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Selected factors affecting feeder calf prices in West Virginia

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Selected Factors Affecting Feeder Calf Prices In West Virginia

West Virginia University
Agricultural and Forestry
Experiment Station

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SUMMARY AND CONCLUSIONS

Since the 1930s, the main marketing channel for feeder calves in West Virginia has been through auction markets. In recent years, the numbers of feeder calves going through auction markets have been declining.

Various researchers have indicated that marketing problems exist for feeder calves. Most of the problems have centered around the pricing system for livestock sold at auction markets. Some farmers have only a vague idea of what they should do to improve their marketing position and income. In view of this, the pricing system of feeder calves at West Virginia auction markets was studied. The study was mainly concerned with factors which affect prices of feeder calves at auction markets, especially those factors considered to be within the control of the producers.

The overall purpose of the study was to determine the influence of selected economic and physical factors on the average price of feeder calves sold through auction markets in West Virginia. The following factors were hypothesized to affect the average price: breed, grade, the year and date of the sale, sex, sale location, average weight, lot size, size of sale, and number of buyers.

Two years' data (1976 and 1977) from ten sale places in West Virginia were used in the study. Lots were used as a basis for observation. There were 3,175 lots of animals or observations in the analysis, containing a total of 33,936 feeder calves.

Regression techniques were employed to analyze price behavior. The factors hypothesized to affect prices were included in a multiple regression equation with price as the dependent variable. The results of the analysis indicated which hypothesized factors were statistically significant. The overall explanation of the variability in price by the factors as indicated by the coefficient of determination (R^2) was 73.27 percent.

The most important factor found to influence the price was the sex of the animal. Higher prices were realized for steers than heifers and their effect on price overshadowed all other variables considered.

The second most important factor was the year the sale took place. Seasonal or yearly variations in supply and demand and, consequently, prices of feeder calves were found to be significant.

Grade had the third highest influence on price. As expected, grades "one" and "two" proved superior to grades "three," "four," and "five." The results indicated that buyers rated grade as an important factor in pricing decisions.

The next most important factor was the number of buyers present at the sale: as the number of buyers increased, the price decreased. Although this result seemingly contradicts general thinking on the effects of number of buyers on the average price paid for feeder calves, a possible explanation involves the nature of the particular buyers at the sales: Buyers consist mainly of order buyers, who are willing to pay higher prices in order to fill their quotas, and farmers, who are not usually willing to pay as high a price. Usually, there is a relatively large group of farmer-buyers and few order buyers. If this small group of order buyers is larger than usual, they could purchase the majority of the animals at a particular sale at higher prices than the farmer-buyers are willing to pay. If the small group of order buyers is smaller than usual, they might purchase what they need (at higher prices) leaving the majority of the animals at the sale to the farmers for purchase at lower prices.

Since this explanation is only an hypothesis, the question will be examined in more detail in the future. The nature and composition of the buyers at West Virginia auctions and their effects on prices will be examined in a subsequent study.

Sale location was also found to have a significant effect on price. Some locations were found to have higher or lower prices than the average, holding all other factors considered in the model constant. This meant that farmers could go to a particular auction and receive higher prices for their animals regardless of grade, weight, sex, etc.

The size of the sale, in terms of the total number of animals sold, was the next most important factor affecting price. It was found that as the size of sale increased, average price per hundredweight decreased slightly. However, although the variable was statistically significant the association between size of sale and price was very small.

Breed was the seventh most important factor affecting price. Charolais and Angus crosses received significantly higher prices and other purebreds received significantly lower prices than the average of all breeds, assuming all other variables in the model were held constant. However, purebred Angus and Herefords accounted for almost 60 percent of the total number of animals sold, and the fact that they dominated was probably the reason they did not have statistically significant effects on price which were different from the average of all breeds.

When one factor (Hereford, for example) dominates in a dummy variable (breed) it is the major determinant of the mean. Since the model determines statistical significance based on differences between means, the dominant factor may not be significantly different statistically.

Although the effect of average weight on price was statistically significant, it was only responsible for 0.12 percent out of the 73.27 percent explained by all variables in the model. The results did indicate, however, that there was an increase in price as the average weight increased up to 508 pounds. Thereafter, the price started to decline.

Date of sale and lot size were not found to be statistically significant. In the case of lot size this lack of statistical significance may have some interesting implications: In the past, lot sizes were smaller making it difficult for order buyers to fill their trucks. In the last few years, however, lot sizes have been larger and in sizes which allow more efficient distribution. If this is the case, the differential effect of lot size on price would not be as great presently as in the past. Another consideration is that lot size is correlated with size of sale. At the larger sales, lot sizes are larger. The statistical model showed size of sale to be a more important affector of price than lot size, and as a result, lot size was not a statistically significant factor affecting price.

The present study was undertaken with only two years of data at ten auction markets. Efforts are now underway (September, 1978) to expand this information to include a longer time period and a more in-depth analysis of some of the hypothesized variables.

Selected Factors Affecting Feeder Calf Prices In West Virginia

G. W. M. Ssekitooleko and John P. Kuehn

The present market structure of the West Virginia livestock economy had its beginnings in about 1931. Since this time feeder calves have been primarily sold through auction markets. This structure replaced the three- and four-year grass-fed steer enterprise which was the major component of livestock production prior to that time. Grass-fed steer production was experiencing difficulties because of changes in market demand. Smaller cattle were preferred that carried the desired finish at a younger age (Emch, 1967).

In 1933, 240 calves were sold in organized auction sales. Such sales continued to steadily grow throughout the years that followed. The grading of animals sold through auction markets also became more and more acceptable to both sellers and buyers. In 1966, 139,000 feeder calves were sold in West Virginia and 22,055 of these calves were sold on a graded basis.

During recent years, sales of calves through auction markets have been declining. In 1961, 104,400 calves (84 percent of the total sold) were sold through auction markets in West Virginia. In 1969, only 60,735 calves (52 percent of the total sold) were sold through such markets. This represented a decrease of 43,665 in the number of calves sold through the auction markets in the given time period (Golden and Kuehn, 1972). This decrease in itself is an indication that a problem or problems exist somewhere in the feeder calf industry, either in marketing, production, or both.

The Problem Situation and Objectives

Price behavior at West Virginia auction markets is quite vital and important to both livestock producers and buyers. Many producers have only a vague idea of prices to expect or what they can do to improve their market position. That being the case, it is important to determine the factors affecting feeder calf prices. Some of the factors considered include: average weight, grade, breed, sex, lot size, date of sale, year of sale, size of sale, and numbers of buyers. There is very little information concerning the relative importance of these factors and their effects on the price of feeder calves at auction markets in West Virginia.

The major objective of this study was to provide information which could be useful to feeder calf producers in raising the required type of calves and improve the efficiency of marketing feeder calves. This could lead to the improvement of the incomes and market positions of the producers. More specifically the objectives were:

1. To hypothesize factors which may affect the prices of feeder calves at West Virginia auction markets.
2. To evaluate the nature and extent of the influence of these factors on feeder calf prices.

Source and Nature of Data

The data used in this study were obtained from West Virginia special feeder calf auction markets for the years 1976 and 1977. All feeder calves sold in these auction markets were represented to be sired by beef type bulls and out of good commercial cows. Approximately 55 percent were steers and 45 percent were heifers. The calves were delivered to the auctions from the farms of consignors and were individually tagged before weighing and grading. The grading was done by livestock specialists from the West Virginia Department of Agriculture and the Cooperative Extension Service. Sale sheets (Appendix A) were provided at these sales. All the information concerning each lot to be sold is recorded on these sale sheets except names of purchasers and the price per hundredweight. Both of these are filled in during the sale.

All calves were graded in accordance with United States Department of Agriculture standards for feeder cattle. The calves were separated according to breed, sex, grade, and frame size and also divided into weight groups, generally broken at 50-pound intervals. All calves were sold by the hundredweight in graded lots. The size of lot varied from less than 5 animals to 80 or more animals. The animals in each lot were, in most cases, of the same breed and grade. However, in a few cases animals of different breeds, but of the same grade, were put in one lot and sold at the same price per hundredweight. Such lots were excluded from this analysis. The remaining lots were used in the analysis as the population to be observed and studied. Lots, or observations, totaled 3,175 and contained 33,936 calves.

The sale sheets were obtained from the Cooperative Extension Specialist to whom all copies of the sale sheets and sale reports from all feeder calf auction markets in West Virginia are submitted. All the sale places were included in this study except those which did not record all of the required data and information.

Ten sale places out of the possible eighteen were used. These ten fully recorded all the data and information required for the study. Each of these ten places conducted an average of two special sales during each year. The sale places used in the study were: Petersburg, Greenbrier, Elkins, Jackson's Mill, Harrisville, Marlinton, Bridgeport, Buckhannon, Terra Alta, and Spencer (Figure 1). See Table 1 for the number of sales included in the study for each location, average number of calves sold per sale, total number of calves sold at each sale, and the percentages of the totals for location.

Research Procedure

The 1976 and 1977 feeder calf sale data and information from ten auction markets in West Virginia were coded on the data spread sheets and then punched onto computer data processing cards. One card was used for each of the 3,175 lots of calves (observations). The data and information punched on these cards included the following: code number of the sale place, breed of calves in every lot size, grade of calves, average weight, sex, lot size, number of calves sold at each sale, number of buyers at the sale, and price in dollars per hundredweight. The information was stored on a computer disc.

Since marketing information concerning individual markets is confidential, each of the ten sale places was arbitrarily assigned a code number.

The grade variables one to five were used in the analysis. The new grading system employs a numerical rating as opposed to names. Grade "one" represents a better grade than "two" or "five." At a few sale places, the old

Figure 1 Location of the Ten Feeder Calf Auction Places in this Study.

Table 1
Number of Sales, Average Number of Calves per
Sale and Total Number of Calves Sold Through
Each Place for Years 1976 and 1977

Sale Place	Number of Sales ^a	Average Number of Calves/Sale	Total Calves Sold	Percentage of Total
Petersburg	4	646	2,586 ^b	7.3
Greenbrier	2	2,711	5,423	15.3
Elkins	4	1,203	4,812	13.6
Jackson's Mill	5	1,101	5,504 ^b	15.6
Harrisville	2	1,446	2,892	8.2
Marlinton	6	976	5,856 ^b	16.6
Bridgeport	4	945	3,742 ^b	10.6
Buckhannon	3	701	2,099 ^b	6.0
Terra Alta	3	412	1,238 ^b	3.5
Spencer	2	579	1,159 ^b	3.3

^aOnly sales included in the analysis

^bSome of the calves were not included in the analysis because all of the required data and information were not available.

system of "fancy," "choice," "good," "standard," and "short," was used on some calves. However, these were eliminated from the statistical analysis.

There were over 80 different combinations of purebred and crossbred calves sold in the sales. Since some of these purebred and crossbred calves were so few, it was decided not to study them individually. Instead they were grouped and studied as a single breed. In so doing, the following groups were formed:

1. Purebred Angus
2. Purebred Hereford
3. Purebred Shorthorn
4. Purebred Charolais
5. Angus crosses (except BWF)
6. Hereford crosses (except BWF)
7. Angus and Charolais crosses
8. BWF (Hereford $\times$ Angus or Black and White Face)
9. Other purebreds—All purebreds other than the ones listed above. Individually the calves of these breeds were too few to be studied alone.
10. Other crosses—All crosses other than Angus crosses, Hereford crosses, and Black and White Face

Appendix C, Table 1 gives the number of observations and total numbers of calves used in the analysis in respect to each breed group.

PRICE ANALYSIS

The average price of calves in the auction sales under study ranged from a low of \$12.00 to a high of \$232.50 per hundredweight. This in itself indicates that prices of feeder calves at West Virginia auction markets are quite variable and are influenced by many factors.

In order to more effectively study price behavior under various conditions, multiple regression techniques were employed. Some of the variables introduced in a multiple regression equation take values over some continuous range and others have two or more distinct levels. An example of a continuous variable in this analysis was the average weight. But other variables such as sale place, grade, etc. were not treated as continuous variables. They were assigned levels in order to take account of the fact that the various sale places, grades, etc. could have separate deterministic effects on the dependent variable (price). Variables of this kind are usually called dummy variables (Draper and Smith, 1966).

In the analysis, dummy variables included the following: sale place, grade, breed, year, and sex.

Regression Model Employed

In this regression model, as previously stated, price was treated as the dependent variable and all other factors as independent variables (price was a function of all the other variables). The regression equation was as follows:

$$P = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + b_{10}X_{10} + b_{11}X_{11} + b_{12}X_{12} + b_{13}X_{13} + b_{14}X_{14} + e$$

where the variables

- P = Price (dependent variable)
- X₁ = breed—dummy variable (ten specific breeds)
- X₂ = grade—dummy variable (five specific grades)
- X₃ = lot size
- X₄ = size of sale
- X₅ = size of sale squared
- X₆ = sale place—dummy variable (ten specific sale places)
- X₇ = date of sale
- X₈ = date of sale squared
- X₉ = year of sale—dummy variable (two specific years)
- X₁₀ = number of buyers
- X₁₁ = number of buyers squared
- X₁₂ = sex-dummy variable (two specific sexes)
- X₁₃ = average weight
- X₁₄ = average weight squared

and the estimated coefficients

- a = intercept term
- b₁ = breed effect on price
- b₂ = grade effect on price
- b₃ = lot size effect on price
- b₄ = size of sale effect on price
- b₅ = size of sale squared effect on price
- b₆ = sale place effect on price
- b₇ = date of sale effect on price
- b₈ = date of sale squared effect on price
- b₉ = year of sale effect on price
- b₁₀ = number of buyers effect on price
- b₁₁ = number of buyers squared effect on price
- b₁₂ = sex effect on price
- b₁₃ = average weight effect on price
- b₁₄ = average weight squared effect on price
- e = error term

A specific representation of the dummy variable technique was used in order to more effectively interpret the results. The representation used allowed a contrast between a particular level of a dummy variable and the average of all levels of that variable.

For example, consider the case of the dummy variable breed. If the coefficient for Angus is 1.15 and the dependent variable is price per hundredweight, the price of Angus feeder calves is \$1.15 greater than the average of all breeds, assuming other variables in the equation (grade, weight, etc.) are held constant.

Another more commonly used representation contrasts a particular level of a dummy variable to the last level of that variable. However, the former representation is more valuable for this analysis.

A complete explanation of the derivations and interpretations of these techniques can be found in Kuehn and Harner (1978).

The Regression Results

The results of analysis are presented in Tables 2, 3, and 4. Table 2 shows that the f-value was 228.19 and significant at the one percent level. The coefficient of determination (R^2), which expresses the percentage of total variability in

price explained by all the independent variables in the regression equation, was 73.27. Table 3 gives the number of observations for each specific variable, the corresponding b-values, and the significance level. This table is used in the discussion of the effect of the independent variables on the dependent variable. Table 4 shows the contribution of the independent variable which is price per hundredweight. The f-value indicates the group variables included in the analysis which were statistically significant.

The Effect of Sex on Price

Sex was found to be the most important factor affecting the average price of feeder calves sold at the West Virginia special feeder calf sales. Sex was responsible for 59.26 percent out of the 73.27 percent variation in price explained by all variables included in the regression equation.

The coefficients were significant at the one percent level. Steers were found to realize \$4.73 higher per hundredweight than the steer-heifer average price, assuming all other variables in the model were held constant. The actual average price for steers was \$40.22 and for heifers was \$27.86 per hundredweight for the two-year period (Appendix C, Table 3).

The adjusted figure (b coefficient) does not coincide with the actual prices since it is adjusted for other variables in the model and it is assigned statistical relevance. The value of the regression coefficient is that it abstracts out influences on the price by holding all other variables affecting price at a constant level. Such coefficients can then be used to more accurately examine factors affecting the dependent variable.

Steers have historically returned higher prices than heifer calves because cattle feeders are interested in calves which will reach a certain weight within the shortest possible time. Steer calves have usually achieved a higher rate of gain than heifers.

The Effect of Year on Price

Seasonal or yearly variations in supply and demand and consequently prices of farm commodities do exist. Two years of data were hypothesized to have an influence on the price of feeder calves at the auction markets when other factors were kept constant.

Results of the analysis indicated the effect of "year" was responsible for 15.5 percent out of the total variation in price explained by all factors included in the model (Table 4).

Table 2
Analysis of Variance

Source of Variation	Degrees of Freedom	Sum of Square	Mean Square	F-Value	Prob F	R-Square
Regression	34	107076.10	3149.30	228.19	0.0001	0.7327
Error	2831	39070.62	13.80			
Corrected Total	2865	146146.72				

Standard Deviation 3.7150

Overall Mean Price \$32.36

Table 3
Variables, Number of Observations, Regression
Coefficients, and Their Significance (Prob>T)^a

Group Variable	Specific Variable	b Value	Prob>T
Breed	Charolais	0.8626	0.0370
	Angus Cross	1.4999	0.0004
	Other Purebred	-1.0373	0.0208
Grade	1	3.7500	0.0001
	2	2.8449	0.0001
	3	-0.7204	0.0001
	4	-0.5049	0.0149
	5	-5.3696	b
Year	1976	-2.5089	0.0001
Sex	Heifer	-4.7280	0.0001
Sale Place	201	-1.9901	0.0001
	202	8.5193	0.0001
	203	2.1070	0.0001
	204	1.1898	0.0004
	205	1.3054	0.0001
	206	-2.0511	0.0001
	207	-0.7856	0.0003
	208	-1.9266	0.0001
	209	-4.5318	0.0001
	210	1.8363	b
Average Weight		0.0679	0.0001
Average Weight Squared		-0.0001	0.0001
Sale Size		-0.0034	0.0002
Number of Buyers		-0.9152	0.0001
Number of Buyers Squared		0.0128	0.0001

^aOnly variables which were significant at the .05 level were presented in this table.

^bThe b coefficients for these variables were not printed out by SAS, since they were the last of the levels of a given dummy variable to be entered. They were derived by summing all other b coefficients of the particular dummy group variable and multiplying by -1. Their levels of significance were not determined since in each case the dummy variable as a whole was found to be statistically significant at the .05 level.

Analysis of the specific years used in the study indicated that the effects of the two years on the price were both significant at the one percent level. These results further showed that assuming all other variables in the regression equation were held constant, the 1977 average price was higher than the average of the two years by \$2.64 per hundredweight.

The actual average price of calves in 1977 was \$8.61 per hundredweight higher than that of 1976 (Appendix C, Table 2).

The analysis of grade and years (Appendix D, Table 7) showed that all the grades in 1977 returned, on the average, relatively higher prices per hundredweight than the corresponding grades in 1976.

Table 4
Partial Regression Coefficients—Contribution of
Variables to the Sum of Squares

Source	D.F.	Sequential SS	F Value	Prob>F	Percent Contribution
Breed	10	793.38	5.75	0.0001	0.74
Grade	4	13761.66	249.29	0.0001	12.85
Year	1	16596.43	1202.55	0.0001	15.50
Sex	1	63454.65	4597.83	0.0001	59.26
Sale Place	9	2804.09	22.58	0.0001	2.62
Avg. Weight	1	501.06	36.31	0.0001	
Avg. Weight Squared	1	1382.58	100.18	0.0001	0.12
Sale Size	1	1939.83	140.56	0.0001	1.81
Sale Size Squared	1	8.35	0.61	0.4367	0.01
Number of Buyers	1	5309.26	384.70	0.0001	
Number of Buyers Squared	1	376.83	27.30	0.0001	5.31
Date	1	93.83	6.80	0.0092	0.09
Date Squared	1	31.54	2.29	0.1307	0.03
Lot Size	1	22.63	1.64	0.2004	0.02

The Effect of Grade on Price

Grade had the third highest influence on price of all variables included in the model. It was responsible for 12.85 percent of the variation explained by all factors included in the equation and was significant at the one percent level.

As expected, grades "one" and "two" proved superior to grades "three," "four," and "five" in terms of price performance. Grades "one" and "two" realized prices of \$3.75 and \$2.84 greater per hundredweight than the average of all grades, assuming other variables were held constant.

The higher prices paid for top grades indicated that buyers recognized the grading system in their bidding. Live animal prices are a reflection of retail values of meat and meat products and their economic importance. Such prices should give incentive for producers to raise better grade calves.

The Effect of the Number of Buyers on Price

Numbers of buyers at the sales included in the analysis ranged from 14 to 39 (Table 6, Appendix C). The effect of the number of buyers on the price explained 5.31 percent out of the 73.27 percent explained by all variables. The "number of buyers" and "number of buyers squared" variables were significant at the one percent level.

Four variables (average weight, sale size, number of buyers, and date) were entered into the model in the quadratic form. This was accomplished by adding the variable into the equation a second time as a squared term in order to test the hypothesis that the relationship between one of these variables and price was curvilinear. In the case of "number of buyers," this was true.

Price was found to decrease as the number of buyers increased up to 36. Thereafter, price began to increase. This statistical result seemed to contradict economic theory, but there is a possible explanation for this seemingly contradicting phenomenon.

The sale sheet used to collect the data for this study (Appendix A) merely listed the names and addresses of those people buying a lot of animals. The total number of different names listed on the sale sheet was used as the "number of buyers" variable. However, buyers at auction sales usually consist of local and out-of-town farmers and order buyers who were not differentiated from each other on the sale sheets.

Order buyers purchase truckload lots of animals for large feedlot operations. Since, as agents for these feedlots they must fill relatively large orders, they might be willing to pay higher prices than local farmers.

There is usually a large number of farmers present and relatively few order buyers at a particular sale. If the number of order buyers present was very low they might have first purchased all the animals they needed at somewhat higher prices than average. After their orders were filled, the more numerous local farmers could have purchased the remaining larger number of animals at lower prices. On the other hand, if more order buyers were present, they might have purchased the majority of the animals for sale, precluding the local farmers from bidding lower prices. This could have resulted in the statistical significance of lower prices with a larger number of buyers and vice versa.

Since this explanation appears logical but is without documentation, the present study will be continued and expanded in the future to consider the nature of different buyers and their effects on price at West Virginia auctions.

The Effect of Sale Place on Price

Sale place or location explained 2.62 percent out of the 73.27 percent of the variation in price explained by all variables in the equation. Ten specific sale places were included for study. Their effects on price were all statistically significant at the one percent level.

The range in their effects on price was from \$8.52 more than the average of all locations to \$4.53 less than this average.

The fact that these coefficients were adjusted for all other variables in the equation means that the particular location, in itself, was responsible for realizing higher or lower prices than other locations. Prices were higher at the larger sale places but at any given sale place the larger the number of animals offered for sale, the lower the price.

The Effect of Size of Sale on Price

Size of sale is the total number of calves offered for sale on a scheduled day. The size of sale effect on price was 1.81 percent out of the 73.27 percent explained by all variables and was significant at the one percent level.

The b coefficient of -0.0034 indicated a very small negative effect on price assuming all other variables were held constant. More specifically, as the size of sale increased, the average price per hundredweight decreased slightly. The sale size squared variable was not statistically significant.

The Effect of Breed on Price

The overall effect of breed on the price of feeder calves was statistically significant at the one percent level. However, this variable was responsible for only 0.74 percent out of the 73.27 percent variation in price explained by all the variables included in the equation (Table 4).

The results of the estimates concerning the specific breed variables are presented in Table 3. Ten specific breeds were included in the analysis.

However, only the three shown in Table 3 had statistically significant regression coefficients.

Charolais realized \$.86 higher than the average of all breeds, Angus crosses (except BWF) realized \$1.50 more, and other purebreds received \$1.04 less than the average of all breeds, assuming other variables were held constant. The other breeds in the equation did not have statistically significant effects on the price.

Analyzing the breeds by numbers indicated that Hereford and Angus calves dominated the sales included in the study. Calves of these two breeds accounted for almost 60 percent of the total calves included in the analysis (Appendix C, Table 1). The fact that these breeds dominated the total number was probably the reason they did not have statistically significant effects on price. Their effects were not significantly greater or less than the average of all breeds as was the case for Charolais, Angus crosses, and for other purebreds.

The Effect of Average Weight on Price

Although the effect of average weight on price was statistically significant, it was only responsible for 0.12 percent out of the 73.27 percent variation in price explained by all the variables included in the regression equation. Both average weight and average weight squared were used in the regression equation as variables. They were both significant at the one percent level (Table 3). The results indicated that there was an increase in the average price as the average weight increased up to 508 pounds; thereafter, the price started declining.

Most of the feeder calves sold in these sales fell within an average weight range of 400-470 pounds. The analysis of average weight by breed (Appendix C, Table 1) indicated that Hereford crosses were the heaviest (464 pounds) and Black-White Face the lightest (439 pounds).

An analysis of sex and average weight revealed that on the average steers were heavier than heifers by 27 pounds (Appendix C, Table 3).

The grade and average weight analysis revealed some positive correlation between grade and average weight. Calves which graded "fancy," "choice," and "one," grades which are supposed to be superior to the rest, averaged relatively higher in weight than the rest of the calves in the lower grades (Appendix C, Table 5).

A possible reason that calves of above average weight, 508 pounds and above, returned a lower average price than the lighter ones might be that cattle feeders do not expect as high a rate of daily gain as they would expect from lighter calves and are therefore not willing to pay as high a price.

The Effects of Date of Sale and Lot Size on Price

Date of Sale. Most agricultural commodities including feeder calves are subject to seasonal variations in supply and demand. Such variations result in price changes. The dates on which the sales were held were expected to have an effect on the price of feeder calves.

However, the effect of date of sale on feeder calf prices was not found to be statistically significant. All sales included in this study were held between the middle of September and the end of October each year. Although the actual data (Appendix C, Table 6), show possible trends in price, the short time period during each year precluded any statistically significant conclusions.

Lot Size. Feeder calves at auction markets are sold in lots of various numbers of animals. For purposes of analysis, each lot size was treated as a single animal. Calves in each lot size were assumed to be of the same sex, breed, and grade. The number of calves in each lot size ranged from a low of 1 to a high of over 80. Because of this variation in the number of calves in each lot, that lot size was expected to have an effect on the price of calves, if all other variables included in the regression equation were held constant. However, the results indicated that effect on price due to lot size was not statistically significant. There was a correlation between lot size and size of sale. Since the size of sale effect on price was statistically significant, it can be assumed that it overshadowed the lot size effect.

Another explaining factor is that lot sizes could be in the ranges desired by many buyers. In the past, lot sizes were smaller, making it difficult for order buyers to fill their trucks. Lately, lot sizes have been larger and in sizes which allow more efficient distribution. If this is the case, the effect of lot size on price would not be as great presently as it has been in the past.

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Appendixes

Appendix A
Table 1
Sale Sheet Steers

Grade	Pen	No	Kind	Average Weight	Total Weight	Price	Buyer
1	1	9	H S	338	3,045		
1	20	4	BWF S	336	1,345		
1	20	1	Ch S	355	355		
1	22	46	H S	405	18,650		
1	9	22	B S	406	8,930		
1	27	77	H S	486	37,395		
1	15	17	BWF S	415	7,060		
1	0	21	Ch S	400	8,410		
1	8	19	B S	488	9,270		
1	77	36	Ch S	496	17,850		
1	2	28	BWF S	488	13,655		
1	6	4	Ch S	424	1,695		
1	7	31	H S	596	18,465		
1	6	19	Ch S	610	11,585		
1	4	12	BWF S	627	7,525		
2	10	25	H S	412	10,300		
2	50	21	B S	504	10,575		
2	50	3	Ch S	485	1,455		
2	3	21	B S	401	8,425		
2	3	3	Ch S	403	1,210		
2	A	16	H S	480	7,680		
2	B	15	B S	333	5,000		
2	76	6	B S	594	3,565		
2	76	3	H S	578	1,735		
2	19	3	H S	340	1,020		
3	73	2	H S	337	675		
3	73	3	B S	340	1,020		
3	73	2	Ch S	328	655		
3	74	7	H S	395	2,765		
3	74	9	B S	401	3,610		
3	75	7	H S	483	3,380		
3	75	4	B S	490	1,960		
3	75	3	Ch S	488	1,465		
3	78	3	Ch S	630	1,890		
3	78	1	B S	590	590		
4	Scales	9	B S	396	3,565		
4	33	10	B S	474	4,735		
4	33	5	H S	477	2,385		
4	33	2	Ch S	515	1,030		
4	45	5	B S	329	1,645		
4	45	1	H S	355	355		
4	C	7	H S	408	2,855		
4	C	1	Ch S	365	365		
4	49	1	H S	565	565		

Total Steers = 544

Appendix A
Table 2
Sale Sheet Heifers

Grade	Pen	No	Kind	Average Weight	Total Weight	Price	Buyer
1	60	14	H H	337	4,715		
1	59	16	Ch H	391	6,250		
1	31	11	BWF H	387	4,255		
1	17	4	B H	348	1,390		
1	47	2	Ch H	310	620		
1	47	1	VWF H	290	290		
1	67	35	H H	415	14,515		
1	63	26	Ch H	489	12,725		
1	61	15	B H	416	6,235		
1	64	10	BWF H	494	4,940		
1	64	4	H H	586	2,345		
1	62	25	H H	489	12,225		
1	51	14	B H	504	7,050		
1	65	11	Ch H	630	6,930		
1	65	2	B H	550	1,100		
1	65	2	BWF H	555	1,110		
2	18	8	H H	338	2,700		
2	56	35	H H	405	14,180		
2	66	16	H H	496	7,935		
2	32	12	B H	325	3,895		
2	28 & 29	33	B H	405	13,375		
2	68	27	B H	486	13,115		
2	30	7	BWF H	648	4,535		
2	30	5	Ch H	524	2,620		
2	44	3	Ch H	407	1,220		
3	54	10	H H	405	4,055		
3	25	11	BWF H	407	4,475		
3	25	4	Ch H	402	1,610		
3	69	1	H H	555	555		
3	69	3	Ch H	612	1,835		
3	55	7	H H	342	2,395		
3	55	1	Ch H	320	320		
3	21	5	B H	481	2,405		
3	21	1	Ch H	470	470		
3	23	5	B H	336	1,680		
4	72	16	B H	409	6,540		
4	70	9	B H	327	2,945		
4	71	1	H H	330	330		
4	71	6	H H	410	2,460		
4	71	3	Ch H	540	1,620		

Total Heifers = 421

Appendix B

West Virginia Feeder Calf and Cattle Grade Standards

Number 1—Large Frame

Moderately thick to thick muscling

Potential slaughter weight—

Steers 1,000 lbs. or more

Heifers 900 lbs. or more

Possible carcass grade—choice—yield 1 to 3

Number 2—Medium Frame

Moderately thick to thick muscling

Potential slaughter weight—

Steers under 1,000 lbs.

Heifers under 900 lbs.

Possible carcass grade—choice—yield 1 to 3

Number 3—Large Frame

Slightly thick to slightly thin muscling

Potential slaughter weight—

Steers approx. 1,000 lbs.

Heifers approx. 900 lbs.

Possible carcass grade—choice—yield 1 to 3

Number 4—Small Frame

Moderately thick to thick muscle

Potential slaughter weight—

Steers under 900 lbs.

Heifers under 800 lbs.

Very early maturing

Number 5—Medium to Large Frame

Thin muscling

MARKS

No mark

Mark on shoulder

Mark on back

S

Mark on tail

Number 1

Number 2

Number 3

Number 4

Number 5

Art: W.Va. Dept. of Agriculture

Appendix C

Table 1

Number of Observations, Total Number of Head,
Average Weight, and Average Price per
Hundredweight by Breed for Calves Included in
This Analysis

Breed	Number of Observations or Pens	Percent	Number of Head	Percent	Average Weight	Average Price
Angus	574	18.1	7,220	21.3	449	34.21
BWF	224	7.1	1,515	4.5	439	32.00
Charolais	339	10.7	2,427	7.1	451	33.86
Hereford	822	25.9	12,863	37.9	442	34.28
Angus Cross	289	9.1	3,147	9.3	456	33.45
Char	163	5.1	1,019	3.0	444	31.91
Hereford Cross	166	5.2	2,568	7.6	464	36.02
MBRD	288	9.1	1,078	3.2	463	46.86
Shorthorn	30	0.9	78	0.2	457	37.27
Other Crosses	278	8.8	2,021	5.9	454	32.79
Total	3,173	100.0	33,936	100.0	450	35.26

Appendix C

Table 2

Number of Observations, Total Number of Head,
Average Weight, and Average Price per
Hundredweight by Years for Calves Included in
This Analysis

Year	Number of Observations or Pens	Percent	Number of Head	Percent	Average Weight	Average Price
1976	1,379	43.4	15,994	47.1	448	30.12
1977	1,796	56.6	17,993	52.9	452	38.73
Total	3,175	100.0	33,987	100.0	450	34.42

Appendix C

Table 3

Number of Observations, Total Number of Head,
Average Weight, and Average Price per
Hundredweight by Sex for Calves Included in This
Analysis

Sex	Number of Observations or Pens	Percent	Number of Head	Percent	Average Weight	Average Price
Steer	1,832	57.7	18,727	55.1	461	40.22
Heifer	1,343	42.3	15,260	44.9	434	27.86
Total	3,175	100.0	33,987	100.0	448	34.04

Appendix C

Table 4

Number of Observations, Total Number of Head,
Average Weight, and Average Price per
Hundredweight by Sale Place for Calves Included
in This Analysis

Sale Place Code	Number of Observations or Pens	Percent	Number of Head	Percent	Average Weight	Average Price
201	335	10.6	2,436	7.2	449	33.17
202	176	5.5	5,423	15.9	464	34.43
203	389	12.2	4,812	14.1	450	32.46
204	609	19.2	5,501	16.2	458	45.98
205	262	8.3	2,892	8.5	438	32.32
206	528	16.6	5,731	16.9	467	32.85
207	308	9.7	3,386	10.0	431	31.44
208	257	8.1	2,094	6.2	439	31.47
209	190	6.0	1,097	3.2	433	31.16
210	121	3.8	615	1.8	434	31.35
Total	3,175	100.0	33,987	100.0	450	34.99

Appendix C

Table 5

Number of Observations, Total Number of Head,
Average Weight, and Average Price per
Hundredweight by Grade for Calves Included in
This Analysis

Grade	Number of Observations or Pens	Percent	Number of Head	Percent	Average Weight	Average Price
1	1,165	36.7	15,270	44.90	468	34.02
2	786	24.7	10,613	31.20	437	33.32
3	564	17.8	4,849	14.30	432	29.50
4	283	8.9	2,321	6.80	426	30.45
5	69	2.2	256	0.70	424	24.75
Fancy	162	5.1	162	0.50	493	72.55
Choice	93	2.9	325	1.00	469	46.65
Good	31	1.0	123	0.40	448	44.31
Standard	6	0.2	13	0.04	384	35.83
Short	16	0.5	55	0.16	422	39.94
Total	3,175	100.0	33,987	100.00	450	34.99

Appendix C
Table 6

Sale Places, Dates Sales Took Place, Size of Sale,
and Number of Buyers 1976 and 1977

Sale Place Code	Date and Year of Sale	Size of Sale	Number of Buyers
201	10-21-76	527	27
	9-30-76	516	25
	10-20-77	893	19
	9-30-77	650	25
202	10-6-76	3,226	27
	10-12-77	2,197	30
203	10-12-76	1,183	24
	10-19-76	1,116	36
	10-18-77	1,185	29
	10-11-77	1,324	30
204	10-7-76	1,628	34
	9-29-76	953	27
	9-29-77	1,128	20
	10-6-77	1,146	21
	9-15-77	649	39
205	10-22-76	1,365	32
	10-21-77	1,527	30
206	10-29-76	748	24
	10-15-76	1,131	15
	10-18-76	947	16
	10-14-77	1,125	17
	10-7-77	900	14
	10-28-77	1,005	31
207	10-22-76	822	19
	10-8-76	619	30
	10-21-77	1,557	35
	10-7-77	744	23
208	10-1-76	715	21
	10-16-76	419	29
	10-1-77	965	17
209	10-20-76	397	24
	10-19-77	606	22
	10-5-77	235	22
210	10-18-76	499	22
	10-17-77	660	36

Appendix C **Table 7**

Estimation of Average Sale Date for Each Year and
Overall Average for the Two Years for the Sales
Included in This Analysis

Sale Place Code	Sale Number	Day of the Year and Year Sale Was Held	
		1976	1977
201	1	295	293
	2	274	273
202	1	280	285
203	1	286	291
	2	293	284
204	1	281	272
	2	273	279
	3	—	258
205	1	296	294
206	1	303	287
	2	289	280
	3	282	301
207	1	296	294
	2	282	280
208	1	275	274
	2	290	—
209	1	294	292
	2	—	278
210	1	292	290
Average		287	283

Average Sale Date

1976—287 or October 13

1977—283 or October 10

Overall average sale date for the two years = 284th day of the year, or October 11.

Appendix D

Table 1

Means for Sale Place by Grade for Calves Included
in This Analysis

Sale Place Code	Grade	Number of Observations	Number Head	% in Grade	Av. Wt.	Av. Price
201	1	150	866	35.6	467	33.22
	2	90	1,035	42.5	425	34.51
	3	48	297	12.2	437	32.22
	4	39	230	9.4	448	32.40
	5	8	8	.3	503	26.31
202	1	83	2,850	52.6	483	37.61
	2	49	1,303	24.0	451	33.33
	3	33	1,026	18.9	452	30.35
	4	7	166	3.1	400	29.86
	5	4	78	1.4	431	23.44
203	1	138	2,021	42.0	476	34.27
	2	102	1,573	32.7	440	33.36
	3	78	700	14.5	432	29.18
	4	49	463	9.6	421	30.62
	5	14	47	1.0	428	25.30
	FA	8	8	0.2	548	45.75
204	1	129	2,407	43.8	459	35.92
	2	90	1,397	25.4	440	35.07
	3	51	559	10.2	444	30.82
	4	37	434	7.9	422	29.67
	5	19	51	0.9	438	24.35
	Fancy	137	137	2.5	490	76.76
	Choice	93	325	5.9	469	46.65
	Good	31	123	2.2	448	44.31
	Standard	6	13	0.2	384	35.83
	Short	16	55	1.0	422	39.94

205	1	107	1,215	42.0	451	33.88
	2	66	871	30.1	428	31.08
	3	42	556	19.2	428	28.02
	4	19	189	6.5	409	26.80
	5	11	44	1.5	372	21.09
	Fancy	17	17	0.6	486	51.29
206	1	197	2,073	36.2	494	34.33
	2	156	2,344	40.9	463	34.12
	3	108	815	14.2	438	29.72
	4	67	499	8.7	444	30.58
207	1	122	1,766	52.2	456	32.71
	2	78	958	28.3	423	32.97
	3	72	469	13.8	414	28.85
	4	23	165	4.9	397	30.03
	5	13	28	0.8	391	27.21
208	1	99	1,162	55.5	455	32.86
	2	64	590	28.2	437	32.32
	3	57	190	9.1	425	28.57
	4	37	152	7.2	420	30.71
209	1	93	640	58.3	449	31.83
	2	52	334	30.4	403	31.94
	3	40	100	9.1	432	28.44
	4	5	23	2.1	420	32.45
210	1	47	270	43.9	456	33.42
	2	39	208	33.8	417	31.11
	3	35	137	22.3	422	28.83

Appendix D**Table 2**

Means for Sex by Grade for Calves Included in the
Analysis

Sex	Grade	Number of Observations	Number Head	% in Grade	Av. Weight	Av. Price
Steer	1	642	8,428	45.00	479	38.57
	2	439	5,922	31.60	449	37.63
	3	212	2,246	12.00	440	33.24
	4	178	1,473	7.90	437	33.75
	5	40	155	0.80	450	28.39
	Fancy	129	129	0.70	498	80.01
	Choice	61	220	1.20	470	51.16
	Good	17	96	0.50	468	51.20
	Standard	4	11	0.10	397	35.87
	Short	10	47	0.20	430	42.85
Heifer	1	523	6,842	44.80	453	28.43
	2	347	4,691	30.74	422	27.85
	3	252	2,603	17.05	422	24.86
	4	105	848	5.55	407	24.85
	5	29	101	0.66	388	19.70
	Fancy	33	33	0.22	471	43.39
	Choice	32	105	0.70	466	38.06
	Good	14	27	0.18	423	35.93
	Standard	2	2	0.01	357	35.75
	Short	6	8	0.05	408	35.08

Appendix D

Table 3

Means for Sale Place × Breed for Calves Included in
This Analysis

Sale Place Code	Breed	Number of Observations	Number Head	% Breed	Av. Wt.	Av. Price
201	Angus	108	1,322	54.30	451	33.13
	BWF	18	124	5.10	418	32.18
	Charolais	48	124	5.10	457	35.46
	Hereford	86	473	19.40	437	32.72
	Angus Cross	37	271	11.10	471	34.82
	Hereford Cross	17	43	1.76	473	33.01
	MBRD	2	2	0.10	480	27.37
	Shorthorn	1	1	0.04	540	42.50
202	Other Crosses	18	76	3.10	433	27.26
	Angus	42	1,286	23.7	472	34.49
	Hereford	41	1,333	24.6	463	34.46
	Angus Cross	12	482	8.9	460	37.87
	Hereford Cross	51	1,888	34.8	462	34.45
	Shorthorn	5	35	0.6	477	36.90
	Other Crosses	25	399	7.4	456	32.07
203	Angus	70	1,252	26.0	454	34.08
	BWF	89	858	17.8	446	33.06
	Hereford	86	1,695	35.2	447	32.64
	Angus Cross	1	38	0.8	358	26.50
	Hereford Cross	32	142	3.0	477	30.13
	MBRD	21	108	2.2	433	28.08
	Char	67	481	10.0	447	34.04
	Other Crosses	22	229	4.8	467	36.52

(continued on next page)

Appendix D
Table 3 (continued)

Means for Sale Place × Breed for Calves Included in
This Analysis

Sale Place Code	Breed	Number of Observations	Number Head	% Breed	Av. Wt.	Av. Price
204	Angus	81	583	10.6	459	47.33
	Charolais	58	430	7.8	444	40.79
	Hereford	179	2,836	51.6	442	39.66
	Angus Cross	85	904	16.4	440	32.35
	Char	17	152	2.8	438	28.55
	Hereford Cross	39	189	3.4	469	48.76
	MBRD	114	209	3.8	501	70.49
	Shorthorn	11	16	0.3	462	44.18
	Other Crosses	25	182	3.3	466	41.88
205	Angus	48	564	19.5	428	28.62
	Charolais	35	725	25.1	437	30.36
	Hereford	88	1,154	39.9	435	35.41
	Angus Cross	37	393	13.6	425	32.36
	Hereford Cross	7	13	0.4	473	28.11
	MBRD	15	23	0.8	467	36.97
	Other Crosses	12	20	0.7	471	29.85
206	Angus	110	1,237	21.6	468	32.74
	Charolais	79	544	9.5	467	34.46
	Hereford	132	2,606	45.5	457	32.38
	Angus Cross	116	1,045	18.2	474	33.81
	Hereford Cross	1	1	0.02	565	50.50
	MBRD	6	9	0.16	499	26.83
	Shorthorn	5	11	0.2	453	30.95
	Other Crosses	79	278	4.8	469	31.14

207	Angus	79	711	21.3	417	30.99
	Charolais	63	437	13.1	446	31.80
	Hereford	100	1,561	46.7	425	31.07
	Angus Cross	1	14	0.4	389	30.00
	Hereford Cross	19	292	8.7	419	28.87
	MBRD	15	35	1.0	452	29.58
	Shorthorn	1	6	0.2	485	22.00
	Other Crosses	29	288	8.6	447	36.22
208	Angus	29	241	11.5	421	27.67
	BWF	36	220	10.5	435	31.19
	Charolais	36	167	8.0	450	28.24
	Hereford	79	865	41.3	437	31.72
	Char	23	173	8.3	460	36.78
	MBRD	49	412	19.7	437	33.22
	Shorthorn	4	5	0.2	426	32.75
	Other Crosses	1	11	0.5	465	34.50
209	BWF	51	257	23.4	449	31.52
	Char	25	68	6.2	410	30.55
	MBRD	46	232	21.1	424	31.29
	Shorthorn	2	3	0.3	408	33.75
	Other Crosses	66	537	49.0	435	30.94
210	Angus	7	24	3.9	433	23.75
	BWF	30	56	9.1	415	30.50
	Hereford	31	340	55.3	438	33.55
	Charolais	31	145	23.5	455	33.13
	MBRD	20	48	7.8	422	29.39
	Shorthorn	1	1	0.2	435	30.00
	Other Crosses	1	1	0.2	445	27.50

Appendix D

Table 4

Means for Breed × Sex for Calves Included in This Analysis

Breed	Sex	Number of Observations	Number Head	% in Sex	Av. Wt.	Av. Price
Angus	Steer	331	4,045	56.0	460	39.38
	Heifer	243	3,175	44.0	435	27.18
BWF	Steer	112	762	50.3	455	36.72
	Heifer	112	753	49.7	422	27.27
Chr	Steer	192	1,204	49.6	463	38.14
	Heifer	147	1,223	50.4	436	28.27
Hereford	Steer	480	7,170	55.7	452	38.97
	Heifer	342	5,693	44.3	427	27.69
Angus Cross	Steer	159	1,631	51.8	470	37.77
	Heifer	130	1,516	48.2	439	28.17
Char	Steer	95	592	58.1	449	35.48
	Heifer	68	427	41.9	436	26.92
Hereford-Cross	Steer	83	1,243	48.4	478	43.51
	Heifer	83	1,325	51.6	449	28.54
MBRD	Steer	178	629	58.3	479	56.50
	Heifer	110	449	41.7	437	31.25
Shorthorn	Steer	24	55	70.5	451	39.36
	Heifer	6	23	29.5	480	28.91
Other Crosses	Steer	176	1,345	66.5	461	36.70
	Heifer	102	676	33.5	443	26.05

Appendix D**Table 5**

Means for Sale Place × Sex for Calves Included in
This Analysis

Sale Place Code	Sex	Number of Observations	Number Head	% in Sex	Av. Wt.	Av. Price
201	Steer	199	1,380	56.6	462	38.93
	Heifer	136	1,056	43.4	430	24.73
202	Steer	97	2,944	54.3	470	38.74
	Heifer	79	2,479	45.7	455	29.12
203	Steer	210	2,608	54.2	462	36.58
	Heifer	179	2,204	45.8	437	27.63
204	Steer	387	3,244	59.0	469	53.21
	Heifer	222	2,257	41.0	440	33.39
205	Steer	150	1,553	53.7	453	36.90
	Heifer	112	1,339	46.3	416	26.17
206	Steer	317	3,045	53.1	476	36.83
	Heifer	211	2,686	49.9	454	26.87
207	Steer	161	1,778	53.5	440	35.26
	Heifer	147	1,608	47.5	420	27.27
208	Steer	138	1,116	53.3	447	35.38
	Heifer	119	978	46.7	430	26.93
209	Steer	105	689	62.8	443	35.45
	Heifer	85	408	37.2	420	25.86
210	Steer	68	370	60.2	448	35.50
	Heifer	53	245	39.8	416	26.03

Appendix D
Table 6
Means for Breed × Grade

Breed	Grade	Number of Observations	Number Head	% in Grade	Average Weight	Average Price
Angus	1	196	2,363	32.70	466	33.82
	2	168	3,058	42.30	440	33.62
	3	93	856	11.90	438	29.23
	4	69	827	11.50	422	30.63
	5	15	40	0.60	477	23.68
	Fancy	15	15	0.20	488	93.53
	Choice	10	27	0.40	461	45.20
	Good	4	16	0.20	437	40.50
	Short	4	18	0.20	448	39.12
BWF	1	102	831	54.80	464	33.77
	2	61	403	26.60	417	33.00
	3	49	209	13.80	424	27.70
	4	10	68	4.50	380	31.05
	5	2	4	0.30	480	21.00
Charolais	1	141	1,534	63.20	478	33.68
	2	70	398	16.40	439	33.80
	3	69	368	15.20	428	29.87
	4	24	40	1.65	424	31.43
	5	5	15	0.61	370	23.15
	Fancy	11	11	0.50	460	56.27
	Choice	11	42	1.70	458	45.13
	Good	4	12	0.50	411	39.75
	Standard	1	1	0.04	372	36.50
	Short	3	6	0.25	412	40.83
Hereford	1	269	5,553	43.20	459	34.70
	2	204	4,268	33.20	438	33.17
	3	150	1,988	15.40	430	29.81
	4	95	769	6.00	427	29.83
	5	25	69	0.53	401	26.20
	Fancy	44	44	0.34	461	58.38
	Choice	21	104	0.81	440	47.05
	Good	8	44	0.34	415	40.87
	Standard	2	5	0.04	371	35.50
	Short	4	19	0.15	418	39.37
Angus Cross	1	118	1,487	47.20	471	34.95
	2	89	983	31.20	456	35.00
	3	45	370	11.80	430	30.22
	4	28	289	9.20	441	29.62
	5	7	16	0.50	461	22.21
	Fancy	2	2	0.10	392	42.50

Appendix D
Table 6 (continued)
Means for Breed × Grade

Breed	Grade	Number of Observations	Number Head	% in Grade	Average Weight	Average Price
Char	1	72	704	69.10	456	32.85
	2	37	132	13.00	445	32.33
	3	37	140	13.70	422	29.90
	4	12	37	3.60	439	31.35
	5	3	4	0.40	370	26.67
	Fancy	2	2	0.20	522	38.75
Other Crosses	1	125	1,113	55.10	477	34.15
	2	65	439	21.70	434	33.12
	3	64	302	14.90	439	30.01
	4	16	109	5.40	443	32.31
	5	6	56	2.80	386	25.79
	Fancy	2	2	0.10	510	50.50
Hereford- Cross	1	64	1,391	54.20	482	34.92
	2	32	506	19.70	440	32.10
	3	22	502	19.50	442	29.23
	4	8	42	1.60	430	27.47
	5	5	43	1.70	434	23.75
	Fancy	13	13	0.50	529	64.50
	Choice	13	35	1.40	455	42.23
	Good	5	24	0.90	454	38.60
	Standard	1	5	0.20	415	37.50
	Short	3	7	0.30	411	39.50
Mixed Straight- breds	1	71	276	25.60	464	31.38
	2	53	393	36.40	407	31.58
	3	30	103	9.60	435	28.23
	4	18	95	8.80	405	31.54
	Fancy	70	70	6.50	516	84.19
	Choice	34	111	10.30	495	49.35
	Good	9	24	2.20	491	54.72
	Standard	2	2	0.20	387	35.00
	Short	1	4	0.40	390	44.00
Shorthorn	1	7	18	23.10	441	36.28
	2	7	33	42.30	452	32.46
	3	5	11	14.10	467	29.80
	4	2	3	3.80	465	32.50
	Fancy	3	3	3.80	478	40.00
	Choice	4	6	7.70	487	43.87
	Good	1	3	3.80	478	40.00
	Short	1	1	1.30	425	40.00

Appendix D

Table 7

Means for Grade $\times$ Year for Calves Included in This Analysis

Year	Grade	Number of Observations	Number Head	Average Weight	Average Price
1976	1	571	7,411	466	31.23
	2	359	4,950	438	30.91
	3	260	2,366	431	27.42
	4	138	1,114	427	28.11
	5	34	136	436	23.15
	Fancy	17	17	467	47.85
1977	1	594	7,859	469	36.70
	2	427	5,663	436	35.34
	3	304	2,483	433	31.27
	4	145	1,207	424	32.68
	5	35	120	412	26.27
	Fancy	145	145	496	75.45
	Choice	93	325	469	46.65
	Good	31	123	448	44.31
	Standard	6	13	469	36.70
	Short	16	55	422	39.94

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