SEASONAL VARIATION
IN PRICES AND SHIPMENTS
OF ARIZONA BEEF CATTLE

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SUMMARY

1. Prices of 700-1,100 pound top fat steers at Phoenix vary from an index of 102.4 in June (the month of highest prices) to an index of 97 in December.¹

2. Choice 700-1,100 pound steers at Los Angeles varied in price from a high index of 103 in April to a low of 97 in October. Thus the seasonal high and low months occurred earlier in the year than for a comparable class of cattle at Phoenix.

3. The seasonal pattern of heifer prices at Los Angeles was similar to that of steers at that market. The high month was April (index 103) and the low month was November (index 96).

4. Maximum seasonal cow prices at Los Angeles came in March (index 104) and the low in November (index 94).

5. Prices of stocker and feeder cattle at Kansas City were highest in March (index 108) and lowest in October (index 94).

6. In general, seasonal prices of high quality steers are the most consistent. The lower grades and the lower slaughter-use classes (e.g. cows) have more variation and tend to reach their seasonal high and low earlier in the year than do choice steers.

7. Seasonal variation in volume of shipments of yearling steers from Arizona has two definite high points or "peaks" during the year. The first comes in May (index 285) and consists largely of slaughter stock, the second comes in October and November (index 217 and 206 respectively) and consists primarily of stockers and feeders.

8. Steers two years old and older have a pattern of seasonal movement similar to that of yearlings, though the range of fluctuations is not as great.

9. The seasonal pattern of heifer shipments is similar to that of yearling steers, but again the spring peak (252) is much higher than that of the fall (143).

10. The peak movement of cows comes during October and November (index 203 and 229 respectively) as ranchers are culling their herds. A minor peak (117) occurs in May when further culling is done.

11. Over half the calf shipments occur during October and November (index 289 and 343 respectively), after which shipments gradually decrease until July.

12. As with Arizona outshipments of calves, shipments of stocker and feeder cattle into California are concentrated during October and November (index 253 and 308 respectively), but movement continues in volume through December and January.

¹In the index numbers used in this study the average of monthly prices or shipments equals 100. These index numbers have been corrected for long-time and cyclical trends in prices and shipments, and for unusual price or shipment conditions which may have occurred.
13. Cattle for immediate slaughter move into California in volume throughout the fall and winter months. Volume drops rapidly in May and continues at a reduced level throughout the summer months.

14. The availability of feed previous to the marketing season has a definite and consistent influence on the cattle prices of that season. Shipments of stocker and feeder cattle tend to reach their highest prices at an earlier date during those years that follow large feed supplies.
SEASONAL VARIATION IN PRICES AND SHIPMENTS OF ARIZONA BEEF CATTLE

By R. E. Seltzer

PURPOSE OF THIS STUDY

The study of seasonal variation in prices and shipments of Arizona cattle, the results of which are presented in this bulletin, was made with the idea of providing Arizona ranchers and cattle feeders with an objective historical description of the seasonal price and shipment patterns for Arizona cattle, together with a brief analysis of the effect of feed supplies on such seasonal patterns. With the information provided the cattle producer or feeder may be able to adjust his operation to take advantage of the typical seasonal movement in prices and shipments. In making such use of an analysis of this type, certain limitations of data and of methods of analysis must be kept in mind.

In the first place, one cannot be sure that the same conditions will prevail in the future as have prevailed in the past. In the second place, the study is restricted to data on outshipments and does not take into account movement of cattle from one point to another within Arizona. And, finally, outshipments data do not differentiate between feeder cattle and slaughter cattle and as a result it has been necessary to make some assumptions regarding the immediate disposition of cattle moving at different seasons.

INTERPRETATION OF THE DATA PRESENTED IN THIS STUDY

The results obtained in the analysis of seasonal variation in prices and shipments are presented in terms of index numbers. The index numbers used may be thought of as percentages of the average for the entire year. Since the average price for the years studied is 100, the price index of 103 for the month of April (Fig. 2) indicates that the average price of choice steers at Los Angeles for April was 3 per cent higher than the average price for the entire seventeen-year period studied.

In Figures 1 through 12, three indexes are shown for each month. These are: (1) the "typical" monthly index—this is the "normal" or "average" index found for that month over the entire period studied, and is shown by the heavy black line in each of the figures; (2) the "high" monthly index—this is the...
Figure 1.—Seasonal variation in prices of 700-1,100 pound top fat steers at Phoenix, typical seasonal variation and range in variation. Average of the period 1935-51 inclusive.

'SAverage of the year equals 100.

Figure 2.—Seasonal variation in prices of 700-1,100 pound choice steers at Los Angeles, typical seasonal movement and range in variation. Average of the period 1935-51 inclusive.

'SAverage of the year equals 100.
highest index found for each particular month in any year studied; and (3) the "low" monthly index—this is the lowest index found for each particular month in any year studied. The difference between the "high" index and the "low" index for each month represents the relative range in prices, and is an indication of the consistency of the "typical" index for that particular month. The narrower this range, the more consistent and hence reliable, is the "typical" index for that month.

**SOURCES OF DATA**

Cattle prices for the Los Angeles and Kansas City markets were obtained from reports of the Market News Service, Production and Marketing Administration, United States Department of Agriculture. Prices on the Phoenix market were calculated by the Department of Agricultural Economics, University of Arizona, from the *Weekly News Letter* of the Central Arizona Cattle Feeders Association.

Arizona outshipment data were obtained from reports of the Arizona Livestock Sanitary Board, and from reports of Arizona cattle shipments issued by the Crop and Livestock Reporting Service, Bureau of Agricultural Economics, United States Department of Agriculture, Phoenix, Arizona. Shipments into California were secured from the "California Annual Livestock Report" issued by the California Crop and Livestock Reporting Service.

**SEASONAL VARIATION IN CATTLE PRICES**

**Top Fat Steers at Phoenix**

Prices of 700-1,100 pound top fat steers at Phoenix in January stand at the average yearly price (index 100), drop slightly in February as shipments from Arizona gain in volume, and then as shipments decline prices rise slowly to a peak index of 102.4 in June (Fig. 1 and Table 1). During the late summer and early fall months, movement of cattle to market increases and prices decline to a seasonal low during October, November, and December.

The shaded area on each figure represents the range in monthly prices around the typical seasonal variation. In Figure 1, it is seen that the pattern of seasonal movement is most reliable during the period of highest prices (April, May, June) and also during the period of lowest prices (October, November, December).

**Choice Steers at Los Angeles**

The pattern of seasonal price variation for 700-1,100 pound choice steers at Los Angeles (Fig. 2) is similar to that of top fat steers at Phoenix. Prices begin the year at the seasonal average, drop during February and then rise toward a seasonal peak. However, at Los Angeles the seasonal peak comes earlier, April as compared to June for the Phoenix market, and is slightly
TABLE 1.—HIGH AND LOW PRICE PERIODS FOR ARIZONA CATTLE, AVERAGE OF YEARS 1935-1951 INCLUSIVE

<table>
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<tr>
<th>Class of cattle and place of pricing</th>
<th>High months and indexes*</th>
<th>Low months and indexes*</th>
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<tr>
<td>700-1,100 pound top fat steers, Phoenix</td>
<td>April 101.8, May 101, June 102.4</td>
<td>October 98, November 98, December 97</td>
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<td>700-1,100 pound choice steers, Los Angeles</td>
<td>March 102, April 103, May 102</td>
<td>September 98, October 97, November 98</td>
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<tr>
<td>Good heifers, Los Angeles</td>
<td>March 102, April 104, May 102</td>
<td>October 98, November 96, December 98</td>
</tr>
<tr>
<td>Common and medium cows, Los Angeles</td>
<td>March 104, April 104</td>
<td>October 96, November 94, December 98</td>
</tr>
<tr>
<td>Stockers and feeder steers, Kansas City</td>
<td>March 108, April 106, May 107</td>
<td>September 96, October 94, November 95</td>
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*Average of the year = 100.

higher, 103 as compared to 102. Having reached a peak in April, prices then decline to a seasonal low in October. The seasonal low at Los Angeles also comes earlier than that at Phoenix (October as compared to December). As at Phoenix, the seasonal pattern at Los Angeles was most consistent during the high and the low extremes.

Good Heifers at Los Angeles

The seasonal price pattern for good heifers at Los Angeles (Fig. 3) closely parallels that of choice steers on the same market. Prices in January are at the seasonal average, dip in February, increase to a peak in April, and then gradually decline to a seasonal low during October, November, and December. The seasonal pattern was most consistent during the seasonal low, but did not have the consistency found in the pattern of steer prices during the period of the seasonal high.

Common and Medium Cows at Los Angeles

Cow prices start the year at a level (102) slightly above that of steers and heifers, and do not drop as much in February (Fig. 4). The seasonal high (104) comes in March, a month earlier than for steers or heifers, after which prices move toward a seasonal low (94) in November. The pattern of consistency of the price seasonal is similar to that for heifers, the index being most consistent during the months of low prices.
Figure 3.—Seasonal variation in prices of good heifers at Los Angeles, typical seasonal variation and range in variation. Average of the period 1935-51 inclusive. 
\(^1\)Average of the year equals 100.

Figure 4.—Seasonal variation in prices of common and medium cows at Los Angeles, typical seasonal variation and range in variation. Average of the period 1935-51 inclusive. 
\(^1\)Average of the year equals 100.
Figure 5.—Seasonal variation in prices of stocker and feeder cattle at Kansas City, typical seasonal variation and range in variation. Average of the period 1935-51 inclusive.

*Average of the year equals 100.

**Stocker and Feeder Steers at Kansas City**

Los Angeles has not become established as an important stocker and feeder market, and in order to have a continuous price series for this class of cattle, it was necessary to use the Kansas City market.

Prices of stocker and feeder cattle at Kansas City begin the year at about the season's average, and then rise rapidly to a seasonal high (about 107) during March, April, and May (Fig. 5). Prices then begin to decline and reach a seasonal low in October and November. The seasonal low in prices coincides with the months of heaviest shipments of this class of cattle.
SEASONAL VARIATION IN CATTLE SHIPMENTS

Limitations of Arizona Outshipment Data

Analysis of Arizona outshipments as reported by the Arizona Livestock Sanitary Board is subject to a definite limitation: the data as reported do not differentiate between cattle moving to slaughter and cattle shipped for further feeding. This being the case, it has been necessary to make certain assumptions regarding the use classification of the cattle moving at the various seasons of the year. These assumptions were based on a knowledge of the general pattern of marketing slaughter and feeder cattle from Arizona and were checked with cattlemen in the State.

Outshipments of Yearling Steers from Arizona

Figure 6 shows the pattern of seasonal variation in shipments of yearling steers from Arizona. The seasonal pattern for this class of cattle shows pronounced variations, and the relatively narrow range about the "typical" line indicates that this pattern of shipments is fairly consistent from year to year.

In the shipment of yearling steers, two definite high points occur. The first of these comes in May when volume of shipments amounts to nearly three times the seasonal average. This peak in shipments occurs during the usual period of heavy movement of cattle from Arizona feed lots, and it would therefore be logical to assume that the bulk of this spring peak consists of slaughter cattle.

During the hot summer months, the volume of shipments decreases rapidly, the seasonal low in August being less than one-quarter of the yearly average. As cattle begin to move off ranges in the fall, shipments rise and the fall maximum, about twice the seasonal average, is reached in October and November. The bulk of this volume of shipments consists of stocker and feeder cattle.

This fall movement decreases rapidly during December, and the winter low, about four-tenths of the yearly average, is reached during December and January. By the latter date the bulk of the stocker and feeder movement has been completed and feeding operations have not yet reached the stage at which slaughter cattle are moving in volume.

Outshipments of Steers
Two Years Old and Older from Arizona

While the pattern of shipments of steers two years old and older was similar to that for yearling steers, it varied considerably from that of yearling cattle. Figure 7 shows the seasonal pattern of Arizona outshipments for steers two years old and older. For this class of cattle, slaughter stock constituted a larger proportion of total movement than was the case for yearling steers. The spring peak comes earlier (March, April, May) than for yearlings, and is about one and one-half times the yearly average. This is about half as large, relatively speaking, as the
Figure 6.—Seasonal variation in outshipments of yearling steers from Arizona, typical seasonal variation and range in variation. Average of the period 1939-51 inclusive. 
¹Average of the year equals 100.

Figure 7.—Seasonal variation in outshipments of steers two years old and older from Arizona, typical seasonal variation and range in variation. Average of the period 1939-51 inclusive. 
¹Average of the year equals 100.
VARIATION IN PRICES & SHIPMENTS OF CATTLE

Variation found for yearling steers. The summer low in shipments occurs later than for yearlings, September as compared to August, and is not as extreme, 46 as compared to 24. The fall peak comes in November, a month later than for yearlings, and is only about half as large, 106 as compared to 216. The volume of stocker and feeder cattle in the two-year and older age group is much smaller than that of yearling steers. Finally, the winter low is much less extreme than that for yearling steers.

Outshipments of Heifers from Arizona

Seasonal variation in Arizona heifer shipments is shown in Figure 8. The pattern of shipments is similar to that for yearling steers, but the fall peak is less extreme. This situation results from the local demand for heifers to replace cows culled from the breeding herds, whereas the feeder demand for steers is not influenced by this alternative use.

The spring peak in heifer shipments comes in May, when the seasonal index rises to a point approximately two and one-half times the yearly average. Shipments drop off rapidly during the summer months and reach a low in August equal to 35 per cent of the yearly average. The fall peak is reached in November, index 143, after which shipments drop rapidly to the winter low of 49 in December.

Outshipments of Cows from Arizona

The bulk of the shipments of cows from Arizona occurs during October and November when ranchers cull their cow herds (Fig. 9). The index of outshipments during these two months reaches 203 and 229 respectively. There is a minor peak in movement in May as a result of further culling when cows are in good condition from spring range. The hot summer months constitute the yearly low with shipments dropping in August to 35 per cent of the yearly average.

Outshipments of Calves from Arizona

Calves have the most pronounced and regular pattern of seasonal movement of all of the classes of cattle (Fig. 10). Over half of the total shipments occur during October and November. The November peak is nearly three and one-half times the seasonal average. On the low side, there is very little movement during the summer months, the index for July and August being less than one-sixth of the season's average. Calves moving from Arizona are primarily feeder calves and the large fall movement coincides with the demand for calves to go on feed in Arizona and California.

SEASONAL VARIATION IN SHIPMENTS OF CATTLE INTO CALIFORNIA

California is the primary out-of-state market for Arizona cattle. During the past ten years, 70 per cent of Arizona's cattle shipped out of the state have gone to California markets. The
Figure 8.—Seasonal variation in outshipments of heifers from Arizona, typical seasonal variation and range in variation. Average of the period 1931-51 inclusive.

Average of the year equals 100.

Figure 9.—Seasonal variation in outshipments of cows from Arizona, typical seasonal variation and range in variation. Average of the period 1939-51 inclusive.

Average of the year equals 100.
VARIATION IN PRICES & SHIPMENTS OF CATTLE

Figure 10.—Seasonal variation in outshipments of calves from Arizona, typical seasonal variation and range in variation. Average of the period 1939-51 inclusive. *Average of the year equals 100.

Figure 11.—Seasonal variation in shipments of stocker and feeder cattle into California, typical seasonal variation and range in variation. Average of the period 1939-51 inclusive. *Average of the year equals 100.
importance of California as a market for Arizona cattle makes it desirable that the seasonal pattern of cattle shipments into that state be determined. The data used in the calculation of the indexes of seasonal movement of cattle into California, include shipments from all states.

**Shipments of Stocker and Feeder Cattle into California**

The pattern of shipments of stockers and feeders into California is shown in Figure 11. A comparison of California inshipments of stockers and feeders with Arizona outshipments of calves (Fig. 10) reveals nearly identical patterns of movement.
The bulk of shipments of stockers and feeders into California comes during October and November.

Shipments of Cattle into California for Immediate Slaughter

The seasonal pattern of movement of cattle into California for immediate slaughter (Fig. 12) does not show the extreme variation found in the case of stockers and feeders. Volume of receipts continues at a high level from October through March, the peak coming in January when the index is 142. In March, shipments begin to decrease and drop rapidly to a low of about half the yearly average during June and July.

EFFECT OF FEED SUPPLY ON SEASONAL PRICE VARIATION

The availability of feed, both concentrates and roughages, in the months previous to the marketing season influences the pattern of cattle prices. In an attempt to measure the effect of food supplies on seasonal price patterns, prices of 700-1,100 pound choice steers at Los Angeles in those years following large feed supplies were selected and compared with prices in years following small feed supplies. Arizona-California barley and hay production were used as measures of feed supplies.4

Figure 13 shows the effect of feed supplies on the seasonal cattle price pattern during the following marketing year. From the price relationships shown in this figure, the following conclusions may be made:

A. In years following large feed crops:

1. Cattle prices during the fall months immediately following large feed crops tend to be higher than normal. Feed grain and hay prices will be relatively low, and the beef-feed ratio will generally be favorable to cattle feeding. Accordingly, there will be a greater than normal demand for cattle to go on feed. This will tend to reduce the supply of cattle available for slaughter during the fall months for two reasons: (1) a greater than normal proportion of two-way cattle (cattle which could either go to slaughter or be fed to a higher finish) will go into feed lots instead of to slaughter, and (2) cattle already on feed will be fed to heavier weights. These two factors will result in a relative scarcity of slaughter stock, and this will tend to bolster cattle prices during the fall.

2. Cattle prices during the following spring will be depressed below normal levels. As the large number of cattle, which had gone on feed the preceding fall, begin to move out of feedlots and into slaughter, market receipts will rise and prices will fall. The movement of fed cattle continues to volume

*To arrive at a combined index of feed supplies, these two crops were weighted on the basis of total digestible nutrients in the concentrate component and in the roughage component of the beef fattening ration. This index was then adjusted to a constant level of cattle numbers in Arizona and California.
Figure 13.—Seasonal variation in prices of 700-1,100 pound choice steers at Los Angeles after years of large feed supplies and after years of small feed supplies.

'Average of the year equals 100.

Figure 14.—Seasonal variation in shipments of stocker and feeder cattle into California after years of large feed supplies and after years of small feed supplies.

'Average of the year equals 100.
VARIATION IN PRICES & SHIPMENTS OF CATTLE

for a longer period than in normal years, with the result that the summer peak in prices comes later.

B. In years following small feed crops:

1. Feed prices will be relatively high, more two-way cattle will go to slaughter, and cattle already on feed will be marketed at lighter weights. This combination of factors will tend to increase market receipts and depress prices during the fall immediately following a short feed crop.

2. During the next spring there will be a scarcity of fed cattle and the seasonal price increase will be greater than normal.

3. Attracted by the higher prices, movement of cattle to slaughter will be accelerated during the late summer and the fall months of the year following, and prices will accordingly drop farther than would normally be expected.

EFFECT OF FEED SUPPLY ON MOVEMENT OF STOCKER AND FEEDER CATTLE INTO CALIFORNIA

In years following large feed supplies, the peak in movement of stocker and feeder cattle into California comes a month earlier in the fall of the year of the large feed crop (Fig. 14), and also a month earlier in the fall of the next year. With feed relatively plentiful and conditions favorable for feeding, there would tend to be a more immediate demand for feeder cattle, and the peak movement would thus occur earlier than in years when, because of short feed supplies, there was less incentive to feed.