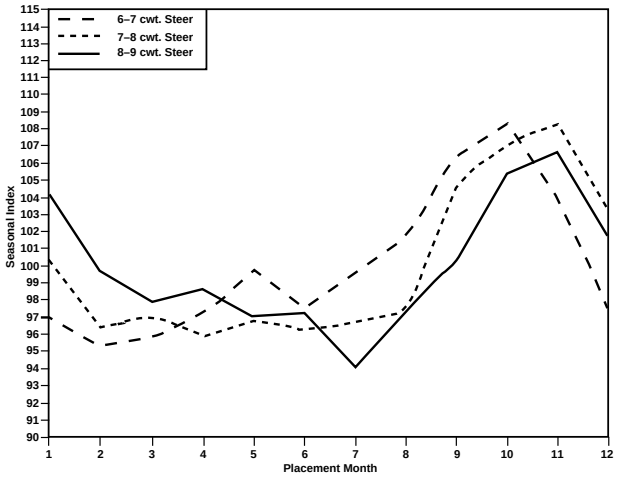


Figure 13. Seasonal Index of Cost of Gain by Placement Weight.

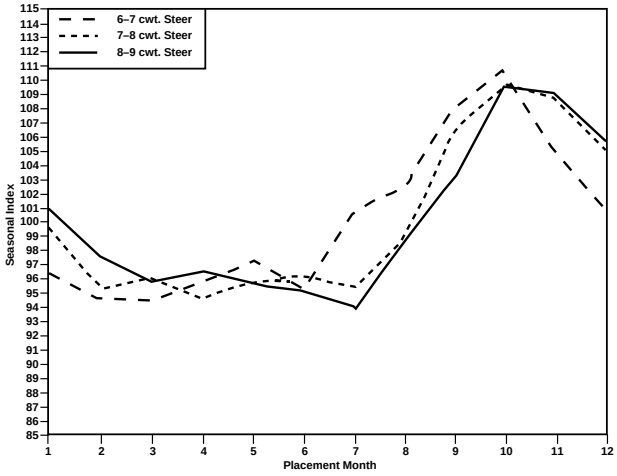


Figure 14. Seasonal Index of Feed Conversion by Placement Weight.

through November tend to have the highest feeding cost of gain. Additionally, cattle placed on feed in the first half of the year tend to have the lowest feed conversions, whereas cattle placed on feed in the fall generally require more pounds of feed to produce a pound of gain. Finally, average daily gains are generally lowest for steers placed on feed from September through December. Steers placed on feed in the winter, spring, and early summer have much higher average daily gains than those placed on feed the last four months of the year.

Fed cattle prices generally reach their seasonal peaks in late winter and early spring and are lowest during the summer months. Corn prices are generally lowest at harvest time and highest at the end of the spring. Lightweight feeder steer prices were usually highest in late winter and early spring and weakest during the fall. Prices for heavyweight steers reached their peak in early winter and declined rapidly by mid-spring.

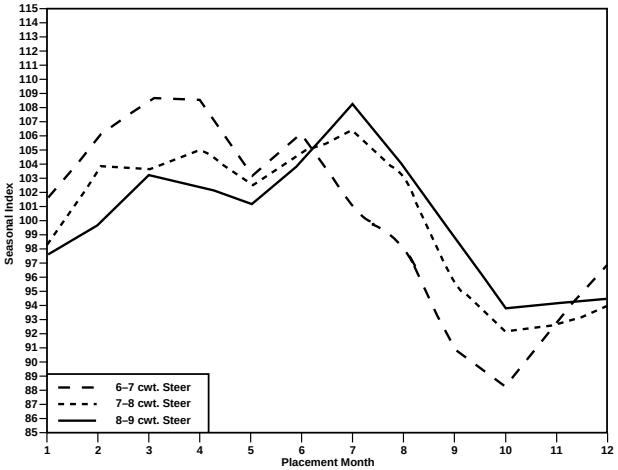


Figure 15. Seasonal Index of Average Daily Gain by Placement Weight

Seasonal profit patterns vary somewhat by placement weight, but steers placed on feed in late winter and early spring are generally less profitable than same-weight steers placed on feed in late spring and early summer. Additionally, cattle placed on feed during the summer typically have less profit variability than cattle placed on feed during other times of the year.

Cattle feeders can use the information in this bulletin to increase their profitability by developing improved projections for feeding cost of gain and break-even prices for specific feedlot steer placements and by using seasonal price and profit information to fine tune their cattle feeding management strategies.

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Reference

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