AN ANALYSIS OF THE ANNUAL AND SEASONAL MOVEMENTS OF BEEF CATTLE PRICES

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By

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INTRODUCTION

The purpose of this study is to present an analysis of the variability of beef cattle prices in the hope of developing some further refinement for the future evaluation of changing price situations. Prediction of future prices without an adequate framework of knowledge and method may result in price forecasts with little or no reliability. The complexity of the pricing mechanism together with the chain reaction of a great many disturbing factors make the analysis difficult. Factors related to supply, demand, cost of production, and time of marketing vary in their combinations to influence the price of cattle for any particular year. If reliable price forecasts are to be made then the net effect of each of these factors must be approximated, and even then the forecast will be dependably accurate only if the net result of future relationships remains similar to that of the past.

Year to Year Price Movements: Previous studies in the United States have established combinations of factors which apparently have accounted for year to year changes in the prices of cattle during the particular periods studied. They have implied that these combinations were logical cause and effect relationships, but when the data were later extended to cover subsequent years, the results of such extension have indicated that some of the associations probably were chance associations existing only for the period covered by the original data. In analyzing the correlation of various price-affecting factors there is no method of determining whether a particular association of factors is the result of chance occurrence or of a cause and effect relationship. Only future experience can show whether the net relationships have continued. If an analysis aims at providing guides to future price movements, the usefulness of the results will be increased if the

following criteria have been used. First, the price-affecting factors used in the study should be selected on the basis of logical relationship, and second, the statistical indicators of those factors should be regularly available in order that the data may be extended at any time. At the time that any correlation analysis of price movements is made, logic is the only basis for judging whether the results are due to chance associations or to cause and effect relationships. But logical selection of factors does not provide an infallible test of cause and effect relationship. A factor might be found that apparently would fulfill the necessary mathematical assumptions, indicate a causal relationship, and yet the effect might be the result of a chance association of that factor with some other factor yet unaccounted for. However, a relationship, logically sound, is more desirable than a relationship on a doubtful logical basis which appears more completely to account for the price movement for a limited period.

This study is based upon secondary data obtained from the publications of various governmental agencies. The data may represent only approximate conditions, but they are the best estimates available since no agency could obtain precise information from more than six million farmers and from the various marketing agencies, even by complete enumeration.

The multiple correlation analyses of the year to year movements of several beef cattle price series cover the period 1922 to 1941 inclusive, although a large part of the remaining analyses of long time price movements goes back to 1910. Data after 1941 were not used in the study since the influence of the various price and production controls in operation under conditions of World War II probably would obscure and alter the normal relationships that otherwise might exist. In the analysis of the year to year movements of beef cattle prices, the graphic method of multiple correlation

was used, while mathematical correlation analysis was applied to account for year to year changes in feed relationships. Should data for future years subsequently prove that the explanations herein developed were significantly influenced by chance, the study, nevertheless, may provide a further step toward the ultimate refinement of methods in later research of this kind.

Month to Month Price Movements: The factors commonly regarded to be associated with average seasonal price movements of cattle are also examined in detail. An average seasonal price pattern for any given number of years will not necessarily approximate the actual price movements in any particular year. The influences of the major factors which may be expected to influence changes in the seasonal price movement must be isolated as nearly as possible in order that the net effect of conflicting tendencies may be evaluated. By taking into account the effects of varying price levels, changing cattle numbers, and fluctuating feed supplies, perhaps a better basis may be established for estimating seasonal movements of price in the future. Percentages of trend based upon moving averages and arithmetic means were used as the basis for measurement.

Utilization of Findings: In an attempt to estimate the future, there is sometimes a tendency on the part of readers mechanically to extrapolate the relationships shown by a research worker. In regard to such extrapolation a word of caution must be emphasized. Refined statistical procedures cannot extract more accuracy from a study than is contained by the original data. Because of the limitations of available data, some of the subclassifications used in this study, as well as in many other studies, contain too few years for great reliability. Even with accurate basic data, the assumptions underlying the statistical methods employed must be met fully or the accuracy of the conclusions will be impaired to the extent of the

divergence. Only if the factors under consideration are causal and the net effect of changing relationships constant should any unmodified prediction of future prices be made. In attempting to utilize this or any other study of price relationships, one should carefully re-examine the conclusions in the light of new conditions to determine whether the results will still withstand the test of logic. Even though there are no apparent changes that would affect the logic or invalidate the results, the conclusions should not be used in a mechanical way, but rather should serve as a basis for subjective analysis and as a supplement to objective study.

FACTORS RELATED TO DEMAND

General Demand Factors: The demand for beef products is essentially the total amount of money that consumers will spend for beef products. Since the average prices of beef products for a given unit of time are determined by this total amount of money divided by the total quantity purchased, then the demand for beef products is dependent upon the incomes of consumers. In the short run, when the supply on the market is fixed with no possibility for storage, then the total amount of money that consumers are willing to pay represents the demand for beef products and determines the average prices that will be received for these products. Even with the above short run limitations removed, demand exerts an influence on the prices of beef products. In the study an attempt is made to isolate factors that may indicate and measure the changes in conditions of demand.

Of the five factors used in this study to measure changes in demand, only the index of wholesale prices is available for the complete series of years 1910 through 1941. Data are available for the index of industrial production, the index of factory payrolls, the index of factory employment, and total national income from 1919 to the present.

Although each of the series may represent different segments of our economic system, each may be used to indicate changes in demand conditions. The commodity in question determines the extent to which one factor may be used in preference to another to represent the conditions of demand. For beef cattle, the factor that most nearly reflects the income of the body of consumers of beef is the logical factor to consider. In this study it is important to remember that four of the five indicators of demand considered are expressed in index numbers with unlike base periods. Therefore, they are

directly comparable only insofar as their relative movements indicate changes in conditions of demand.

The index of wholesale prices,[1] compiled and published by the Bureau of Labor Statistics of the United States Department of Labor, is based upon the wholesale prices in primary markets of approximately 890 commodities.[2] Due to the large number of commodities included, and to the weight given to heavy industries, a somewhat sluggish movement is apparent (Figure 1). An indication of the tendency for this index to lag behind other indicators of demand may be seen in the period 1921 through 1929. The index of wholesale prices indicated relatively stable business conditions with gradually declining prices for this period, but did not account for the influences of the real estate boom and excessive stock market activity. Again during the period 1935 through 1941, the index of wholesale prices indicated relatively smaller fluctuations in business conditions than the more sensitive index numbers. The beginning of World War II in 1939 brought new demands for certain types of goods from the United States which took up the slack in our economic system. This slack was great enough that industrial production and employment could be increased within limits, without proportionately increasing the general price level.

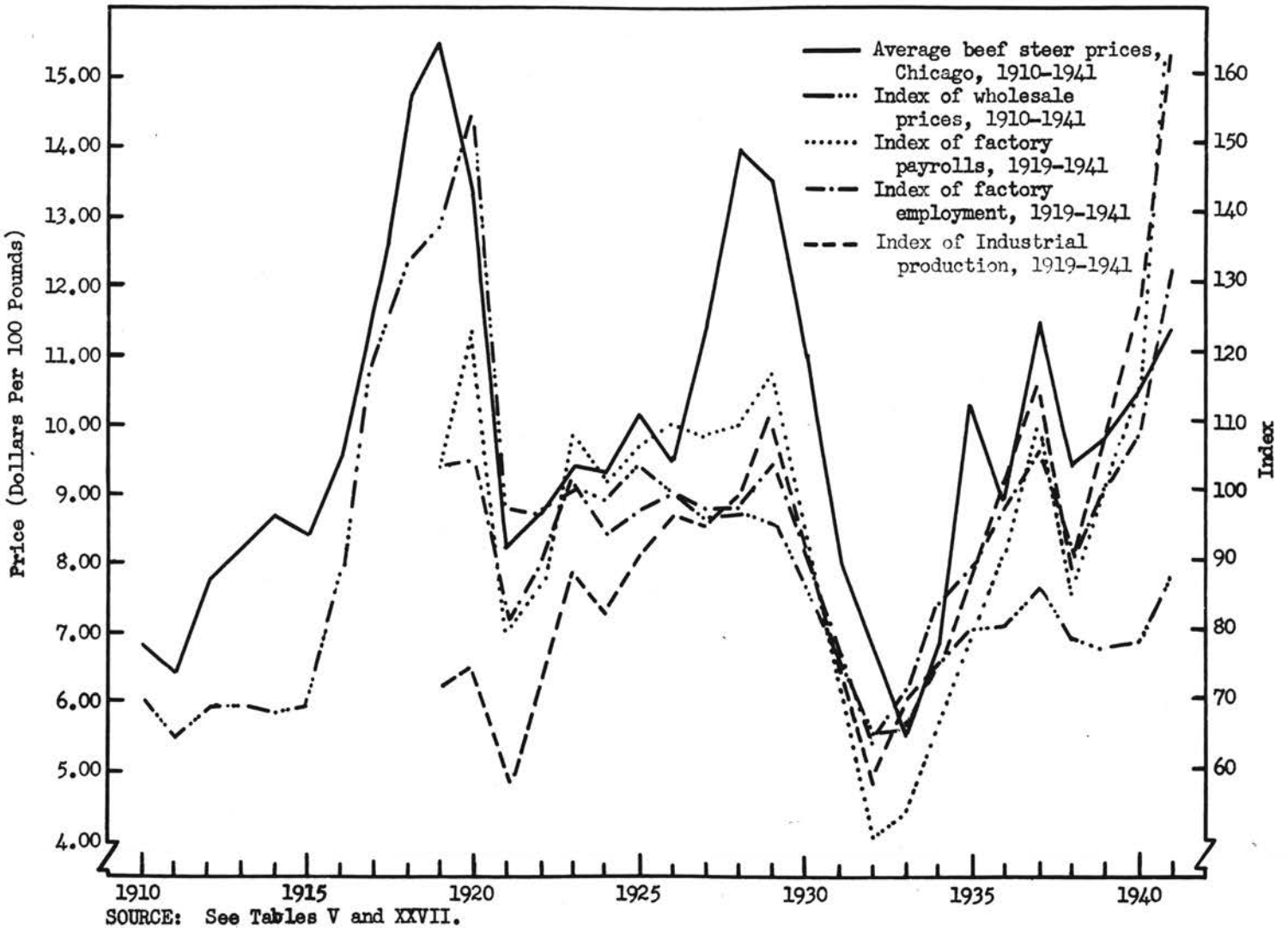
The index of factory employment and the index of factory payrolls are published by the Bureau of Labor Statistics. Both index numbers[3] are based upon reports from selected industries of which 154 are manufacturing and 20

1/ Base Period 1926 = 100.

2/ Philip M. Hauser and William R. Leonard, Government Statistics for Business Use, p. 306.

3/ Base Period 1939 = 100.

FIGURE 1. AVERAGE PRICES OF BEEF STEERS SOLD FOR SLAUGHTER AT CHICAGO AND FOUR INDICATORS OF UNITED STATES GENERAL DEMAND CONDITIONS



SOURCE: See Tables V and XXVII.

are non-manufacturing.[4] Factory payrolls reflect the incomes of an important segment of the consumers of beef and tend more quickly to reflect changes in conditions of demand for beef. Factory payrolls tend to fluctuate relatively more than factory employment, particularly at the extremes (Figure 1). During high business activity, the increase in payrolls may be greater than the increase in employment because of over-time pay, while during low business activity, the number employed may decrease relatively little as compared with payrolls due to work-spreading and feather-bedding activities. The take-home pay, as represented by the index of factory payrolls, may be more important than the number of people employed in determining whether the consumer will choose to consume beef over the possible substitutes or vice versa.

In general, the movement of the index of factory payrolls corresponded closely with the movement of the average prices of beef steers sold at Chicago. The divergent movement, where it occurs, may be attributable to the effect of supply factors and to the effect of auxiliary demand factors to be discussed later.

The index of industrial production[5] compiled and published by the Board of Governors of the Federal Reserve System, indicates changes in business activity in terms of physical volume of output of industries.[6] The index of industrial production did not correspond as closely to the average prices of beef steers sold at Chicago as did the index of factory payrolls, although the changes from year to year were similar (Figure 1). However, this reason

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4/ Hauser and Leonard, op. cit., p. 395.

5/ Base Period 1935-1939 = 100.

6/ Hauser and Leonard, op. cit., p. 33.

is not enough to discard the use of the index of industrial production since beef cattle prices are influenced by factors other than demand and may rightly deviate from changes in demand. The decision to discard the use of any indicator, which logic alone will not conclusively show to be inapplicable, should be based upon careful testing of the factor within the framework of the particular problem.

A comparatively recent addition to the field of indicators of business activity is total national income. Total national income is the sum of incomes in dollars accruing from productive activity, measured for personal incomes before taxes and for business incomes after taxes. 7/ The movement of total national income follows closely the movement of the index of factory payrolls, especially after 1929 (Figure 2). The principal reasons favoring the use of the index of factory payrolls over the use of total national income as an indicator of demand were the relative ease of accessibility in current publications and the fact that the index of factory payrolls is computed and published monthly while total national income is computed and published only quarterly. The use of the index of factory payrolls to indicate changes in demand conditions will give more frequent estimates by which decisions may be altered currently if the relationships subsequently pointed up in this study are used as bases for situation analysis.

Auxiliary Demand Factors: Not all changes in demand for beef are reflected in changes in general demand conditions. Certain auxiliary demand factors are peculiar to the particular product under discussion.

Auxiliary demand factors which are not accurately reflected by the index of factory payrolls, do exert an influence on the prices that will be

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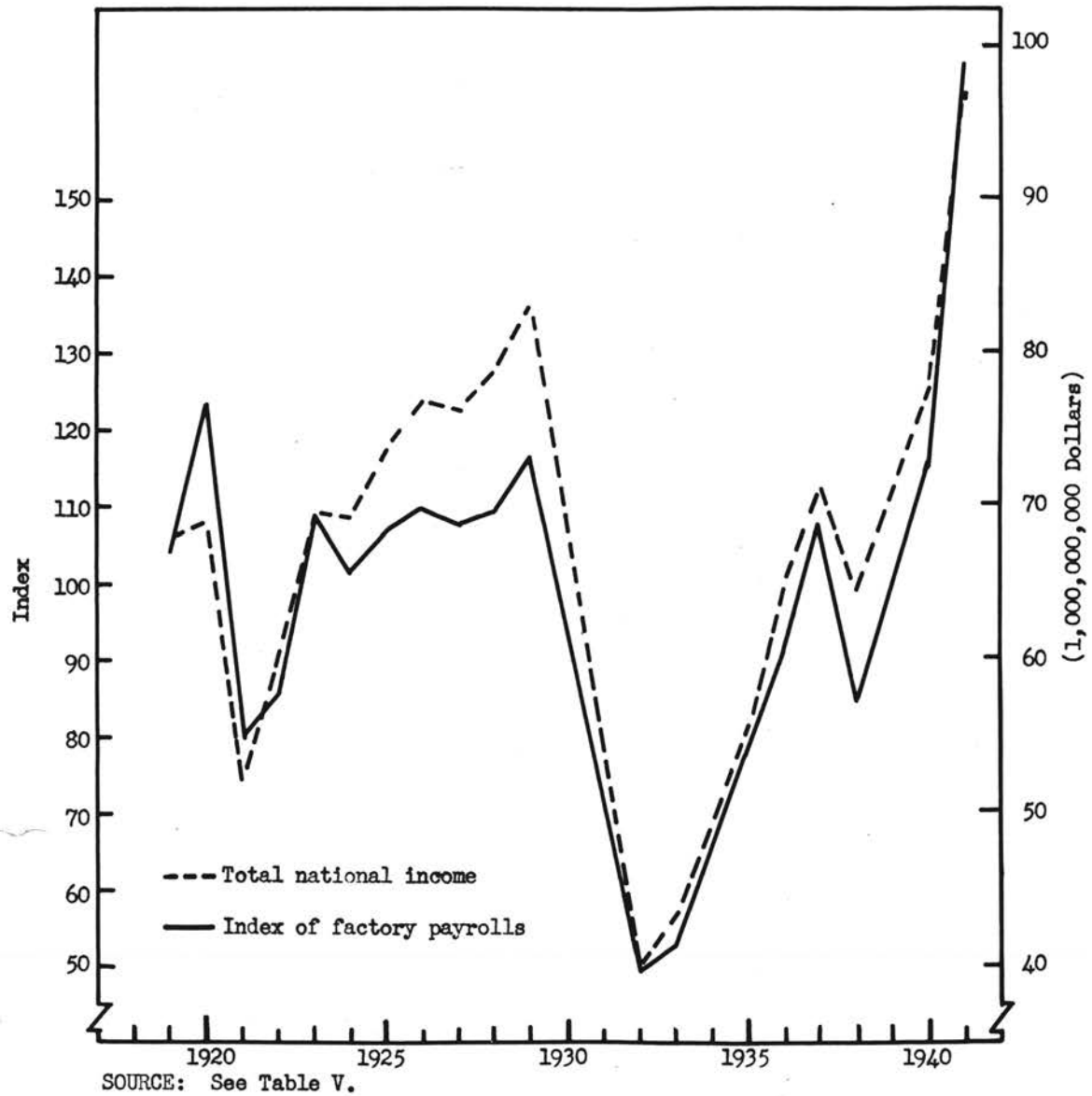
7/ Ibid., pp. 20 and 21.

FIGURE 2. TOTAL NATIONAL INCOME AND INDEX OF FACTORY PAYROLLS, UNITED STATES, 1919-1941



SOURCE: See Table V.

paid for beef products. The demand for beef by-products is indirectly a demand for beef cattle, thus the value of cattle depends in part upon the value of the by-products, for example, hides, obtained in slaughter. It has been estimated that the value of a hide makes up about 8.6 percent of the value of a steer.[8/] An average yearly price of packer and country hides at Chicago was obtained by summing the average yearly prices and computing the arithmetic mean. These prices of hides depend, in part, upon the general demand conditions, and consequently, the average prices of hides tended to move in sympathy with the index of factory payrolls, but the supply of hides is dependent upon the supply of cattle. Therefore, when numbers were small as in 1926 through 1928 with small supplies of hides, the higher average price of hides appeared to exert a strengthening influence on the average prices of beef steers sold at Chicago (Figure 3). The prices of hides should be considered as a marginal factor affecting the prices of beef cattle. When the average prices of hides are low with respect to demand conditions, it might logically be assumed that the influence will tend to depress cattle prices, and conversely, when the average prices of hides are high with respect to demand conditions, the logical assumption is that cattle prices will tend to be strengthened.

The substitution of competing products, such as the substitution of pork for beef in the consumers' diet, logically exerts an influence on beef cattle prices. When hog prices are low relative to cattle prices, the effect of the competition should tend to depress cattle prices. When hog prices are high relative to cattle prices, the substitution of beef for pork

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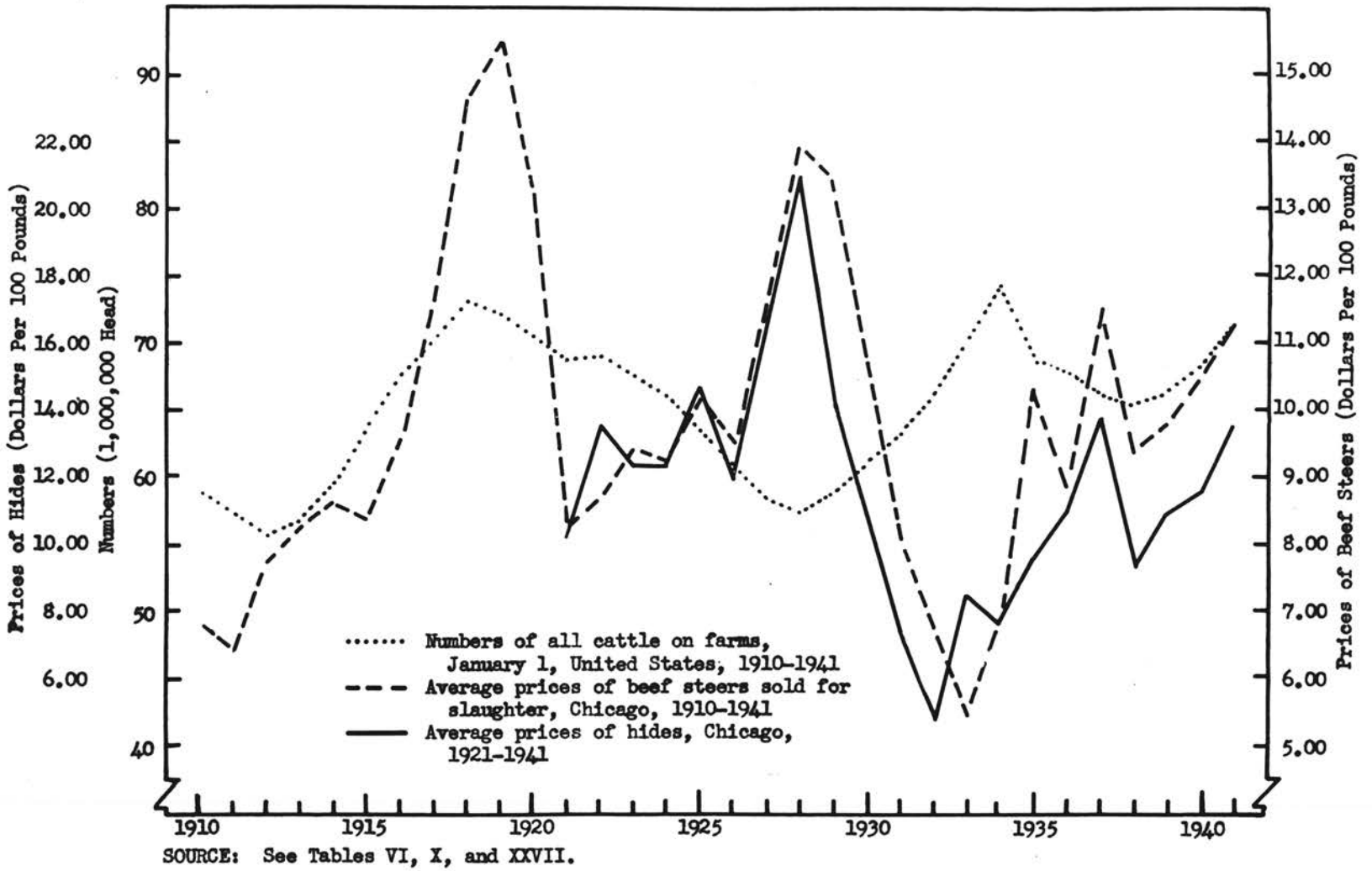
8/ E. C. Voorheis and A. B. Koughan, Economic Aspects of the Beef Cattle Industry, p. 124.

FIGURE 3. NUMBERS OF ALL CATTLE ON FARMS, UNITED STATES; AVERAGE PRICES OF HIDES, CHICAGO; AND PRICES OF BEEF STEERS SOLD FOR SLAUGHTER, CHICAGO



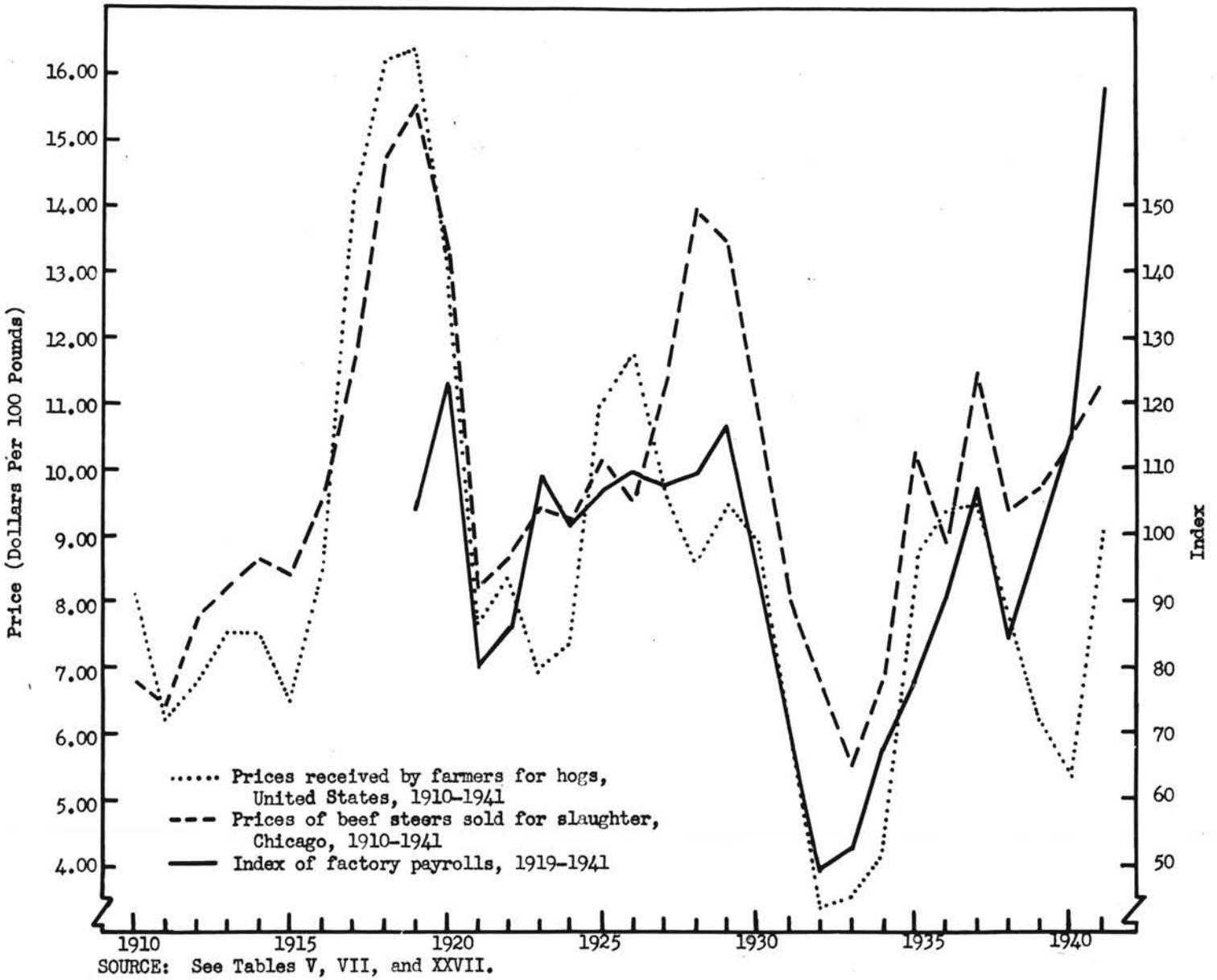
SOURCE: See Tables VI, X, and XXVII.

should tend to strengthen cattle prices. It is difficult to isolate these logical effects without resort to other relationships (Figure 4). The per capita consumption of beef and pork indicates evidence of this substitution effect. When the prices of hogs decreased relative to the prices of cattle, the per capita consumption of pork increased and the per capita consumption of beef decreased. Conversely, when the prices of hogs increased relative to the prices of cattle, the per capita consumption pork decreased while the per capita consumption of beef increased (Figure 5).

The effect of changing quantities of beef and beef products exported from the United States should influence the average prices paid for beef cattle. Large exports, as they decrease the supply of beef available to domestic consumers, logically, exert a strengthening influence on the average prices of beef cattle. Large imports on the other hand, as they increase the supply of beef products available, should exert a depressing influence on the average prices of beef cattle. However, the actual movements of exports and imports, logically tend to fluctuate inversely with beef cattle prices. With high average prices of beef cattle, then net exports should decrease and net imports should increase, while with low average prices of beef cattle, net exports should increase and net imports should decrease.

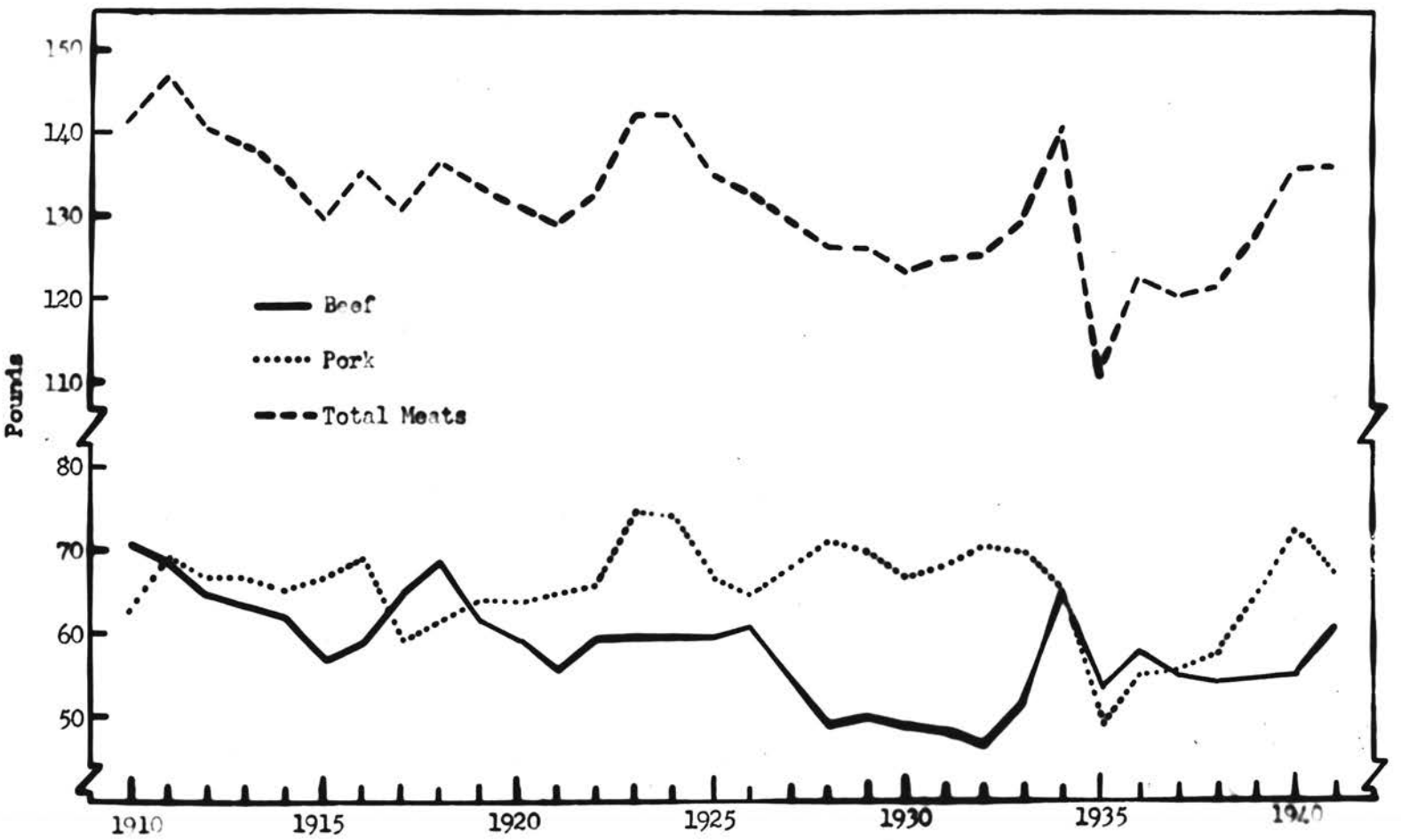
The trend of exports of beef from the United States has been downward from 1910 to 1941 except during World War I (Figure 6). From 1910 through 1913 exports of beef decreased from 93,620,000 pounds to 33,125,000 pounds. The downward trend was halted during the war period and exports were pushed up to a high of 521,844,000 pounds in 1917. After 1921, exports began to level off, and until 1941, varied between 12 and 25 million pounds. This indicates that exports of beef have become of decreasing significance as a demand factor affecting beef cattle prices. Net exports of cattle and beef

FIGURE 4. PRICES RECEIVED BY FARMERS FOR HOGS, UNITED STATES: PRICES OF BEEF STEERS SOLD FOR SLAUGHTER, CHICAGO: AND INDEX OF FACTORY PAYROLLS, UNITED STATES



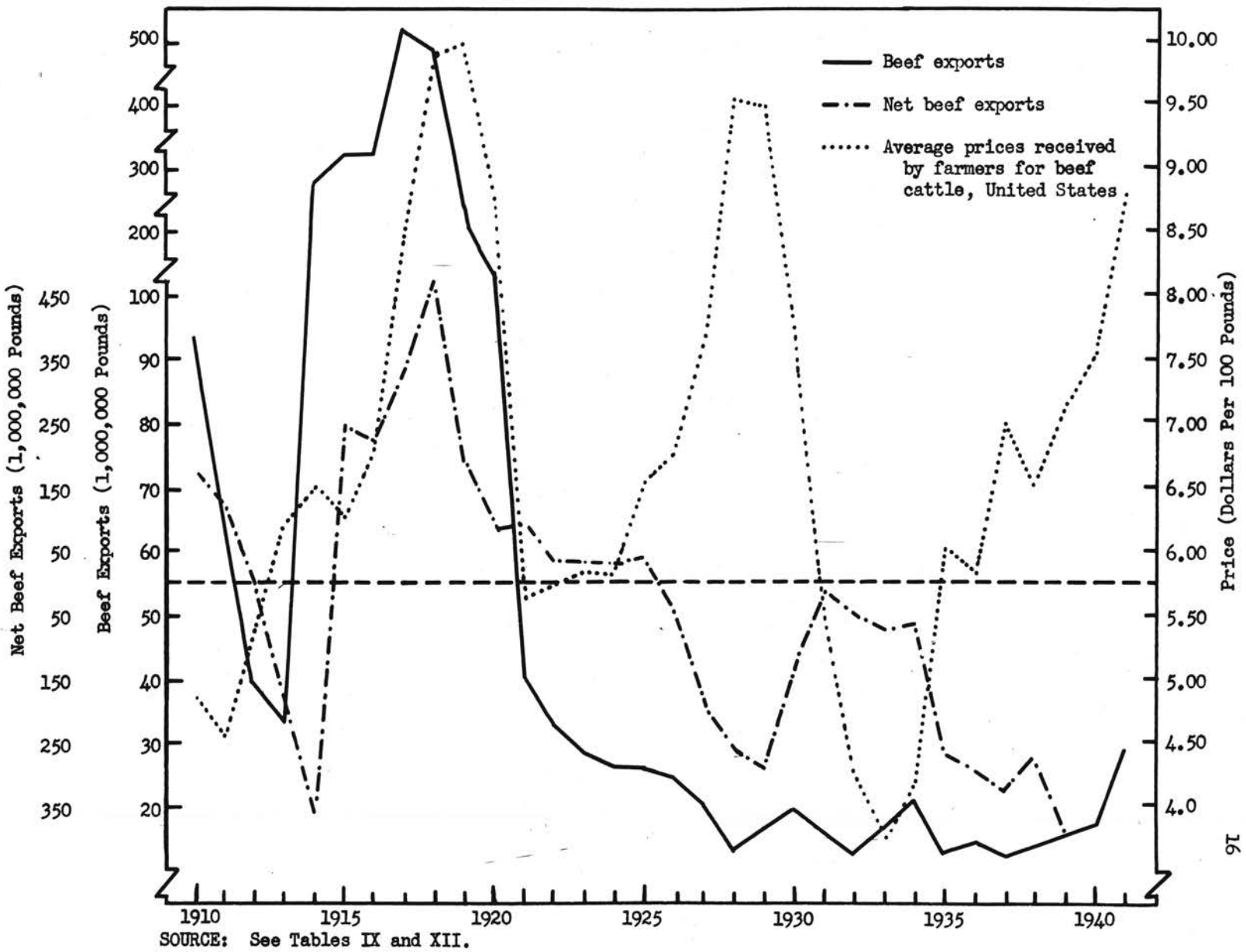
SOURCE: See Tables V, VII, and XXVII.

FIGURE 5. PER CAPITA CONSUMPTION OF BEEF, PORK, AND TOTAL MEATS, UNITED STATES, 1910-1941



SOURCE: See Table VIII.

FIGURE 6. BEEF EXPORTS; NET BEEF EXPORTS; AND AVERAGE PRICES RECEIVED BY FARMERS FOR BEEF CATTLE, 1910-1941



SOURCE: See Tables IX and XII.

show about the same overall relationship as total beef exports. Care must be exercised in reading this section of the figure. The horizontal dashed line corresponding to zero on the scale representing net exports, indicates that all points lying above this line are net exports while all points lying below are net imports. The relationship between the movement of average prices of beef cattle and the movement of net exports apparently illustrated the logical relationships expressed above. There was a tendency for net imports to be in direct relationship with average beef cattle prices. When cattle prices were low, net imports tended to decrease, conversely, when cattle prices were high, net imports tended to increase.

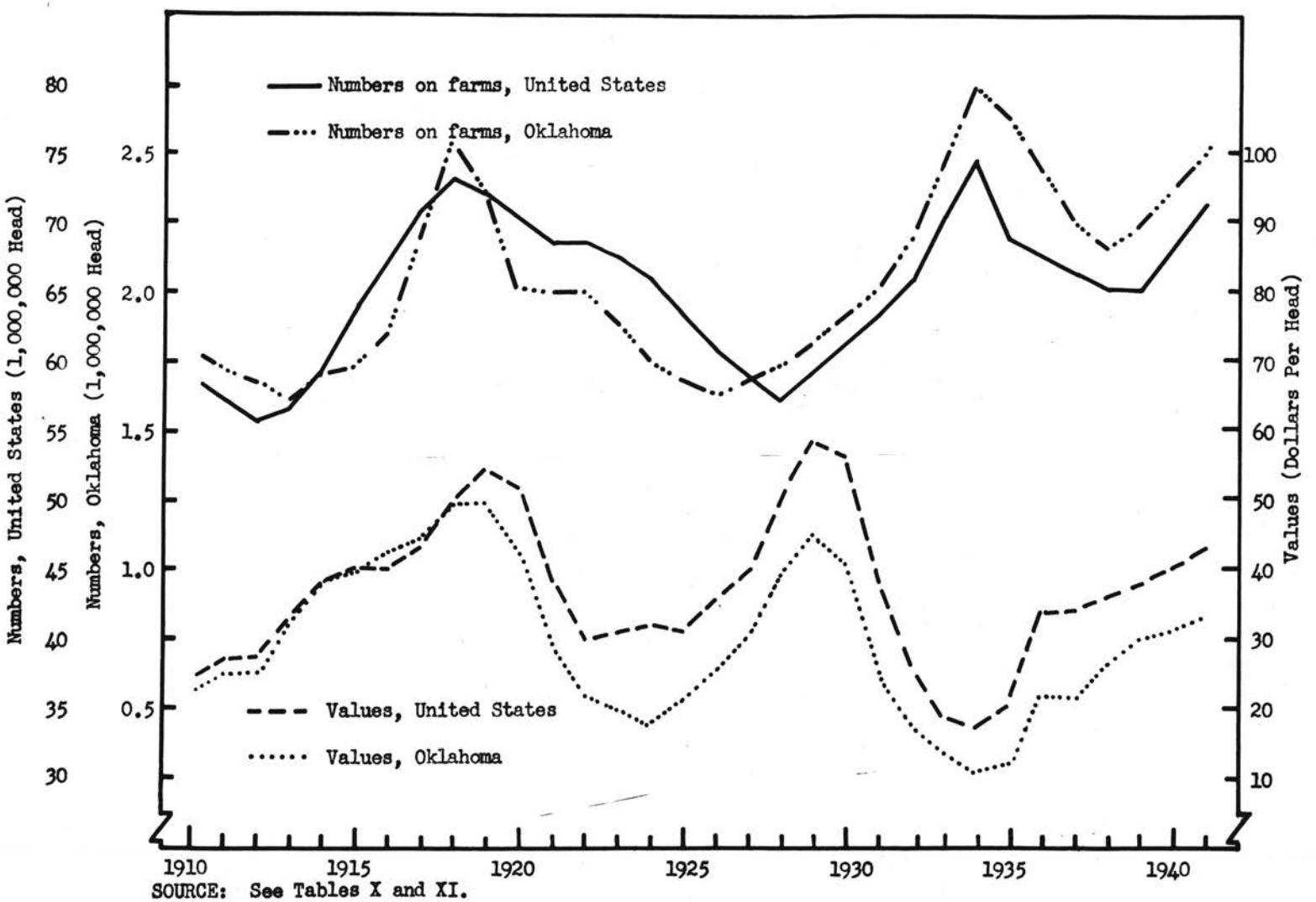
FACTORS RELATED TO SUPPLY

Characteristics of Cattle Numbers and Market Receipts: The number of cattle on farms January 1 each year is estimated by the United States Department of Agriculture for the United States and for the individual states. The direction of changes in Oklahoma cattle numbers tends to coincide with the direction of changes in United States cattle numbers (Figure 7). Beginning with 1910, cattle numbers on farms both in the United States and Oklahoma were declining. The low was reached by the United States in 1912 while the low was reached for Oklahoma a year later. Thereafter, cattle numbers began increasing until the peak was reached in 1918 both in the United States and Oklahoma. The following trough of cattle numbers on farms in Oklahoma in 1926 preceded the United States trough by two years. A peak in numbers in 1934 for the United States and Oklahoma was followed by a trough in numbers on farms in 1938. After 1938, cattle numbers again began to increase in cyclical fashion.

There are many explanations of the causes of the beef cattle cycle varying from the episodic theory to the production-price cycle theory related to the cobweb theorum. The behavior of production and prices of beef cattle during the past thirty years seems to support some theory similar to the latter, although episodic happenings frequently alter the so-called normal operations of the cycle. World War I, the drought and relief purchases of the early thirties, and World War II all have significantly affected production and prices of beef cattle.

The cobweb theorum considering only a three to four year lag in changes in beef production in response to changes in beef cattle prices will not in itself explain the beef cattle cycle. A lag of seven to eight years would be necessary to explain the twelve to sixteen year beef cattle cycle. If

FIGURE 7. NUMBERS AND VALUES OF ALL CATTLE ON FARMS, JANUARY 1, UNITED STATES AND OKLAHOMA, 1910-1941



SOURCE: See Tables X and XI.

the cobweb theorum is to be used to explain the beef cattle cycle then it must be assumed that farmers would continue to expand their herds at least three to four years after the initial decision to expand production had been made or some consideration must be given to the effect of numbers of cattle on farms.

An explanation similar in operation to the cobweb theorum, although it was not indicated as a supplement to the cobweb theorum, has been presented by Lorie.[9/] In essence, this theory states that the numbers of cattle on farms, the values of those cattle, and actual marketings all revolve around some equilibrium level and that the cyclical fluctuations are inherent in the operations of the cattle industry. This equilibrium may move up or down in response to factors either inside or outside the cattle enterprise such as changes in demand or changes in the carrying capacity of pasture.

When values begin to increase as a result of change in one of these factors, the numbers on farms increase as farmers withhold cattle from the market for breeding purposes, and consequently, marketings decline. In three to four years after inventories begin to expand, increased production from these expanded herds would reverse the downward trend in marketings. The increased marketings would now cause values to begin declining, but, the values are still above the equilibrium level.

Farmers would continue to expand their herds for three to four years in spite of decreasing values, although at a decreasing rate, until declining values and increasing marketings reach the equilibrium level, and increasing numbers reach their peak.

9/ James H. Lorie, Causes of Annual Fluctuations in the Production of Livestock and Livestock Products, pp. 53-57.

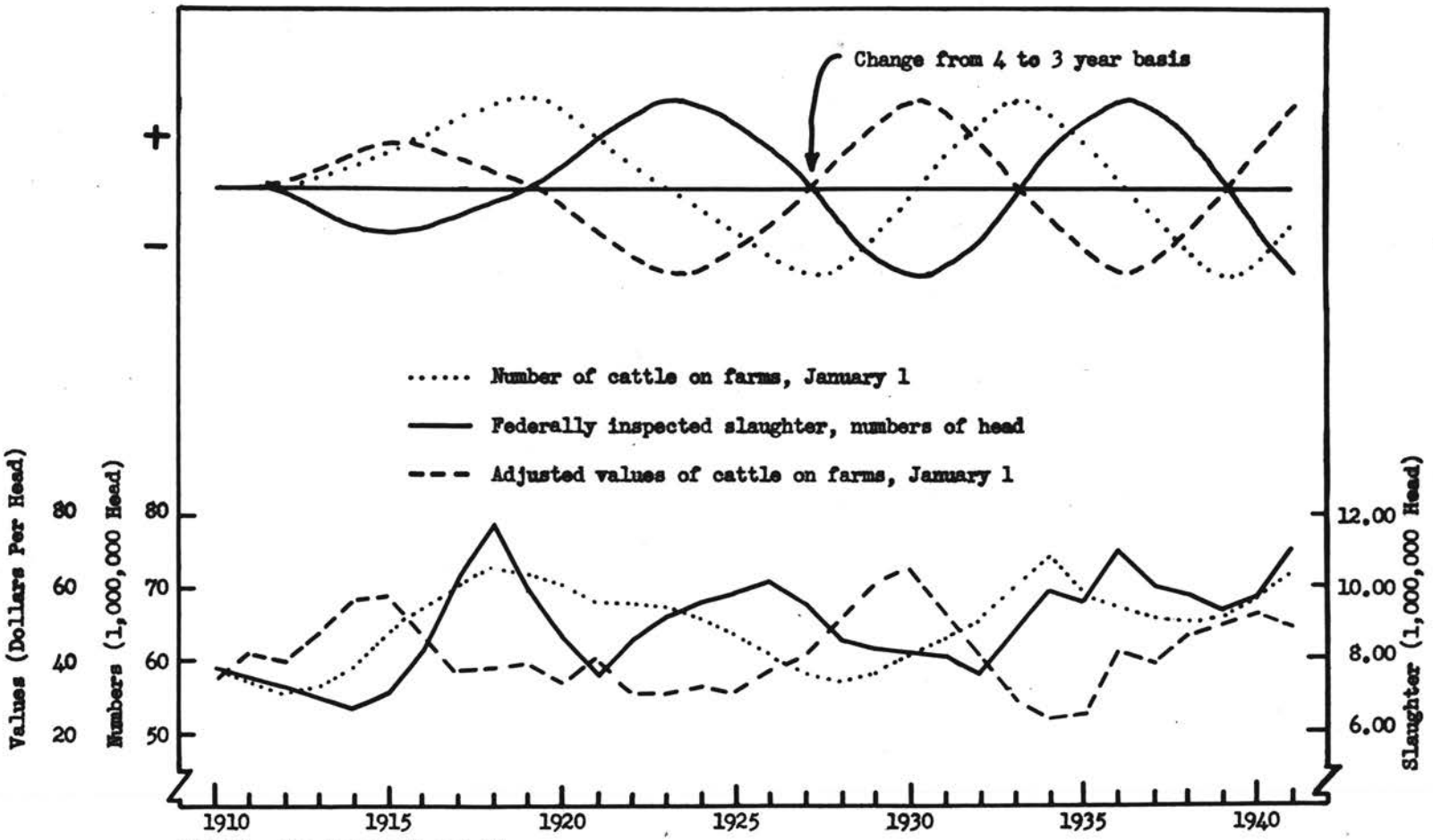
Marketings will continue to increase because of larger production from expanded herds. These increased marketings will cause values to decrease below the equilibrium level which, in turn, will cause liquidation of herds. Marketings will continue to increase, because of both the liquidation of herds and large production from herds, for about three to four years until a peak is reached with a corresponding trough in values, and declining numbers will reach the equilibrium level.

From nine to twelve years have now elapsed in the cycle. As numbers on farms continue to decline, because values are below their equilibrium level, marketings from contracting herds will also decline, which, in turn, will cause values to increase. In three to four years, numbers on farms reach their ebb as declining marketings meet the increasing values at the equilibrium level, now completing the twelve to sixteen year cycle.

Although there has been a gradually decreasing length of time involved between the decision of the producer to produce a certain number of cattle and the actual time of marketing of those cattle, primarily because of the tendency to market beef at earlier ages, for convenience in constructing Lorie's theoretical model, it was assumed that this period equaled four years from 1910 to 1927 and equaled only three years from 1927 through 1941 (Figure 8). The values of all cattle on farms in the United States adjusted by the index of wholesale prices for changes in the general price level, the number of head of federally inspected slaughter, and the numbers of all cattle on farms in the United States were selected to represent the actual movements of values, marketings, and numbers to compare with the theoretical movements explained in the model.

In the period 1910 through 1941, there was a degree of similarity between the theoretical movements and the actual movements of values,

FIGURE 8. COMPARISON OF NUMBERS, ADJUSTED VALUES, AND FEDERALLY INSPECTED SLAUGHTER, UNITED STATES, WITH A THEORETICAL MODEL OF THE CATTLE CYCLE, 1910-1941



SOURCE: See Tables X and XV.

marketings, and cattle numbers for the United States (Figure 8). Episodic factors sometimes hastened the movement of one or more of these factors to partially obscure the relationship. During World War I, the heavy demand for exports and the drought of 1918-1919 caused the peak of federally inspected slaughter to come about three to four years earlier than the results from the model would indicate. This premature liquidation of herds caused a trough in the numbers of head of federally inspected slaughter that otherwise might not have occurred. The depression of the thirties brought about a sudden change in conditions of demand which caused decreasing values and decreasing slaughter supplies along with rapidly expanding numbers of cattle on farms. The effect of the drought relief purchases to reduce cattle numbers and the effect of the Agricultural Adjustment Administration to reduce hog numbers probably contributed to the joint increase of both values and slaughter in 1935 and 1936. While recognizing that these limitations do exist, it is apparent that adjusted values and numbers of head of federally inspected slaughter tend to change in inverse relationship, while the numbers of cattle on farms tend to increase until about two to four years after the peak in values, and to decrease until about two to four years after the trough in values (Figure 8).

Along with this cyclical movement, the trend of cattle numbers on farms has been upward with peaks and troughs representing progressively larger numbers. The decrease in the numbers of horses and mules on farms since 1910 has played an important role in allowing cattle production to increase. A large quantity of roughage and hay formerly used by horses had to be utilized by cattle or its production sharply curtailed. It has been estimated that fifteen million tons of grain and nineteen million tons of hay

formerly produced and fed to horses and livestock in cities, is either not produced or is fed to other classes of livestock.[10/]

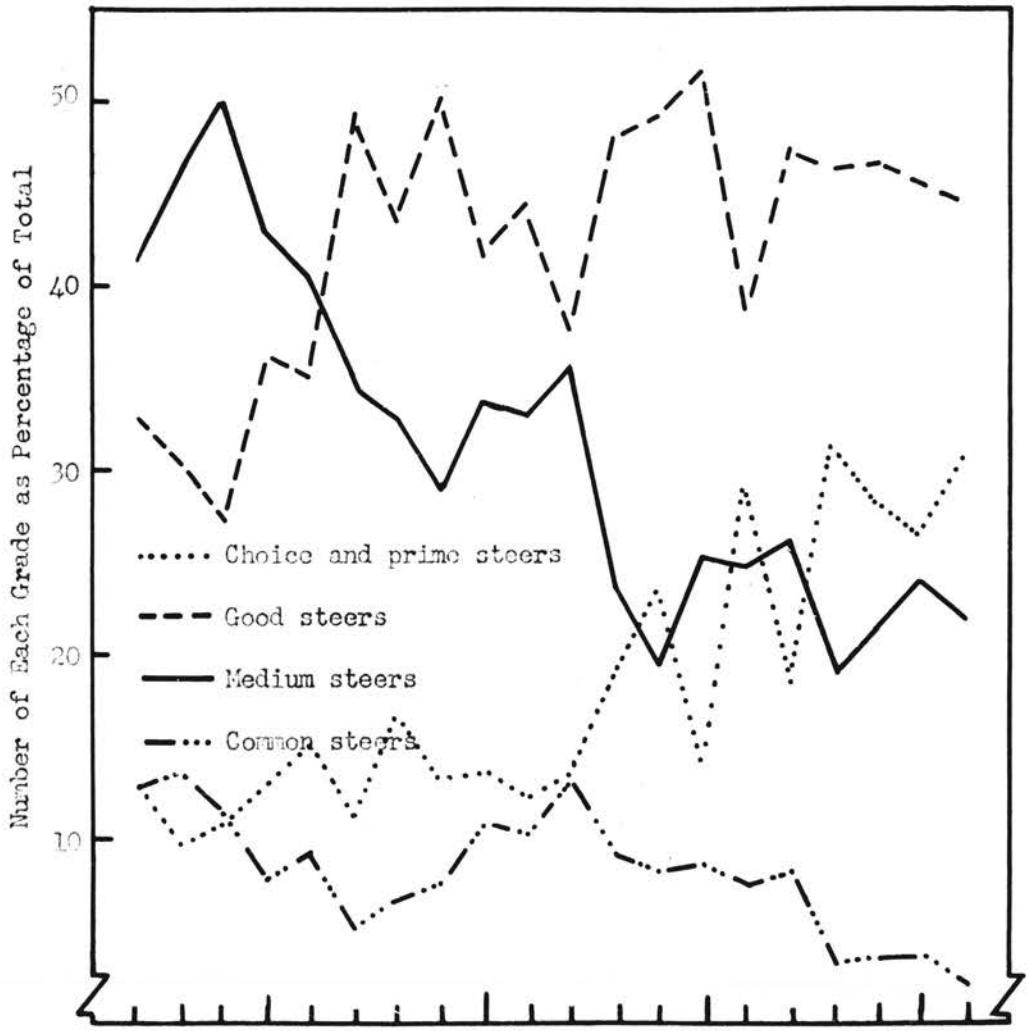
Cattle, other than for milk, on farms in the United States have followed the cyclical variation of small and large numbers of all cattle on farms. However, unlike the pattern for all cattle, the peaks and troughs for cattle other than for milk did not become progressively larger. Milk cows on farms have been increasing in an almost continuous trend to account for the upward trend in all cattle numbers and have also become an increasingly important factor influencing the supply of beef cattle. It has been estimated that the by-products of the dairy industry, calves from expanding herds and cows that have served their usefulness as dairy animals, contribute approximately one-fourth of all the animals slaughtered for meat.[11/]

Evidence of increasing intensity of feeding operations and increasing quality of slaughter livestock in the beef cattle industry is indicated by the percentage the number sold of each grade is of the total number of beef steers sold out of first hands for slaughter at Chicago from 1922 through 1941. Choice and prime steers have steadily increased from about 10 percent of the total in 1923 to 32 percent in 1941 (Figure 9). Good steers have increased from about 30 percent to slightly less than 50 percent of the total number sold, for the same period, to occupy the position of greatest importance to the total sales of beef steers at Chicago.

10/ R. D. Jennings, Feed Consumption of Livestock, 1910-41, p. 17.

11/ United States Department of Agriculture, Agriculture Yearbook, 1922, p. 284.

FIGURE 9. NUMBER SOLD OF EACH GRADE AS PERCENTAGE OF TOTAL NUMBER OF BEEF STEERS SOLD FOR SLAUGHTER, CHICAGO, 1922-1941



SOURCE: See Table XIV.

This change in quality is largely reflected in the reductions in the proportion of medium steers in the market receipts. From 1922 to 1941, medium steers decreased from about one-half to less than one-fourth of the total number sold at Chicago.

The fluctuations in the percentage of common steers sold at Chicago has been less than for any other grade of livestock. There was a tendency for the percentage for choice and prime steers to move inversely with the percentage for common steers when related to the price level. As the level of beef cattle prices increased it was more profitable to increasing feeding operations, and the percentage for choice and prime steers increased while the percentage for common steers decreased. Conversely, as the level of beef cattle prices declined, it was less profitable to feed to higher grades and the percentage for choice and prime steers decreased while the percentage for common steers increased. A certain percentage of the livestock coming to the market cannot be advantageously fed to the better grades. A large number of discarded milk cows and two-way cattle are slaughtered at common grades which have a steadying influence on the percentage that common grades constitute of the total number of Chicago receipts.

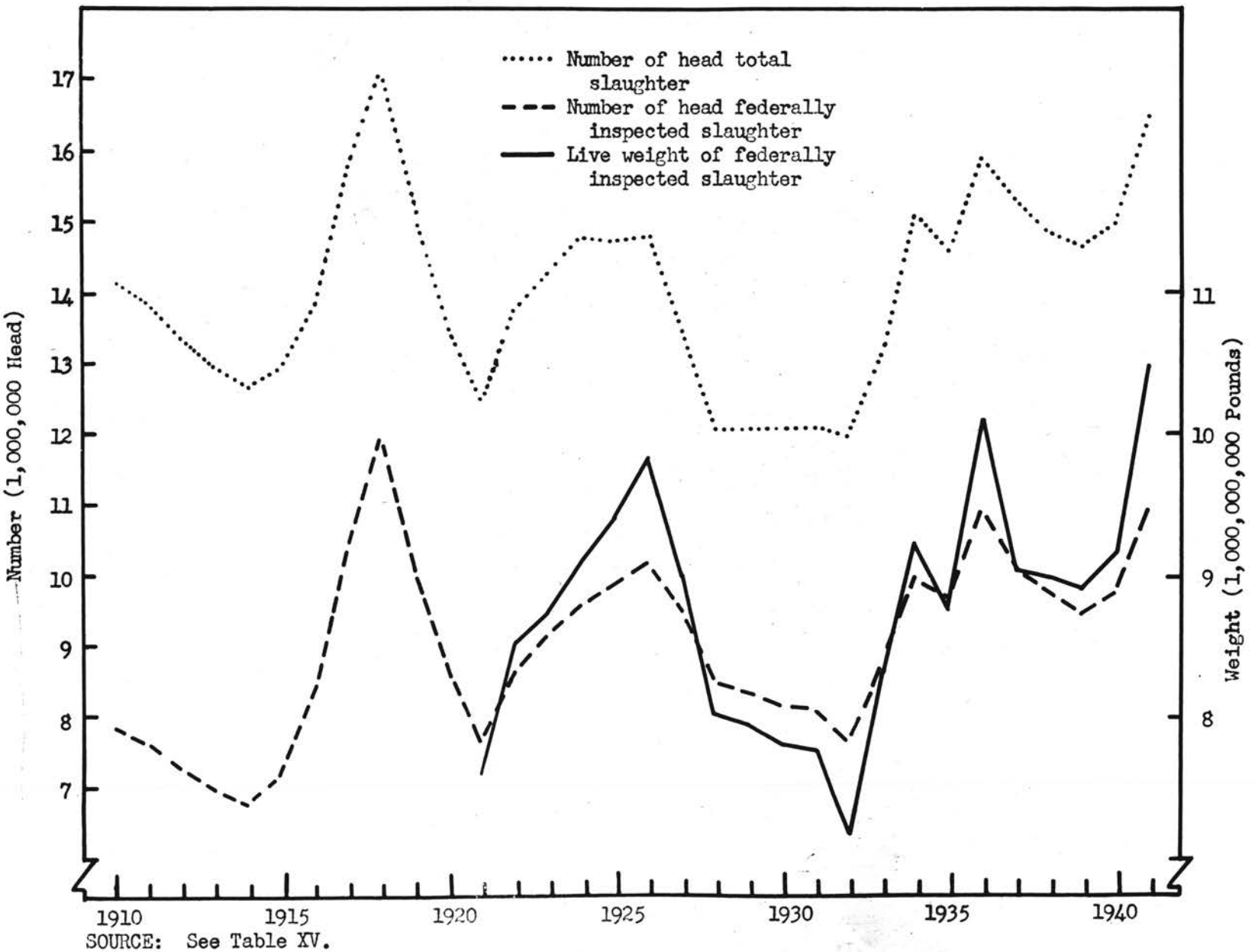
Indicators of Supply: The supply of cattle going to the market technically is the supply of beef in determining demand and supply relationships. There are three estimates of this supply, two of which are on the basis of the number of head slaughtered and the other is on the basis of the total live weight slaughtered. Federally inspected slaughter, in numbers of head, is based upon the total number of head slaughtered at all plants operating under the supervision of the Meat Inspection Service of the Bureau of Animal Industry. Total slaughter, also in numbers of head, is based upon this federally inspected slaughter plus an estimate of the number of head of

livestock slaughtered in plants not under federal inspection and an estimate of farm and home slaughter. The number of head of total slaughter necessarily is larger than the number of head of federally inspected slaughter but the movements in each series are similar. However, during the period 1924 through 1932, it appeared that the number of head of total slaughter did not fluctuate as much as did the number of head of federally inspected slaughter (Figure 10).

The live weight of federally inspected slaughter is based upon the total live weight of slaughter at all plants operating under federal inspection. The only significant difference between this estimate and previous estimates is that while the number of head marketed will fluctuate, the number of pounds marketed will fluctuate even more because of the different average weights at which livestock are marketed at different times. Federally inspected slaughter on a live weight basis, although not available for as long a period as the estimates based on the number of head, does give a better estimate of the supply of beef going to the market, and therefore, will be used in the correlations that follow to represent the supply of beef cattle on the market. However, in the later analysis of seasonal variation, it has been necessary to use federally inspected slaughter based on the number of head because the live weight estimates do not cover all of the years used in that section of the study.

Relationship Between Feed and Cattle Supplies and Prices: Feed relationships as they affect the production and prices of beef cattle present many interesting problems. The number of cattle other than milk cows on farms January 1 in the United States, hereafter termed "other cattle", was selected as the supply factor representing beef cattle in determining these

FIGURE 10. NUMBER OF HEAD TOTAL SLAUGHTER, NUMBER OF HEAD FEDERALLY INSPECTED SLAUGHTER, AND LIVE WEIGHT FEDERALLY INSPECTED SLAUGHTER, UNITED STATES



SOURCE: See Table XV.

relationships. Jennings has estimated the total consumption of all grains, corn, oats, and hay by "other cattle" from 1910 through 1921.[12/]

Using Jennings' consumption figures, six hypotheses were formulated for the present study regarding feed, cattle numbers and price relationships, that would permit mathematical tests of significance. If these six hypotheses cover all logical associations then through the process of elimination of these hypotheses which fail to provide significant statistical association, it should be possible to isolate and examine those relationships which do provide statistically significant relationships. Scatter diagrams were also made to aid in the analysis. The statistical results will not prove or disprove any hypothesis, they only provide further evidence to be used together with subjective analysis. As will be indicated, logical relationships are sometimes obscured by the effects of other factors when mathematical determination of the degree of association between two variables is attempted.

The first hypothesis was as follows: An increase in the quantities of feed produced would not be associated with an increase in the quantities of feed used by "other cattle" the following year. That is, correlation between feed supply and cattle numbers would be zero. For all grains, corn, oats, and hay the coefficients of correlation, r, were highly significant at the 1 percent level,[13/] indicating that there was an association of an increase in feed production with an increase in feed consumption the following year, and giving evidence that the hypothesis was in error (Table I). Although the correlation coefficient for corn was larger than for the other relationships, a direct comparison of the respective r's cannot be made.

12/ R. D. Jennings, op. cit., p. 25.

13/ For a more complete explanation of the meaning of statistical significance see Appendix, p. 111.

Table I. Correlation Coefficients For Feed Relationships, United States, 1910-1941

X	Y	r
All Grain Production	All Grain Used, following Year	0.77**
Corn Production	Corn Used, following Year	0.78**
Oats Production	Oats Used, following Year	0.70**
Hay Production	Hay Used, following Year	0.72**
Other Cattle Numbers	All Grain Used	0.03
Other Cattle Numbers	Corn Used	0.08
Other Cattle Numbers	Oats Used	0.17
Other Cattle Numbers	Hay Used	0.36*
Cattle Prices	All Grain Used	0.18
Cattle Prices	Corn Used	0.14
Cattle Prices	Oats Used	0.28
Cattle Prices	Hay Used	0.45**
All Grain Prices	All Grain Used	0.03
Corn Prices	Corn Used	0.19
Oats Prices	Oats Used	0.21
Hay Prices	Hay Used	0.03
Cattle Prices	All Grain Prices	0.67**
Cattle Prices	Corn Prices	0.55**
Cattle Prices	Oats Prices	0.54**
Cattle Prices	Hay Prices	0.46**
Other Cattle Numbers	All Grain Prices	0.53**
Other Cattle Numbers	Corn Prices	0.54**
Other Cattle Numbers	Oats Prices	0.54**
Other Cattle Numbers	Hay Prices	0.51**

SOURCE: See Table XVIII.

The second hypothesis was that an increase in "other cattle" numbers would not be associated with an increase in the quantities of feed consumed by "other cattle". The correlation coefficients were not significantly different from zero at the 1 percent level (Table I). Therefore, there was no statistical evidence to alter the hypothesis. The correlation coefficient for the hay relationship just exceeded the 5 percent level of significance, and indicated that there might be a tendency for some association to exist

between the numbers of "other cattle" and the quantities of hay used by them. As indicated under the results from the first hypothesis, there is a significant relationship between the production of feed and its consumption by "other cattle". This association of consumption with feed production may be sufficiently strong as to prevent the statistical demonstration of an association between "other cattle" numbers and feed consumption, which, on a logical basis, might be expected to exist.

The third hypothesis was that an increase in the prices received by farmers for cattle in the United States would not be associated with an increase in the quantities of feed used by "other cattle". For all grains, corn, and oats the correlation coefficients were not significantly different from zero at the 1 percent level, and gave no evidence to justify discarding the hypothesis (Table I). The correlation coefficient for hay, however, was 0.45, a highly significant relationship, and indicated that there was an association of an increase in the quantities of hay consumed by "other cattle" with an increase in the prices of cattle. There are so many grain consuming units of livestock as compared to roughage consuming units, that as the prices of cattle go up, the prices of other livestock may also go up enough to bid away from cattle the grain that they would ordinarily consume. Cattle would then consume more hay and less feed grains.

The fourth hypothesis was that an increase in the prices of feed would not be associated with an increase in the quantities of feed fed to "other cattle". Correlation coefficients for all grains, corn, oats, and hay were not significant at the 1 percent level. Statistically, therefore, there is no basis for the assumption that the price of feed has any significant association with the quantity of feed consumed by other cattle. It is probably true that the effects of other factors have obscured the association that might otherwise have been expected.

The fifth hypothesis was that an increase in the prices received by farmers for cattle would not be associated with an increase in the prices of feed. The two prices logically are not fully independent in that they are both affected by the general level of prices. But, they are assumed to be dependent upon their respective supplies even though they may be associated through a common dependence upon the general level of prices. Tentatively, they are assumed to be independent simply to provide the statistical bases for the proper tests of significance. The correlation coefficients were highly significant for all grains, corn, oats, and hay (Table I). This indicated that there was an association of an increase in the prices of feed with an increase in the prices of cattle. As suggested above, it is probably true that a large part of this association is accounted for by the fact that the prices of cattle and the prices of feed both move in sympathy with the general price level. However, an important assumption is that the price of feed depends upon the marginal productivity in its use by the cattle enterprise. If the prices of cattle increase then the marginal productivity of a unit of feed will also increase, therefore, as the prices of cattle rise then, ceteris paribus, the prices of feed that go into the cattle enterprise will also tend to increase. This will be true only to the extent that net returns to other livestock enterprises, representing opportunity costs to the cattle enterprise, remain the same or improve. Should cattle numbers or feed supplies ever become extremely high or extremely low then this statement must be modified. If cattle numbers are extremely high with inversely low prices then other livestock enterprises, as they represent opportunity costs to the beef cattle enterprise, might utilize this feed and limit the decline in feed prices. On the other hand, if the cattle producer feels he must purchase the necessary feed, regardless of the feed cost, in order to

utilize his fixed costs with the least loss than the effects of the competition of these larger numbers of cattle for feed might be sufficiently strong as to allow feed prices to actually increase as cattle prices decrease. If cattle numbers should become extremely low with inversely high prices then these smaller numbers would not be able to utilize all the available feed and thus the prices of feed would decline as the prices of cattle increase. Related to these effects for numbers are the effects of feed supplies. Extremely short supplies of feed might force the liquidation of cattle numbers to cause declining cattle prices with increasing feed prices. Very large supplies of feed might leave such an abundance of feed that increasing cattle prices could accompany decreasing feed prices.

Hypothesis number six was that changes in "other cattle" numbers did not accompany changes in the prices of feed. However, correlation coefficients were highly significant for all feeds used, which indicates that changes in cattle numbers are associated with changes in feed prices (Table I). Since the results obtained from the previous hypothesis indicated that cattle prices and feed prices were positively correlated, then it might be assumed that cattle numbers and feed prices would be negatively correlated. This assumption was not borne out. Changes in "other cattle" numbers were positively correlated with changes in the prices of feed, and indicated an apparent contradiction of the logical relationships expected. The effect of the chance occurrence of an increasing price level with an increasing phase of the cattle number cycle has entered the analysis. Fifteen years in the study have been years of increasing cattle numbers, and nine of these fifteen years have been years in which the price level has also increased. However, cattle numbers are related to cattle prices only by way of cattle marketings, and an increase in cattle numbers may precede an increase in cattle receipts

by as long as two to four years. It is the cattle marketings which should move inversely with cattle prices. If the first two years of the decreasing phase of the cattle numbers cycle are included in years of increasing numbers, and conversely, the first two years of the increasing phase of the cattle numbers cycle are included in years of decreasing numbers to approximate the effect of this lag, then eleven of thirteen years of increasing numbers would be years in which price levels have also increased, while only eight of sixteen years of decreasing numbers would be years in which the price levels have also increased. This two to four year lag will account for a part of the chance occurrence of years of increasing cattle numbers and years of increasing price levels. The remainder of the association may be attributable to the effect of large cattle numbers. Logically, large cattle numbers in competition for feed, both within the beef cattle industry and with other livestock enterprises, strengthen the demand for feed, which, in turn, should exert a strengthening influence on the prices of that feed. The effect of this chance occurrence of increasing numbers and increasing price levels together with the tendency for larger numbers of cattle to bid up the prices of feed probably account for this apparently illogical relationship indicating that both increasing cattle numbers and increasing cattle prices were associated with increasing feed prices.

Six basic assumptions regarding feed relationships have been tested. They were tested both statistically with probability statements and subjectively with the aid of graphs. The results were as follows:

(1) The quantities of feed produced were directly associated with the quantities of feed used by "other cattle" a year later.

(2) "Other cattle" numbers were not directly associated with the quantities of feed used by "other cattle".

(3) Cattle prices were not directly associated with the quantities of all grains, corn, and oats used by "other cattle". Cattle prices were, however, directly associated with the quantities of hay used by "other cattle".

(4) Feed prices were not directly associated with the quantities of feed used by "other cattle".

(5) Cattle prices were directly associated with feed prices, and

(6) "Other cattle" numbers were directly associated with feed prices.

THE YEAR TO YEAR MOVEMENT IN BEEF CATTLE PRICES

Many factors are associated with cattle price changes. Some of these are measurable, while many are not capable of numerical expression. Even though many of the factors affecting price are not amenable to statistical analysis, it is still necessary for those associated with the cattle trade to estimate the probable movement of prices in the future. In the past many of the studies which have attempted to explain the factors responsible for year to year changes in cattle prices have produced results which do not appear to be borne out by later movements of the apparently correlated factors. The inadequacy of some of these results is due in part to the limitations of available data and compensating changes of the various factors, but part of it at least appears to be due to insufficient testing of the statistical series used in the analysis. Consequently, there remains a pressing challenge to attempt the correlation of cattle prices with those factors which, first, will be readily and currently available to livestock workers, and second, will satisfy the requirements of logic. The correlation of such factors may give less perfect results, statistically, than might be attained if the ease and availability of data were ignored, or if more dependence were placed upon purely mathematical procedures and less consideration given to the logic of relationships. Insofar as such correlations can logically be determined, they may be useful, with cognizance of their limitations, as a basis for future estimates of the cattle price situation.

Four common price series have been used in this study as the basis for the analysis of cattle price movements. They are (1) average cattle prices received by farmers in the United States, (2) the average cost of livestock slaughtered in the United States based on a monthly survey of wholesale slaughterers, (3) the average prices of beef steers sold out of first hands

for slaughter at Chicago, and (4) the average prices of stocker and feeder cattle at Kansas City. For convenience in this section of the study in which these various price series must be designated frequently, the terms farmer price, cost to packer price, beef steer price, and feeder and stocker price, respectively, will be used. The Chicago market was selected to represent the prices of slaughter livestock in the United States because it is the most important livestock market as indicated, not only by the fact that it is the largest slaughter cattle market and is centrally located, but by the fact that more market information on the general supply and demand conditions for beef cattle emanates from or goes through the Chicago market than is true of any other single market.[14] The Kansas City market was selected to represent the prices of stocker and feeder cattle in the United States because it is the most important single livestock market for this classification of cattle. More stocker and feeder cattle are shipped from Kansas City than any other market. Logically then, this market might be expected to represent the overall pattern of price changes for stocker and feeder cattle.[15]

The method of graphic multiple correlation analysis as presented by Bean,[16] rather than the purely mathematical correlation analysis, has been used for determining the association of the various factors. This method was used for the following reasons, (1) each factor together with its effect could be examined on a logical basis as it was being used in the analysis, (2) for a period of only nineteen years, the mathematical statistics derived probably

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14/ A. A. Dowell and Knute Bjorka, Livestock Marketing, pp. 378 and 379.

15/ Ibid., p. 124.

16/ L. H. Bean, Applications of a Simplified Method of Graphic Curvilinear Correlation, pp. 1-20.

would not permit any greater degree of accuracy in the results as could be obtained graphically, and (3) although the net regressions were drawn by approximation, the reader is permitted to examine the relationships, as they are presented, and to acquire a better understanding of the nature and scope of the problem and its limitations.

In the presentation of the results of graphic multiple correlation analysis, the estimated prices based upon the correlation results are plotted in a line graph for comparison with the actual prices. This procedure provides a simple indication of how closely the estimated prices are approximating the actual prices and therefore, how closely the correlated factors do actually account for the price changes. However, this presentation may give the appearance of greater similarity between the estimated and actual prices than really exists. This is because extreme price fluctuations may cause the line representing cattle price movements to rise or decline to such an extent that large residuals are obscured by the steepness of the slope. A better estimate of the dispersion of the deviations, representing the unaccounted for part of the variation, may be obtained by inspection of the dispersion of these residuals from the regression line representing the final factor used in the correlation procedure, or from the guide cards used by the worker. Recognizing the danger of misinterpreting the relationships between the plotted lines representing the estimated and actual prices, this procedure, nevertheless has been employed in the present study because the presentation is more easily read by one not fully familiar with the graphic multiple correlation method.

To calculate the estimated prices for the years included in the analysis, two methods are available. First, the net residuals from the regression line representing the final factor used in the correlation may be

either added to or subtracted from the actual prices to obtain the estimated prices. Second, the estimated prices can be calculated from the relationships shown in the successive approximation in the analysis. This method involves the calculation of the algebraic sum of the residuals from the regression lines for the known values for each factor for each year. However, this latter procedure involves a large amount of work which is not completely necessary since the calculated prices can be plotted more directly through their relationship to actual prices. In the method employed, all residuals above the regression line representing the final factor were plotted below the actual prices while all residuals below the regression line were plotted above the actual prices. The reason for this apparently inverse procedure is that the regression line for the final factor represents the variation that is accounted for. For residuals lying above this line, this and previous regression lines in the graphic correlation have underestimated the actual prices, therefore, the actual prices must lie above the estimated price by the amount of the residual and the residuals must be plotted below the actual prices. Conversely, for residuals lying below this line, this and previous regression lines have overestimated the actual prices, therefore, the residuals must be plotted above the actual prices.

The purpose of plotting the prices calculated from the correlation analysis, along with the actual prices is to demonstrate simply the degree to which the estimate accounts for all price changes. In this case the estimate is calculated from known values for each price-affecting factor in the correlation problem. However, in predicting the future price of the commodity in question, the future values of the factors are not known. It would be necessary, therefore, to make estimates, based upon existing conditions, for the values of each of the price-affecting factors. Applying these estimated

values to the individual charts in reverse order, the points on each of the regression lines may be located. The algebraic sum of the residuals, obtained from reading the points on each of the regression lines from the respective scales, added to or subtracted from the estimated price on the chart representing the first factor used in the analysis would give the calculated estimated price.

United States Prices Received By Farmers: Illustrative of the fact that high correlations can be attained which will not stand up in the light of logic are the results secured in analyzing the movements of farmer prices of beef cattle by the correlation of the index of factory payrolls representing demand, the number of beef steers sold in Chicago representing supply, the number of all cattle on farms in the United States representing production, and the index of price of all grains representing an important cost item (Figure 11). This correlation gave the smallest residuals of any set of observations tested when only one demand factor was used. On the surface, it might appear that any one of these factors might logically be included in analyzing beef cattle prices, and because of the apparent excellence of the results, there might be some temptation to attribute significance to the findings. However, the association which is indicated in this particular correlation is probably the result of nonsense correlation. Subsequently in the study it is shown that when two demand factors were used to reflect, more adequately, the changes in demand, the use of United States cattle numbers did not improve the correlations. Movements in cattle numbers do not truly indicate movements in slaughter supplies which logically would be directly associated with cattle prices but rather precede the movements of slaughter supplies by a period consisting of two to four years. At the same time the composition of cattle numbers is so heterogeneous that no particular class of

FIGURE 11. CORRELATION OF PRICES RECEIVED BY FARMERS FOR BEEF CATTLE, UNITED STATES, WITH INDEX OF FACTORY PAYROLLS, NUMBER OF BEEF STEERS SOLD AT CHICAGO, NUMBER OF CATTLE ON FARMS, AND INDEX OF PRICE OF ALL GRAINS, 1922-1941

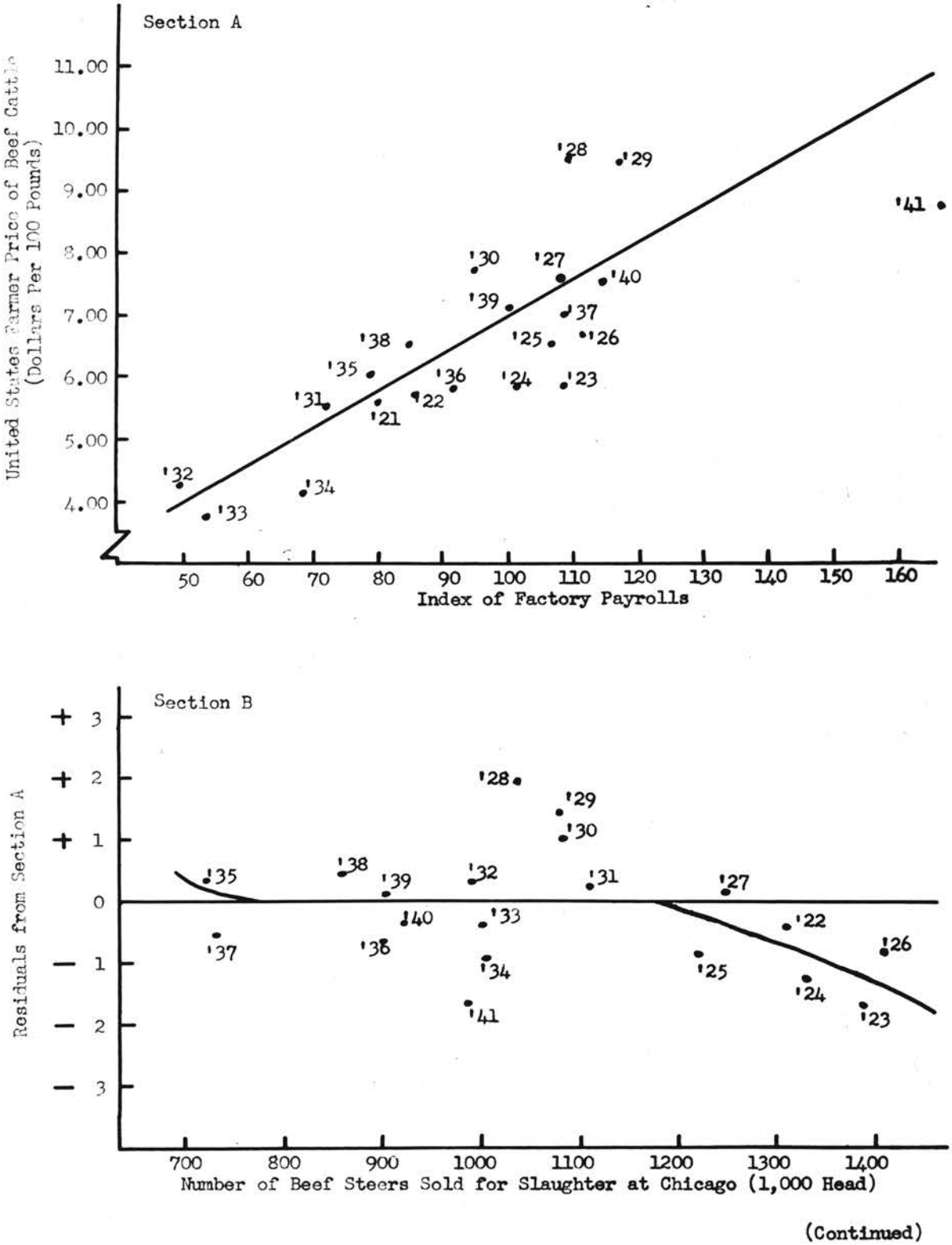

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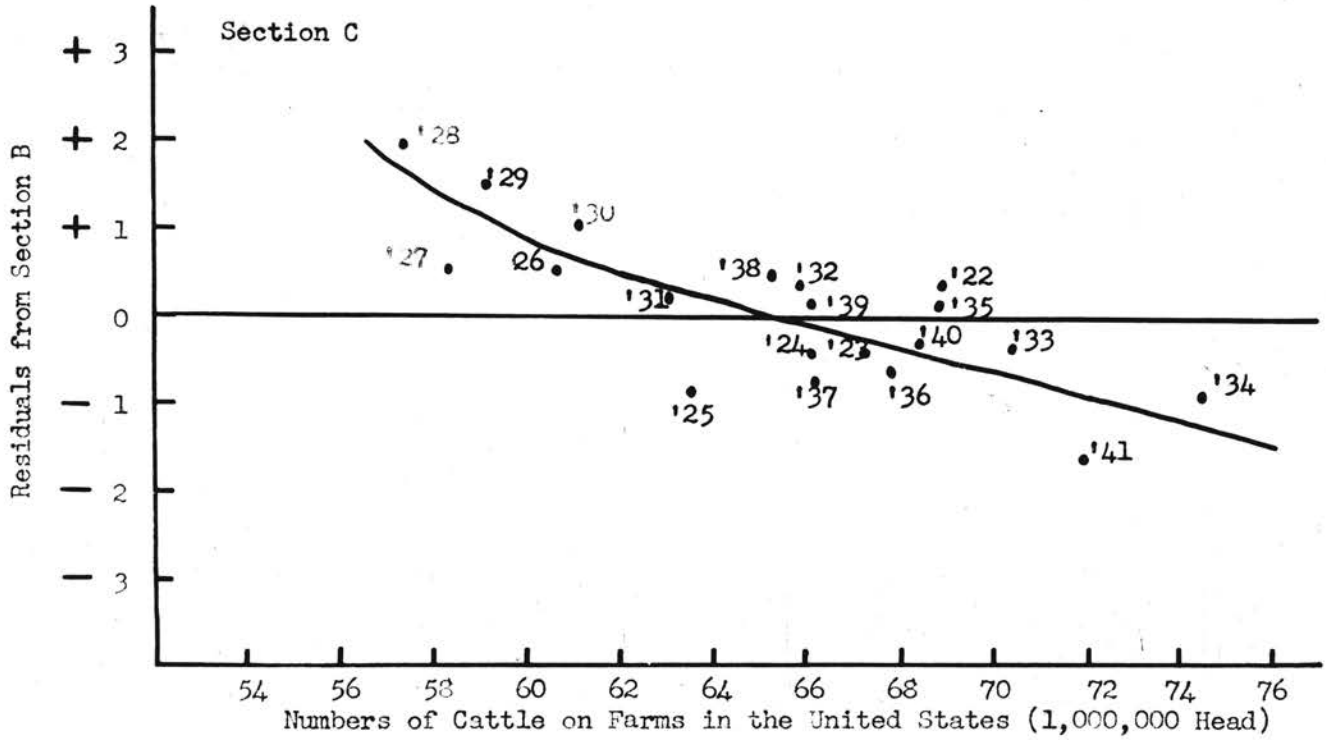
FIGURE 11. (Continued)



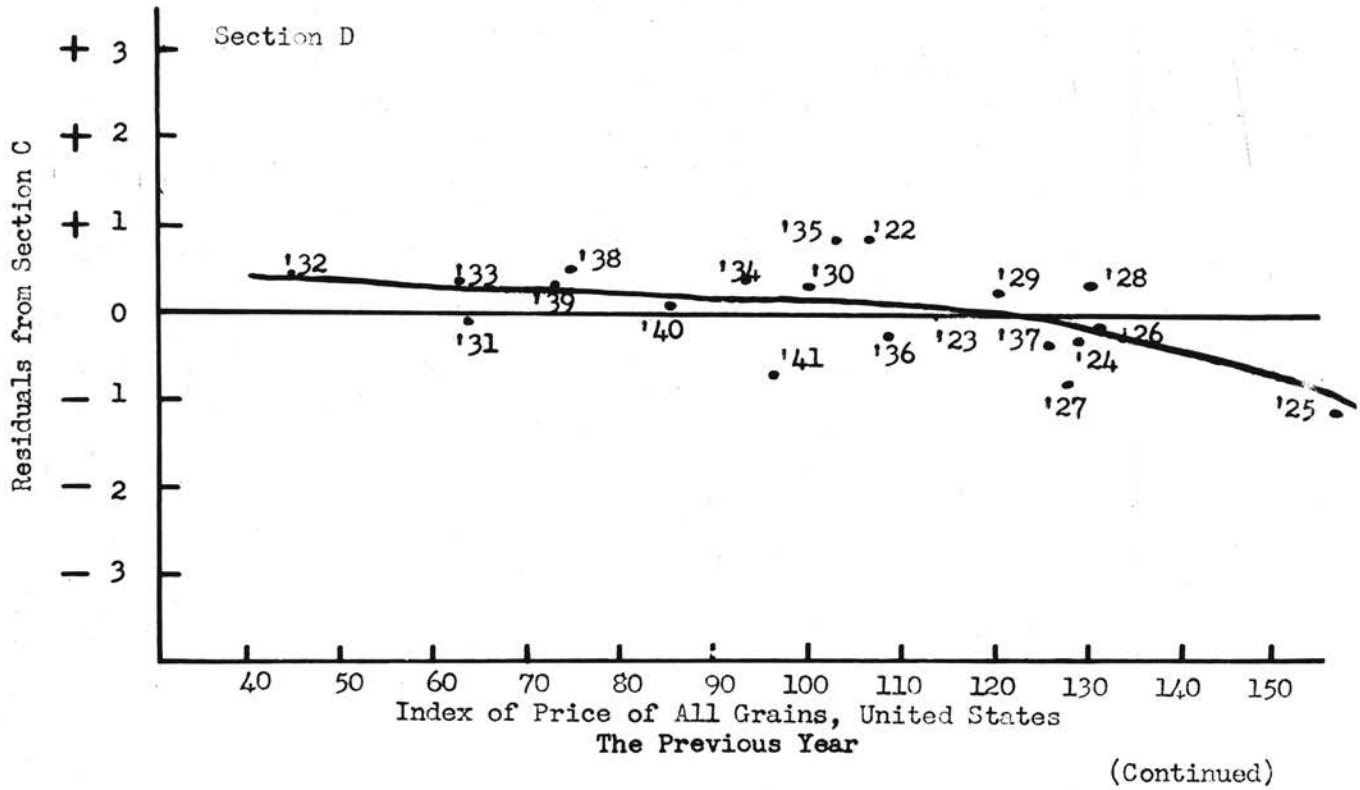


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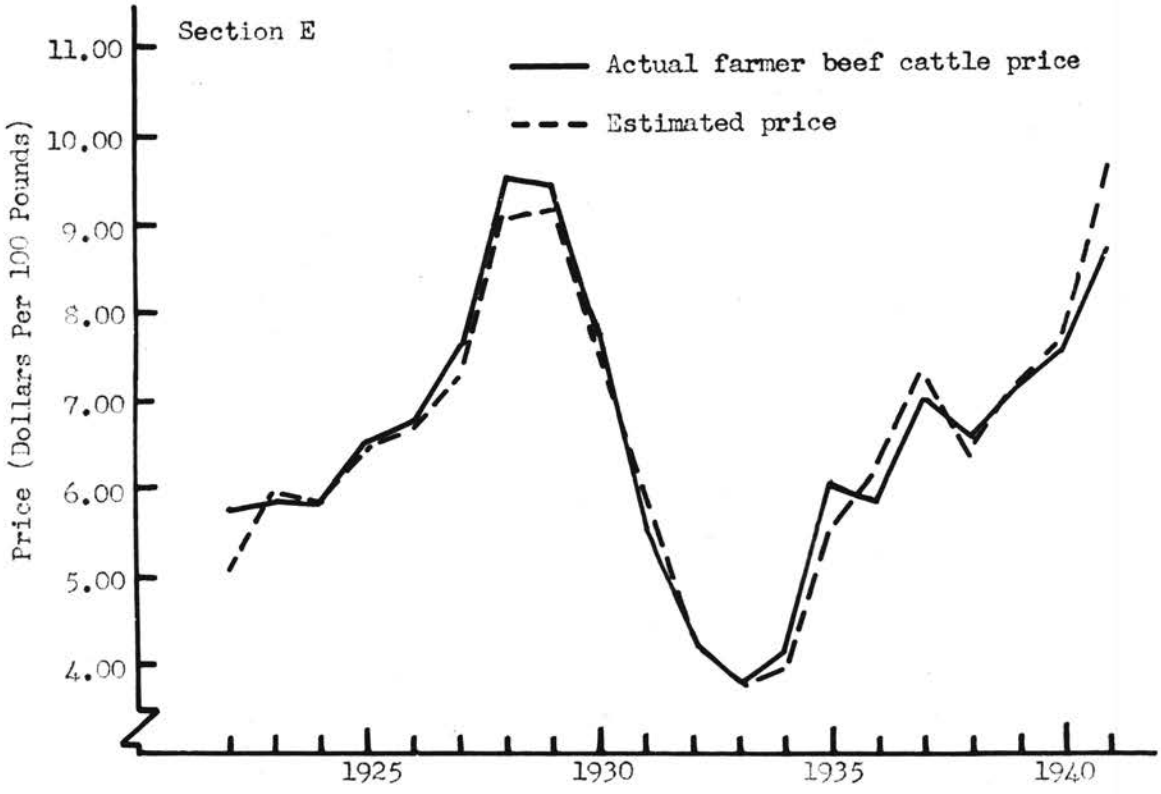
FIGURE 11. (Continued)



SOURCE: See Tables V, XII, XIV, and XVI.

cattle is represented by its use. There is a strong probability that the deviations apparently accounted for by use of United States cattle numbers are actually accounted for by a concealed factor which, for the particular years studied, is reflected by the movement of cattle numbers.

It was shown earlier in the study that the prices of cattle and prices of all grains were positively correlated.[17/] In the present correlation the slope of the line representing all grains was negative which would indicate that the prices of all grains and the prices of cattle would be negatively correlated. In view of the previous more definitive analysis together with the re-examination of the logical relationships that might be expected, it is highly probable that the present indicated effect of the prices of all grains does not represent the true relationships involved. The United States prices received by farmers for hogs and the per capita consumption of beef each gave about the same residuals as the index of prices of all grains and in each case the lines representing these other factors had negative slopes. These relationships like the relationship for the prices of all grains, are completely illogical.

In addition to the weaknesses of the logic of using all cattle numbers and the prices of all grains, it is doubtful whether the number of beef steers sold at Chicago should be assumed to represent the movements of the total supply of cattle on all the markets combined. The line representing the number of beef steers sold at Chicago greatly reduces the deviations only at either extreme.

Other combinations of measures commonly used to indicate supply and demand conditions for beef cattle were experimented with. Among these factors

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17/ Cf. ante, p. 32.

used were (1) the number of head of federally inspected slaughter, (2) the live weight of federally inspected slaughter, (3) pasture conditions in the United States, (4) the production of all grains, (5) the United States beef-steer-corn price ratio, and (6) net beef exports. In varying combinations, these were used in addition to the factors previously cited. Although the results from some of these later combinations approximated the results of the correlation just cited, in no case were the residuals as small.

In the endeavor to eliminate the dependence upon questionable factors, the use of two supplementary indicators of demand were employed to reflect, more adequately, the changing conditions of demand. Shepherd[18/] suggests that either two demand factors be used in the correlations covering a long period of time or an explanation be made concerning why only one was used. Following this procedure the index of wholesale prices was used to represent changes in the general price level and the index of industrial production was used to represent changes in physical output. These were applied, successively, to leave residuals which would be independent of the general demand conditions. To account for changes in supply, federally inspected slaughter on a live weight basis would logically provide a more sensitive guide than the number of head slaughtered.[19/] It is further logical to suppose that the quality of beef coming on the market should influence the price per hundred pounds that would be paid for it. The only available estimate of this quality for the United States was the percentage that each of the grades of beef steers sold for slaughter at Chicago was of the total number sold. In this study, the percentages for choice and prime steers and for good

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18/ Geoffrey S. Shepherd, Agricultural Price Analysis, p. 119.

19/ Cf. ante, p. 27.

steers were combined to get the percentage of total beef supply which was made up of better beef.

When the residuals from the demand and supply factors were plotted against this quality factor, it was observed that most of the residuals could be accounted for (Figure 12). The residuals, both before and after the inclusion of this quality factor, were plotted against the numbers of all cattle on farms with no increase in precision (Figure 13). This suggests that the use of two demand factors eliminates the deviations previously accounted for by the use of cattle numbers.

For the ninteen year period, when demand, supply, and quality were accounted for, there remained small amounts of variation which might be attributable to other factors for individual years, such, for example, as changes in hog prices as they happened to exert a strengthening or depressing influence on the prices received by United States farmers for beef cattle.

Cost to Packers: The average prices received by farmers in the United States is a composite of the prices of several different kinds of beef cattle. In an attempt to explain the movement of prices of the livestock actually slaughtered, the average cost of livestock slaughtered in the United States, based on a monthly survey of wholesale slaughterers, was selected. Richards has used national income, live weight of federally inspected slaughter, and the average prices of heavy native, packer, steer hides for rather good results in explaining the movements of prices represented by average cost to packers from 1921 through 1934.[20/] The same factors which he used were extended in the present study through 1941 (Figure 14). The later

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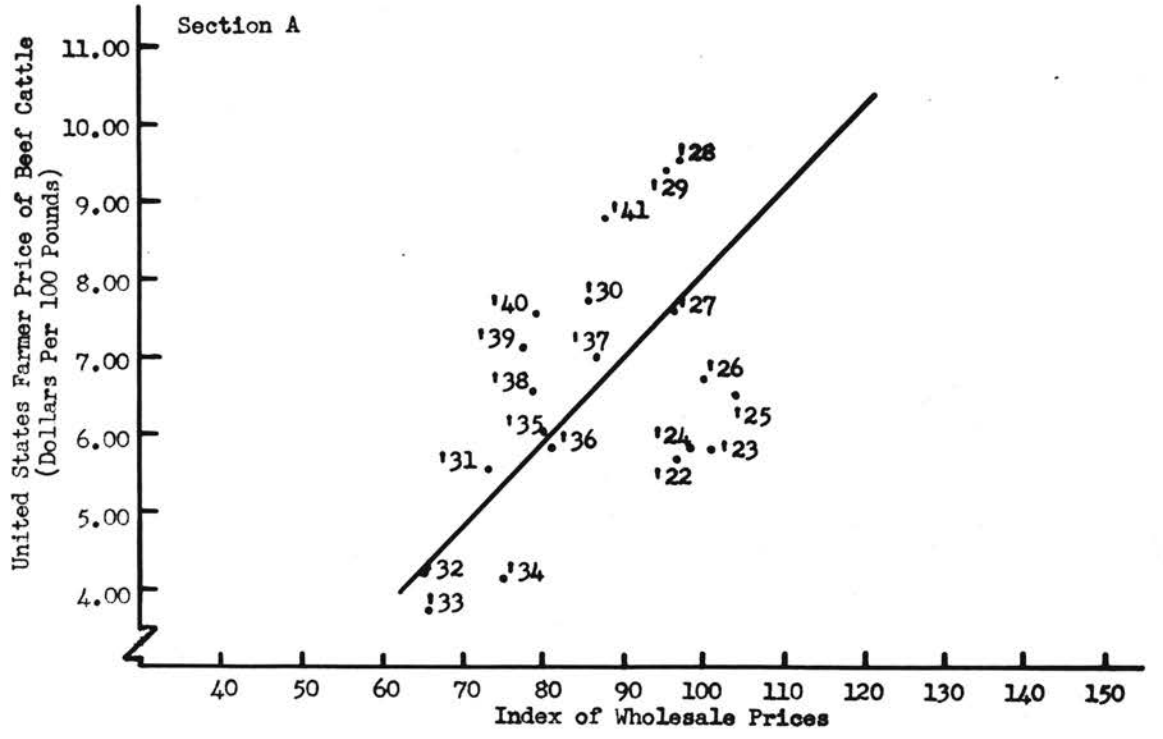
20/ F. L. Thomsen, Agricultural Prices, pp. 355 and 356.

FIGURE 12. CORRELATION OF PRICES RECEIVED BY FARMERS FOR BEEF CATTLE, UNITED STATES, WITH INDEX OF WHOLESALE PRICES, INDEX OF INDUSTRIAL PRODUCTION, LIVE WEIGHT OF FEDERALLY INSPECTED SLAUGHTER, AND PERCENTAGE OF BETTER BEEF SOLD AT CHICAGO, 1922-1941



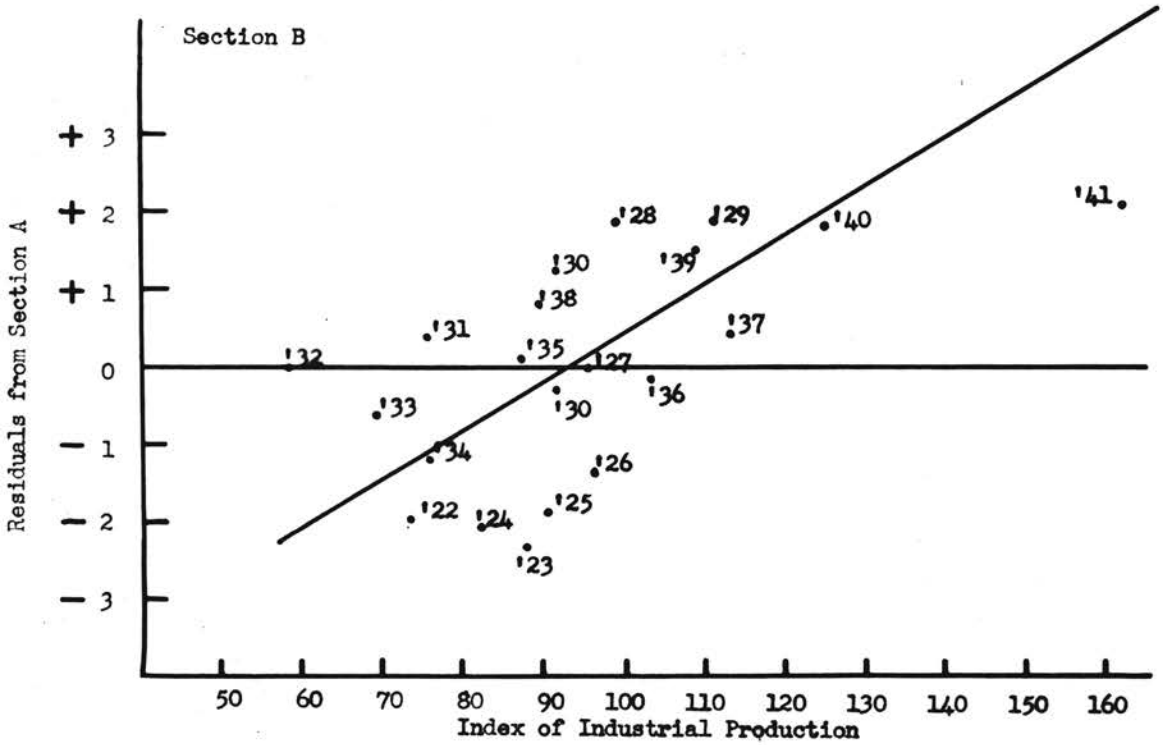


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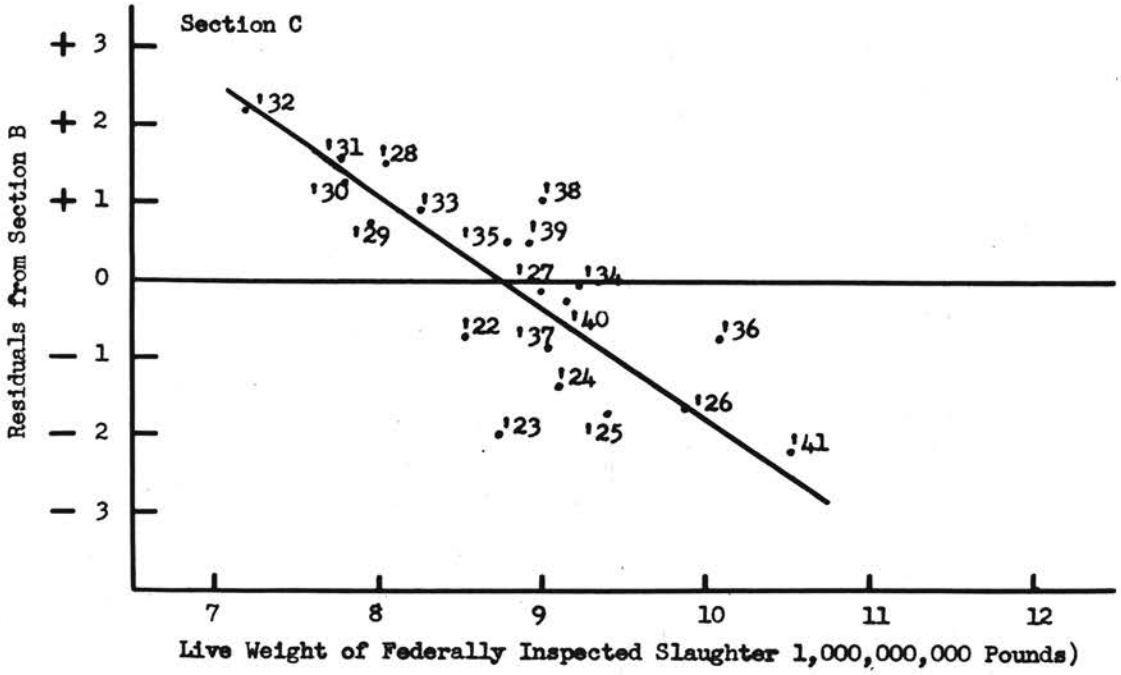
FIGURE 12. (Continued)



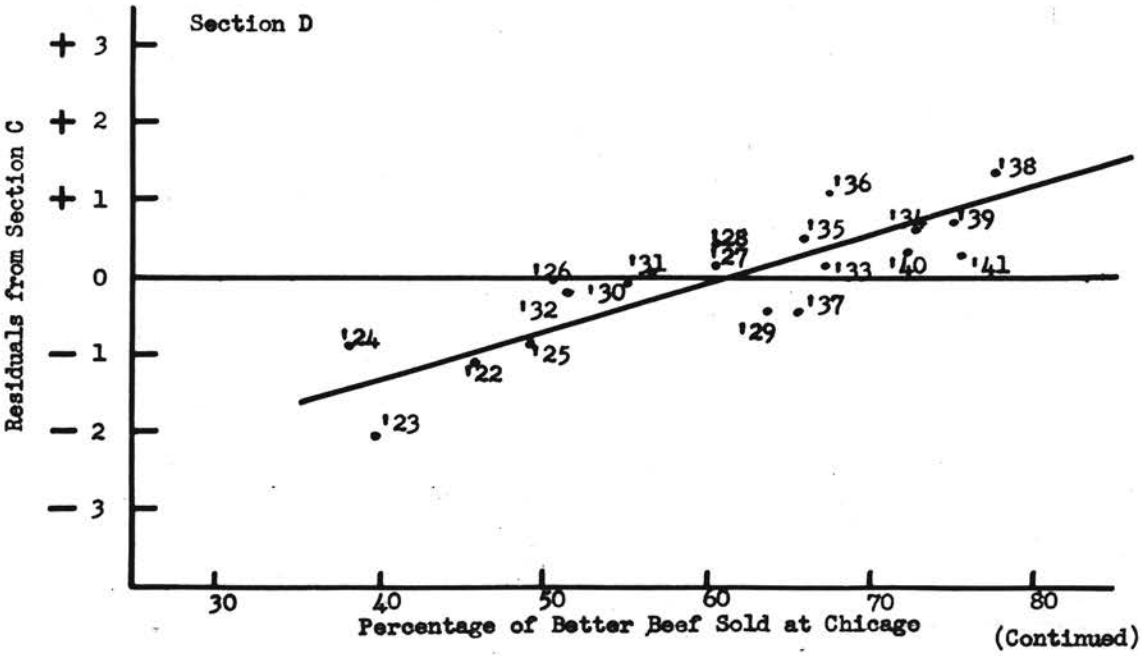


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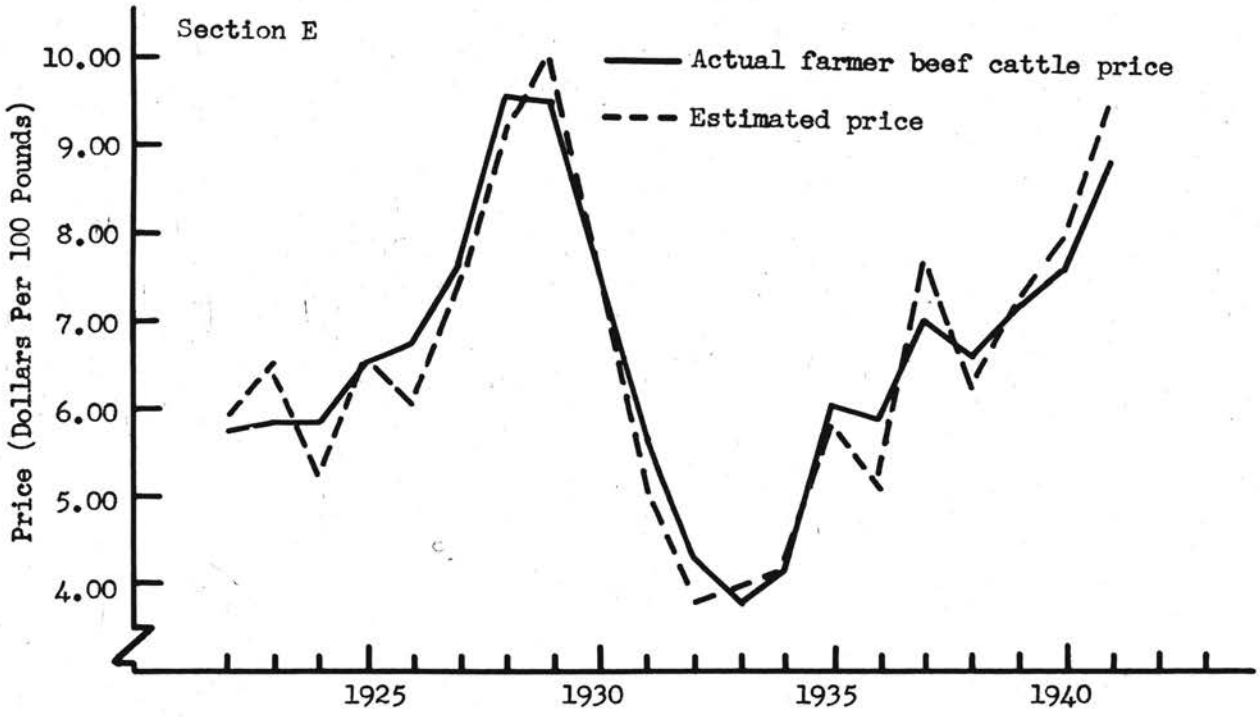
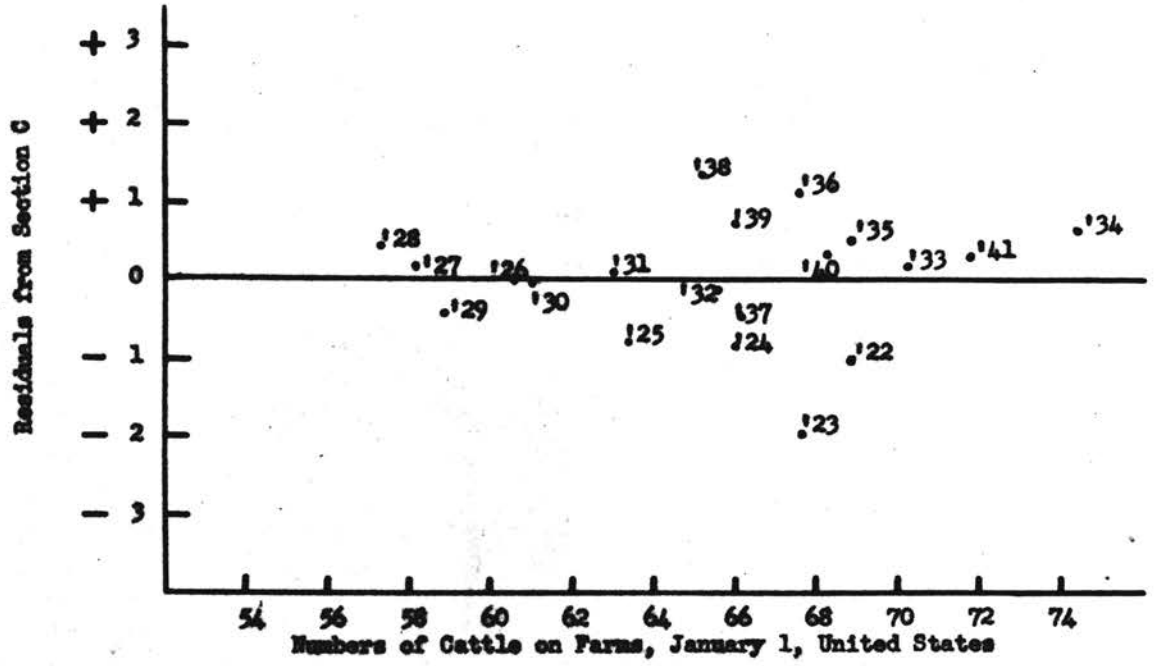
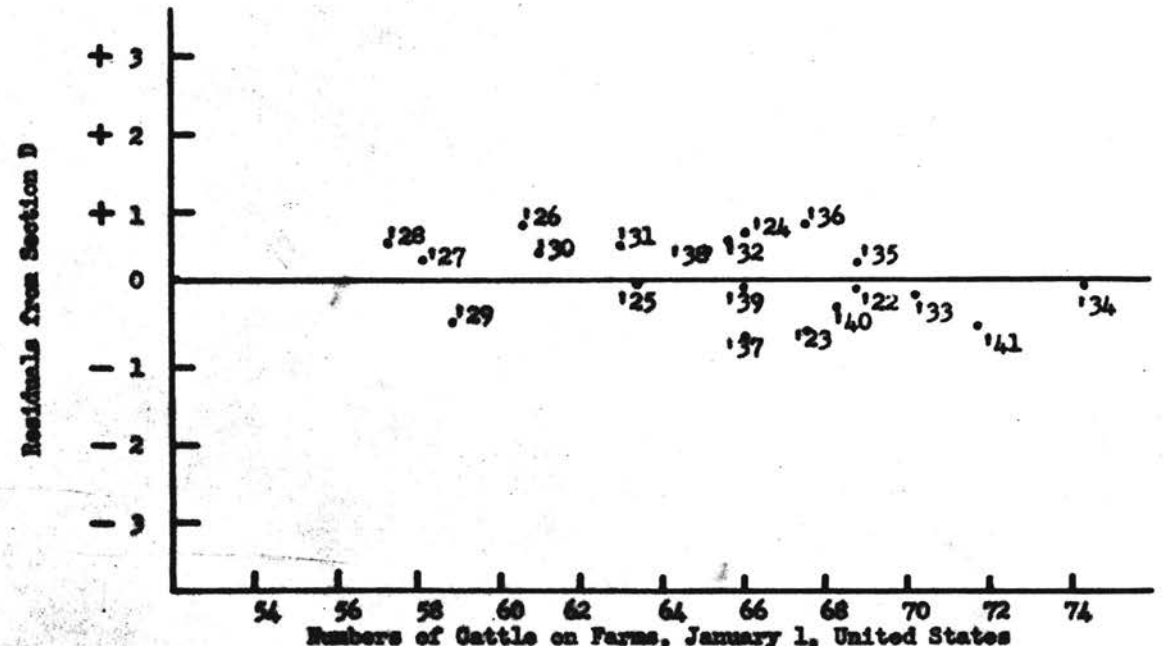
FIGURE 12 (Continued)



SOURCE: See Tables V, XII, XIV, and XV.

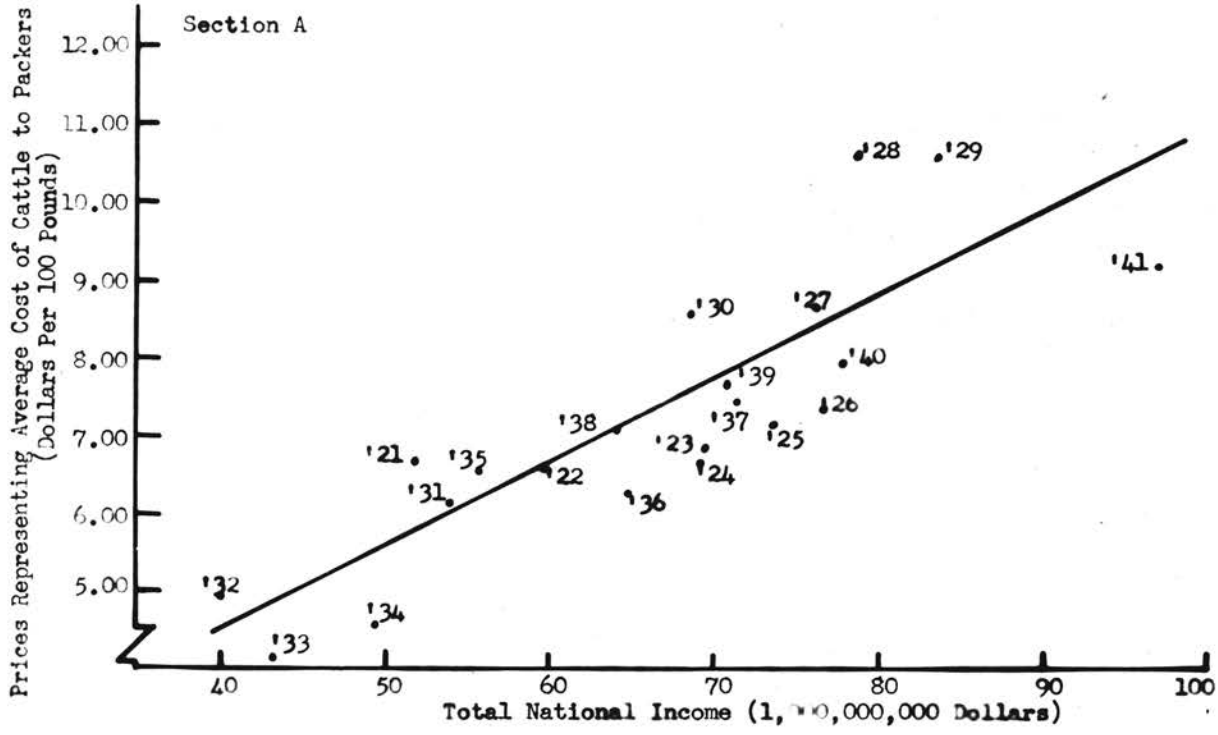
FIGURE 13. RESIDUALS FROM SECTIONS C AND D, FIGURE 12, AGAINST NUMBERS OF CATTLE ON FARMS, UNITED STATES, 1922-1941





SOURCE: See Figure 12 and Table X

FIGURE 14. CORRELATION OF PRICES REPRESENTING AVERAGE COST OF CATTLE TO PACKERS, UNITED STATES, WITH TOTAL NATIONAL INCOME, LIVE WEIGHT FEDERALLY INSPECTED SLAUGHTER, AND PRICES OF HIDES, CHICAGO, 1922-1941



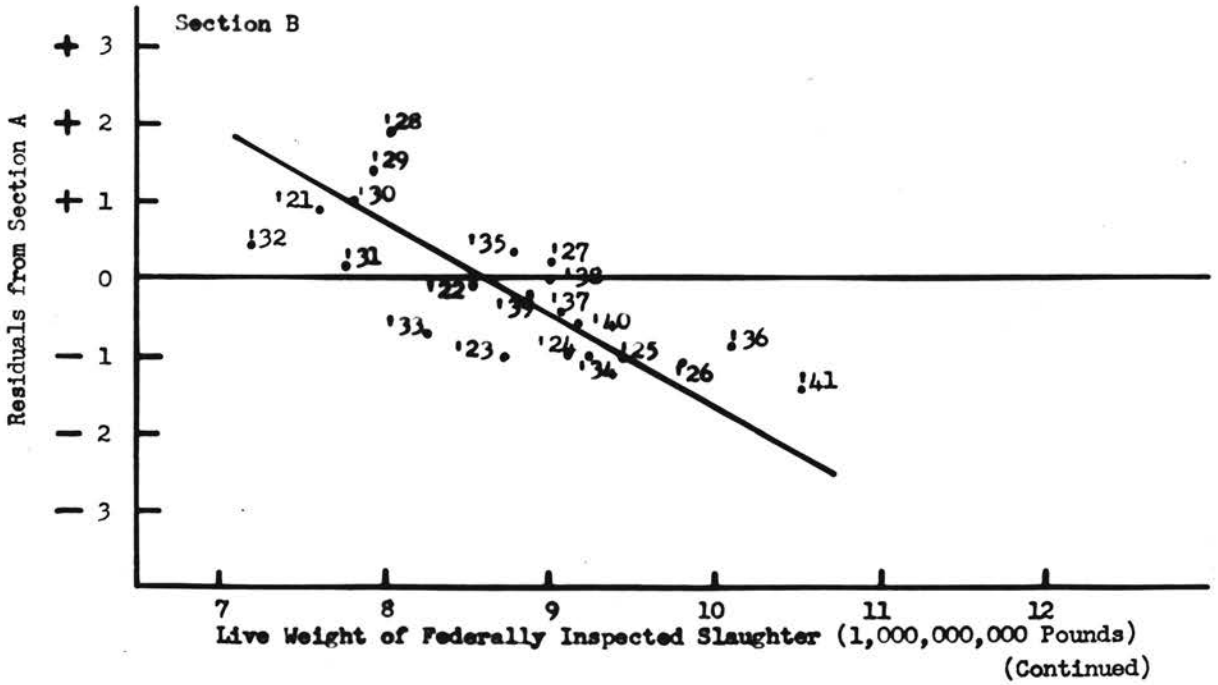


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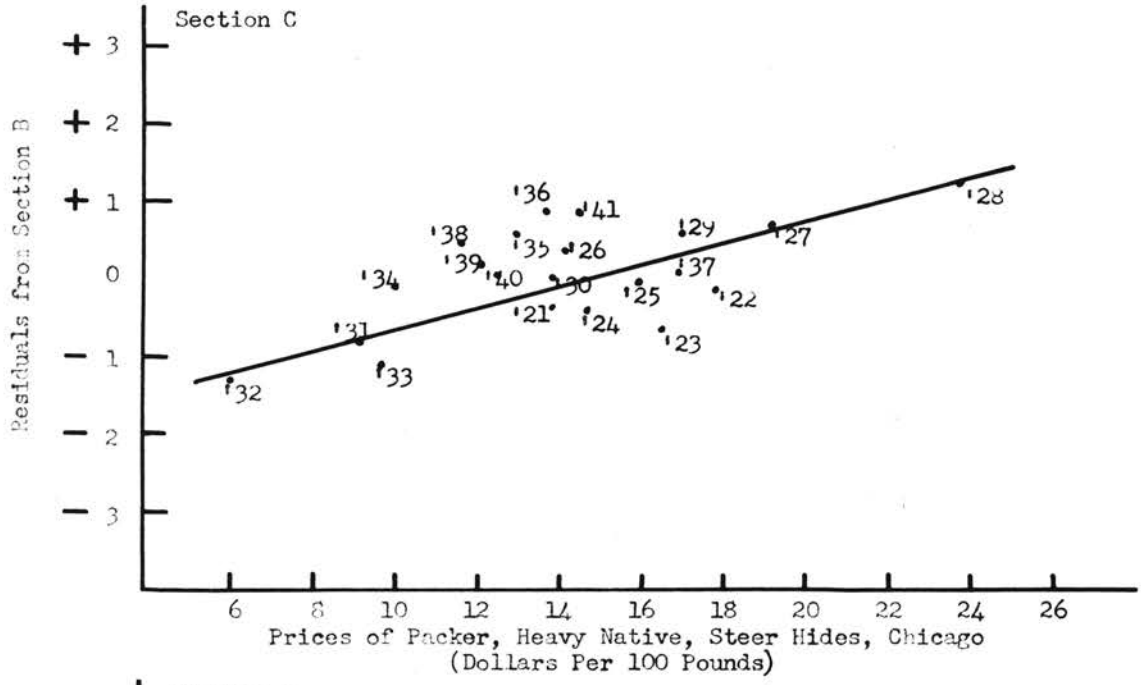
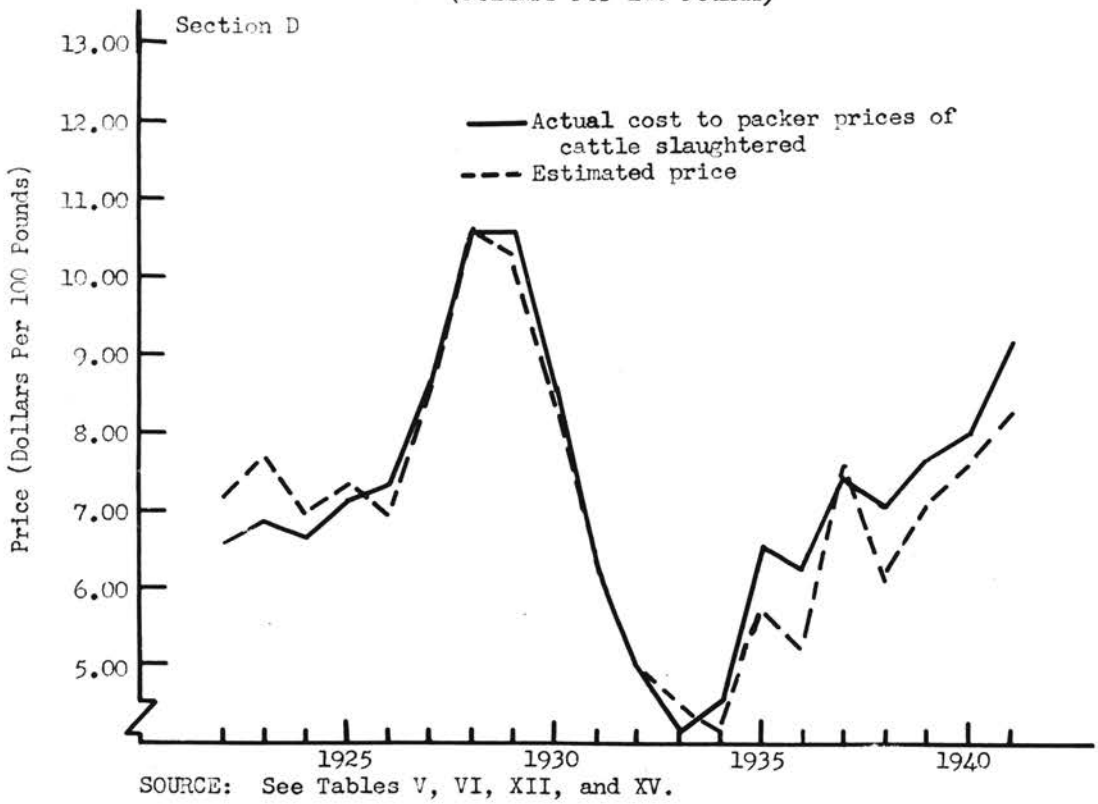
FIGURE 14. (Continued)



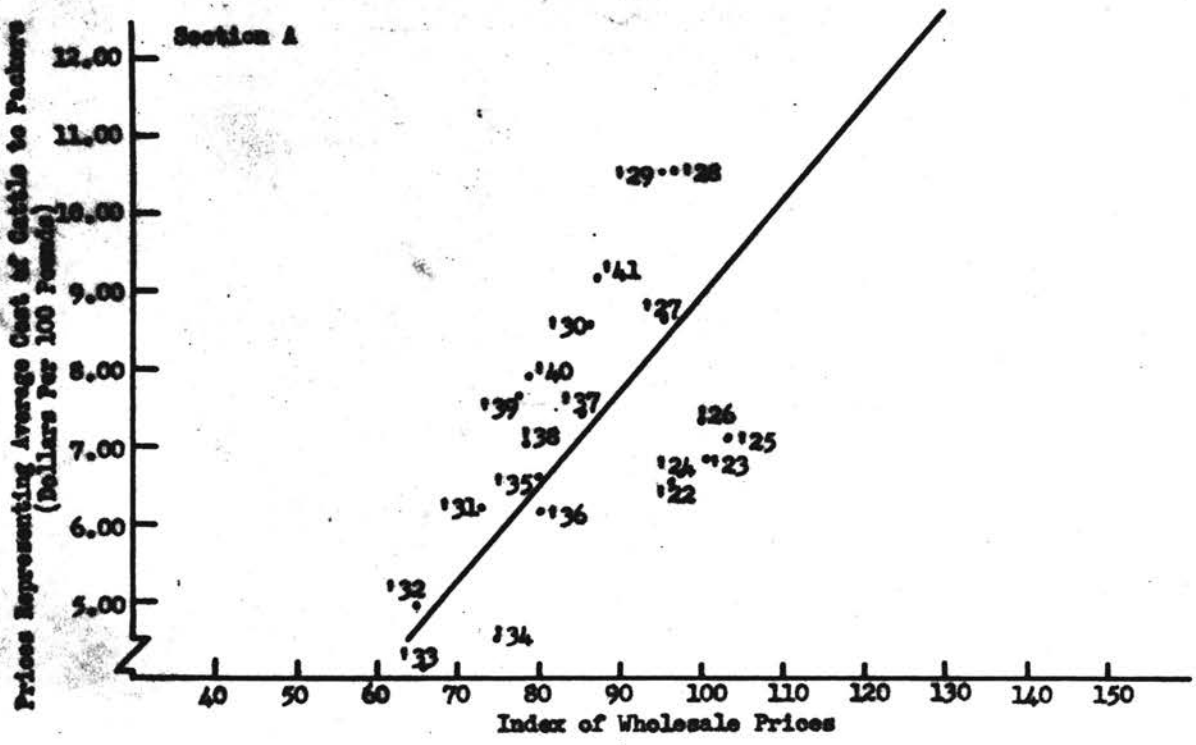


SOURCE: See Tables V, VI, XII, and XV.

years included did not show the same relationships as Richards found for the earlier years which he studied. For these later years, except 1937, the net residuals were all on the same side (i.e., above) of the line representing the influence of hides and deviated rather widely from it. The regression lines have underestimated the actual prices. This would indicate that the prices of hides failed to account for as much of the deviation in these later years as in earlier years and that the relationship had changed.

In line with the reasoning arrived at in the farmers' cattle prices, the next logical step was to substitute two demand factors for total national income. The index of wholesale prices and the index of industrial production were again used by successive approximation to obtain residuals independent of demand. Those residuals were plotted against the live weight of federally inspected slaughter to account for changes in conditions of supply. The residuals from the line representing the influence of supply were plotted against the percentage of better beef sold at Chicago to represent quality. This combination of factors gave better results than were obtained from Richards' combination of national income, slaughter, and the prices of hides (Figure 15). The estimated prices tended to be above the actual prices about as much as below. The estimated prices deviated from the actual prices about the same in later years as in the earlier years. When the two demand factors were used the inclusion of the prices of hides gave no increase in precision. It is probable that national income does not account for as much of the changes in demand as does the successive approximation of the index of wholesale prices and the index of industrial production. Thus, when national income was used, in conjunction with the prices of hides, the prices of hides apparently embodied an element of general demand rather than exerting a delineated influence on beef cattle prices as a by-product of

CHART 16. CORRELATION OF PRICES REPRESENTING THE AVERAGE COST OF CATTLE TO PACKERS, UNITED STATES, WITH INDEX OF WHOLESALE PRICES, INDEX OF INDUSTRIAL PRODUCTION, LIVE WEIGHT OF FEDERALLY INSPECTED SLAUGHTER, AND PERCENTAGE OF BETTER BEEF SOLD AT CHICAGO, 1922-1941



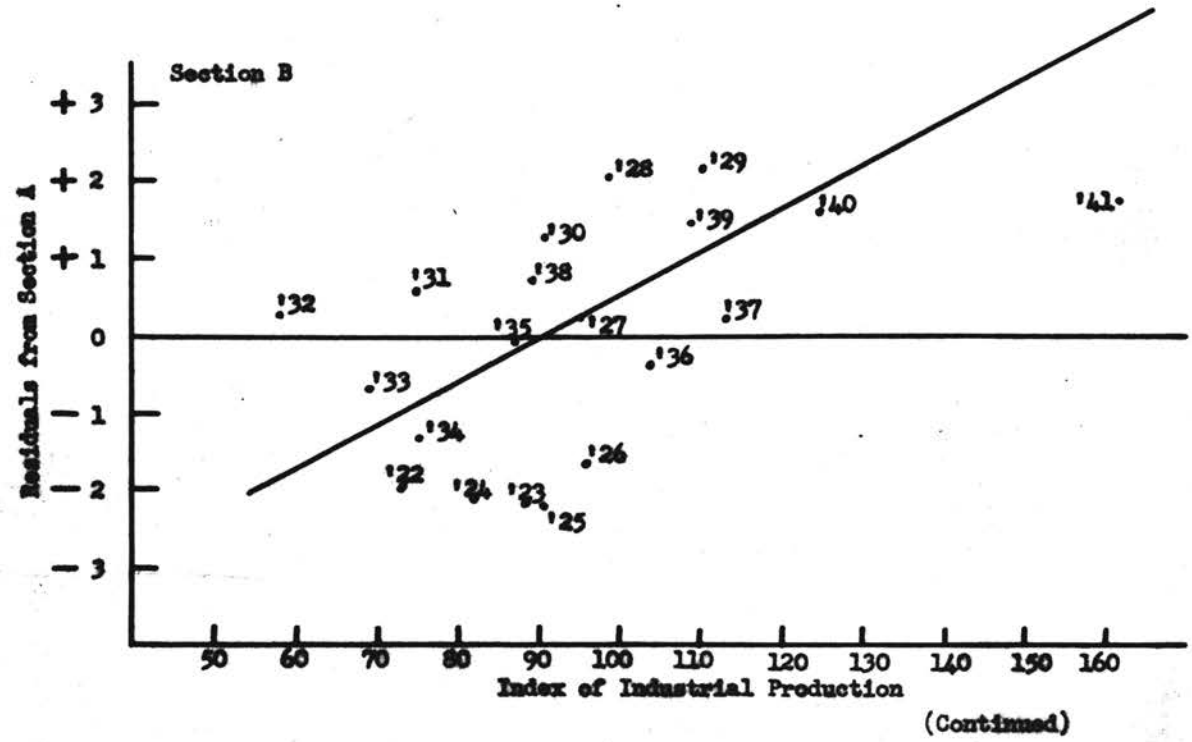


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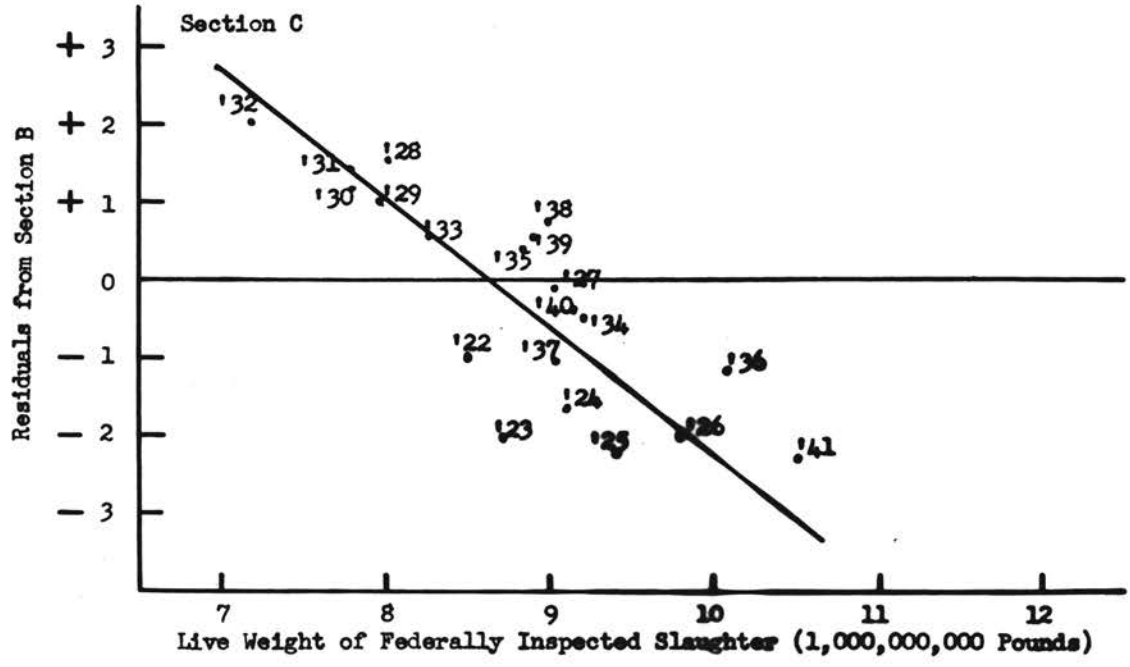
FIGURE 15. (Continued)



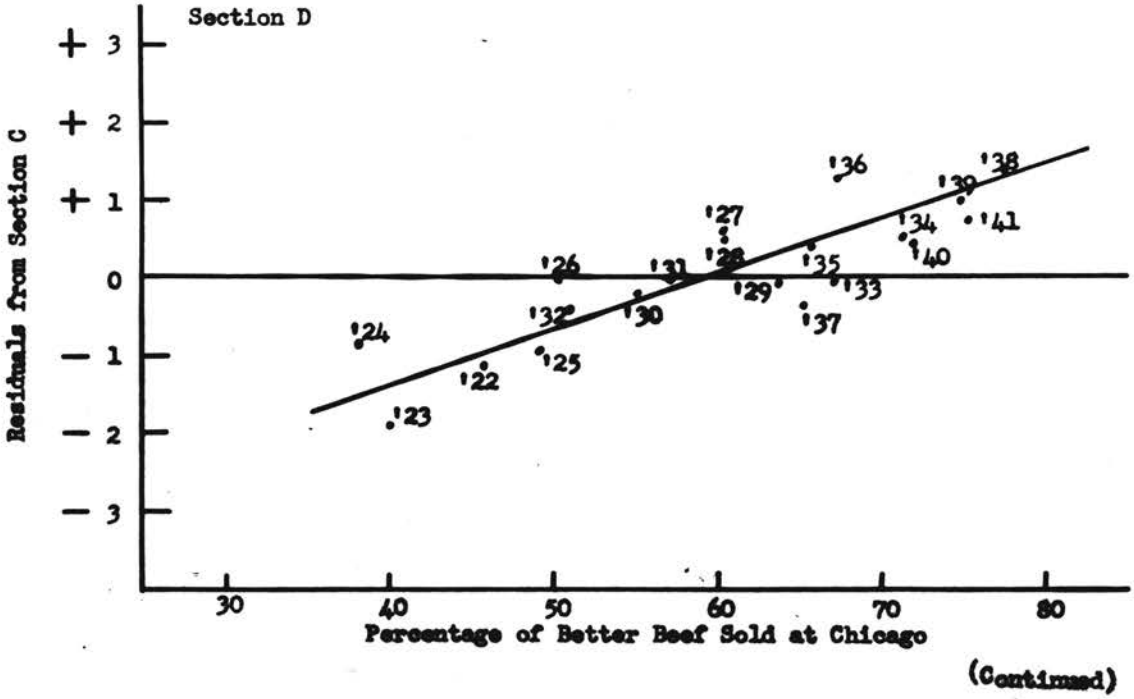


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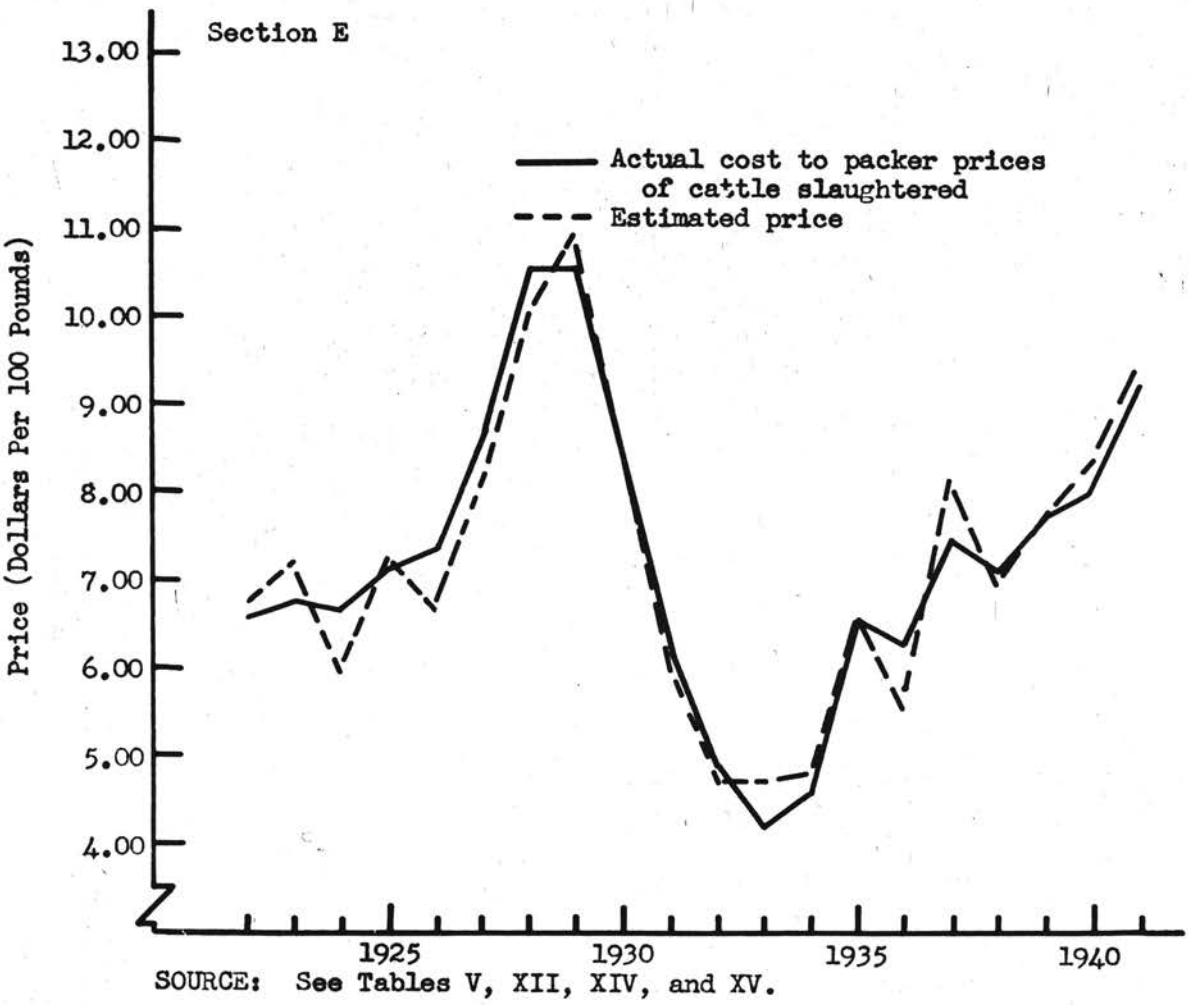
FIGURE 15. (Continued)



SOURCE: See Tables V, XII, XIV, and XV.

the industry. The price of hides is affected by the general price level and by the demand for leather goods to such an extent that it, like United States cattle numbers, possibly conceals some factor which has in the past moved in the same direction. This is not to say that the price of hides is not a factor influencing the prices of cattle but rather to say that its influence is not consistent through the years or is not sufficiently strong to be a major factor as is implied by Richards and later by Thomsen.[21/]

Based on these findings, the demand, supply, and quality represented respectively by the index of wholesale prices and the index of industrial production, the live weight of federally inspected slaughter, and the percentage of better beef sold at Chicago, appear to account for most of the movements in the average cost of livestock slaughtered in the United States.

Chicago Beef Steer Prices: The average cost of livestock slaughtered in the United States represents the composite prices of all classifications of slaughter livestock and does not reflect the price movements of any particular class. The prices of a given kind of cattle on a given market may be expected to reflect more accurately the changing demand and supply conditions to which they, especially, are related. The prices of beef steers sold out of first hands at Chicago have been selected to indicate the movement of the prices of one important class of slaughter livestock for the United States.

Since the index of factory payrolls gives approximately the same results as total national income it was selected to represent changes in demand conditions. The residuals from the line representing the influence of demand were plotted against the live weight of federally inspected slaughter to account for changes in the movement of supply. These residuals, independent of

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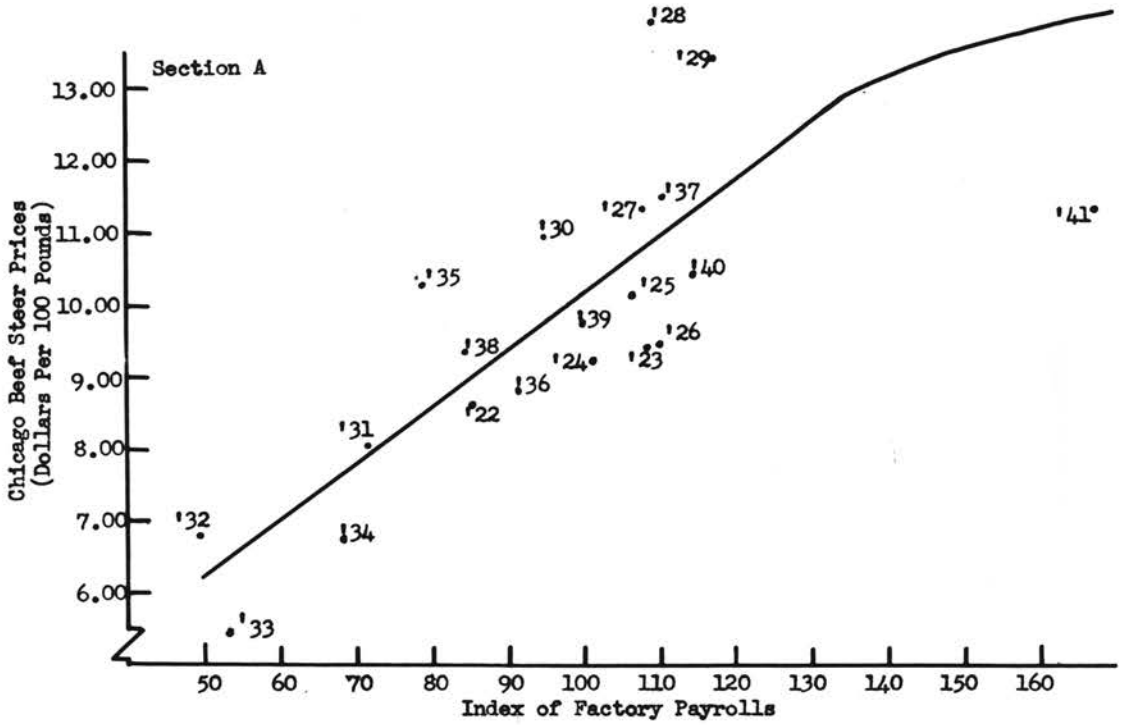
21/ Loc. cit.

demand and supply conditions, were plotted against the United States cattle numbers on farms to represent the production of beef cattle. This combination, identical with a combination which was used to obtain fair results in explaining farmers' prices, left widely scattered residuals (Figure 16). The addition of the number of beef steers sold at Chicago decreased the range of deviations at least one-third. This was expected since the Chicago price is a function of the number sold at Chicago even with the influence of the overall supply conditions accounted for. As indicated above, it is suggested that cattle numbers conceal some factor which has in the past moved in the same direction.

Again two demand factors were substituted for one. The index of wholesale prices and the index of industrial production were used to obtain deviations independent of the influence of demand conditions. The residuals were plotted, successively, against the live weight of federally inspected slaughter to represent supply, against the percentage of better beef sold at Chicago to represent quality, and against the number sold at Chicago to represent the local supply conditions. The results gave smaller residuals and left less unexplained than did the use the single demand factor and the United States cattle numbers (Figure 17). Thus, with demand represented by the price level and physical output, supply represented by the volume of beef marketed in the United States and by the number sold on the local market, and quality represented by the percentage of better beef sold at Chicago, most of the major movements in the Chicago price are accounted for.

Kansas City Stocker and Feeder Steer Prices: As will be shown in the seasonal variation of cattle prices, there is a significant difference between the pattern for the prices of slaughter beef steers and the pattern for the prices of stocker and feeder steers. Considering this and other

FIGURE 16. CORRELATION OF BEEF STEER PRICES, CHICAGO, WITH INDEX OF FACTORY PAYROLLS, LIVE WEIGHT FEDERALLY INSPECTED SLAUGHTER, NUMBERS OF CATTLE ON FARMS, UNITED STATES, AND NUMBER OF BEEF STEERS SOLD AT CHICAGO, 1922-1941



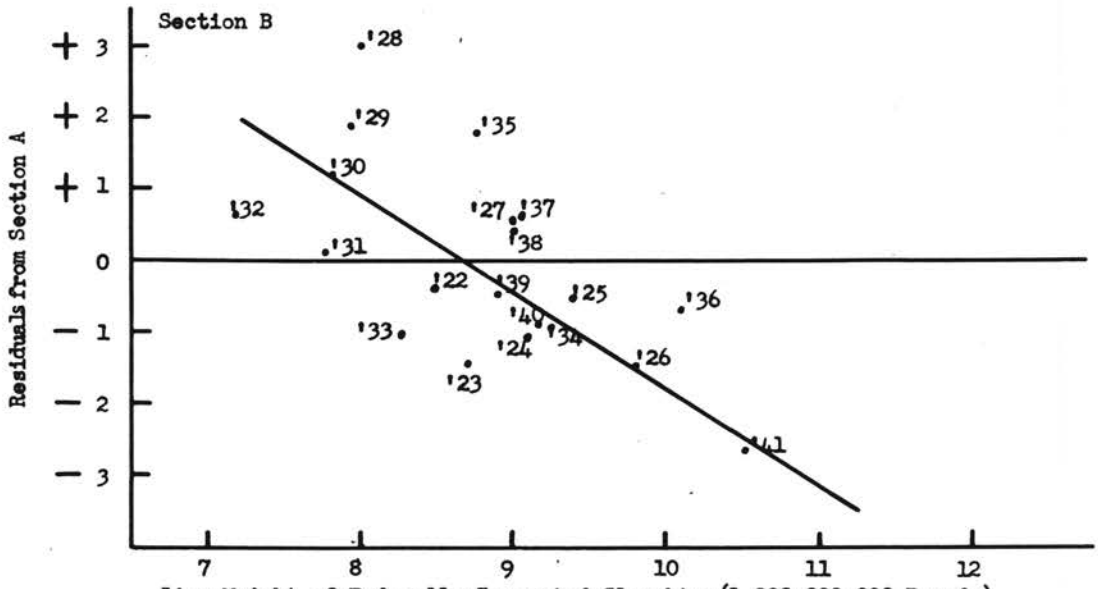


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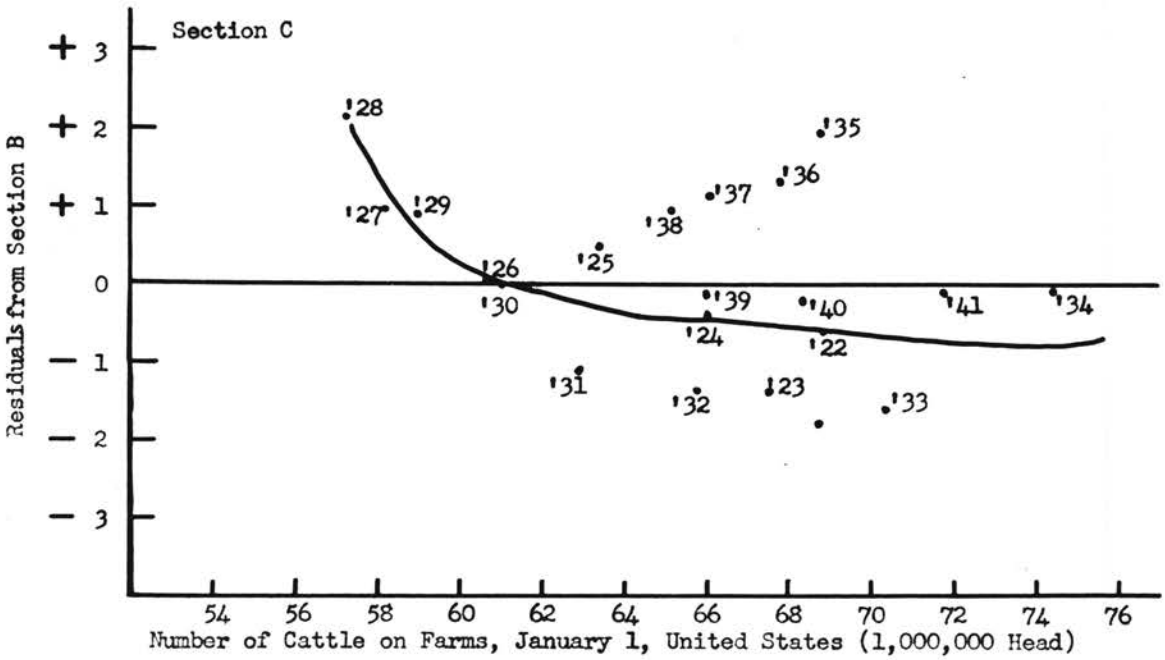
FIGURE 16. (Continued)



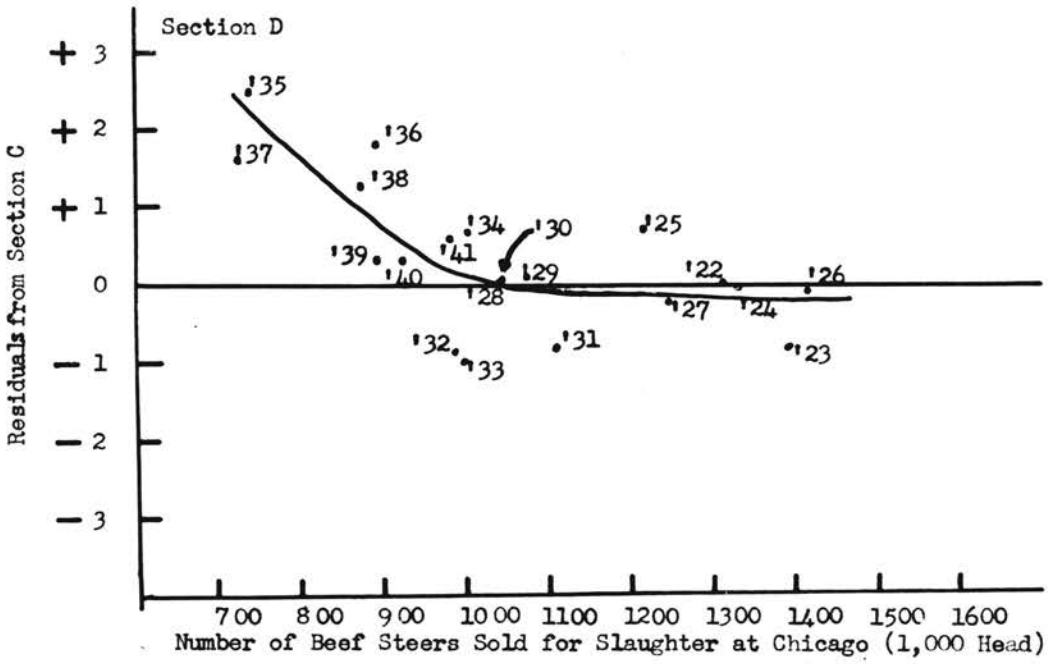


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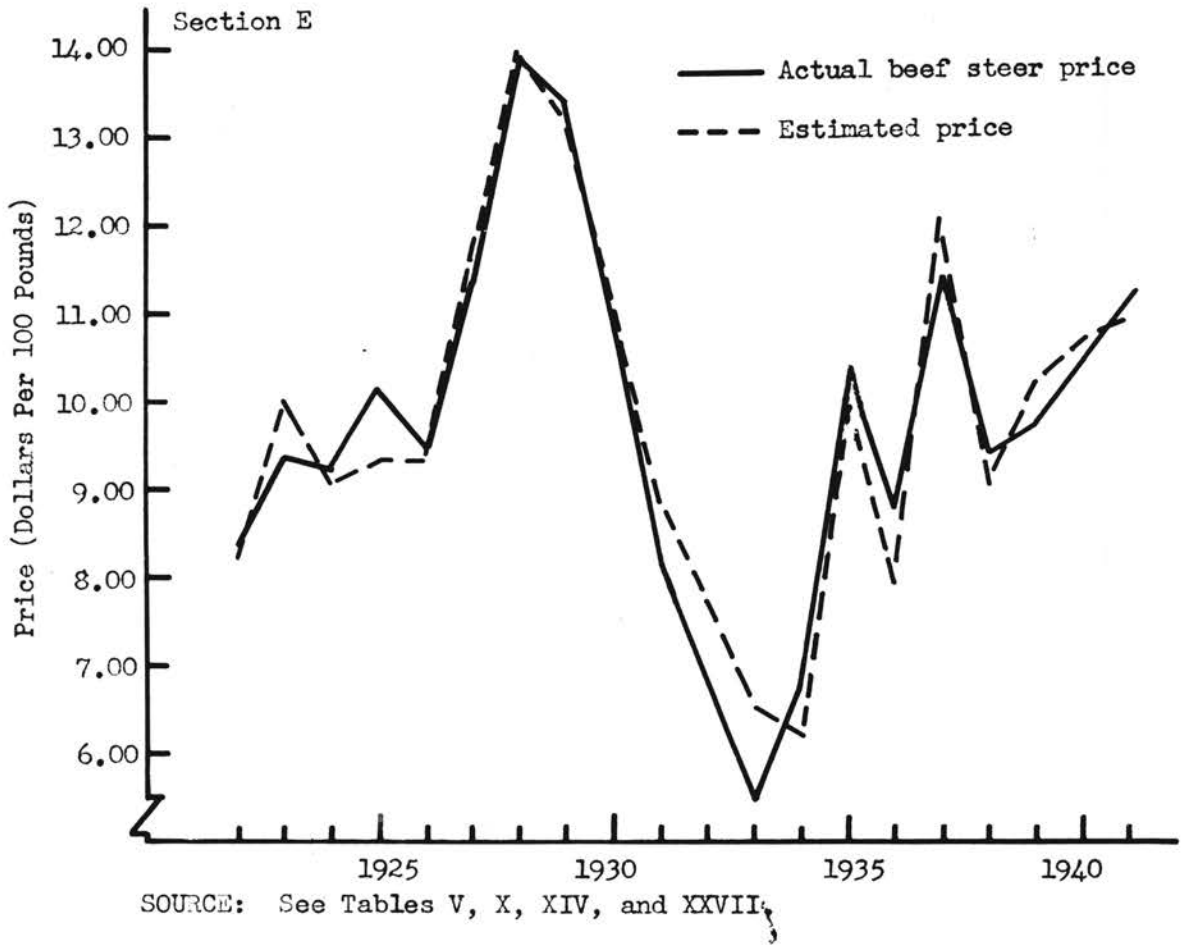
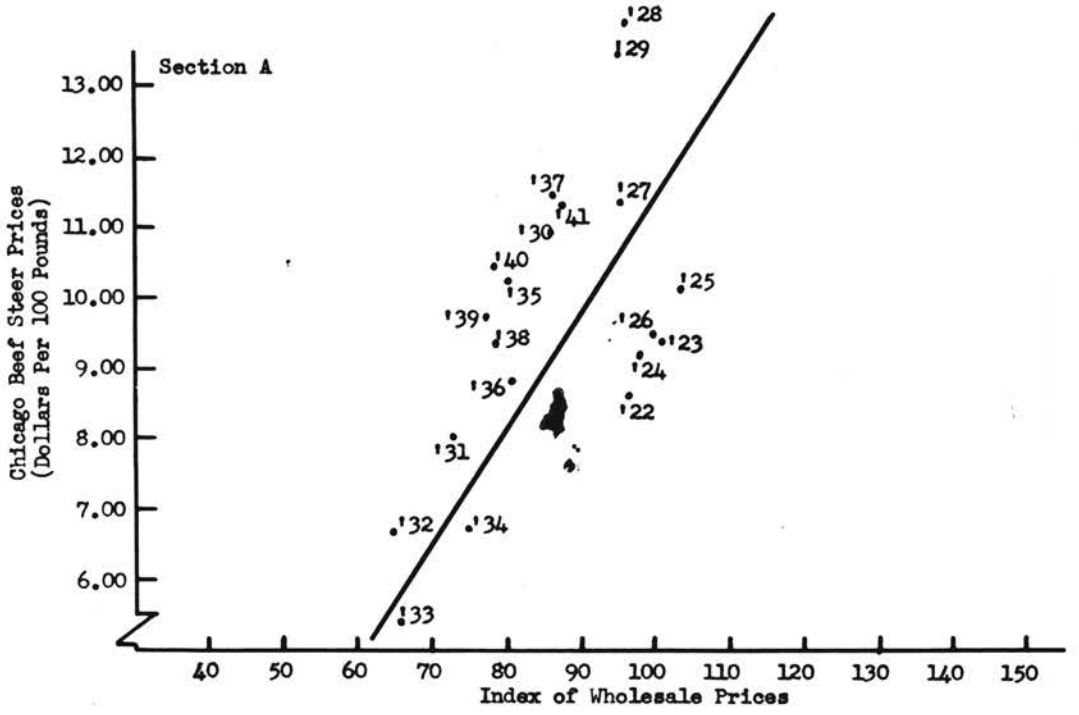
FIGURE 16. (Continued)



SOURCE: See Tables V, X, XIV, and XXVII.

FIGURE 17. CORRELATION OF BEEF STEER PRICES, CHICAGO, WITH INDEX OF WHOLESALE PRICES, INDEX OF INDUSTRIAL PRODUCTION, LIVE WEIGHT FEDERALLY INSPECTED SLAUGHTER, PERCENTAGE OF BETTER BEEF SOLD AT CHICAGO, AND NUMBER OF BEEF STEERS SOLD AT CHICAGO, 1922-1941



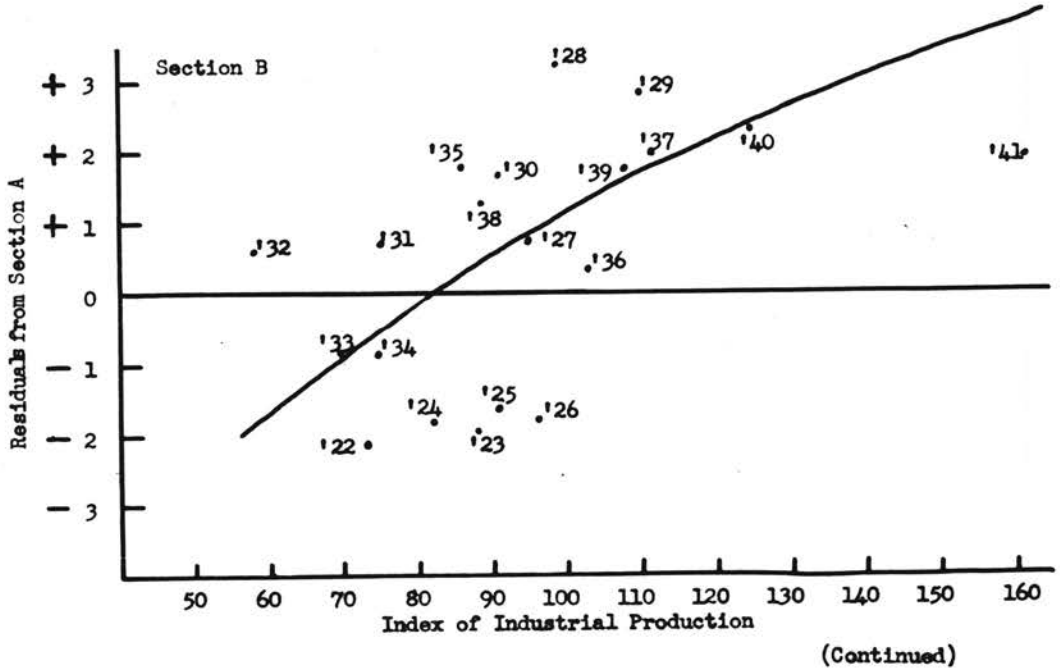


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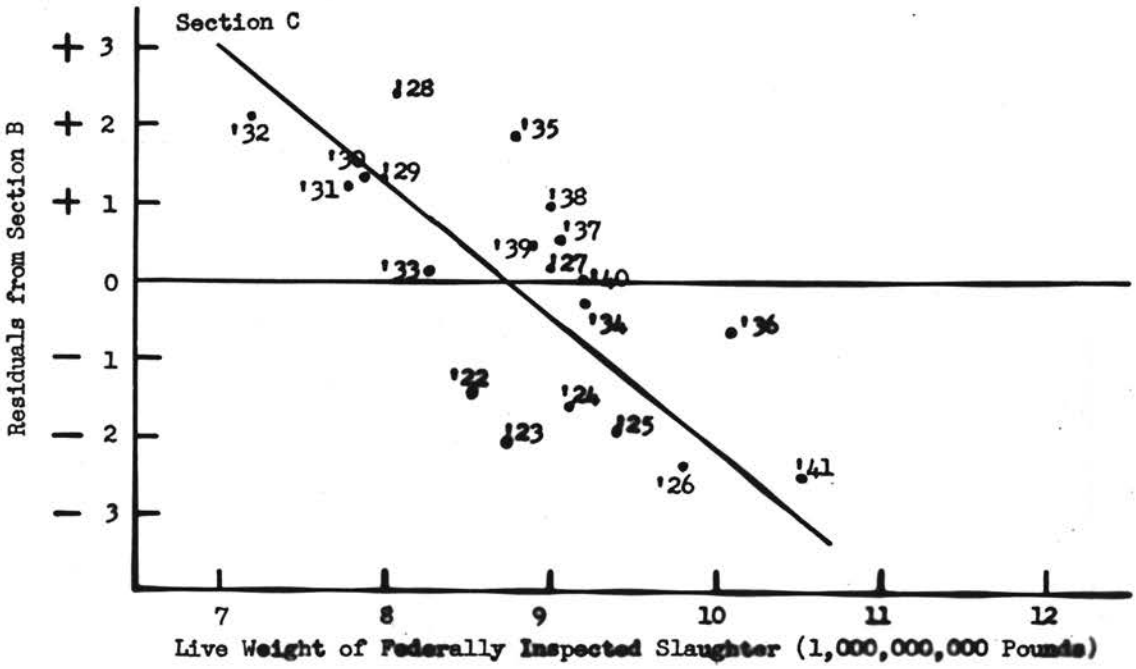
FIGURE 17. (Continued)



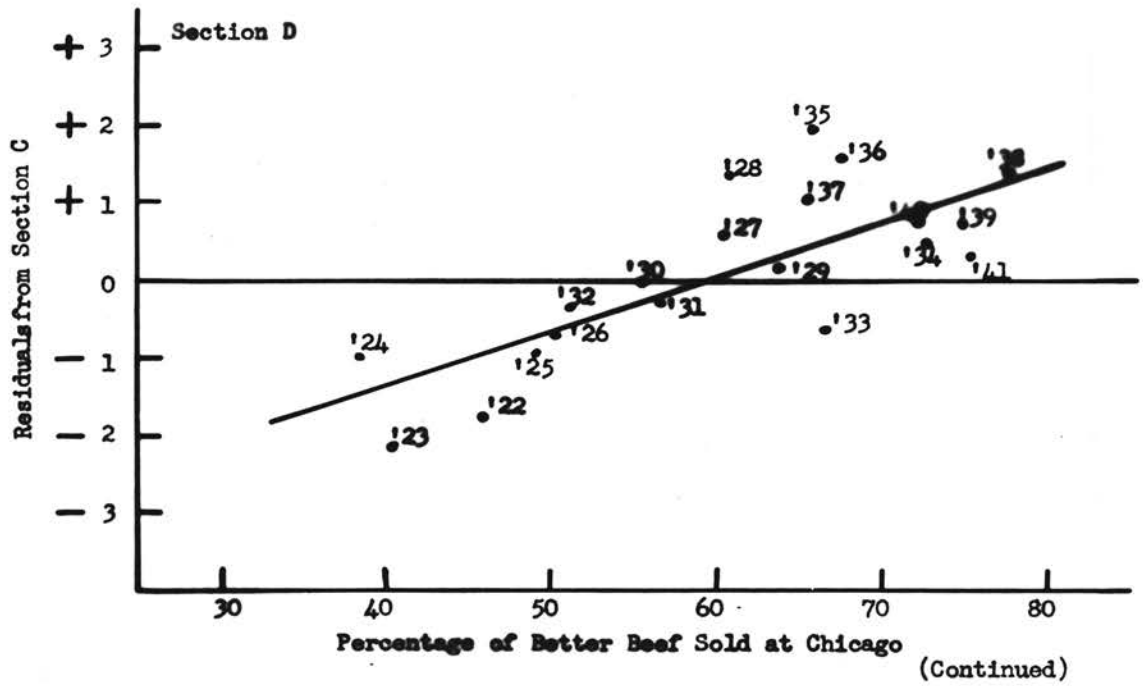


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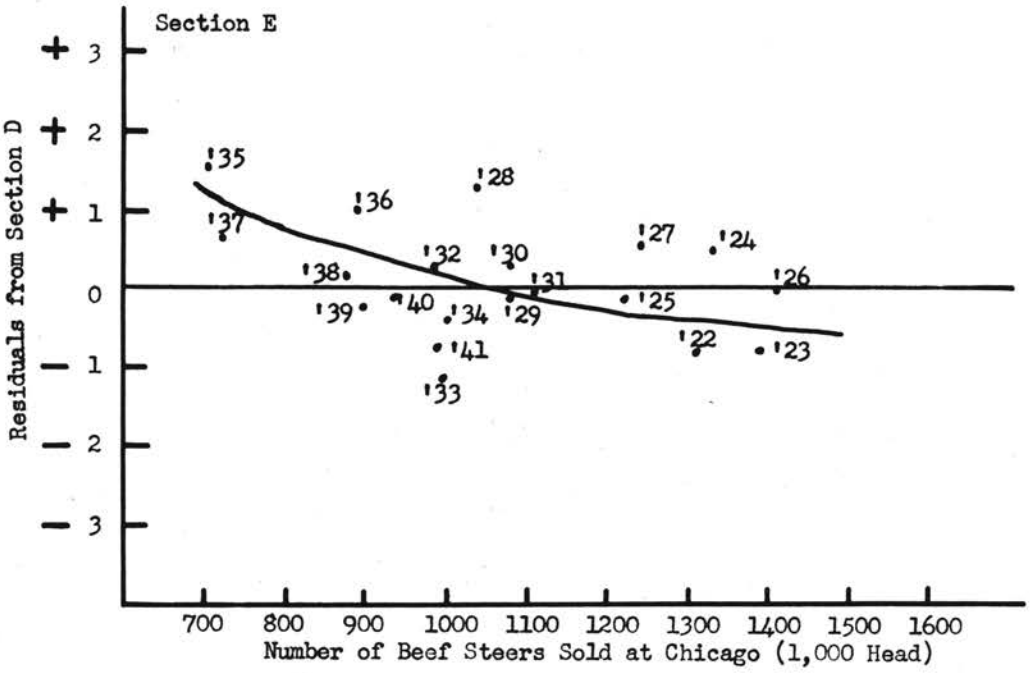
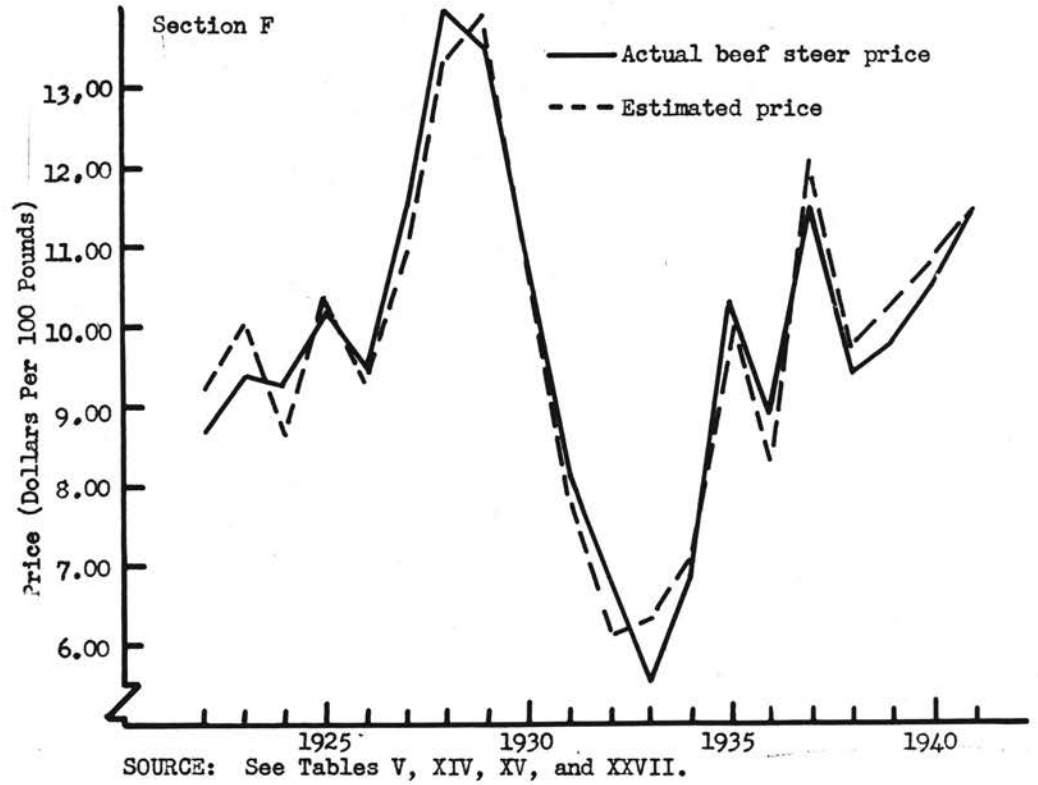
FIGURE 17. (Continued)





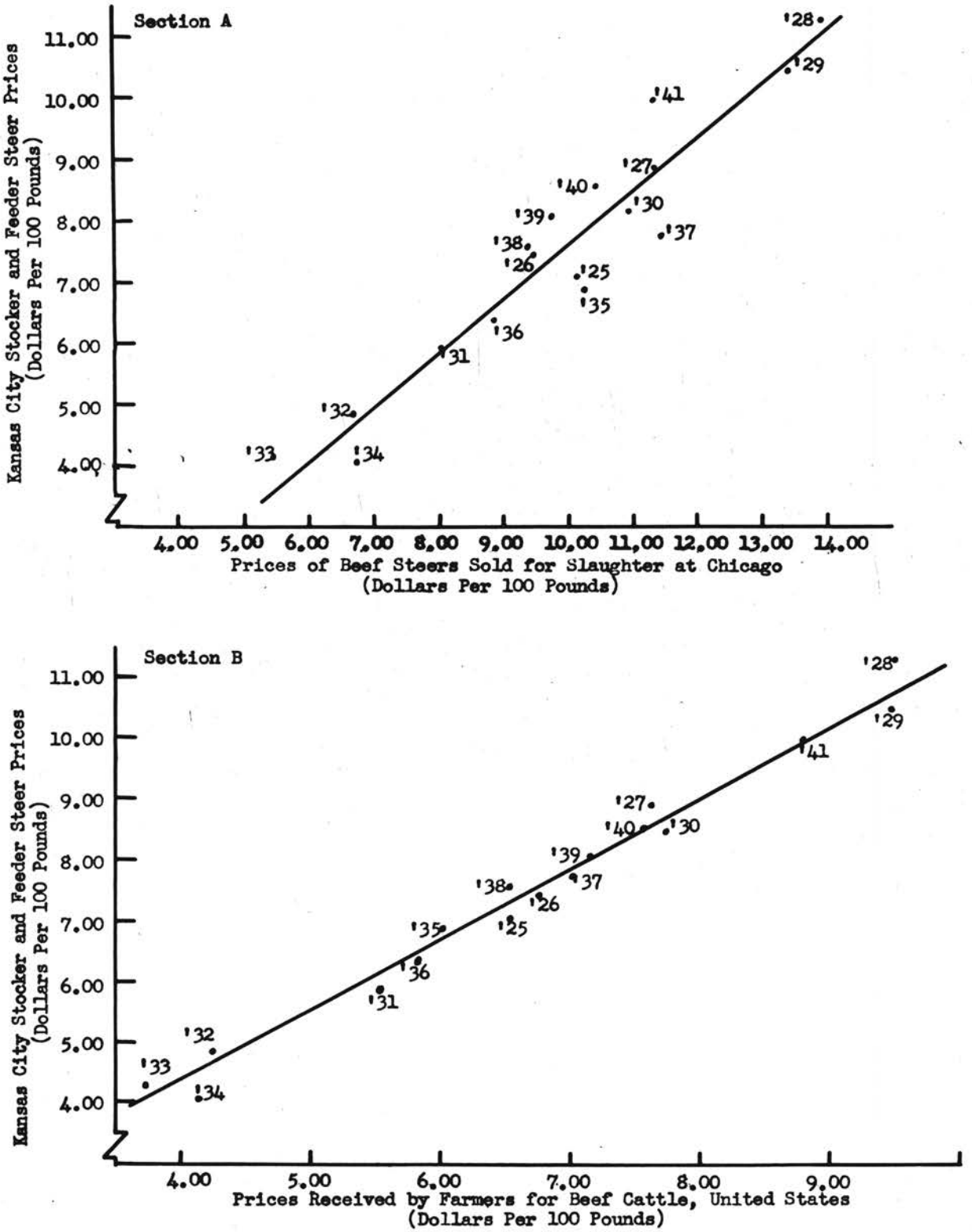
SOURCE: See Tables V, XIV, XV, and XXVII.

differences, it might be questioned whether the year to year changes in these two price series could be accounted for by the same combination of supply and demand factors.

Differences between the year to year movements of prices for stocker and feeder steers at Kansas City and for beef steers at Chicago are indicated when the beef steer prices are plotted against the stocker and feeder steer prices. The deviations from a straight line representing this comparison are rather wide (Figure 18). This would tend to substantiate an assumption that the price movements of stocker and feeder steers could not be accounted for by the same combination of factors as was used to account for the price movements of beef steers sold at Chicago.

The prices received by farmers in the United States were plotted against the prices of stocker and feeder steers shipped from Kansas City by a similar procedure. The deviations from a line representing the latter cattle classifications indicated a much greater similarity in the year to year price movements (Figure 18). This would suggest that the price changes in these two series will be accounted for largely by the same combination of factors in the correlation analysis. Either the farmer price is heavily weighted by stocker and feeder price relationships or both series are strongly affected by common influences. It is probable that these two considerations are jointly responsible for this close relationship. However, no factor could be found that would indicate the quality of stocker and feeder cattle. Quality differences from year to year are likely to have some influence on the year to year changes in the prices of stocker and feeder cattle. The lack of any adequate measure of this quality factor limits the dependability of results from the correlation analysis.

FIGURE 18. COMPARISON OF PRICES OF STOCKER AND FEEDER STEERS, KANSAS CITY, WITH PRICES OF BEEF STEERS, CHICAGO, AND PRICES RECEIVED BY FARMERS FOR BEEF CATTLE, UNITED STATES, 1925-1941



To account for the movements of the prices of stocker and feeder cattle, the index of wholesale prices and the index of industrial production were plotted against the prices of stocker and feeder cattle to obtain residuals with the influence of demand eliminated. The residuals were plotted, successively, against the live weight of federally inspected slaughter to account for the overall supply of beef, against the production of all grains one year earlier to account for the availability of feed grains to be used for finishing, and against the number of inspected feeder steers shipped from Kansas City to account for the local supply conditions. Although the residuals from this combination were smaller than for other combinations tried on stocker and feeder steer prices, they were not sufficiently small to justify their use in estimating the future price movements (Figure 19). Like the results from Richards' combination, these results underestimate the actual prices during the later years included in the study. As explained previously,[22/] the deviations appear smaller in the comparison of the estimated and actual prices than when observed from the guide cards or the line representing the influence of the last factor used in the graphic procedure.

The same overall supply and demand factors have consistently been associated with the farmers' prices, the prices representing the average cost to packers and the prices of beef steers at Chicago. However, to account for the price changes more fully some consideration had to be given to local supply conditions and to the quality of the marketings. It must be reiterated that these relationships will not necessarily be the same in the future, and therefore, no fully quantitative predictions of future price movements can accurately be made, even though the main factors are estimated

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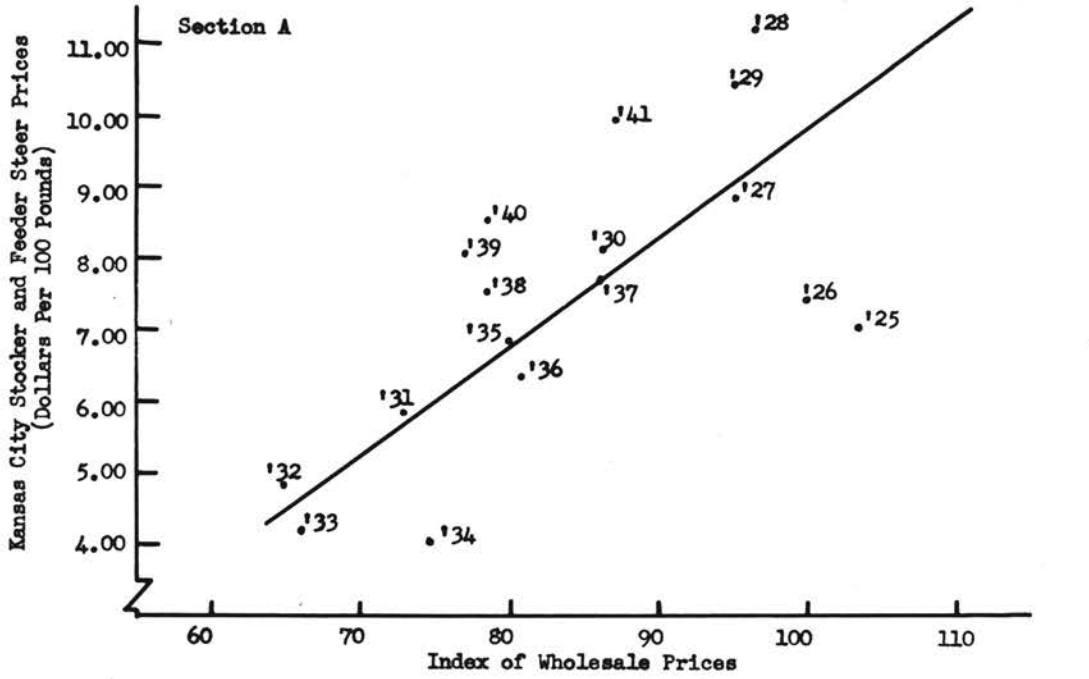
22/ Cf. ante, p. 53.

FIGURE 19. CORRELATION OF PRICES OF STOCKER AND FEEDER STEERS, KANSAS CITY, WITH INDEX OF WHOLESALE PRICES, INDEX OF INDUSTRIAL PRODUCTION, LIVE WEIGHT OF FEDERALLY INSPECTED SLAUGHTER, PRODUCTION OF ALL GRAIN THE PREVIOUS YEAR, AND NUMBER OF FEEDER STEERS SHIPPED FROM KANSAS CITY, 1925-1941



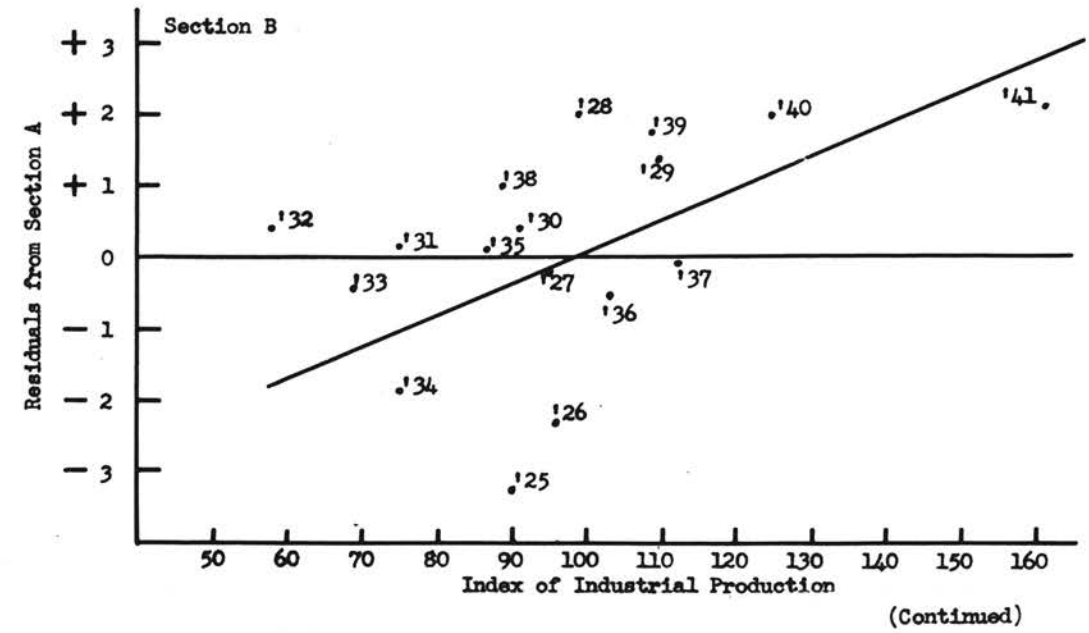


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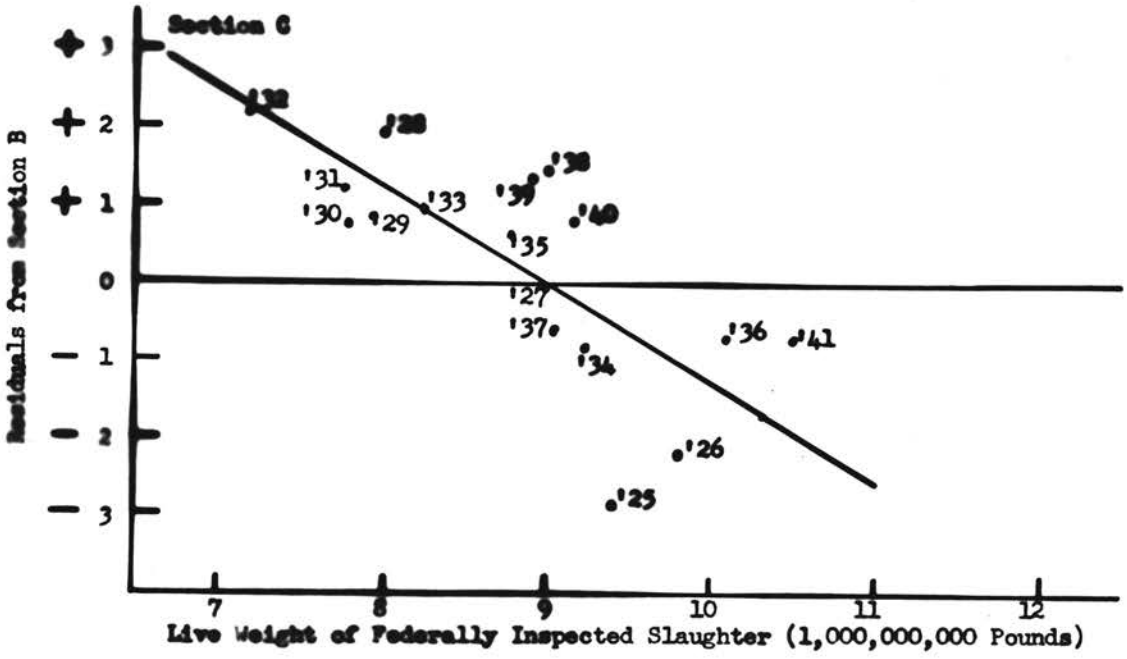
FIGURE 19. (Continued)



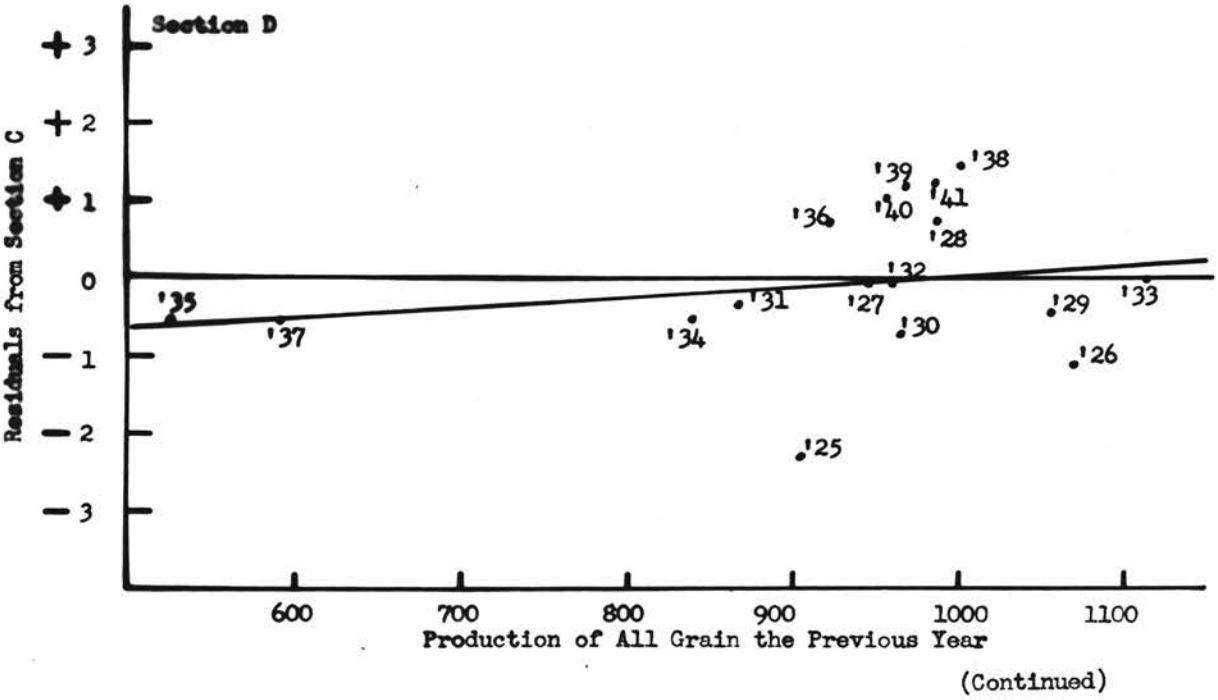


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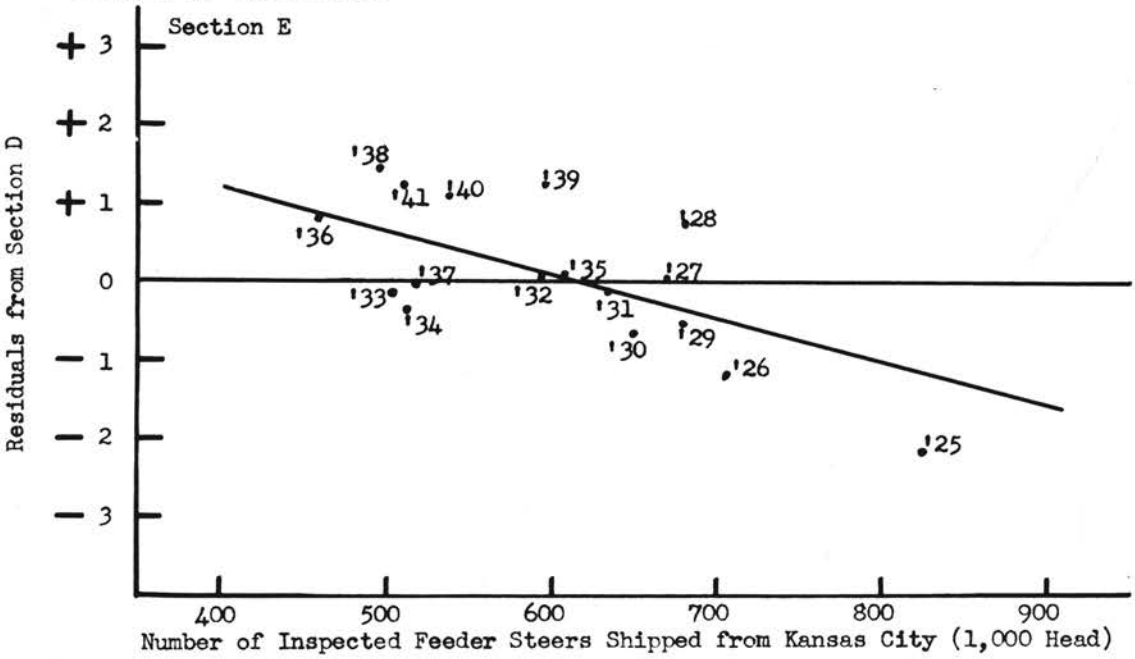
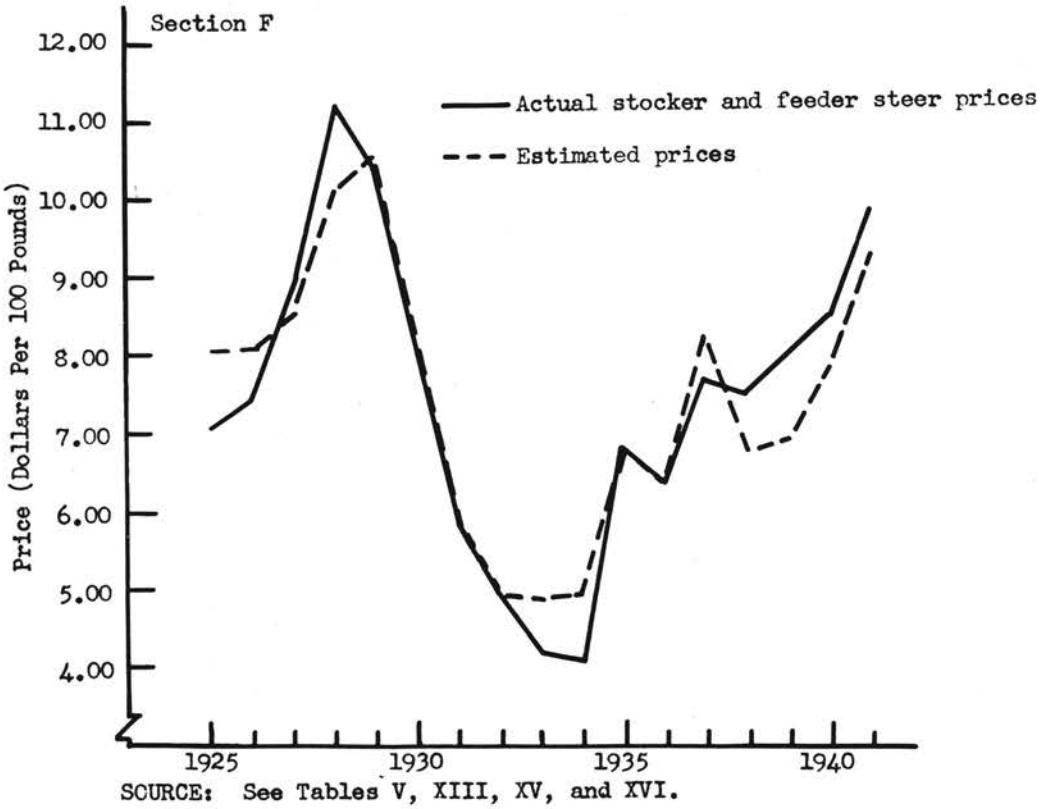
FIGURE 19. (Continued)





SOURCE: See Tables V, XIII, XV, and XVI.

with little error. If the inter-relationships between these factors are constant and their influences causal, then an estimate based upon the combination of factors shown to be associated with the particular classification of cattle would be the best available estimate of the future price movements for that classification. Only future statistics can illuminate the findings to determine whether these relationships are truly cause and effect relationships or whether they are too heavily influenced by chance occurrence. In the analysis of year to year price movements of various classes of beef cattle, a large number of different factors in varying combinations have been tested. Description of the results of all these tests would add greatly to the bulk of the description without appreciably adding to the clarity of the overall analysis. Therefore, only those analyses which appear to make some contribution, either negatively or positively, to the clarification of the factors associated with cattle price movements have been included in the report. Some of the correlations included have to be rejected on the grounds of logic. The associations which appear to be most helpful and best stand the light of logic are summarized as follows:

(1) The index of wholesale prices, the index of industrial production, the live weight of federally inspected slaughter, and the percentage of better beef sold at Chicago correlated with the prices received by farmers for beef cattle in the United States by successive approximations apparently explain most of the movements of those farmer prices.

(2) The index of wholesale prices, the index of industrial production, the live weight of federally inspected slaughter, and the percentage of better beef sold at Chicago correlated with the price representing the average cost to packers of livestock slaughtered in the

United States by successive approximations apparently explain most of the movements in the prices representing average cost to packers.

(3) The index of wholesale prices, the index of industrial production, the live weight of federally inspected slaughter, the percentage of better beef sold at Chicago, and the number of beef steers sold for slaughter at Chicago correlated with the prices of beef steers sold out of first hands for slaughter at Chicago by successive approximations apparently explain most of the movements of prices of beef steers.

(4) The index of wholesale prices, the index of industrial production, the live weight of federally inspected slaughter, the production of all grains the previous year, and the number of inspected feeder steers shipped from Kansas City correlated with the prices of stocker and feeder steers shipped from Kansas City by successive approximations apparently failed to adequately explain the movements of the prices of stocker and feeder steers. This combination of factors gave better results, however, than did any other combination of factors tried in the study.

SEASONAL VARIATION IN BEEF CATTLE PRICES

Procedure: Like the prices of most agricultural commodities, the prices of beef cattle tend to follow a seasonal pattern of month to month changes. Livestock management should be facilitated by any workable knowledge of this pattern. In the present study, the average prices received by farmers in Oklahoma have been used as the basis for determining this seasonal pattern, although some consideration has been given to the average prices of beef steers, all grades and weights, sold out of first hands for slaughter at Chicago and to the average prices of stocker and feeder steers, all grades and weights, shipped from Kansas City. It is presumed that this seasonal pattern will not be the same for the different classes of beef cattle primarily because of the seasonality of marketings, but perhaps, the effects of important factors influencing this seasonal pattern might be estimated.

The period covered in this study includes the years 1910 through 1941. In the attempt to obtain an average seasonal variation for beef cattle prices and federally inspected slaughter in which the effect of cyclical variation on the seasonal pattern had been partially accounted for, percentages of trend were computed in the following manner.[23/] The values for 12 consecutive months were added to get a 12 month moving total which centered between the sixth and seventh month. In order to get a moving average which centered on the month, two consecutive 12 month moving totals were added, then divided by 24. This moving average represented a point on the trend. The original value was divided by the 24 month moving average for the corresponding month with the result known as the percentage of trend. Thus, percentages of trend represent ratios of the original values to the 12 month moving averages with

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23/ For an example of this procedure see Appendix p. 112.

the moving averages corrected to represent mid-month values comparable with the original values.

Simple average monthly prices for this period may be misleading unless care is exercised in their use. They do not consider separately, each of the various influences of price-strengthening and price-depressing factors, but rather consider only an average effect of the combined factors which happened to be exerted during the period of the analysis. This average result is useful, however, as a basis from which to expand the analysis. For any particular month of a given year, the simple average monthly prices for the period 1910 through 1941 will probably come closer to the actual prices for that month than simple average monthly prices based on a five to ten year period immediately preceding the year and month in question. A longer period of years will allow cancellation of the effects of conflicting tendencies, provided there are no important changes in the inter-relationships of the factors, while five to ten years will not be as likely to permit this cancellation.

In the attempt to refine the analysis to account for the separate influences of changes in the general price level, changes in the numbers of all cattle on farms, and variations in feed supplies, the years were combined into years when the price level, as indicated by the Bureau of Labor Statistics' index of wholesale prices of all commodities, increased from that of the previous year and into years when the price level decreased from that of the previous year. These years were termed years of increasing price level and years of decreasing price level respectively.

After the effects of the increasing and decreasing price levels had been determined as nearly as possible, the beef cattle prices were adjusted by dividing the monthly indexes of wholesale prices into the monthly beef cattle

prices to eliminate the effect of the general price level on the seasonal variation in beef cattle prices to provide a more nearly net effect from the operation of other factors successively tested. This procedure necessarily assumes that a 1:1 ratio exists between the index of wholesale prices and beef cattle prices. There was no information available to determine the true ratio, consequently the assumption had to be made that this ratio did exist, with cognizance given to the probability that the effect of the general price level was not entirely eliminated due to the errors imputed by this procedure.

To isolate the separate effect of numbers of all cattle on farms in the United States January 1, the monthly adjusted prices for each of the years 1910 through 1941 were combined into years when the number of cattle on farms increased from those of the previous year and years when the number of cattle on farms decreased from those of the previous year. Since the time required to market beef cattle has varied from two to four years after the decision to produce, it was necessary to allow some lag between the decision of the producer and the actual time of marketing to determine the effect of numbers on the seasonal pattern. In this study, the lag was assumed to be two years, therefore, the first two years of the increasing numbers phase of the cycle were included in the years of decreasing numbers, and conversely, the first two years of the decreasing numbers phase of the cycle were included in the years of increasing numbers. The results of this classification should give an estimate of the effect of the numbers of cattle on farms in the United States on the average seasonal variation in beef cattle prices with the effect of the price level partially eliminated and with the effect of an average feed crop.

To obtain the net effect of feed crops produced in the United States on the average seasonal prices of beef cattle, with the effect of average numbers

and with the effect of the price level partially eliminated, it was necessary to select the major feed crops for which production data were available. Corn, oats, barley, rye, and grain sorghums were selected and the production of each expressed in corn equivalent units, one common measure of the value of each of the grains, to obtain a composite value for the year (Table II).

Table II. Feed Crops: Total Feed Production, Including Corn, Oats, Barley, Rye, and Grain Sorghums, 1/ Expressed in Corn Equivalent Units, 2/ United States, 1910-1941

Year	1,000,000 Corn Equivalent Units	Year	1,000,000 Corn Equivalent Units	Year	1,000,000 Corn Equivalent Units
1910	3,562	1921	3,697	1932	3,916
1911	3,076	1922	3,564	1933	2,970
1912	3,837	1923	3,744	1934	1,857
1913	2,973	1924	3,195	1935	3,264
1914	3,255	1925	3,767	1936	2,084
1915	3,777	1926	3,373	1937	3,540
1916	3,178	1927	3,498	1938	3,434
1917	3,852	1928	3,718	1939	3,388
1918	3,437	1929	3,396	1940	3,469
1919	3,429	1930	3,059	1941	3,726
1920	4,008	1931	3,412		

SOURCE: Computed from data in Bureau of Agricultural Economics, United States Department of Agriculture, Feed Statistics (Washington, D.C., October, 1946) p. 8.

1/ Grain Sorghums included beginning 1921.

2/ Conversion factors are as follows: Corn 1.000, oats 0.507, barley 0.837, rye 0.994, and grain sorghums 0.922.

Since data were not available for grain sorghums prior to 1921, the median was selected as the basis for determining the size of the feed crop rather than the average. A composite corn equivalent unit value greater than the median was designated as a large feed crop, while a composite corn equivalent unit value smaller than the median was designated as a small feed crop. The effect of the size of the feed crop was assumed to be a factor

influencing the average seasonal prices of beef steers beginning October 1 and continuing through September. Therefore, the years were combined on the basis of this October through September effect into years when the production of feed crops expressed in corn equivalent units represented large feed crops and into years when the production of feed crops expressed in corn equivalent units represented small feed crops. While the designation large and small does not consider the absolute size of the feed crops, it does provide the basis for an indication of the influence that might be expected from the size of the feed crop.

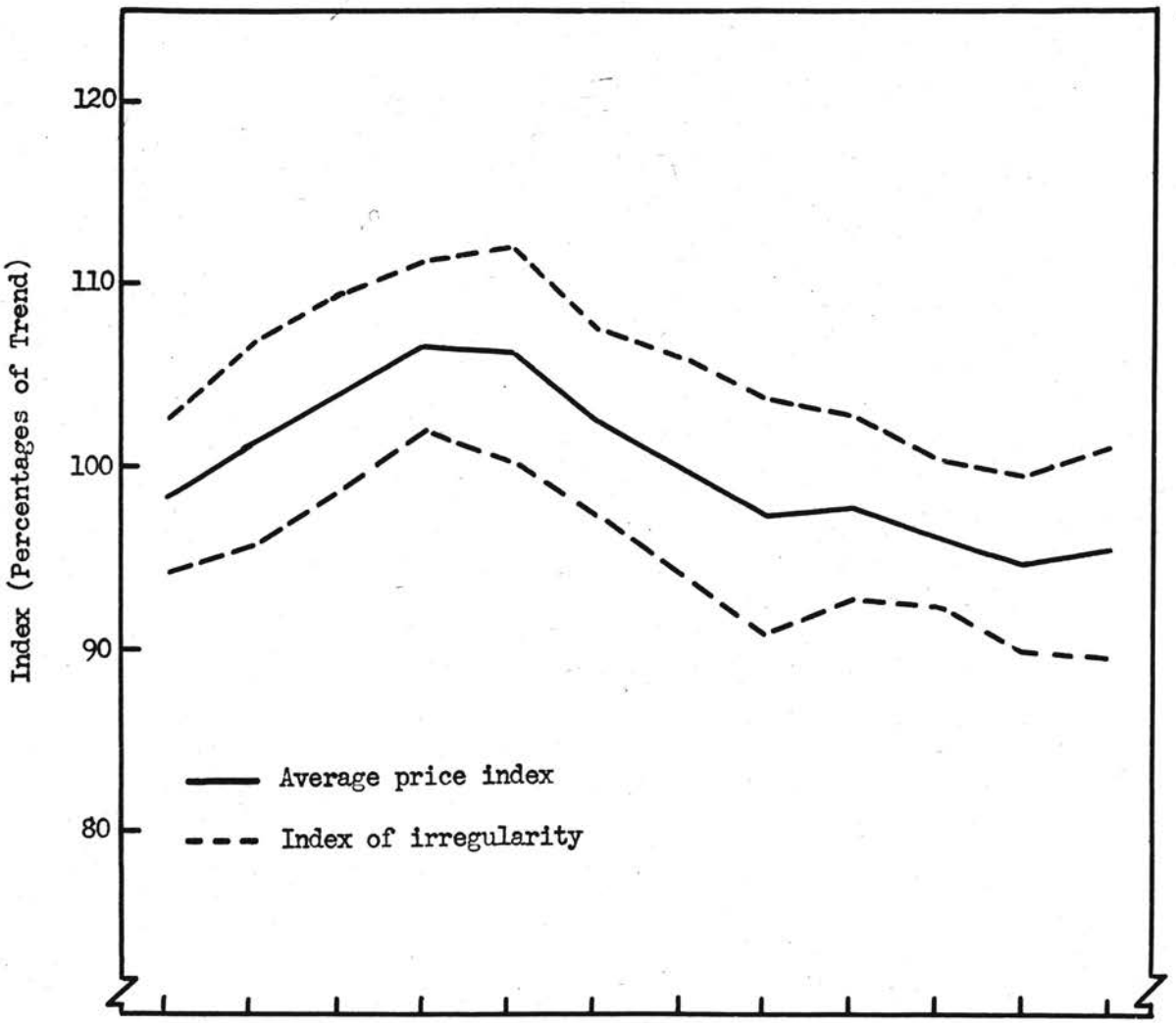
Another classification employed to estimate the effect of large and small feed crops on the average seasonal variation in the prices of beef cattle was to subdivide the years beginning October 1, which fell into the classification of increasing cattle numbers on farms into years when the production of feed crops expressed in corn equivalent units represented large feed crops and years when the production of feed crops expressed in corn equivalent units represented small feed crops. This same subdivision was applied to years of decreasing cattle numbers on farms. This represented an attempt to further refine the analysis to obtain the net effect of large and small feed crops when numbers of cattle on farms were increasing as contrasted to the net effect when numbers on farms were decreasing. This refinement limited the number of years in each classification to the extent that the results were questionable and were not included in the report.

Oklahoma Prices Received By Farmers for Cattle: To approximate the net seasonal variation in the average prices received by farmers in Oklahoma, with the effect of the cyclical variation on the seasonal pattern at least partially removed, monthly percentages of trend were computed in the manner explained in the preceding section. The average seasonal variation in the

prices received by farmers in Oklahoma based on simple average monthly percentages of trend indicated the following movements. Average monthly prices seasonally increased beginning with January until a peak was reached in the spring months of April and May, decreased through August, slightly increased in September, and thereafter decreased until a trough in average monthly prices was reached in November (Figure 20). This seasonal variation is similar to that for the common grades of slaughter cattle and for stocker and feeder cattle. This relationship was expected since the average prices received by farmers in Oklahoma are heavily weighted by the prices of stocker and feeder cattle. A large proportion of the beef cattle marketed from Oklahoma have only a grass fat finish and are marketed in the fall. These animals must be either slaughtered with the present grass fat finish representing lower grades or shipped to the corn belt for further finishing. Large supplies of animals with this type of finish on the market in the fall tend to exert a depressing influence on the average prices. In the spring, the supplies are small while the demand for stockers to utilize pastures during the summer months is relatively great. Both short supplies and a relatively strong demand in the spring exert a strengthening influence on the average prices of stocker and feeder cattle which, in turn, exert a strengthening influence on the average prices received by farmers in Oklahoma. This average seasonal pattern indicates that the average monthly price received by farmers in Oklahomaare relatively high during the spring months and relatively low during the fall months, and are inversely related to the average seasonal supply.

For any particular year this average seasonal month to month price movement will not conform to the rigid pattern indicated by the average monthly percentages of trend for the complete period. An indication of the extent of

FIGURE 20. AVERAGE SEASONAL VARIATION IN PRICES RECEIVED BY FARMERS FOR CATTLE, OKLAHOMA, 1911-1941



SOURCE: See Table XIX.

the deviations from the average seasonal prices received by farmers in Oklahoma is the size of the index of irregularity. The index of irregularity for this study is comparable to the standard deviation of a statistical sample. If the period 1910 through 1941 can be assumed to be a random period selected from a population of all possible periods of years, then the index of irregularity and the standard deviation would be the same. The index of irregularity for a particular month in this study considers all the prices representing that month for each of thirty-two years. To the extent that the prices for that month for each year tended to cluster around the average, the index of irregularity is small. If the prices for that month for each year deviated appreciably from the average then the index of irregularity is large. The average monthly price plus and minus the index of irregularity will delineate a range within which two-thirds of the monthly average prices will lie for this particular month. This procedure was completed for each of the 12 months with 32 average monthly prices comprising the sample for each month. If this sample period of years is truly representative, then it may be assumed that these results will approximate the same conditions for all possible prices as for the period 1910 through 1941.

The indexes of irregularity for the 12 months varied from the largest in August to the smallest in October (Figure 20). This variation in the sizes of the indexes of irregularity indicates more deviation in August prices from the average monthly prices from year to year than in October prices. The band delineated by the average monthly prices plus and minus their respective indexes of irregularity, indicates quite wide variations from year to year. Nevertheless, this seasonal pattern of the prices received by farmers in Oklahoma should provide a useful basis from which to estimate the range within which the effects of important factors will

probably fall as they influence deviations from the pattern of average seasonal prices.

An additional measure of this average seasonal pattern of month to month changes in the prices received by farmers in Oklahoma is the tabular analysis of the number of times that the prices received by farmers in Oklahoma increased, remained unchanged, or decreased from the price of the previous month for the years 1910 through 1941.

Table III. Cattle: The Number of Times the Oklahoma Prices Received By Farmers for Cattle Increased, Decreased, or Remained Unchanged from the Prices the Previous Month, 1910-1941

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Increased	21	21	21	20	14	7	6	13	15	13	9	14
Decreased	5	9	7	7	16	23	22	17	13	17	16	12
Unchanged	6	2	4	5	2	2	4	2	4	2	7	6

SOURCE: Computed from Table XXIV.

The largest number of increases of the price over the price the previous month was 21, and this was shared equally by January, February, and March. In April the number of increases remained high while in May the number of increases was slightly less than the number of decreases. Based upon this relationship the average monthly prices received by farmers for cattle in Oklahoma increased during the late winter and spring months from January through April then leveled off in May. This follows the seasonal increase in prices indicated by the average seasonal variation in prices received by farmers in Oklahoma computed from the percentages of trend. The prices for June and July decreased from the prices the previous month the largest number of times, 23 and 22 respectively, to indicate the beginning of the

seasonal decline in the prices received by Oklahoma farmers.

There were more decreases than increases for August, but the trend was reversed in September with a slightly larger number of increases than decreases in the prices received by farmers in Oklahoma over the prices for the previous months. This indicates a possible secondary peak in September prices. For October and November the number of decreases exceeded the number of increases to indicate the further decline in the average seasonal prices received by farmers in Oklahoma. The December price was as likely to go up as to go down since neither the increases nor the decreases represented one-half of the years included in the analysis. The results of the tabulated analysis of the number of times the average prices received by farmers in Oklahoma increased, decreased, or remained unchanged, indicated a seasonal variation of those prices that, in general would confirm the seasonal variation as determined by the average percentage of trend in which a seasonal peak in April and May, a secondary peak in September, and a seasonal trough in November occurred.

One of the major factors influencing this average seasonal price pattern is the seasonality of marketings. To estimate this seasonal pattern of month to month changes in marketings, the number of federally inspected slaughter was selected. There was no long time series of marketings of Oklahoma cattle available and consequently it was necessary to use volume of marketings in the United States. In view of the fact that the series on the live weight of federally inspected slaughter goes back only to 1921, it was necessary to use number of head of federally inspected slaughter. This is less indicative than the former series and in addition, there was found no effective measure of the relationship between this value and the changes in Oklahoma supplies. The analysis therefore is limited. At best, only approximate results may be obtained. The effect of this supply factor was

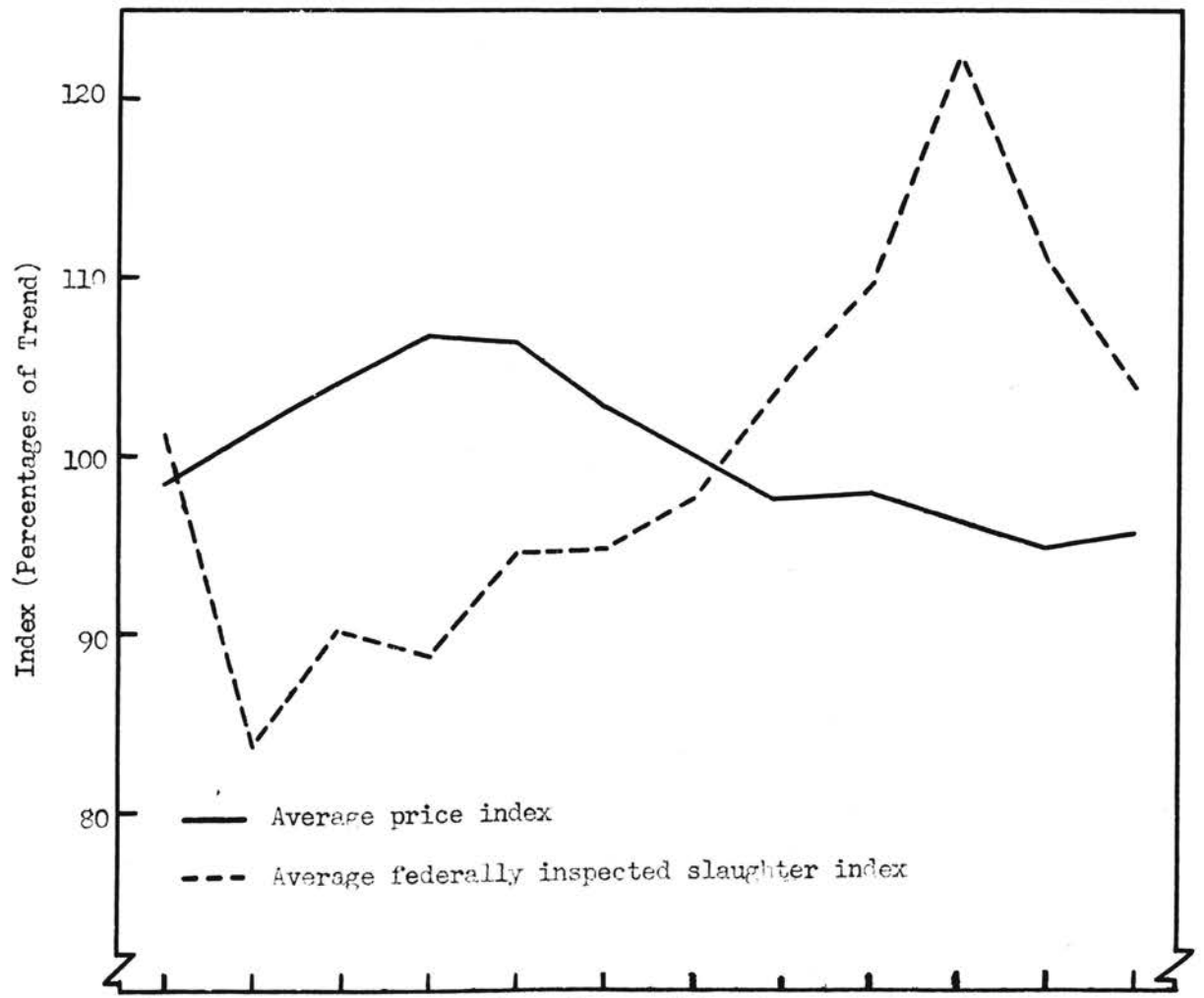
estimated from the average monthly percentages of trend computed in the manner described earlier.

The average seasonal pattern for the number of head of federally inspected slaughter tended to be low during the first half of the year and to be high during the last half (Figure 21). The trough in federally inspected slaughter occurred in February. In March, the number of head slaughtered increased while in April the number declined. Thereafter, the average seasonal pattern of federally inspected slaughter increased until the peak in October was reached and then decreased through January. Although some of this variation in the average seasonal pattern of federally inspected slaughter may be due to the irregular number of market days in each month, in general, it indicates the seasonality of marketings. When compared with the average seasonal variations in prices received by Oklahoma farmers, it is apparent that an inverse relationship exists between the two series, although the peaks and troughs did not occur during the same months.

Changes in the average seasonal movement of numbers of head of federally inspected slaughter would indicate the effect of changes in the current supply of beef coming on the market but would not account for the supply of beef in storage that would possibly influence the prices of beef. For many agricultural commodities, the stocks of the commodity in storage exerts an influence on the average prices sufficient to reduce the seasonal variation of those prices. Cold storage holdings are relatively unimportant for beef and veal, however, since most of the storage stocks consist of holdings of fresh beef incident to the normal slaughtering processes.[24/]

24/ Dowell and Bjorka, op. cit., p. 359.

FIGURE 21. AVERAGE SEASONAL VARIATION IN PRICES RECEIVED BY FARMERS FOR CATTLE, OKLAHOMA AND FEDERALLY INSPECTED SLAUGHTER, UNITED STATES, 1911-1941



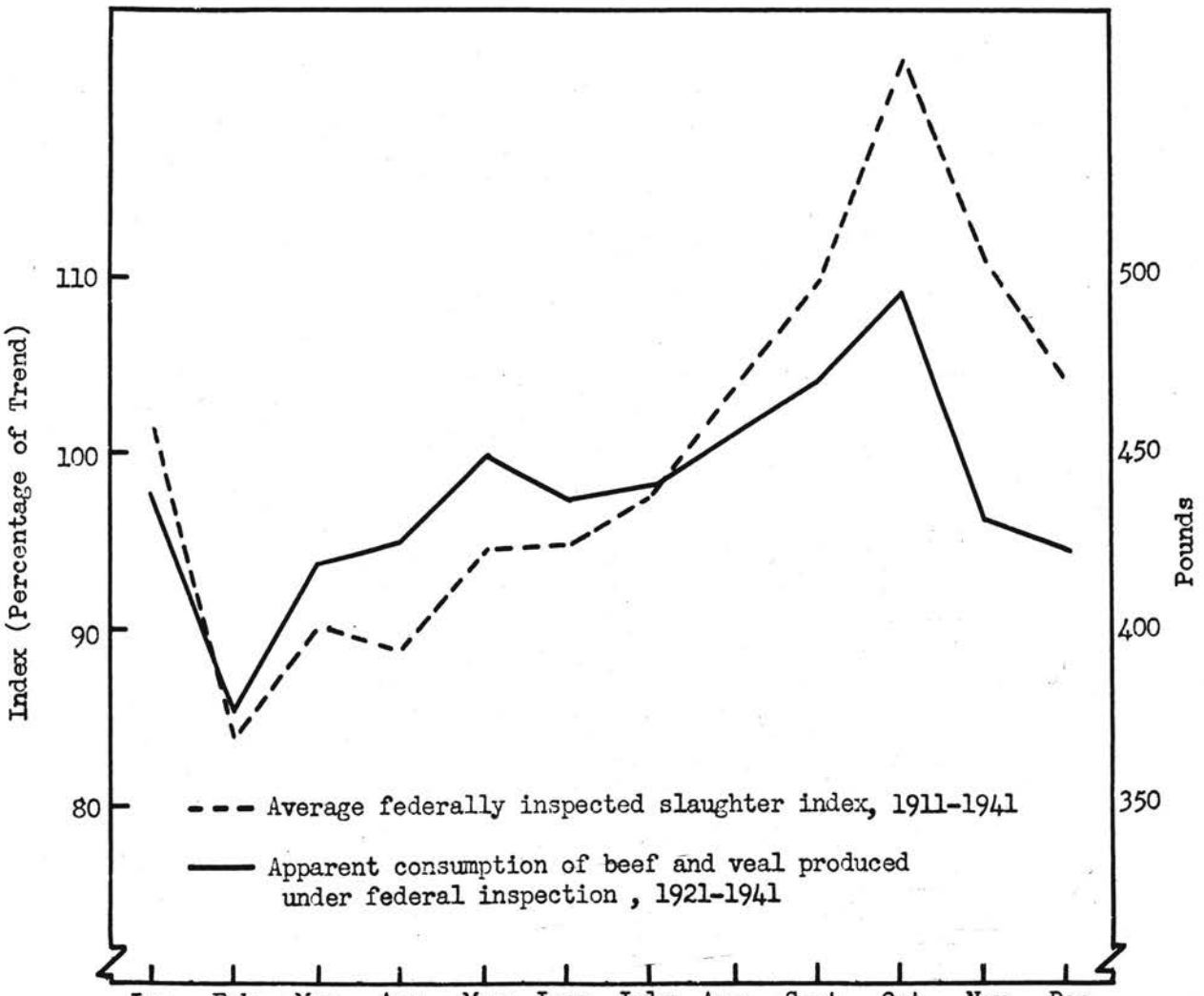
SOURCE: See Tables XIX and XX.

As further evidence of this relative unimportance of cold storage holdings, the movement of the average monthly quantities of apparent consumption of beef and veal produced under federal inspection was similar to the movement of the average seasonal pattern for the numbers of head of federally inspected slaughter (Figure 22). The peaks and troughs for both series occurred during the same months. The average seasonal pattern of consumption of beef and veal increased from the trough in February until May. The consumption for June decreased, but thereafter, increased until the peak was reached in October. During November and December, the average seasonal pattern of consumption of beef and veal declined while during January it increased.

Changes in the seasonal variation of demand for beef might logically be expected to affect this average seasonal pattern of month to month changes in the quantities of apparent consumption of beef and veal. Insofar as the index of factory payrolls reflects the seasonal variation in conditions of demand, then seasonal variations in demand conditions do not significantly affect the seasonal pattern of beef and veal consumption. Further, a more definitive study of the seasonality of demand conditions is desirable to test the validity of this apparent lack of correlation.

In an attempt to further refine the analysis to provide a basis for subjectively evaluating the separate effects of important factors the adjusted prices were computed as described in the procedure. The average seasonal adjusted prices received by farmers indicated no change in the seasonal pattern as compared to the average seasonal unadjusted prices. This is not to say that the general price level has no influence on the average seasonal variation in prices received by Oklahoma farmers but rather that for the complete

FIGURE 22. AVERAGE SEASONAL VARIATION IN FEDERALLY INSPECTED SLAUGHTER AND APPARENT CONSUMPTION OF BEEF AND VEAL PRODUCED UNDER FEDERAL INSPECTION, UNITED STATES



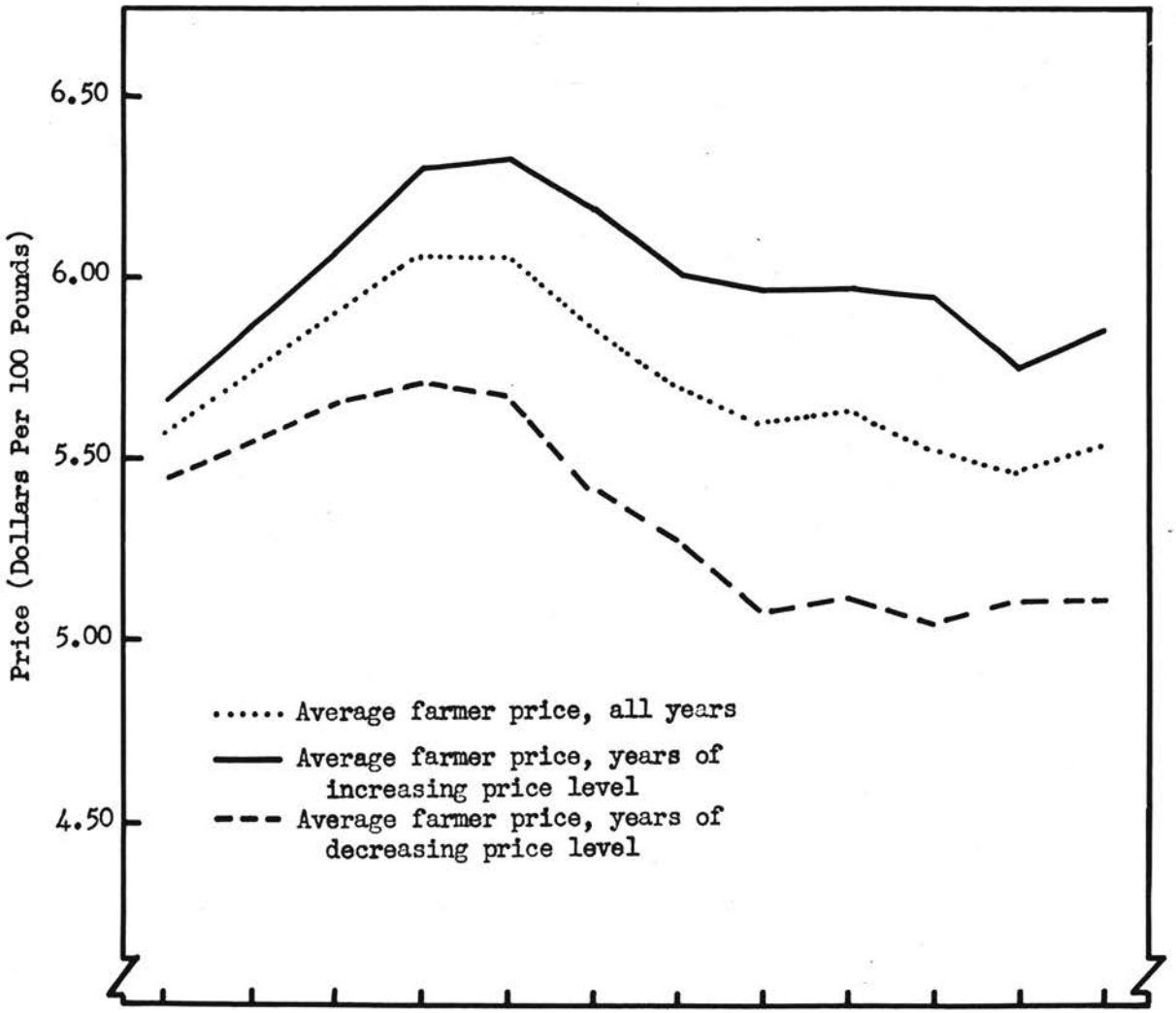
SOURCE: See Tables XX and XXI.

period, the influence of an increasing price level tended to be offset by the influence of a decreasing price level.

The average seasonal price pattern for years in which the general price level was increasing differed somewhat from the average seasonal pattern for years in which the general price level was decreasing. The effect of an increasing price level logically should accentuate the seasonal rise in prices and should moderate the seasonal decline in prices. Also, the prices logically should be relatively higher near the end of the year than near the beginning of the year. A decreasing price level on the other hand, might be expected to exert a depressing influence on the seasonal pattern and should limit the seasonal rise and aggravate the seasonal decline. The results, in general, confirmed this logical influence attributable to the effect of the price level on the average seasonal pattern. During years when the price level was increasing, the prices received by farmers in Oklahoma increased more in April and May, the peak months, and decreased less during the fall months (Figure 23). During years when the price level was decreasing, the price rise tended to be relatively smaller during the peak months and the price decline relatively greater during the fall months.

The primary limitation of a classification such as this is that it does not consider the absolute size of the increase or decrease nor does it consider the level from which the increase or decrease came. The general price level has tended to decline from high to low levels much more quickly than to rise from low to high levels. This was especially true in the depression of the thirties. Of the thirty-two years in the study, nineteen are years of an increasing price level while only thirteen are years of a decreasing price level. Some reservation must be made in the interpretation of the results to subjectively account for these limitations.

FIGURE 23. AVERAGE SEASONAL VARIATION IN PRICES RECEIVED BY FARMERS FOR CATTLE, OKLAHOMA: ALL YEARS; YEARS OF INCREASING PRICE LEVEL; YEARS OF DECREASING PRICE LEVEL, 1910-1941

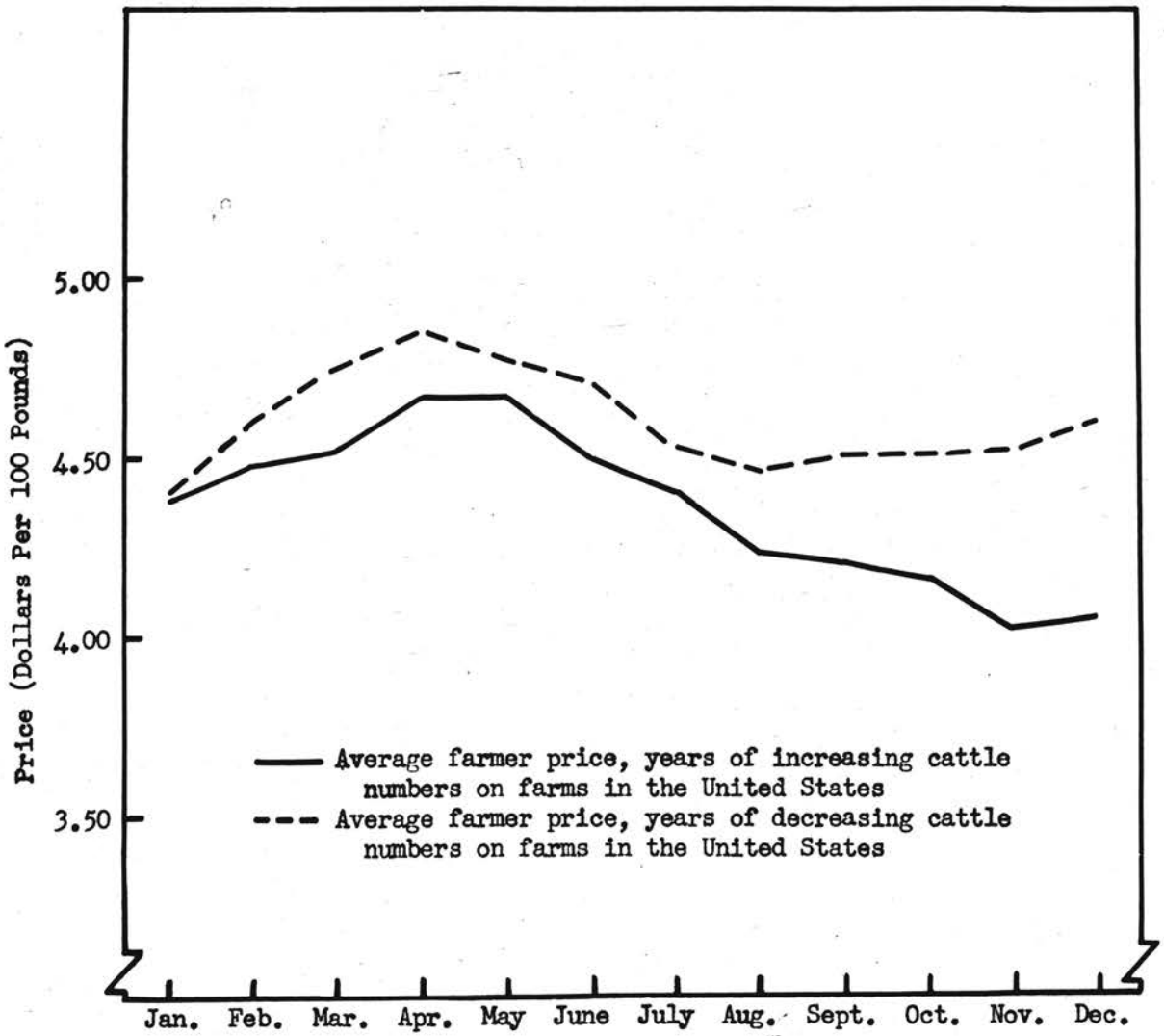


SOURCE: See Tables XXIV and XXVI.

Since cattle prices logically are associated with the numbers of cattle on farms, in addition to the effect of the price level, it might be assumed that when cattle numbers are at high levels and prices therefore tending to be low, the price-depressing influence of increasing cattle numbers would tend to limit the amount of seasonal rise and intensify the seasonal decline. Conversely, the price-strengthening factor of decreasing cattle numbers might logically intensify the upward seasonal movement. When the adjusted prices received by farmers were classified into years according to whether the cattle numbers were increasing or decreasing, this logic was apparently illustrated (Figure 24). With the price-strengthening factor of decreasing numbers the seasonal rise in prices during the spring months was intensified and the seasonal decline appears definitely to be retarded. With the price-depressing factor of increasing numbers, the upward seasonal movement in the spring months was limited and the downward seasonal movement from mid-summer through December was sharpened.

Even though the logic is apparently well illustrated, this pattern can hardly be assumed to indicate the net effect of numbers since eleven of these thirteen years of increasing cattle numbers were also years of increasing price levels. Insofar as the influence of the price level is not completely eliminated in the adjusting process, the increasing price level would tend to offset the price-depressing influence of increasing numbers. However, in view of the fact that a large part of the effect of the price level can be expected to be eliminated by the adjusting procedure, this pattern may be indicative that the logic is substantiated in practice. With the limitations of the analysis in mind, the subjective evaluation and re-examination of the factors may provide a helpful basis for future situation analysis based on these relationships.

FIGURE 24. AVERAGE SEASONAL VARIATION IN PRICES RECEIVED BY FARMERS FOR CATTLE, OKLAHOMA: YEARS OF INCREASING CATTLE NUMBERS; YEARS OF DECREASING CATTLE NUMBERS, 1910-1941



SOURCE: See Table XXVI.

After the decision by the producer to commit a given acreage to the production of feed crops, the production of those feed crops is determined by external factors, such as the weather, over which the farmer has no control. Changes in feed supplies are largely attributable to the effects of these external factors. The size of the feed crop, in turn, affects the number of livestock that can utilize this feed. The size of the feed crop also influences the demand for cattle. In the fall, large feed crops logically should exert a strengthening influence on the demand for feeder cattle while small feed crops logically should exert a depressing influence on the demand for feeder cattle. A larger number of cattle will go into the feed lots following the production of large feed crops than following the production of small feed crops. The cattle going into the feed lots in the fall will be sold as finished beef in the spring. With the production of large feed crops, a large number of cattle will go into the feed lots in the fall, and be sold on the market in the spring, therefore, the influence of large feed crops will exert a depressing influence on the prices of finished beef cattle in the spring. On the other hand, with the production of small feed crops, a small number of cattle will go into the feed lots in the fall and be sold on the market in the spring. These small numbers should exert a strengthening influence on the prices of finished beef in the spring. Although previous analysis of the effect of changing cattle numbers and fluctuating price levels had indicated the effects attributable to each of these series, the size of the feed crop may be expected to modify these influences which are exerted on cattle prices.

Although the influence of feed supplies the second year sometimes may be as important as the influence the first year, it was not feasible to attempt to determine this effect by simple averages since only two or three

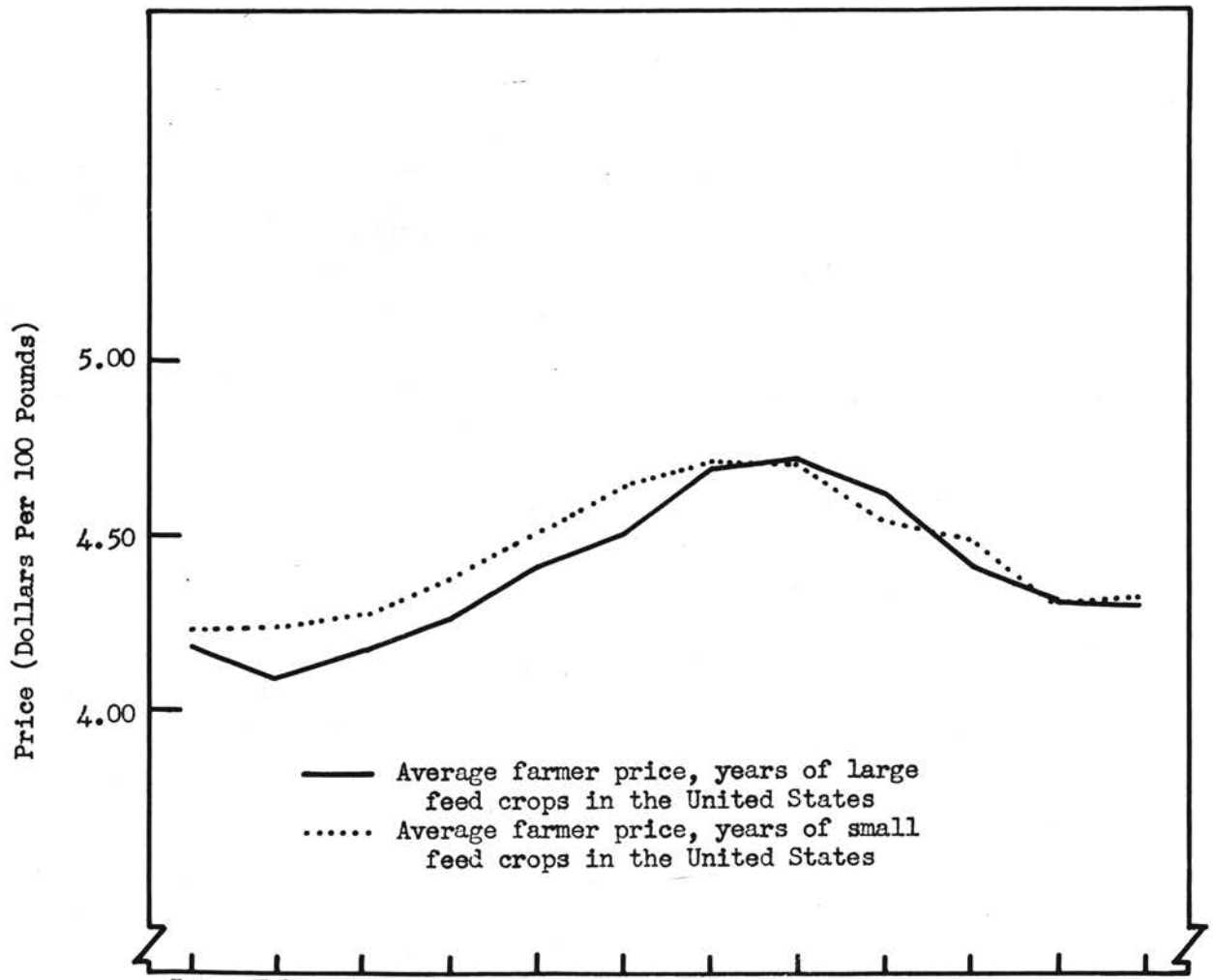
years would have been included in each subdivision. It would have been necessary to consider each year separately to estimate this effect and this was beyond the scope of the present study. The years were grouped as to years of large feed crops and years of small feed crops as described earlier.

Since the cattle prices received by farmers in Oklahoma are heavily weighted by the prices of stocker and feeder cattle it was logical to assume that in the fall, the effect of large feed crops would tend to strengthen the prices received by farmers and the effect of small feed crops would tend to depress the prices received by farmers. This logic was not well illustrated. The seasonal patterns for the two series were not greatly different (Figure 25). Apparently either the prices received by farmers for cattle in Oklahoma represent a sufficient quantity of the slaughter classes of livestock to obscure the logical relationships or the effect of chance occurrence in the combination of the various factors is sufficiently strong to obscure the relationships in the averaging process.

Chicago Beef Steers Prices: The prices received by farmers for cattle in Oklahoma represent a composite of many different kinds of beef cattle. Although stocker and feeder cattle may dominate in the cattle population of the State, seasonal variations based upon this composite do not represent any particular class of cattle. In order to show the average seasonal price pattern for slaughter livestock, the average prices of beef steers sold out of first hands for slaughter at Chicago were selected.

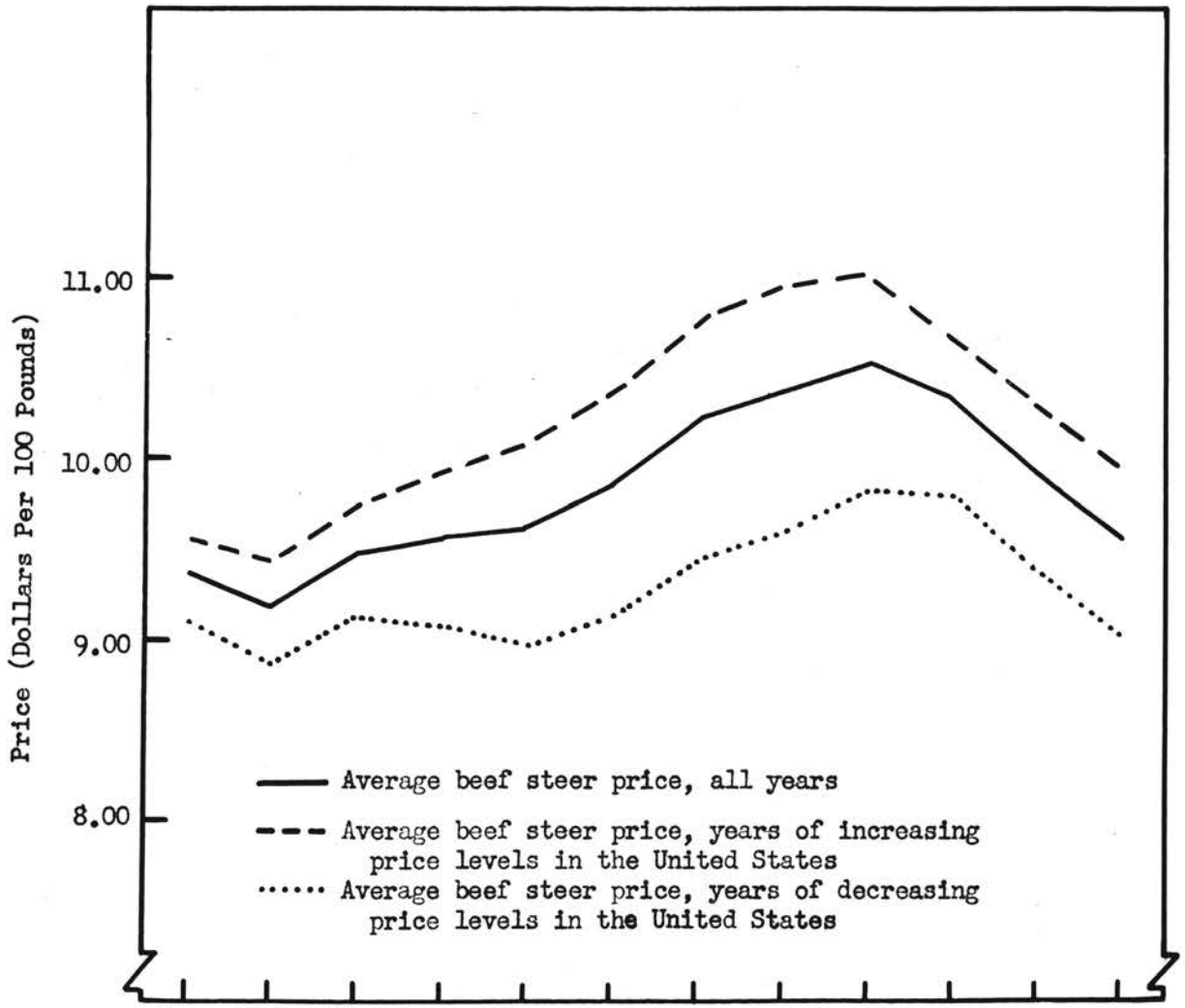
Average monthly prices for beef steers sold at Chicago indicated that these prices tended to decline to a trough in February when large numbers of finished livestock are marketed (Figure 26). As the flush of marketings subsides then the average seasonal prices gradually rise until a peak is

FIGURE 25. AVERAGE SEASONAL VARIATION IN PRICES RECEIVED FOR CATTLE, OKLAHOMA: YEARS OF LARGE FEED CROPS; YEARS OF SMALL FEED CROPS, 1910-1941



SOURCE: See Table XXVI.

FIGURE 26. AVERAGE SEASONAL VARIATION IN PRICES OF BEEF STEERS, CHICAGO: ALL YEARS; YEARS OF INCREASING PRICE LEVEL; YEARS OF DECREASING PRICE LEVEL, 1910-1941



SOURCE: See Tables XXVII and XXIX.

reached in September, since marketings of highly finished livestock are relatively low during the late summer and early fall. After September, average prices decline until the end of the year.

The influence of an increasing price level should logically limit the seasonal decline in the spring of the year when marketings are large and should accentuate the seasonal rise in the fall when marketings are small. The influence of a price-depressing decreasing price level should tend to lower the seasonal trough in the spring and limit the amount of seasonal rise in prices in the fall. The comparison of the average seasonal pattern for beef steer prices during years of an increasing price level with the pattern for years of a decreasing price level apparently illustrated this logic. Although the trough in the spring months would not show the effect of an increasing price level as much as a trough in the fall months, the seasonal decline was apparently limited while the seasonal rise was greatly intensified (Figure 26). On the other hand, the average seasonal pattern for years of a decreasing price level indicated that the seasonal decline appeared to be intensified while the seasonal rise definitely was retarded.

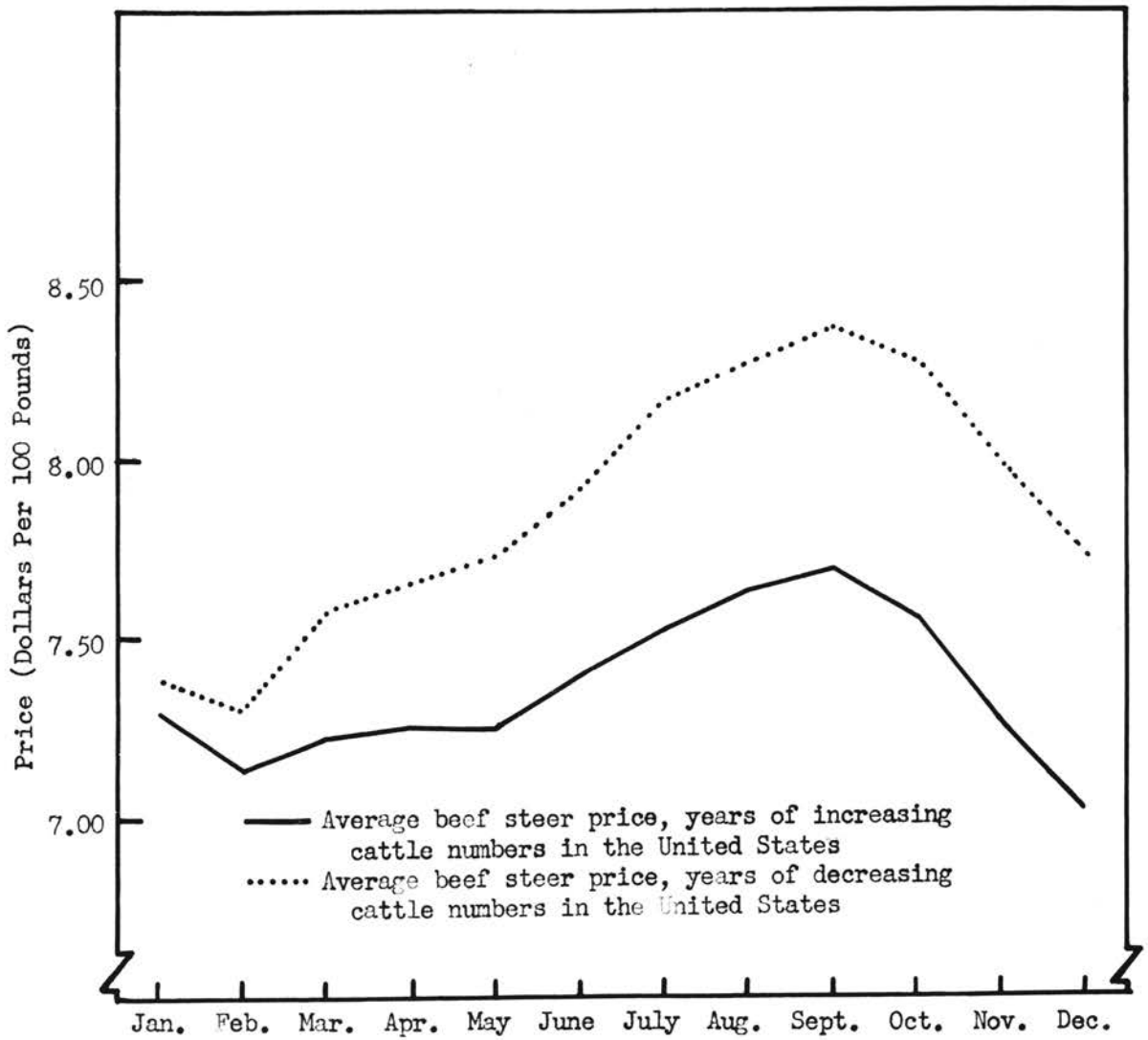
As explained in the analysis of the prices received by Oklahoma farmers, the influence of cattle numbers logically is associated with the prices of beef cattle. The same procedure was employed as in the former analysis, with the same limitations, to adjust the prices of beef steers at Chicago. The effect of cattle numbers on the average seasonal price pattern should logically be similar to that for prices received by farmers, that is, the price-depressing factor of increasing cattle numbers should intensify the seasonal decline and limit the seasonal rise while the price-strengthening factor of decreasing numbers should restrain the seasonal decline and stimulate the seasonal rise. The seasonal pattern for average adjusted

beef steer prices at Chicago during years of increasing numbers was greatly different from the seasonal pattern during years of decreasing numbers (Figure 27). During years of increasing numbers, the seasonal decline in February appeared to be sharpened while the seasonal rise from February to September was similarly curbed. The effect of the price-supporting factor of decreasing numbers tended to moderate the seasonal decline in February and to sharpen the seasonal rise from February to the peak in September.

It was suggested in an earlier section that the influence of the size of the feed crop on slaughter cattle prices might be different from one for stocker and feeder cattle prices. The logic expressed was that a large feed crop in the fall should tend to strengthen the prices of stocker and feeder cattle in the fall which should tend to depress slaughter cattle prices in the spring when the large numbers of finished animals are marketed. The comparison of the seasonal patterns of average adjusted beef steer prices during years of large feed crops and during years of small feed crops apparently illustrated this logic (Figure 28). During years of large feed crops the seasonal decline was considerably enhanced while the seasonal rise appeared to be restrained. The seasonal pattern under small feed crop conditions indicated that the seasonal decline was limited while the seasonal rise was accentuated.

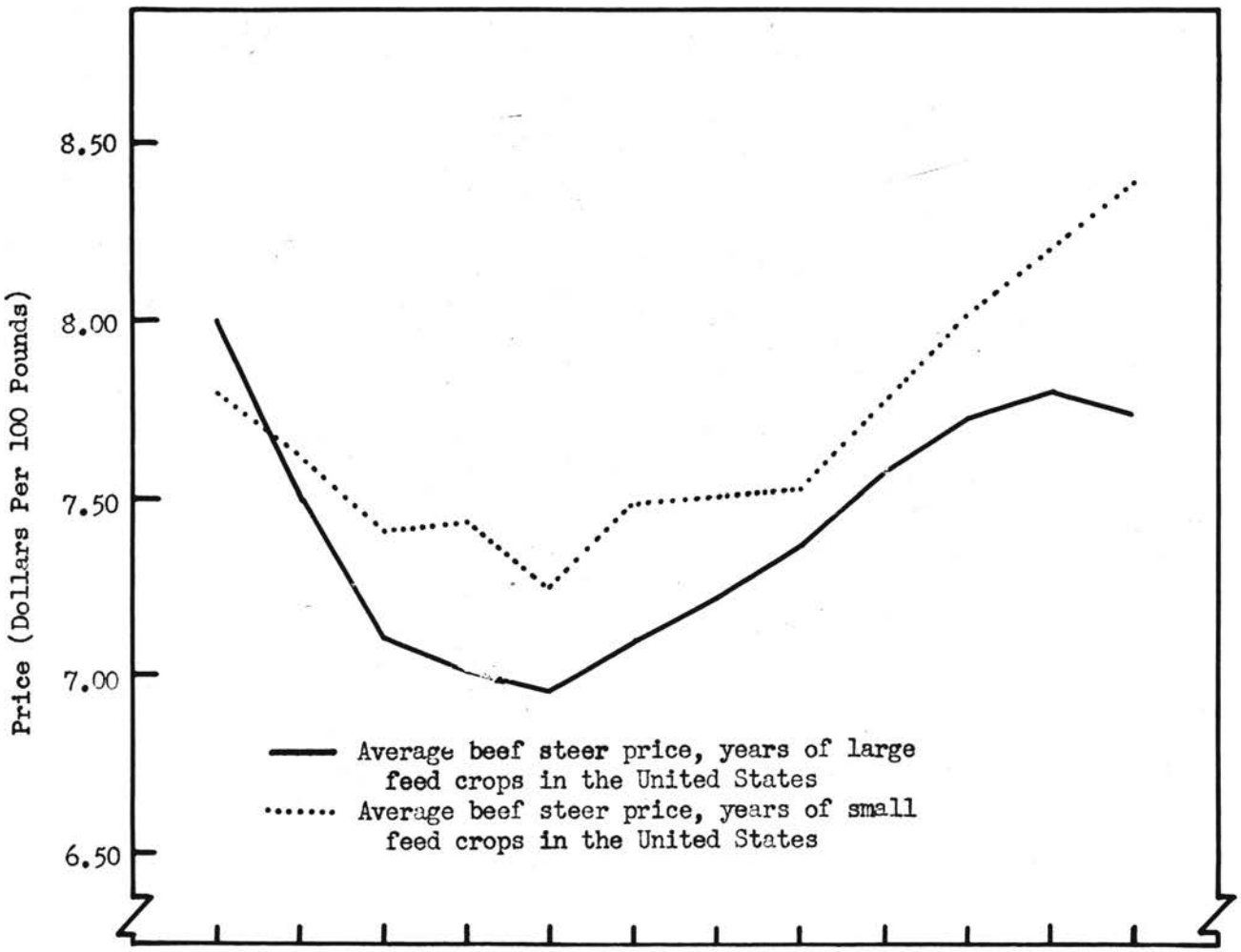
Kansas City Stocker and Feeder Steer Prices: The average seasonal price pattern for slaughter livestock representing one class of cattle on a given market has been analyzed. Since stocker and feeder cattle probably are the most important single classification of cattle to the Oklahoma producer, it was necessary to give some consideration to the average seasonal variation of prices for this classification of cattle. The analysis of the prices of stocker and feeder cattle was limited by the lack of sufficient data even for

FIGURE 27. AVERAGE SEASONAL VARIATION IN PRICES OF BEEF STEERS, CHICAGO: YEARS OF INCREASING CATTLE NUMBERS; YEARS OF DECREASING CATTLE NUMBERS, 1910-1941



SOURCE: See Table XXIX.

FIGURE 28. AVERAGE SEASONAL VARIATION IN PRICES OF BEEF STEERS, CHICAGO: YEARS OF LARGE FEED CROPS; YEARS OF SMALL FEED CROPS, 1910-1941



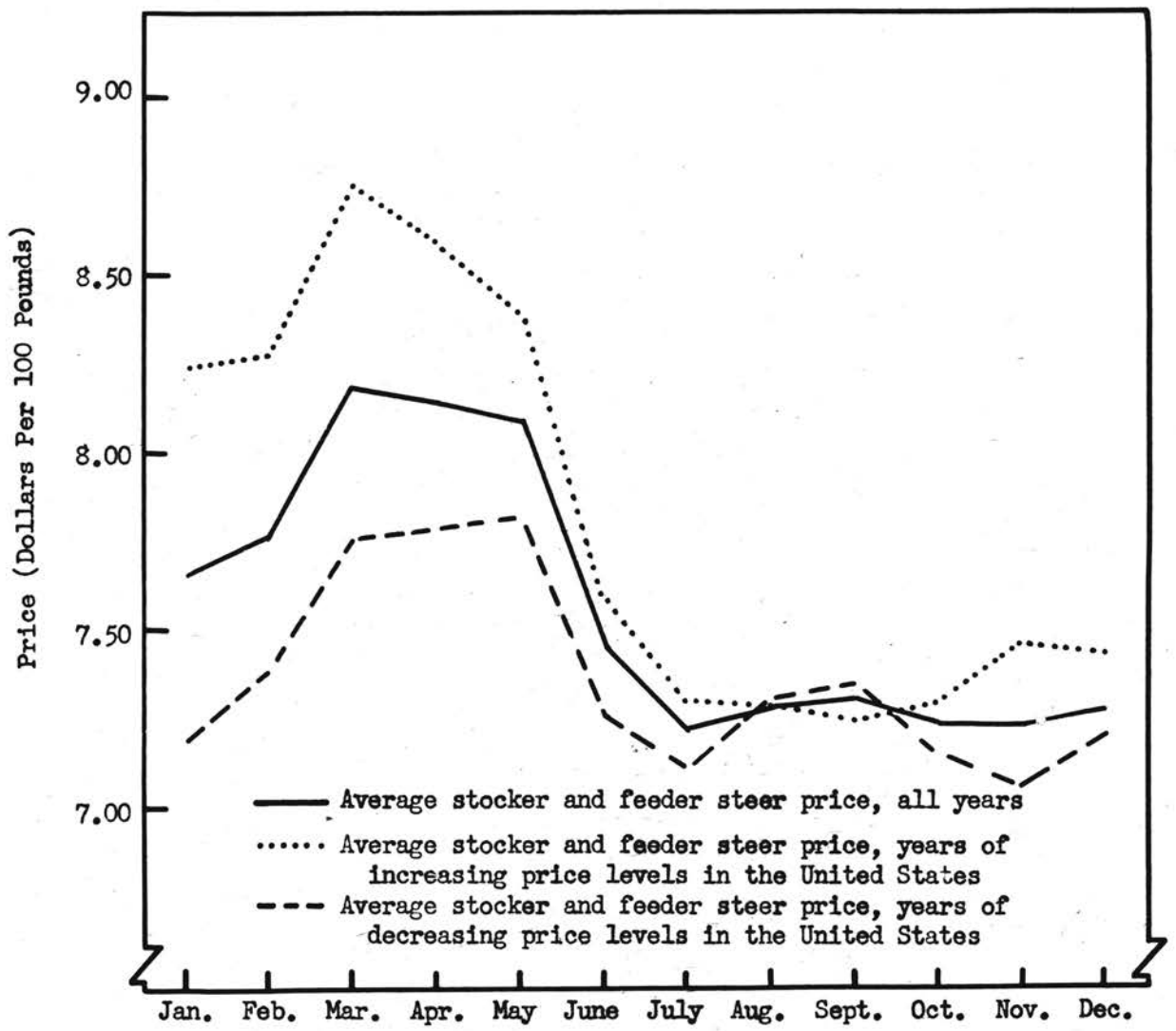
SOURCE: See Table XXIX.

Kansas City, the most significant stocker and feeder cattle market. The prices were available only as early as 1925 which left only the years 1925 through 1941 in the study. The seasonal price pattern based on the prices for the seventeen years would probably not allow sufficient time for the cancellation of factors and would be subject to greater unreliability because of the change occurrence of the effects of two or more factors.

The average seasonal price pattern for stocker and feeder cattle shipped from Kansas City, tended to be in inverse relationship with marketings of stocker and feeder cattle. In the spring months of March, April, and May, the supply of stocker cattle in the market was small relative to the demand for cattle to utilize pastures and the prices were seasonally high (Figure 29). The seasonal decline began in June and continued through October, November, and December with the exception of July. Heavy marketings of two-way, grass fat cattle were large in the fall and tended to depress the cattle prices to the trough in November.

As suggested before, the general price level has exhibited the tendency to drop suddenly and to rise gradually. Cattle prices, being partially dependent upon the general level of prices, tend to follow the same pattern. One-half the years included in the years of increasing price level from 1925 to 1941 were from 1933 through 1937, a period of depression and drought. Consequently, when the prices of stocker and feeder cattle were grouped into years of increasing price levels and into years of decreasing price levels the results were questionable. Logically, an increasing price level should exert a price-strengthening influence while a decreasing price level should exert a price-depressing influence on stocker and feeder cattle prices. There is some resemblance between this logic and the results obtained in the average seasonal prices of stocker and feeder cattle. With an increasing

FIGURE 29. AVERAGE SEASONAL VARIATION IN PRICES OF STOCKER AND FEEDER STEERS, KANSAS CITY: ALL YEARS; YEARS OF INCREASING PRICE LEVELS; YEARS OF DECREASING PRICE LEVELS, 1925-1941



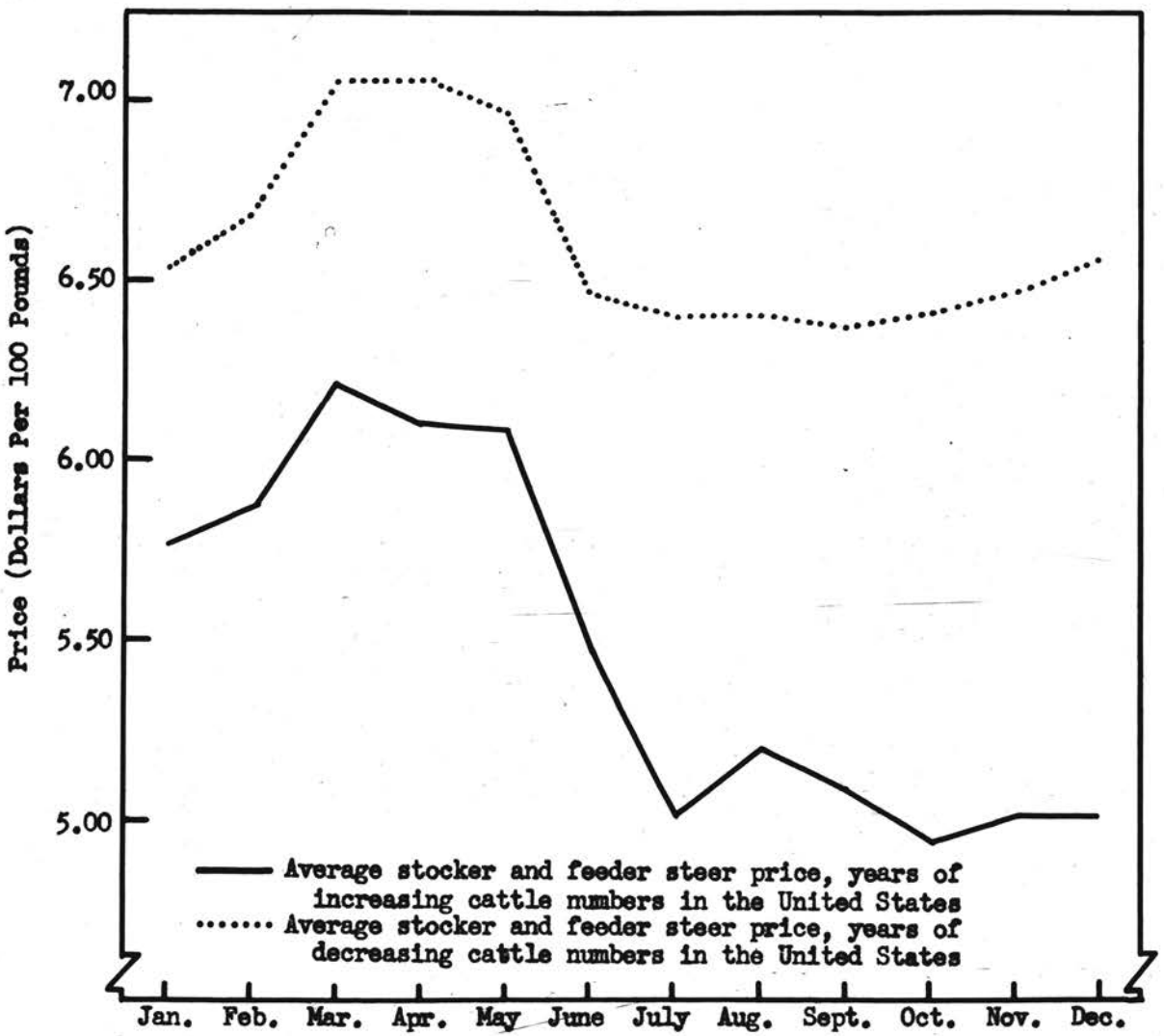
SOURCE: See Tables XXX and XXXII.

price level the seasonal rise to the peak in the spring months tended to be intensified while the seasonal decline in the fall months tended to be limited. With a decreasing price level the seasonal rise tended to be restricted while the seasonal decline tended to be stimulated (Figure 29).

The prices of stocker and feeder cattle were adjusted in the same manner as were the prices received by farmers in Oklahoma and the prices of beef steers sold at Chicago. The adjusted prices were combined into years of increasing numbers of all cattle on farms and years of decreasing numbers of all cattle on farms in the United States. The logical influence of numbers, like the effect under the former series tested, was that increasing numbers would exert a price-depressing effect while decreasing numbers would exert a price-strengthening effect on the adjusted prices of stocker and feeder steers. The validity of this logic was again apparently illustrated (Figure 30). During years of increasing numbers, the seasonal rise appears to be suppressed while the seasonal decline is considerably sharpened. Conversely, during years of decreasing numbers, the seasonal rise appears to be expanded while the seasonal decline is definitely curbed.

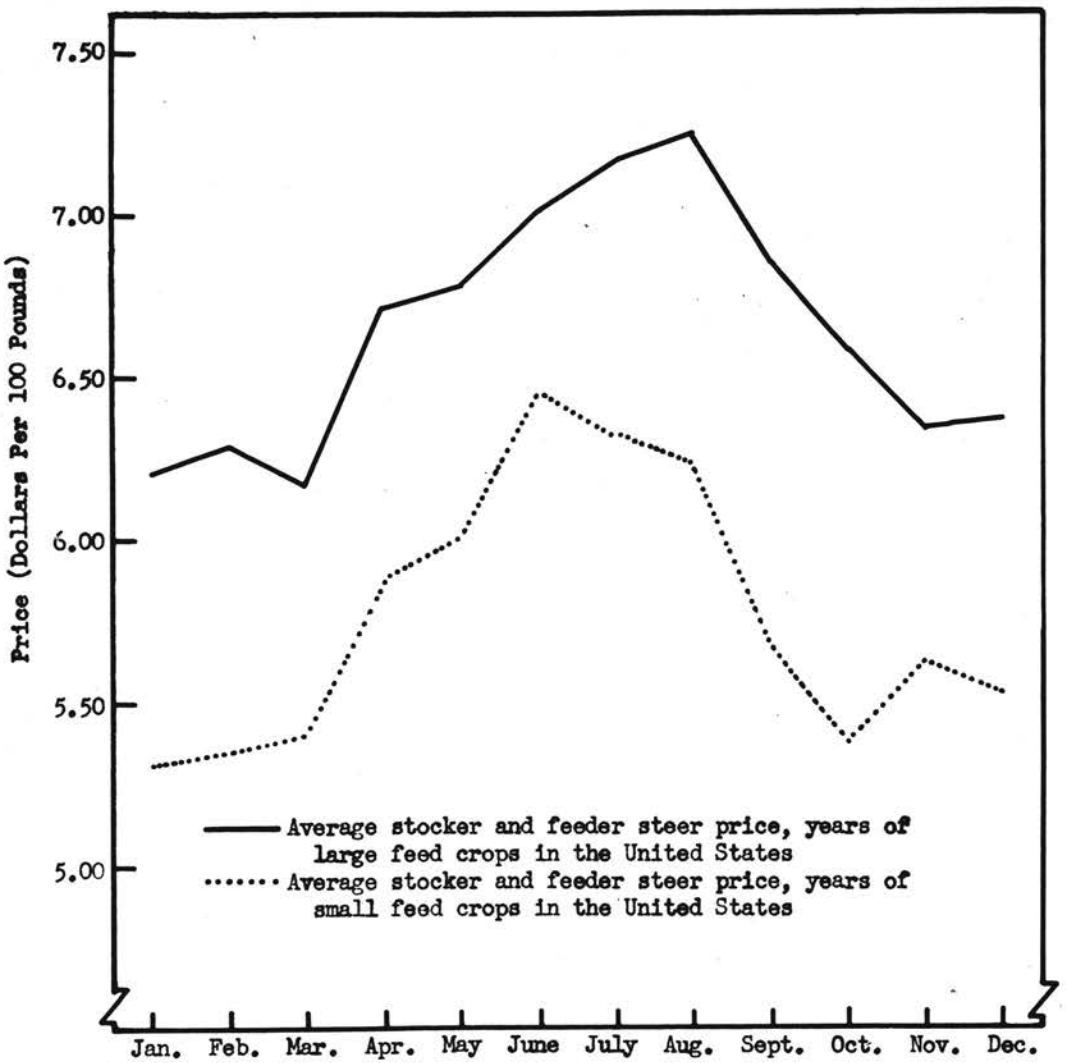
The effect of varying price levels and changing numbers on farms might be expected to be modified by the effect of the size of the feed crop. A large feed crop in the fall will increase the availability of feed for finishing livestock and logically should exert a price-strengthening influence on the prices of stocker and feeder cattle in the fall because of the heavy demand for feeder cattle. On the other hand, a small feed crop will decrease the amount of feed available for finishing livestock and logically should discourage the demand for feeder cattle to exert a price-depressing influence on the prices of stocker and feeder cattle. The results apparently failed to sustain the logic (Figure 31). Chance occurrence

FIGURE 30. AVERAGE SEASONAL VARIATION IN PRICES OF STOCKER AND FEEDER STEERS, KANSAS CITY: YEARS OF INCREASING CATTLE NUMBERS AND YEARS OF DECREASING CATTLE NUMBERS, 1925-1941



SOURCE: See Table XXXII.

FIGURE 31. AVERAGE SEASONAL VARIATION IN PRICES OF STOCKER AND FEEDER STEERS, KANSAS CITY: YEARS OF LARGE FEED CROPS; YEARS OF SMALL FEED CROPS, 1925-1941



SOURCE: See Table XXXII.

may have entered the analysis to obscure the logical relationships. The seasonal increase under large feed crop conditions did appear to be lengthened and accentuated more than under small feed crop conditions, although even this observation is open to question.

Application of the Findings: There are many factors involved in the relationships for each of the classifications of cattle studied. The net results probably are not entirely attributable to the simple relationships between changes in cattle numbers, variations in the price level, and changes in the size of the feed crops. However, if the strength of these factors is sufficiently strong to give a fairly constant directional variation from the average seasonal pattern then the grouping of years on these bases may be helpful in giving some indication of the kind of variation that may be expected under changing conditions from year to year in the future.

Although it is impossible to attribute to these influences their true net effect, these general conclusions are derived:

(1) The average seasonal prices received by farmers in Oklahoma increased from December through April and May, the peak months, decreased through August, increased slightly in September, and decreased through November, the trough month. This seasonal pattern tended to be in inverse relationship with the number of head of federally inspected slaughter.

(2) The average seasonal prices of beef steers sold out of first hands for slaughter at Chicago indicated a seasonal rise from the trough in February through September, the peak month, and thereafter declined. This movement was inversely related to the seasonal movement of marketings.

(3) The average seasonal prices of stocker and feeder cattle shipped from Kansas City indicated a peak in March, April, and May prices, a secondary trough in July prices, and a trough in October, November, and December prices. Again these prices were in inverse relationship with the seasonality of marketings.

(4) An increasing price level tended to exert a price-strengthening influence on the average seasonal price pattern for each class of livestock in the study. The seasonal rise tended to be accentuated while the seasonal decline tended to be limited. A decreasing price level, on the other hand, tended to exert a price-depressing influence. The seasonal rise tended to be curbed while the seasonal decline tended to be sharpened.

(5) Increasing numbers of all cattle on farms with a two year lag apparently indicated a price-depressing influence on each class of livestock under consideration. The seasonal rise appeared to be reduced while the seasonal decline appeared stimulated. Conversely, decreasing numbers apparently indicated a price-strengthening influence. The seasonal rise appeared intensified while the seasonal decline appeared limited.

(6) The influence of large and small feed crops was not so evident as the influence indicated for the other factors. For the price pattern of Beef steers sold at Chicago, large feed crops tended to stimulate the seasonal decline in the spring while small feed crops tended to restrain the seasonal decline in the spring. For the prices received by Oklahoma farmers for cattle and for the prices of stocker and feeder steers shipped from Kansas City, the influence of the size of the feed crop on the seasonal price patterns

apparently failed to substantiate the logical relationships that might be assumed to exist.

SUMMARY AND CONCLUSIONS

Earlier studies, which have been reviewed and which apparently accounted for the year to year changes in beef cattle prices, have been shown to be somewhat inapplicable to later price movements. In these studies, the combinations of factors which were used in the analysis did not always withstand the test of logic.

Extensive tests of logically related factors indicate that certain measures of general supply and demand conditions may be applied in accounting for changes in each of the different types of beef cattle price series. However, in the present study it was found to be necessary to select certain additional supply and demand indicators, applicable to the particular price series, to be used with the measures of general supply and demand conditions to account for the year to year changes in the prices of each of the various kinds of beef cattle. In the current analysis it was found that demand could not be fully represented by any single indicator. The use of multiple demand factors, one supply factor and one quality factor apparently accounted for the movements of prices representing the composite United States price series of beef cattle.

Changes in the prices received by United States farmers for beef cattle were reasonably well accounted for by the movements of the index of wholesale prices, the index of industrial production, the live weight of federally inspected slaughter, and the percentages of better beef sold at Chicago.

Changes in the prices representing the average costs of livestock slaughtered in the United States were apparently accounted for by the use of the same combination of factors that was used with prices received by United States farmers for beef cattle.

The addition of the number of beef steers sold for slaughter at Chicago, representing local supply conditions, to the above combination of factors was necessary to account for the movements of Chicago beef steer prices.

No combination of correlated factors satisfactorily accounted for the changes in stocker and feeder steer prices at Kansas City. However, the combination of factors which left the smallest unaccounted for variation included the index of wholesale prices, the index of industrial production, the live weight of federally inspected slaughter, the production of all grains, and the number of feeder steers shipped from Kansas City. There was no known estimate of the quality of stocker and feeder steers as was the case with the other price series.

The average patterns of seasonal variations were not duplicated in any particular year. When the effects of major factors which influence deviations from the average seasonal price patterns were isolated as nearly as possible, they provided some logical bases for subjective forecasts for the seasonal variation in prices for particular years in the future.

The average seasonal price pattern for prices received by farmers in Oklahoma for cattle indicated a peak in April and May, a secondary peak in September, and a trough in November. The average seasonal price pattern for the Chicago prices of beef steers indicated a trough in February rising to a peak in September. The average seasonal price pattern for Kansas City prices of stocker and feeder steers indicated a peak in the spring months of March, April, and May declining to a trough in the fall months. In general, these movements were in inverse relationship with the movements of marketings representing each price series.

Further analysis has indicated that an increasing price level may be expected to exert a price-strengthening influence emphasizing the seasonal increases and moderating the seasonal declines. Decreasing price levels may be expected to exert a price-depressing influence on each of the seasonal price patterns, reducing the seasonal rises and deepening the seasonal declines.

Increasing numbers of cattle on farms apparently exerted a price-depressing influence limiting the seasonal peaks and emphasizing the seasonal troughs. Decreasing numbers of cattle on farms apparently exerted a price-strengthening influence with the converse effect on each of the seasonal price patterns.

The influences of large and small feed crops on the seasonal price patterns were evident only for the prices of beef steers. In the spring, large feed crops were price-depressing factors while small feed crops were price-strengthening factors. The influences of the feed crops on the prices received by Oklahoma farmers and the prices of stocker and feeder steers at Kansas City were not apparent.

It is recognized that these factors cannot work in isolation and that, in their varying combinations, the effects of any factor may tend either to counteract or to supplement the effects of other factors. An attempt, therefore, was made to approximate the effects of the major factors in various combinations. However, the effectiveness of this refinement was limited by the fact that for the period covered by the study the numbers of years in many of the classifications were so small that the results were questionable. Since the influences of the separate factors are not <u>net</u> influences and since the changing effects of varying combinations of the factors cannot be determined objectively, therefore, the results of these seasonal analyses do not provide bases by which definitive forecasts of the future may be made. However, they may be used as bases for the subjective evaluation of the influences that may be expected for particular years in the future.

APPENDIX

STATISTICAL SIGNIFICANCE

The correlation coefficient is a measure of the change in the independent variable that is associated with changes in the dependent variable. It is a measure of the degree of association between two or more variables. The test of significance of the correlation coefficient as used here relates to the following. In the field of statistical theory, there have been set up tables of probability of occurrence at various levels for statistics computed from known population of items. The probability table for the correlation coefficient is based upon a known bivariate population in which there is zero correlation or association between two variables. Repeated sampling from this population will give various estimates of r, each being the best estimate available if it were the only sample. These estimates tend to center about the true relationship in such a manner that a curve can be drawn to represent these estimates. This curve can be rectified or transformed mathematically to a curve with an area of 1 within the limits of which all possible values fall.

The relative proportions or percentages of the items in the population falling within particular ranges form the probability curve.

The value for the one percent level of significance and the proper number of degrees of freedom means that a sample value or statistic as large or larger than this one percent population tabular value (lying outside the range minus 49½ percent to plus 49½ percent) would occur in only 1 out of 100 samples due to sampling variation. If the sample value does not at least equal the population tabular value for the level of significance selected then it is said to be statistically not different from zero.

Table IV. Moving Averages and Percentages of Trend of the Prices Received by Farmers for Cattle, Oklahoma, By Months, 1911

Year	Month	Farm Price	12 Month Moving Total	24 Month Moving Total	24 Month Moving Average	Percentage of Trend
		Dollars Per 100 Pounds				
1910	June	4.60				
	July	4.00				
	August	4.10				
	September	4.10				
	October	4.10				
	November	4.00				
	December	4.10	45.50			
1911	January	4.30	49.00	98.50	4.10	105
	February	4.20	48.50	97.50	4.06	103
	March	4.40	48.20	96.70	4.03	109
	April	4.30	47.80	96.00	4.00	108
	May	4.00	47.60	95.40	3.97	101
	June	3.90	47.30	94.90	3.95	99
	July	3.50	47.00	94.30	3.93	89
	August	3.60	47.10	94.10	3.92	92
	September	3.80	47.20	94.30	3.93	97
	October	3.70	47.60	94.80	3.95	94
	November	3.80	48.60	96.20	4.00	95
	December	3.80	49.50	98.10	4.09	93
1912	January	4.00				
	February	4.30				
	March	4.50				
	April	4.70				
	May	5.00				
	June	4.80				

SOURCE: Computed from prices in Trimble R. Hedges and K. D. Blood, Oklahoma Farm Price Statistics, 1910-1938 (Oklahoma Agricultural Experiment Station Bulletin, 238, 1939) p. 30.

Table V. Indicators of Demand and Price Level, United States, 1910-1941

Year	Index of Factory Employment 1/ Unadjusted (1939 = 100)	Index of Factory Payrolls 1/ Unadjusted (1939 = 100)	Index of Industrial Production 1/ Unadjusted (1935-39 = 100)	Total National Income 2/ 1,000,000 Dollars	Index of Wholesale Prices, 3/ All Commodities (1926 = 100)
1910					70.4
1911					64.9
1912					69.1
1913					69.8
1914					68.1
1915					69.5
1916					85.5
1917					117.5
1918	4/	4/	4/	4/	131.3
1919	103.8	103.2	72	68,108	138.6
1920	104.2	123.5	75	69,226	154.4
1921	79.8	79.7	58	51,857	97.6
1922	88.2	85.5	73	59,746	96.7
1923	101.0	108.4	88	69,546	100.6
1924	93.8	101.2	82	69,247	98.1
1925	97.1	106.6	90	73,630	103.5
1926	98.9	109.9	96	76,598	100.0
1927	96.8	107.9	95	76,105	95.4
1928	96.9	109.1	99	78,815	96.7
1929	103.1	117.1	110	83,326	95.3
1930	89.8	94.7	91	68,858	86.4
1931	75.8	71.8	75	54,479	73.0
1932	64.4	49.5	58	39,963	64.8
1933	71.3	53.1	69	43,322	65.9
1934	83.1	68.3	75	49,455	74.9
1935	88.7	78.6	87	55,719	80.0
1936	96.4	91.2	103	64,924	80.8
1937	105.8	108.8	113	71,513	86.3
1938	90.0	84.7	89	64,200	78.6
1939	100.0	100.0	109	70,829	77.1
1940	107.5	114.5	125	77,574	78.6
1941	132.1	167.5	162	96,857	87.3

1/ Board of Governors, Federal Reserve System, Federal Reserve Bulletin, April 1946 (Washington, D. C., April, 1946) p. 419.
2/ Philip M. Hauser and William R. Leonard, Government Statistics for Business Use (New York, John Wiley and Sons, Inc., 1946) p. 23.
3/ Bureau of the Census, United States Department of Commerce, Statistical Abstract of the United States, 1944-45 (Washington, D. C., 1945) p. 417.
4/ Previous data were not available.

Table VI. Average Prices of Hides, Chicago, 1921-1941

Year	Average Prices of Packer and Country Hides 1/ 2/	Average Prices of Heavy Native, Packer, Steer Hides 3/
	Dollars Per 100 Pounds	
1921	10.16	13.88
1922	13.51	17.83
1923	12.36	16.46
1924	12.30	14.67
1925	14.72	15.96
1926	11.97	14.08
1927	16.71	19.28
1928	20.87	23.85
1929	14.10	16.98
1930	10.96	13.87
1931	7.37	9.06
1932	4.61	6.04
1933	8.49	9.67
1934	7.69	9.92
1935	9.55	12.97
1936	10.98	13.77
1937	13.78	16.95
1938	9.26	11.61
1939	10.85	12.13
1940	11.45	12.50
1941	13.58	14.49

1/ Chicago Daily Drovers Journal, Drovers Journal Yearbook of Figures of the Livestock Trade, 1942 (Chicago, 1943) p. 94.

2/ Unweighted mean of packer and country yearly average prices.

3/ Production and Marketing Administration, United States Department of Agriculture, Livestock, Meats, and Wool Market Statistics and Related Data, 1945 (Washington, D. C., 1946) p. 59.

Table VII. Hogs: Estimated Numbers on Farms and Yearly Average Prices, United States and Oklahoma, 1910-1941

Year	United States		Oklahoma	
	Estimated Numbers on Farms, January 1 1/	Prices Received By Farmers 2/	Estimated Numbers on Farms, January 1 1/	Prices Received By Farmers 3/
	1,000 Head	Dollars Per 100 Pounds	1,000 Head	Dollars Per 100 Pounds
1910	48,072	8.14	1,550	7.97
1911	55,366	6.21	1,600	5.92
1912	55,394	6.73	1,230	6.66
1913	53,747	7.54	1,200	7.39
1914	52,853	7.52	1,300	7.25
1915	56,600	6.47	1,450	6.34
1916	60,596	8.37	1,480	8.23
1917	57,578	13.89	1,300	13.65
1918	62,931	16.14	1,390	15.60
1919	64,326	16.39	1,275	16.08
1920	60,159	12.92	1,304	12.33
1921	58,942	7.63	1,213	7.16
1922	59,849	8.40	1,334	7.85
1923	69,304	6.94	1,401	6.38
1924	66,576	7.34	1,175	6.77
1925	55,770	10.91	969	10.55
1926	52,105	11.79	936	11.59
1927	55,496	9.64	883	9.25
1928	61,873	8.54	1,104	8.07
1929	59,042	9.42	1,215	8.62
1930	55,705	8.84	1,053	8.08
1931	54,835	5.73	927	5.61
1932	59,301	3.34	1,205	3.22
1933	62,127	3.53	1,506	3.13
1934	58,621	4.14	1,180	3.72
1935	39,066	8.65	800	7.98
1936	42,975	9.37	824	8.69
1937	43,083	9.50	700	8.97
1938	44,525	7.74	763	7.35
1939	50,012	6.23	954	6.01
1940	61,165	5.39	1,225	5.15
1941	54,353	9.09	956	8.77

1/ Years 1910 through 1935 from Bureau of Agricultural Economics, United States Department of Agriculture, Livestock on Farms, January 1, 1867-1935 (Washington, D. C., 1938) pp. 26 and 112.
Years 1936 through 1939 from United States Department of Agriculture, Agricultural Statistics, 1942 (Washington, D. C., 1942) p. 396.
Years 1940 and 1941 from Bureau of Agricultural Economics, United States Department of Agriculture, Livestock and Poultry on Farms January 1, Numbers, Value Per Head, and Total Value, Revised Estimates, 1940-1945 (Washington, D. C., 1947) pp. 14 and 15.

2/ War Food Administration, United States Department of Agriculture, Livestock, Meats, and Wool Market Statistics and Related Data, 1943 (Washington, D. C., 1944) p. 69.

3/ Trimble R. Hedges and K. D. Blood, Oklahoma Farm Price Statistics, 1910-1938 (Oklahoma Agricultural Experiment Station Bulletin 238, 1939) p. 34; Subsequent data from Agricultural Marketing Service, United States Department of Agriculture, Mid-Month Local Price Reports (Washington, D. C., various issues).

Table VIII. Meats: Per Capita Consumption of Beef, Pork, and Total Meats, United States, 1910-1941

Year	Beef	Pork Excluding Lard	Total Meats
		Pounds	
1910	70.4	62.3	146.4
1911	68.5	69.1	152.0
1912	64.5	66.7	145.8
1913	63.3	66.9	143.7
1914	62.0	65.1	140.0
1915	56.4	66.5	134.9
1916	58.9	69.0	140.2
1917	64.7	58.9	135.3
1918	68.5	61.1	141.7
1919	61.5	63.9	138.9
1920	59.1	63.6	136.1
1921	55.5	64.8	134.0
1922	59.1	65.8	137.8
1923	59.6	74.2	147.3
1924	59.5	74.0	147.3
1925	59.4	66.8	140.0
1926	60.3	64.1	138.0
1927	54.5	67.7	134.8
1928	48.7	70.9	131.6
1929	49.7	69.7	131.3
1930	48.7	66.6	128.3
1931	48.3	68.0	130.0
1932	46.4	70.3	130.3
1933	51.2	69.6	134.6
1934 1/	64.9	65.0	146.0
1935 1/	53.0	48.1	115.9
1936	57.8	54.8	127.5
1937	54.8	55.4	125.4
1938	54.0	57.8	126.3
1939	54.4	64.3	132.8
1940	54.7	72.4	141.0
1941	60.5	66.5	141.4

SOURCE: United States Department of Agriculture, Agricultural Statistics, 1944 (Washington, D. C., 1945) p. 330.

1/ Includes beef, veal and mutton from animals slaughtered for government account in 1934 and 1935.

Table IX. Exports, Imports, and Net Exports of Beef and Cattle, United States, 1910-1941

Year	Exports 1/	Imports 2/	Net Exports of Beef and Cattle Dressed Weight Equivalent
	1,000 Pounds	1,000 Pounds	1,000,000 Pounds
1910	93,620	382	174
1911	64,378	1,032	124
1912	40,059	4,229	- 3
1913	33,125	180,137	-186
1914	277,559	184,491	-368
1915	320,133	71,102	244
1916	322,767	15,217	225
1917	521,844	24,452	330
1918	485,731	163,805	471
1919	217,079	43,870	191
1920 1/	139,186	54,161	81
1921	41,009	32,698	90
1922	32,672	37,375	31
1923	28,161	25,727	33
1924	26,051	25,307	30
1925	26,463	24,506	39
1926	24,777	44,510	- 47
1927	19,358	86,956	-192
1928	13,316	110,418	-261
1929	16,349	130,658	-292
1930	19,234	75,501	-123
1931	16,583	23,129	- 12
1932	12,504	26,366	- 50
1933	16,834	42,342	- 74
1934	21,884	47,860	- 67
1935	12,609	86,491	-254
1936	14,392	94,066	-297
1937	12,666	94,725	-328
1938	13,988	81,893	-270
1939	15,163	90,557	-385
1940	16,654	75,452	
1941	28,359	145,790	

SOURCE: Preston Richards, Trends in Production and Foreign Trade for Meats and Livestock in the United States (Washington, D. C., United States Department of Agriculture Technical Bulletin, 764, 1941) pp. 53 and 57.

1/ Change from year beginning in July to the calendar year.

Table X. All Cattle: Estimated Numbers on Farms, Values and Adjusted Values, January 1, United States, 1910-1941

Year	Numbers on Farms	Values	Adjusted Values 1/
	1,000 Head	Dollars Per Head	Dollars Per Head
1910	58,993	24.54	34.86
1911	57,225	27.22	41.94
1912	55,675	27.68	40.06
1913	56,592	33.07	47.38
1914	59,461	38.97	57.22
1915	63,849	40.67	58.52
1916	67,438	40.10	46.90
1917	70,979	43.34	36.89
1918	73,040	50.01	38.09
1919	72,094	54.65	39.43
1920	70,400	52.64	34.09
1921	68,714	39.07	40.03
1922	68,795	30.39	31.43
1923	67,546	31.66	31.47
1924	65,996	32.11	32.73
1925	63,373	31.72	30.65
1926	60,576	36.80	36.80
1927	58,178	39.98	41.91
1928	57,322	50.63	52.36
1929	58,877	58.47	61.35
1930	61,003	56.36	65.23
1931	63,030	38.99	53.41
1932	65,801	26.39	40.73
1933	70,280	19.74	29.95
1934	74,369	17.78	23.74
1935	68,846	20.20	25.25
1936	67,847	34.06	42.15
1937	66,098	34.06	39.47
1938	65,249	36.58	46.54
1939	66,029	38.44	49.86
1940	68,309	40.60	51.65
1941	71,755	43.20	49.48

SOURCES: Years 1910 through 1935 from Bureau of Agricultural Economics, United States Department of Agriculture, Livestock On Farms January 1, 1867-1935 (Washington, D. C., 1938) p. 27.

Years 1936 through 1939 from United States Department of Agriculture, Agricultural Statistics, 1941 (Washington, D. C., 1941) p. 340.

Years 1940 and 1941 from Bureau of Agricultural Economics, United States Department of Agriculture, Livestock and Poultry on Farms January 1, Number, Value Per Head, and Total Value, Revised Estimates, 1940-1945 (Washington, D. C., 1947) p. 6.

1/ Adjusted by index of wholesale prices.

Table XI. All Cattle: Estimated Numbers on Farms, Values and Adjusted Values, January 1, Oklahoma, 1910-1941

Year	Numbers on Farms	Values	Adjusted Values 1/
	1,000 Head	Dollars Per Head	Dollars Per Head
1910	1,797	22.50	31.96
1911	1,725	25.90	39.91
1912	1,673	25.70	37.19
1913	1,606	32.40	46.42
1914	1,702	38.40	56.39
1915	1,736	40.30	57.99
1916	1,844	42.70	49.94
1917	2,205	44.00	37.45
1918	2,535	49.20	37.47
1919	2,360	49.90	36.00
1920	2,074	42.10	27.27
1921	2,000	29.60	30.33
1922	2,050	22.10	22.85
1923	1,900	20.40	20.28
1924	1,750	18.60	18.96
1925	1,695	21.10	20.39
1926	1,627	25.40	25.40
1927	1,695	30.90	32.39
1928	1,729	39.70	41.05
1929	1,814	45.00	47.22
1930	1,915	41.00	47.45
1931	2,020	25.40	34.79
1932	2,200	18.80	29.01
1933	2,470	14.10	21.40
1934	2,750	11.10	14.82
1935	2,633	12.70	15.88
1936	2,422	22.90	28.34
1937	2,252	21.60	25.03
1938	2,160	26.30	33.46
1939	2,236	30.00	38.91
1940	2,370	31.10	39.57
1941	2,512	33.50	38.37

SOURCES: Years 1910 through 1935 from Bureau of Agricultural Economics, United States Department of Agriculture, Livestock on Farms January 1, 1867-1935 (Washington, D. C., 1938) p. 113.
Years 1936 through 1939 from United States Department of Agriculture, Agricultural Statistics, 1941 (Washington, D. C., 1941) p. 340.
Years 1940 and 1941 from Bureau of Agricultural Economics, United States Department of Agriculture, Livestock and Poultry on Farms January 1, Number, Value Per Head, and Total Value, Revised Estimates, 1940-1945 (Washington, D. C., 1947) p. 6.

1/ Adjusted by index of wholesale prices.

Table XII. Cattle: Number of Cattle, Other Than Milk Cows, on Farms, January 1, Average Prices Received By Farmers for Beef Cattle, and Average Cost of Livestock Slaughtered, United States, 1910-1941

Year	Number of Cattle Other Than Milk Cows, on Farms 1/	Prices Received By Farmers For Beef Cattle 2/	Average Cost of Livestock Slaughtered 3/ (Live Weight Basis)
	1,000 Head	Dollars Per 100 Pounds	Dollars Per 100 Pounds
1910	39,543	4.86	
1911	37,803	4.57	
1912	36,158	5.43	
1913	37,012	6.20	
1914	39,640	6.52	
1915	43,579	6.26	
1916	46,686	6.76	
1917	49,767	8.54	
1918	51,504	9.88	
1919	50,549	9.97	
1920	48,945	8.71	4/
1921	47,258	5.63	6.65
1922	46,944	5.73	6.58
1923	45,408	5.84	6.85
1924	43,665	5.84	6.64
1925	40,798	6.53	7.12
1926	38,166	6.75	7.32
1927	35,927	7.62	8.63
1928	35,091	9.52	10.59
1929	36,437	9.47	10.59
1930	37,971	7.71	8.54
1931	39,210	5.53	6.23
1932	40,905	4.25	4.94
1933	44,344	3.75	4.14
1934	47,438	4.13	4.55
1935	42,764	6.04	6.54
1936	42,651	5.82	6.26
1937	41,449	7.00	7.42
1938	40,783	6.54	7.06
1939	41,429	7.14	7.67
1940	43,271	7.55	7.95
1941	45,983	8.80	9.14
Mean	42,500	6.72	

1/ United States Department of Agriculture, Agricultural Statistics 1942 (Washington, D. C., 1942) p. 369.

2/ War Food Administration, United States Department of Agriculture, Livestock, Meats, and Wool Market Statistics and Related Data 1943 (Washington, D. C., 1944) p. 68.

3/ Ibid., p. 85.

4/ Previous data were not available.

Table XIII. Stocker and Feeder Cattle: Numbers of Inspected Feeder Cattle, and Average Prices of All Grades and Weights of Stocker and Feeder Steers, Shipped From Kansas City, 1925-1941

Year	Numbers of Inspected Feeder Cattle	Average Prices of Stocker and Feeder Steers
	1,000 Head	Dollars Per 100 Pounds
1925	825	7.03
1926	706	7.43
1927	671	8.87
1928	684	11.27
1929	680	10.45
1930	650	8.17
1931	635	5.89
1932	595	4.88
1933	504	4.14
1934	511	4.07
1935	608	6.88
1936	460	6.39
1937	516	7.72
1938	498	7.54
1939	598	8.09
1940	539	8.53
1941	510	9.93

SOURCE: United States Department of Agriculture, Livestock, Meats, and Wool Market Statistics and Related Data, 1935 through 1941 (Washington D. C., 1936 through 1942).

Table XIV. Beef Steers: Total Numbers Sold and Percentage That Numbers Sold of Each Grade is of Total Marketings, Chicago, 1922-1941 1/

Year	Number Sold All Grades	Percentage Number Sold of Each Grade is of Total Number Sold				
		Choice and Prime	Choice and Prime Plus Good	Good	Medium	Common
	Number	Percent				
1922	1,310,570	13.1	45.9	32.8	41.3	12.8
1923	1,393,081	9.8	40.2	30.4	46.1	13.7
1924	1,331,318	10.8	38.2	27.4	50.0	11.8
1925	1,220,363	13.0	49.2	36.2	43.0	7.8
1926	1,414,055	15.4	50.5	35.1	40.4	9.1
1927	1,246,962	11.3	60.5	49.2	34.4	5.1
1928	1,038,332	16.8	60.6	43.8	32.8	6.6
1929	1,078,909	13.3	63.7	50.4	28.8	7.5
1930	1,081,058	13.7	55.3	41.6	33.8	10.9
1931	1,111,466	12.1	56.6	44.5	33.0	10.4
1932	987,306	13.5	51.1	37.6	35.6	13.3
1933	996,771	19.2	67.3	48.1	23.6	9.1
1934	1,002,308	23.6	72.7	49.1	19.2	8.1
1935	707,674	14.1	65.9	51.8	25.3	8.8
1936	897,827	29.1	67.5	38.4	24.9	7.6
1937	727,270	18.3	65.5	47.2	26.1	8.4
1938	878,740	31.3	77.7	46.4	19.0	3.3
1939	899,166	28.4	75.0	46.6	21.4	3.6
1940	923,747	26.7	72.3	45.6	24.0	3.7
1941	987,254	30.8	75.5	44.7	22.2	2.3

SOURCE: War Food Administration, United States Department of Agriculture, Livestock, Meats, and Wool Market Statistics and Related Data, 1943 (Washington, D. C., 1944) pp. 53 and 56.

1/ Sold out of first hands for slaughter.

Table XV. Cattle: Estimated Total Slaughter and Federally Inspected Slaughter, United States, 1910-1941

Year	Total Slaughter 1/	Federally Inspected Slaughter 2/	Federally Inspected Slaughter Live Weight Basis
	1,000 Head	1,000 Head	1,000,000,000 Pounds
1910	14,140	7,808	
1911	13,817	7,619	
1912	13,386	7,253	
1913	12,939	6,978	
1914	12,676	6,757	
1915	12,901	7,153	
1916	13,793	8,310	
1917	15,741	10,350	
1918	17,093	11,829	
1919	15,027	10,091	
1920	13,470	8,609	3/
1921	12,428	7,608	7.60
1922	13,706	8,678	8.52
1923	14,283	9,163	8.73
1924	14,750	9,593	9.11
1925	14,704	9,853	9.40
1926	14,766	10,180	9.81
1927	13,413	9,520	9.00
1928	12,028	8,467	8.03
1929	12,038	8,324	7.95
1930	12,056	8,170	7.81
1931	12,096	8,108	7.77
1932	11,980	7,625	7.19
1933	13,107	8,655	8.26
1934	15,071	9,943	9.23
1935	14,566	9,666	8.79
1936	15,897	10,972	10.10
1937	15,254	10,070	9.05
1938	14,822	9,776	9.00
1939	14,621	9,446	8.91
1940	14,971	9,756	9.17
1941	16,433	10,946	10.52

SOURCE: Production and Marketing Administration, United States Department of Agriculture, Livestock, Meats, and Wool Market Statistics and Related Data, 1945 (Washington, D. C., 1946) p. 25.

1/ Total slaughter estimated by the Bureau of Agricultural Economics, includes inspected, non-inspected, retail, and farm slaughter.

2/ Rounded figures added for all totals, except calendar years.

3/ Previous data were not available.

Table XVI. Feeds: Annual Production, and Seasonal Average Price Received By Farmers, of Principal Feeds, United States, 1910-1941

Year	All Grains: Production 1/	All Grains: Index of Prices 2/ (1909-14 = 100)	Corn: Production 1/	Corn: Average Price 3/	Oats: Production 1/	Oats: Average Price 4/	Hay: Production 5/	Hay: Average Price 6/ 7/
	1,000 Tons		1,000,000 Bushels	Cents Per Bushel	1,000,000 Bushels	Cents Per Bushel	1,000 Tons	Dollars Per Ton
1910		104	2,853	51.6	1,106	35.6	75,184	11.70
1911		96	2,475	68.0	886	44.9	64,574	14.10
1912		106	2,948	55.3	1,353	33.7	86,066	10.80
1913		92	2,273	70.4	1,039	38.6	77,022	11.40
1914		102	2,524	70.8	1,066	43.9	82,605	10.60
1915		120	2,829	68.0	1,435	38.3	91,436	10.30
1916		126	2,425	116.6	1,139	48.7	98,633	11.10
1917		217	2,908	145.9	1,443	70.1	85,024	16.50
1918	8/	227	2,441	152.2	1,429	68.5	82,288	19.60
1919	97,988	233	2,679	151.3	1,107	76.7	92,487	20.90
1920	115,719	232	3,071	61.8	1,444	53.8	91,668	16.50
1921	103,955	112	2,928	52.3	1,045	32.2	84,821	11.60
1922	99,276	106	2,707	74.5	1,148	37.4	95,152	11.60
1923	105,733	113	2,875	82.5	1,227	40.7	89,418	13.10
1924	90,640	129	2,223	106.1	1,416	47.8	91,454	12.70
1925	107,105	157	2,798	69.9	1,405	38.9	78,832	12.80
1926	95,784	131	2,547	74.5	1,153	40.0	76,025	13.30
1927	98,815	128	2,616	85.0	1,093	47.1	98,151	10.30
1928	105,733	130	2,666	84.0	1,313	40.7	83,842	11.30
1929	96,387	120	2,516	79.9	1,113	41.8	87,357	10.90
1930	86,928	100	2,080	59.6	1,275	32.2	74,527	11.10
1931	96,935	63	2,576	32.0	1,124	21.3	75,203	8.73
1932	111,159	44	2,930	31.9	1,251	15.7	83,721	6.20
1933	84,105	62	2,398	52.2	733	33.5	75,072	8.09
1934	52,633	93	1,449	81.5	542	48.0	60,485	13.20
1935	92,287	103	2,299	65.5	1,195	26.3	90,389	7.52
1936	59,234	108	1,506	104.4	786	44.9	70,040	11.16
1937	100,115	126	2,643	51.8	1,162	30.1	83,035	8.74
1938	96,836	74	2,549	48.7	1,068	23.7	91,465	6.78
1939	95,756	72	2,581	56.7	936	31.1	86,305	7.94
1940	98,615	85	2,462	61.8	1,246	30.3	94,767	7.58
1941		96		75.1		38.7		9.67
Mean	95,073		2,542		1,151		83,777	
Mean		119		76.3		40.5		11.49

1/ Bureau of Agricultural Economics, United States Department of Agriculture, Feed Statistics (Washington, D. C., October 1946) p. 8.
2/ United States Department of Agriculture, Agricultural Statistics, 1942 (Washington, D. C., 1942) p. 648.
3/ Ibid., p. 54.
4/ Ibid., p. 70.
5/ Bureau of Agricultural Economics, United States Department of Agriculture, op. cit., p. 43.
6/ Ibid., p. 49.
7/ Weighted by production.
8/ Previous data were not available.

Table XVII. Feeds: Quantities of Principal Feeds, Used By Cattle, Other Than Milk Cows, On Farms January 1 United States, 1910-1941

Year	Quantity of All Grains	Quantity of Corn (Including Silage)	Quantity of Oats	Quantity of Hay
	1,000 Tons	1,000 Tons	1,000 Tons	1,000 Tons
1910	11,152	8,116	2,563	21,397
1911	11,899	8,819	2,600	13,056
1912	11,540	8,508	2,560	12,875
1913	12,170	8,759	3,043	15,567
1914	8,857	6,128	2,539	16,693
1915	9,744	7,019	2,236	19,326
1916	11,316	8,382	2,602	25,718
1917	10,636	7,728	2,525	28,086
1918	12,338	9,278	2,710	22,076
1919	10,684	7,961	2,171	21,795
1920	10,720	7,734	2,455	24,252
1921	11,715	8,506	2,629	23,089
1922	10,694	8,005	2,224	27,224
1923	11,270	8,524	2,268	27,396
1924	11,078	8,413	2,294	26,149
1925	9,827	7,077	2,532	23,914
1926	11,428	8,318	2,582	20,516
1927	10,612	7,599	2,303	21,087
1928	11,242	8,422	2,460	26,748
1929	10,650	7,770	2,506	26,735
1930	10,132	7,539	2,233	24,366
1931	9,638	7,089	2,078	19,736
1932	11,048	8,040	2,316	19,640
1933	11,424	8,690	2,096	22,315
1934	8,031	6,232	1,011	20,254
1935	8,334	5,997	1,531	17,515
1936	10,749	7,671	2,235	23,363
1937	8,615	6,035	1,629	21,745
1938	11,233	8,519	2,108	23,235
1939	11,376	8,319	2,169	29,443
1940	11,557	8,533	2,158	31,917
1941	12,714	9,014	2,500	33,752
Mean	10,750	7,891	2,306	22,841
Mean (Excluding 1910)	10,623 1/	7,884	2,297	22,887

SOURCE: R. D. Jennings, Feed Consumption by Livestock, 1910-1941, Relations Between Feed, Livestock, and Food at the National Level (Washington, D. C., United States Department of Agriculture Circular, 670, 1943) p. 25.

1/ Includes only 1920 through 1941.

Table XVIII. Total Correlations of Feed Relationships, United States, 1910-1941

X	Y	Sx^2	Sxy	Sy^2	b	s_b	r	sy.x
All Grain Production 1/	All Grain Used 2/	452,866.37	27,894.36	2,811.86	0.062	0.011	0.77**	7.39
Corn Production	Corn Used	40,868.84	7,784.97	2,414.19	0.190	0.028	0.78**	5.67
Oats Production	Oats Used	14,597.87	1,780.06	438.97	0.122	0.023	0.70**	2.77
Hay Production	Hay Used	264,213.42	100,474.10	73,081.48	0.380	0.067	0.72**	34.68
Other Cattle Numbers 3/	All Grain Used	64,838.00	526.00	3,992.00	0.008	0.045	0.03	11.53
Other Cattle Numbers	Corn Used	64,838.00	976.00	2,418.72	0.015	0.035	0.08	8.95
Other Cattle Numbers	Oats Used	64,838.00	901.00	447.88	0.014	0.015	0.17	3.81
Other Cattle Numbers	Hay Used	64,838.00	24,674.00	73,295.72	0.381	0.181	0.36*	46.15
Cattle Prices	All Grain Used	88.66	107.03	3,992.00	1.207	1.205	0.18	11.35
Cattle Prices	Corn Used	88.66	66.51	2,418.72	0.750	0.944	0.14	8.89
Cattle Prices	Oats Used	88.66	54.84	447.88	0.619	0.395	0.28	3.71
Cattle Prices	Hay Used	88.66	1,153.23	73,295.72	13.008	4.682	0.45**	44.08
All Grain Prices 4/	All Grain Used	70,560.97	554.50	3,992.00	0.008	0.043	0.03	11.53
Corn Prices	Corn Used	28,700.80	1,558.52	2,418.72	0.054	0.052	0.19	8.82
Oats Prices	Oats Used	5,469.12	331.35	447.88	0.061	0.051	0.21	3.78
Hay Prices	Hay Used	352.16	- 172.80	73,295.72	-0.491	2.632	0.03	49.40
Cattle Prices 5/	All Grain Prices	88.66	1,682.91	70,560.97	18.982	3.810	0.67**	35.88
Cattle Prices	Corn Prices	88.66	879.96	28,700.80	9.925	2.740	0.55**	25.80
Cattle Prices	Oats Prices	88.66	379.32	5,469.12	4.279	1.203	0.54**	11.32
Cattle Prices	Hay Prices	88.66	81.00	352.16	0.914	0.323	0.46**	3.04
Other Cattle Numbers 6/	All Grain Prices	64,838.00	36,047.00	70,560.97	0.556	0.161	0.53**	41.04
Other Cattle Numbers	Corn Prices	64,838.00	23,198.90	28,700.80	0.358	0.122	0.54**	26.08
Other Cattle Numbers	Oats Prices	64,838.00	10,165.70	5,469.12	0.157	0.045	0.54**	11.37
Other Cattle Numbers	Hay Prices	64,838.00	2,460.46	352.16	0.038	0.012	0.51**	2.94

SOURCE: Computed from Tables XII, XVI, and XVII.

1/ Feed Production represents the annual production of the particular feed in the United States.

2/ Feed Used represents the quantity of the particular feed used by cattle, other than for milk, on farms, January 1, United States.

3/ Other Cattle Numbers represent the numbers of cattle, other than for milk, on farms, January 1, United States.

4/ Feed Prices represents the average yearly prices received by farmers for the particular feed, United States.

5/ Cattle Prices represent the average yearly prices received by farmers for beef cattle, United States.

Table XIX. Cattle: Monthly Percentages of Trend of Prices Received By Farmers, Oklahoma, 1911-1941

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1911	105	103	109	108	101	99	89	92	97	94	95	93
1912	96	101	104	107	102	105	97	99	95	96	92	96
1913	95	103	106	110	109	105	101	93	95	96	96	102
1914	98	105	106	105	103	98	98	100	101	96	100	101
1915	101	95	96	98	102	99	115	101	98	100	96	93
1916	93	94	101	104	110	109	101	96	96	92	95	92
1917	98	103	102	110	105	108	97	99	95	98	91	104
1918	100	93	100	103	113	109	100	96	100	96	92	94
1919	100	105	108	109	109	98	99	106	95	93	96	94
1920	103	97	97	108	105	110	109	102	98	104	92	89
1921	95	96	100	106	111	99	102	91	87	90	91	91
1922	91	98	108	108	116	109	104	97	95	93	94	93
1923	98	101	103	115	102	104	100	93	100	94	84	102
1924	105	102	100	108	103	100	95	98	96	91	90	93
1925	94	104	120	114	108	100	93	91	93	97	101	98
1926	99	108	105	96	99	104	100	105	99	97	99	98
1927	96	95	101	102	104	98	94	97	96	92	95	102
1928	101	112	106	102	102	97	98	106	109	103	93	92
1929	96	98	97	107	110	107	103	100	96	99	96	94
1930	100	106	110	110	111	110	95	79	87	94	95	98
1931	103	103	103	110	109	96	99	93	92	92	101	101
1932	98	96	100	101	94	91	117	107	108	97	96	86
1933	88	91	97	106	117	112	104	99	93	97	94	88
1934	94	104	105	104	110	97	92	88	101	87	78	76
1935	97	114	116	117	119	103	98	101	94	98	94	96
1936	102	108	104	108	101	104	94	89	96	97	95	101
1937	100	96	104	101	105	101	105	109	107	103	100	92
1938	91	94	100	103	100	99	100	97	99	96	97	98
1939	100	103	109	107	104	97	95	90	103	101	101	100
1940	100	99	101	103	104	100	98	95	97	97	96	95
1941	103	102	100	104	98	101	100	102	104	100	93	97
Mean	98.06	100.94	103.81	106.26	106.00	102.23	99.74	97.13	97.48	96.13	94.45	95.13
Average Seasonal	93.3	101.2	104.0	106.5	106.2	102.5	100.0	97.3	97.7	96.3	94.7	95.3
s 1/	4.2	5.6	5.4	4.6	5.8	5.2	6.0	6.5	5.1	3.9	4.8	5.8

SOURCE: Computed from Table XXIV.

1/ Index of irregularity.

Table XX. Monthly Percentages of Trend of Numbers of Head of Federally Inspected Slaughter of Cattle, United States, 1911-1941

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1911	97	83	87	78	94	97	93	113	109	130	117	96
1912	108	83	92	86	93	85	84	106	108	136	117	104
1913	104	82	81	93	93	95	102	101	113	122	106	105
1914	105	91	87	86	86	88	90	93	116	131	115	118
1915	98	79	93	85	90	96	100	98	105	121	115	111
1916	101	81	94	73	84	94	80	104	110	129	130	110
1917	105	83	80	79	97	99	91	99	108	132	120	110
1918	97	84	87	95	81	85	103	99	115	129	129	123
1919	120	76	71	71	83	76	103	106	105	132	128	119
1920	104	80	88	83	84	90	93	98	119	122	125	98
1921	102	78	93	90	88	100	92	108	108	118	107	90
1922	97	85	100	86	100	101	96	104	108	119	115	104
1923	99	84	91	91	99	95	95	106	105	124	110	98
1924	106	87	86	89	99	85	95	98	108	126	118	114
1925	105	80	89	88	91	89	105	99	105	129	104	111
1926	97	83	93	90	93	100	102	96	115	118	112	106
1927	94	85	92	91	97	100	94	107	106	116	115	101
1928	95	90	91	86	101	100	94	102	109	115	109	96
1929	106	82	91	95	97	92	102	105	109	122	106	96
1930	103	81	89	92	101	96	105	104	112	123	89	101
1931	95	82	93	102	104	99	104	107	101	116	92	103
1932	99	89	97	100	96	100	97	100	114	111	99	89
1933	94	86	91	89	102	105	103	113	108	112	99	91
1934	104	92	96	93	106	101	98	101	104	121	112	101
1935	104	82	88	87	92	84	92	107	108	130	114	105
1936	105	84	85	90	87	94	102	111	116	123	108	109
1937	96	79	94	92	87	100	94	105	112	115	103	103
1938	100	86	97	91	94	100	101	105	114	111	108	95
1939	96	83	98	86	103	99	99	104	111	112	104	97
1940	104	89	90	97	99	91	101	103	99	118	107	102
1941	105	83	88	89	101	96	105	104	106	116	97	103
Average	101.45	83.61	90.06	88.48	94.26	94.58	97.26	103.42	109.29	121.90	110.65	103.52
Adjusted Average	101.6	83.7	90.2	88.6	94.4	94.7	97.4	103.6	109.4	122.1	110.8	103.7

SOURCE: Computed from data in War Food Administration, United States Department of Agriculture, Livestock, Meats, and Wool Market Statistics and Related Data, 1943 (Washington, D. C., 1944) p. 29.

Table XXI. Apparent Consumption of Beef and Veal Produced Under Federal Inspection, United States, 1921-1941

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	1,000,000 Pounds, Carcass Weight											
1921	381	295	378	363	363	403	356	420	412	422	373	336
1922	384	336	407	365	432	433	409	433	448	466	427	399
1923	427	375	406	416	452	422	415	454	439	500	429	394
1924	454	379	386	414	459	395	446	446	481	525	456	449
1925	482	388	439	452	458	431	490	449	470	564	425	489
1926	465	398	459	462	466	501	498	468	538	533	489	481
1927	450	409	452	442	465	462	428	474	458	477	446	397
1928	397	382	389	381	442	419	386	408	434	422	398	356
1929	431	339	390	415	417	388	420	419	424	454	386	364
1930	416	333	371	393	424	386	415	409	434	464	332	398
1931	384	335	379	421	424	405	417	432	405	449	343	380
1932	380	340	372	386	369	375	354	365	405	381	357	332
1933	372	344	374	377	433	434	423	473	465	490	437	416
1934	499	439	464	449	500	462	430	454	461	522	465	423
1935	463	365	392	405	426	381	417	471	472	547	473	464
1936	494	427	440	485	475	502	524	528	559	581	466	482
1937	483	401	485	484	445	491	443	473	502	491	438	453
1938	456	404	465	442	453	457	449	468	499	480	461	416
1939	434	377	450	403	479	453	453	477	503	494	457	438
1940	481	424	425	468	484	441	479	481	457	525	469	439
1941	503	429	465	486	559	526	569	564	592	636	525	574
$\bar{X}$ Mean	439.8	377.1	418.5	424.2	448.8	436.5	439.1	455.5	469.4	496.3	430.8	422.9

SOURCE: War Food Administration, United States Department of Agriculture, Livestock Meats, and Wool Market Statistics and Related Data, 1943 (Washington, D. C., 1944) p. 94.

Table XXII. Classification of Years Used In Determining the Average Seasonal Relationships, For Particular Conditions in the United States, 1910-1941

Increasing Price Level	Decreasing Price Level	Increasing Numbers	Decreasing Numbers	Large Feed Crops	Small Feed Crops
		Years			
1910	1911	1915	1910	1910-11	1911-12
1912	1914	1916	1911	1912-13	1913-14
1913	1921	1917	1912	1915-16	1914-15
1915	1922	1918	1913	1917-18	1916-17
1916	1924	1919	1914	1920-21	1919-20
1917	1926	1920	1921	1921-22	1924-25
1918	1927	1931	1923	1922-23	1926-27
1919	1929	1932	1924	1923-24	1929-30
1920	1930	1933	1925	1925-26	1930-31
1923	1931	1934	1926	1927-28	1931-32
1925	1932	1935	1927	1928-29	1933-34
1928	1938	1936	1928	1932-33	1934-35
1933	1939	1941	1929	1937-38	1935-36
1934			1930	1940-41	1936-37
1935			1937		1939-40
1936			1938		
1937			1939		
1940			1940		
1941					

Table XXIII. Index Numbers of Wholesale Prices, All Commodities, United States, 1910-1941
(1910-1914 = 100)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1910	104.2	104.1	106.4	106.9	105.1	108.6	103.6	103.4	102.0	99.1	96.9	97.2
1911	96.5	94.0	94.5	92.4	92.0	92.0	93.3	95.6	96.5	96.6	96.2	95.3
1912	96.4	97.4	98.5	101.8	102.2	100.7	100.6	101.8	102.9	103.4	102.5	102.3
1913	102.6	101.9	102.0	101.8	100.6	100.7	101.5	101.8	103.1	102.8	102.3	100.9
1914	100.1	99.7	99.3	98.7	98.4	98.4	98.2	101.6	102.5	99.3	98.5	98.2
1915	99.4	100.1	99.6	100.3	100.7	99.7	101.2	100.1	99.7	102.5	104.7	108.0
1916	112.4	114.6	117.4	119.3	120.4	121.0	121.8	124.2	126.9	133.0	142.2	144.8
1917	149.1	152.6	157.2	166.6	176.2	178.1	179.6	182.2	180.3	178.4	179.3	179.4
1918	182.5	179.1	194.5	187.3	187.0	188.3	192.7	196.1	200.7	199.0	199.0	199.0
1919	196.2	189.5	191.7	194.2	197.5	198.0	206.0	210.7	206.0	206.7	210.9	219.7
1920	230.2	229.3	231.5	241.6	244.1	243.1	242.0	235.6	226.6	210.5	194.7	176.2
1921	166.4	153.1	149.5	144.4	140.4	136.4	136.4	136.5	136.4	137.4	137.5	135.6
1922	133.4	135.6	135.5	136.1	140.3	140.6	145.1	143.9	145.0	145.4	146.7	147.0
1923	148.9	150.8	152.6	151.7	148.8	146.4	143.6	142.8	145.5	145.1	143.6	143.2
1924	145.4	145.5	143.8	142.0	140.0	138.5	139.6	141.6	141.8	143.4	144.7	148.2
1925	150.2	151.8	152.1	148.8	148.3	150.4	152.3	151.7	150.9	151.2	152.6	150.9
1926	150.7	148.9	146.9	146.4	146.7	146.6	145.3	144.7	145.5	145.1	143.6	142.9
1927	140.9	139.9	138.2	137.4	137.5	137.4	137.7	139.0	140.6	141.0	140.6	140.7
1928	140.7	139.9	139.4	141.0	142.3	141.2	142.2	142.5	143.9	141.2	139.9	139.9
1929	140.0	139.3	140.3	139.4	138.2	139.0	140.9	140.6	140.3	138.8	136.5	136.2
1930	135.0	133.4	131.7	131.4	129.6	126.7	123.2	123.1	123.2	121.2	118.7	116.2
1931	114.2	112.1	110.9	109.2	106.9	105.3	105.1	105.3	103.9	102.6	102.5	100.1
1932	98.2	96.8	96.4	95.6	94.0	93.3	94.2	95.2	95.3	94.0	93.3	91.4
1933	89.1	87.3	87.9	88.2	91.5	94.9	100.6	101.5	103.4	103.9	103.8	103.4
1934	105.4	107.4	107.6	107.0	107.6	108.9	109.2	111.5	113.3	111.7	111.7	112.3
1935	115.0	116.1	115.9	116.9	117.1	116.5	115.9	117.5	117.8	117.5	117.7	118.1
1936	117.7	117.7	116.2	116.4	114.7	115.6	117.5	119.1	119.1	119.0	120.3	122.9
1937	125.4	126.0	128.2	128.5	127.6	127.3	128.3	127.7	127.6	124.7	121.6	119.3
1938	118.1	116.5	116.4	114.9	114.0	114.3	115.0	114.0	114.3	113.3	113.1	112.4
1939	112.3	112.3	112.0	111.2	111.2	110.4	110.1	109.5	115.5	115.9	115.6	115.6
1940	115.9	114.9	114.5	114.7	114.5	113.1	113.4	113.0	113.9	114.9	116.2	116.8
1941	118.0	117.7	119.0	121.5	123.9	127.2	129.6	131.8	134.0	134.9	135.0	136.6

SOURCE: War Food Administration, United States Department of Agriculture, Livestock, Meats, and Wool Market Statistics and Related Data 1943 (Washington, D. C., 1944) p. 80.

Table XXIV. Cattle: Average Prices Received By Farmers, Oklahoma, 1910-1941

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
					Dollars Per 100 Pounds							
1910	3.90	4.10	4.50	4.90	4.40	4.60	4.00	4.10	4.10	4.10	4.00	4.10
1911	4.30	4.20	4.40	4.30	4.00	3.90	3.50	3.60	3.80	3.70	3.80	3.80
1912	4.00	4.30	4.50	4.70	5.00	4.80	4.50	4.70	4.60	4.70	4.60	4.90
1913	4.90	5.40	5.60	5.90	5.90	5.80	5.60	5.20	5.40	5.50	5.50	5.80
1914	5.60	6.00	6.10	6.10	6.00	5.70	5.70	5.80	5.80	5.50	5.70	5.80
1915	5.80	5.50	5.60	5.70	6.00	5.80	6.70	5.90	5.80	6.00	5.80	5.70
1916	5.70	5.80	6.30	6.50	6.90	6.90	6.50	6.30	6.40	6.20	6.50	6.40
1917	6.90	7.40	7.40	8.10	7.90	8.20	7.50	7.80	7.50	7.80	7.40	8.60
1918	8.30	7.80	8.50	8.90	9.80	9.50	8.70	8.50	8.90	8.70	8.30	8.50
1919	9.00	9.40	9.70	9.70	9.66	8.60	8.60	9.10	8.00	7.70	7.80	7.60
1920	8.30	7.70	7.50	8.30	7.90	8.10	7.80	7.10	6.60	6.80	5.80	5.40
1921	5.50	5.30	5.30	5.40	5.40	4.70	4.70	4.10	3.90	4.00	4.00	4.00
1922	4.00	4.30	4.80	4.80	5.20	4.90	4.70	4.40	4.30	4.20	4.20	4.10
1923	4.30	4.40	4.50	5.00	4.40	4.50	4.30	4.00	4.30	4.00	3.80	4.30
1924	4.40	4.30	4.20	4.50	4.30	4.20	4.00	4.10	4.10	4.00	4.00	4.20
1925	4.30	4.80	5.60	5.40	5.20	4.90	4.60	4.60	4.70	4.90	5.10	5.00
1926	5.10	5.70	5.60	5.20	5.40	5.70	5.50	5.80	5.50	5.40	5.60	5.60
1927	5.50	5.50	5.90	6.00	6.20	6.00	5.90	6.30	6.40	6.30	6.70	7.40
1928	7.50	8.50	8.30	8.20	8.30	8.00	8.10	8.80	9.00	8.60	7.80	7.80
1929	8.20	8.30	8.20	9.00	9.20	8.90	8.60	8.30	7.90	8.10	7.80	7.50
1930	7.80	8.00	8.00	7.80	7.60	7.30	6.10	4.90	5.20	5.40	5.30	5.20
1931	5.30	5.20	5.10	5.30	5.10	4.40	4.40	4.00	3.80	3.70	3.90	3.80
1932	3.60	3.50	3.60	3.60	3.30	3.10	3.90	3.50	3.50	3.10	3.05	2.75
1933	2.80	2.85	3.00	3.25	3.55	3.40	3.15	3.00	2.85	2.95	2.85	2.65
1934	2.80	3.10	3.15	3.15	3.35	3.00	2.90	2.90	3.30	3.20	3.00	3.10
1935	4.15	5.10	5.40	5.60	5.90	5.30	5.20	5.40	5.10	5.30	5.10	5.20
1936	5.50	5.80	5.60	5.80	5.40	5.60	5.10	4.80	5.20	5.30	5.20	5.60
1937	5.60	5.50	6.10	6.00	6.30	6.10	6.30	6.50	6.40	6.10	5.90	5.40
1938	5.30	5.40	5.70	5.80	5.60	5.60	5.70	5.60	5.80	5.70	5.80	5.90
1939	6.10	6.30	6.70	6.60	6.50	6.10	6.00	5.70	6.50	6.40	6.40	6.40
1940	6.40	6.40	6.60	6.70	6.80	6.60	6.50	6.40	6.60	6.70	6.70	6.70
1941	7.40	7.50	7.50	8.00	7.70	8.00	8.10	8.40	8.70	8.50	8.10	8.50
Average	5.57	5.73	5.90	6.07	6.07	5.88	5.71	5.61	5.63	5.58	5.48	5.55

SOURCES: Trimble R. Hedges and K. D. Blood, Oklahoma Farm Price Statistics, 1910-38 (Oklahoma Agricultural Experiment Station Bulletin, 238, 1939) p. 30. Subsequent data from Agricultural Marketing Service, United States Department of Agriculture, Mid-Month Local Price Reports (Washington, D. C., various issues).

Table XXV. Cattle: Average Adjusted Prices Received By Farmers, Oklahoma, 1910-1941

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
						Dollars Per 100 Pounds						
1910	3.74	3.94	4.23	4.58	4.19	4.44	3.86	3.97	4.02	4.14	4.13	4.22
1911	4.46	4.47	4.66	4.65	4.35	4.24	3.75	3.77	3.94	3.83	3.95	3.99
1912	4.15	4.41	4.57	4.62	4.89	4.77	4.47	4.62	4.47	4.55	4.49	4.79
1913	4.78	5.30	5.49	5.80	5.86	5.76	5.52	5.11	5.24	5.35	5.38	5.75
1914	5.59	6.02	6.14	6.18	6.10	5.79	5.80	5.71	5.66	5.54	5.79	5.91
1915	5.84	5.49	5.62	5.68	5.96	5.82	6.62	5.89	5.82	5.85	5.54	5.28
1916	5.07	5.06	5.37	5.45	5.73	5.70	5.34	5.07	5.04	4.66	4.57	4.42
1917	4.63	4.85	4.71	4.86	4.48	4.60	4.18	4.28	4.16	4.37	4.13	4.79
1918	4.55	4.36	4.37	4.75	5.24	5.05	4.51	4.33	4.43	4.37	4.17	4.27
1919	4.59	4.96	5.06	4.99	4.89	4.34	4.17	4.32	3.88	3.73	3.70	3.46
1920	3.61	3.36	3.24	3.44	3.24	3.33	3.22	3.01	2.91	3.23	2.98	3.06
1921	3.31	3.46	3.55	3.74	3.85	3.45	3.45	3.00	2.86	2.91	2.91	2.95
1922	3.00	3.17	3.54	3.53	3.71	3.49	3.24	3.06	2.97	2.89	2.86	2.79
1923	2.89	2.92	2.95	3.30	2.96	3.07	2.99	2.80	2.96	2.76	2.65	3.00
1924	3.03	2.96	2.92	3.17	3.07	3.03	2.87	2.90	2.89	2.79	2.76	2.83
1925	2.86	3.16	3.68	3.63	3.51	3.26	3.02	3.03	3.11	3.24	3.34	3.31
1926	3.38	3.83	3.81	3.55	3.68	3.89	3.79	4.01	3.78	3.72	3.90	3.92
1927	3.90	3.93	4.27	4.37	4.51	4.37	4.28	4.53	4.55	4.47	4.77	5.26
1928	5.33	6.08	5.95	5.82	5.83	5.67	5.70	6.18	6.25	6.09	5.58	5.58
1929	5.86	5.96	5.84	6.46	6.66	6.40	6.10	5.90	5.63	5.84	5.71	5.51
1930	5.78	6.00	6.07	5.94	5.86	5.76	4.95	3.98	4.22	4.46	4.47	4.48
1931	4.64	4.64	4.60	4.85	4.77	4.18	4.19	3.80	3.66	3.61	3.80	3.80
1932	3.67	3.62	3.73	3.77	3.51	3.32	4.14	3.68	3.67	3.30	3.27	3.01
1933	3.14	3.26	3.41	3.68	3.88	3.58	3.13	2.96	2.76	2.84	2.75	2.56
1934	2.66	2.89	2.93	2.94	3.11	2.75	2.66	2.60	3.09	2.86	2.69	2.76
1935	3.61	4.39	4.66	4.79	5.04	4.55	4.59	4.60	4.33	4.51	4.33	4.40
1936	4.67	4.93	4.82	4.98	4.71	4.84	4.34	4.03	4.37	4.45	4.32	4.56
1937	4.47	4.37	4.76	4.67	4.94	4.79	4.91	5.09	5.02	4.89	4.85	4.53
1938	4.49	4.64	4.90	5.05	4.91	4.90	4.96	4.91	5.07	5.03	5.13	5.25
1939	5.43	5.61	5.98	5.93	5.85	5.53	5.45	5.21	5.63	5.52	5.54	5.54
1940	5.52	5.57	5.76	5.84	5.94	5.84	5.73	5.66	5.79	5.83	5.77	5.74
1941	6.27	6.37	6.30	6.58	6.21	6.29	6.25	6.37	6.49	6.30	6.00	6.22
Average	4.34	4.50	4.62	4.74	4.73	4.59	4.44	4.32	4.33	4.31	4.26	4.31

SOURCE: Computed from Tables XXIII and XXIV.

Table XXVI. Cattle: Average Prices Received By Farmers, Oklahoma, Under Specified Conditions, 1910-1941

Conditions	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	Dollars Per 100 Pounds											
Increasing Price Level	5.66	5.86	6.07	6.31	6.33	6.19	6.01	5.97	5.98	5.95	5.75	5.86
Decreasing Price Level	5.44	5.54	5.66	5.72	5.68	5.42	5.28	5.08	5.12	5.04	5.10	5.11
Increasing Cattle Numbers 1/ 2/	4.38	4.48	4.52	4.67	4.67	4.49	4.40	4.23	4.20	4.16	4.02	4.05
Decreasing Cattle Numbers 1/ 2/	4.39	4.59	4.75	4.85	4.83	4.72	4.53	4.47	4.50	4.50	4.51	4.59
Large Feed Crops 1/ 3/	4.25	4.42	4.50	4.68	4.71	4.61	4.40	4.31	4.31	4.18	4.09	4.16
Small Feed Crops 1/ 3/	4.37	4.51	4.64	4.70	4.70	4.53	4.47	4.30	4.32	4.24	4.24	4.26

SOURCE: Computed from Tables XXII, XXIV, and XXV.

1/ Monthly prices adjusted for changes in the general price level.

2/ Numbers on farms January 1, United States.

3/ As of October 1, United States; crop year basis.

Table XXVII. Beef Steers: Average Prices of All Grades and Weights, Sold Out of First Hands for Slaughter, Chicago, 1910-1941

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
						Dollars Per 100 Pounds							
1910	6.20	6.35	7.35	7.55	7.50	7.50	7.10	6.85	6.80	6.60	6.20	6.00	6.80
1911	6.15	6.15	6.20	6.10	5.95	6.05	6.30	6.95	6.80	6.75	6.70	6.65	6.40
1912	6.85	6.60	7.20	7.65	7.95	8.00	7.90	8.50	8.15	7.90	8.10	7.85	7.75
1913	7.80	8.25	8.30	8.15	8.00	8.15	8.25	8.30	8.50	8.40	8.25	8.20	8.25
1914	8.45	8.30	8.35	8.50	8.40	8.60	8.80	9.10	9.35	9.05	8.60	8.35	8.65
1915	8.05	7.50	7.65	7.70	8.35	8.80	9.20	9.05	8.95	8.80	8.70	8.35	8.40
1916	8.35	8.35	8.75	9.10	9.50	9.85	9.25	9.45	9.40	9.75	10.15	10.00	9.50
1917	10.15	10.50	11.25	11.75	11.90	12.15	12.35	12.70	13.10	11.70	11.10	11.40	11.60
1918	12.10	12.00	12.60	14.70	15.40	15.85	16.05	15.75	16.00	14.80	15.05	14.90	14.65
1919	15.80	15.95	16.05	15.85	15.00	13.55	15.60	16.45	15.50	16.15	15.10	14.35	15.50
1920	13.95	13.05	13.10	12.30	12.25	14.95	15.00	14.85	15.05	14.20	12.00	10.10	13.30
1921	8.70	8.20	9.05	8.15	8.25	8.00	8.10	8.50	8.00	8.10	7.40	7.00	8.20
1922	7.23	7.62	7.87	7.90	8.21	8.76	9.42	9.52	9.84	10.23	9.16	8.76	8.65
1923	8.88	8.62	8.70	8.81	9.28	9.74	9.71	10.36	10.18	9.94	9.46	8.96	9.40
1924	8.99	8.81	9.17	9.52	9.59	9.28	9.31	9.53	9.52	9.57	8.90	8.71	9.24
1925	8.97	9.15	9.93	9.99	9.90	10.34	11.28	11.10	11.04	10.80	10.60	9.72	10.16
1926	9.48	9.42	9.42	9.11	9.07	9.51	9.44	9.30	10.00	10.00	9.48	9.43	9.47
1927	9.70	9.81	10.20	10.51	10.68	11.12	11.78	12.02	12.63	13.43	13.57	13.08	11.36
1928	13.67	13.15	12.83	13.01	13.19	13.86	15.11	15.30	15.91	14.61	13.84	12.86	13.91
1929	12.51	11.92	12.68	13.52	13.67	14.10	14.59	14.22	13.92	13.81	13.00	12.74	13.43
1930	12.62	12.46	12.33	11.88	11.15	10.59	9.42	9.48	10.95	10.64	10.47	10.17	10.95
1931	9.43	8.36	8.40	7.82	7.30	7.43	7.62	8.53	8.29	8.38	8.53	7.11	8.06
1932	6.61	6.21	6.31	6.35	6.04	6.66	7.90	7.88	7.91	7.09	6.29	5.44	6.70
1933	4.95	4.80	5.04	4.96	5.64	5.79	6.01	5.88	5.75	5.53	5.13	5.17	5.42
1934	5.35	5.49	5.91	6.42	6.91	7.34	7.21	7.34	8.06	7.48	7.28	7.41	6.76
1935	9.24	10.49	10.77	11.10	11.13	10.28	9.80	10.27	10.36	10.38	9.97	9.79	10.26
1936	9.30	8.37	8.65	8.42	7.92	7.86	8.13	8.46	9.16	9.31	10.31	10.27	8.82
1937	10.69	10.22	10.79	10.75	11.21	12.11	13.97	14.13	13.78	12.79	10.65	8.96	11.47
1938	8.13	7.78	8.46	8.63	8.82	9.50	10.71	10.31	10.42	10.33	10.03	10.13	9.39
1939	10.35	10.17	10.29	10.02	9.68	9.22	9.30	9.09	10.23	9.87	9.63	9.59	9.75
1940	9.46	9.08	9.31	9.46	9.83	9.69	10.44	11.00	11.50	11.87	12.06	11.85	10.43
1941	11.90	11.27	10.81	10.67	10.23	10.62	11.24	11.73	11.73	11.55	11.40	12.57	11.33
Average	9.38	9.20	9.49	9.57	9.62	9.85	10.20	10.37	10.52	10.31	9.90	9.56	

SOURCE: Production and Marketing Administration, United States Department of Agriculture, Livestock, Meats and Wool Market Statistics and Related Data, 1945 (Washington, D. C., 1946) p. 52.

Table XXVIII Beef Steers: Average Adjusted Prices of All Grades and Weights, Sold Out of First Hands for Slaughter, Chicago, 1910-1941

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	Dollars Per 100 Pounds											
1910	5.95	6.10	6.91	7.06	7.14	7.24	6.85	6.62	6.67	6.66	6.40	6.17
1911	6.37	6.54	6.56	6.60	6.47	6.58	6.75	7.27	7.05	6.99	6.96	6.98
1912	7.11	6.78	7.31	7.51	7.78	7.94	7.85	8.35	7.92	7.64	7.90	7.67
1913	7.60	8.10	8.14	8.01	7.95	8.09	8.13	8.15	8.24	8.17	8.06	8.13
1914	8.44	8.32	8.41	8.61	8.54	8.74	8.96	8.96	9.12	9.11	8.73	8.50
1915	8.10	7.49	7.68	7.68	8.29	8.83	9.09	9.04	8.98	8.59	8.31	7.73
1916	7.43	7.29	7.45	7.63	7.89	8.14	7.59	7.61	7.41	7.33	7.14	6.91
1917	6.81	6.88	7.16	7.05	6.75	6.82	6.88	6.97	7.27	6.56	6.19	6.35
1918	6.63	6.70	6.48	7.85	8.24	8.42	8.33	8.03	7.97	7.44	7.56	7.49
1919	8.05	8.42	8.37	8.16	7.59	6.84	7.57	7.81	7.52	7.81	7.16	6.53
1920	6.06	5.69	5.66	5.09	5.02	6.15	6.20	6.30	6.64	6.75	6.16	5.73
1921	5.23	5.36	6.05	5.64	5.88	5.87	5.94	6.23	5.87	5.90	5.38	5.16
1922	5.42	5.62	5.81	5.80	5.85	6.23	6.49	6.62	6.79	7.04	6.24	5.96
1923	5.96	5.72	5.70	5.81	6.24	6.65	6.76	7.25	7.00	6.85	6.59	6.26
1924	6.18	6.05	6.38	6.70	6.85	6.70	6.67	6.73	6.71	6.67	6.15	5.88
1925	5.97	6.03	6.53	6.71	6.68	6.88	7.41	7.32	7.32	7.14	6.66	6.44
1926	6.29	6.33	6.41	6.22	6.18	6.49	6.50	6.43	6.87	6.89	6.60	6.60
1927	6.88	7.01	7.38	7.65	7.77	8.09	8.55	8.65	8.98	9.52	9.65	9.30
1928	9.72	9.40	9.20	9.23	9.27	9.82	10.63	10.74	11.06	10.35	9.89	9.19
1929	8.94	8.56	9.04	9.70	9.89	10.14	10.35	10.11	9.92	9.95	9.52	9.35
1930	9.35	9.34	9.36	9.04	8.60	8.36	7.65	7.70	8.89	8.78	8.82	8.75
1931	8.26	7.46	7.57	7.16	6.83	7.06	7.25	8.10	7.98	8.17	8.32	7.10
1932	6.73	6.42	6.55	6.64	6.43	7.14	8.39	8.28	8.30	7.54	6.74	5.95
1933	5.56	5.50	5.73	6.62	6.16	6.10	5.97	5.76	5.56	5.32	4.94	5.00
1934	5.08	5.11	5.49	6.00	6.42	6.74	6.60	6.58	7.11	6.70	6.52	6.60
1935	8.03	9.04	9.29	9.50	9.50	8.82	8.46	8.74	8.79	8.83	8.47	8.29
1936	7.90	7.11	7.44	7.23	6.90	6.80	6.92	7.10	7.69	7.82	8.57	8.36
1937	8.52	8.11	8.42	8.37	8.79	9.51	10.89	11.06	10.80	10.26	8.76	7.51
1938	6.88	6.68	7.27	7.51	7.74	8.31	9.31	9.04	9.12	9.12	8.87	9.01
1939	9.22	9.06	9.19	9.01	8.71	8.35	8.45	8.30	8.86	8.52	8.33	8.30
1940	8.16	7.90	8.13	8.25	8.59	8.57	9.21	9.73	10.10	10.33	10.38	10.15
1941	10.08	9.58	9.08	8.78	8.26	8.35	8.67	8.90	8.75	8.56	8.44	9.20
Average	7.28	7.18	7.38	7.43	7.48	7.65	7.85	7.95	8.04	7.95	7.64	7.39

SOURCE: Computed from Table XXVII.

Table XXIX. Beef Steers: Average Prices of All Grades and Weights Sold Out of First Hands for Slaughter, Chicago, Under Specified Conditions, 1910-1941

Conditions	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	Dollars Per 100 Pounds											
Increasing Price Level	9.56	9.43	9.74	9.91	10.06	10.34	10.72	10.92	11.00	10.66	10.26	9.93
Decreasing Price Level	9.10	8.86	9.13	9.08	8.99	9.14	9.44	9.57	9.81	9.79	9.37	9.01
Increasing Cattle Numbers 1/ 2/	7.29	7.13	7.23	7.26	7.25	7.40	7.53	7.63	7.69	7.57	7.27	7.02
Decreasing Cattle Numbers 1/ 2/	7.38	7.30	7.58	7.65	7.73	7.91	8.16	8.26	8.36	8.27	7.98	7.74
Large Feed Crops 1/ 3/	7.02	6.96	7.09	7.22	7.35	7.56	7.72	7.78	7.74	8.01	7.52	7.11
Small Feed Crops 1/ 3/	7.43	7.25	7.49	7.50	7.53	7.76	8.02	8.19	8.39	7.80	7.62	7.42

SOURCE: Computed from Tables XXII, XXVII, and XXVIII.

1/ Monthly prices adjusted for changes in the general price level.

2/ Numbers on farms January 1, United States.

3/ As of October 1, United States; crop year basis.

Table XXX. Stocker and Feeder Steers: Average Prices of All Grades and Weights, Shipped from Kansas City, 1925-1941

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
						Dollars Per 100 Pounds						
1925	6.58	7.00	7.48	7.32	7.14	6.14	6.94	7.01	6.79	7.13	7.10	7.59
1926	8.00	8.21	8.35	8.13	8.04	7.42	6.93	6.91	7.34	7.19	7.26	7.31
1927	7.96	8.16	8.55	8.76	8.67	8.30	8.55	8.74	8.72	9.08	9.60	9.89
1928	11.14	11.22	11.31	11.49	11.32	11.18	11.48	11.52	11.88	11.06	10.77	10.25
1929	11.21	10.99	12.19	12.52	12.38	11.52	11.24	10.12	9.71	9.94	9.67	10.15
1930	10.54	10.89	10.89	10.39	9.84	7.78	6.30	6.57	6.88	7.06	7.23	7.44
1931	7.58	7.04	7.56	6.89	6.62	5.82	5.01	5.69	5.04	5.05	5.48	4.65
1932	5.06	5.04	5.62	5.29	4.93	4.54	4.97	5.23	4.82	4.47	4.72	4.12
1933	4.45	4.37	4.56	4.79	5.28	4.68	4.33	4.20	4.06	3.68	3.51	3.57
1934	4.00	4.55	4.55	4.69	4.75	4.08	3.71	3.76	4.05	3.92	3.98	4.07
1935	5.92	6.86	7.28	7.48	7.69	6.88	6.32	6.91	7.06	6.88	6.52	6.83
1936	7.07	6.95	7.51	7.23	7.12	6.56	5.34	5.53	5.81	6.01	6.32	6.46
1937	7.26	7.32	7.84	7.67	7.86	7.87	8.28	8.58	8.09	7.58	7.14	6.71
1938	6.98	7.04	7.60	7.55	7.72	7.51	7.80	7.54	7.42	7.47	7.77	8.00
1939	8.52	8.79	9.18	9.21	8.89	7.94	7.61	7.43	8.02	8.04	7.95	7.96
1940	8.07	8.12	8.97	9.06	9.18	8.05	8.09	8.53	8.41	8.52	8.81	8.76
1941	10.16	10.00	10.29	10.33	10.06	9.90	9.59	9.79	9.98	9.53	9.35	10.46
Average	7.68	7.80	8.22	8.16	8.09	7.42	7.21	7.30	7.30	7.21	7.25	7.31

SOURCE: United States Department of Agriculture, Livestock, Meats and Wool Market Statistics and Related Data, 1935 through 1941 (Washington, D. C., 1936 through 1942).

Table XXXI. Stocker and Feeder Steers: Average Adjusted Prices of All Grades and Weights, Shipped From Kansas City, 1925-1941

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
						Dollars Per 100 Pounds						
1925	4.38	4.61	4.92	4.92	4.80	4.08	4.56	4.62	4.50	4.72	4.65	5.03
1926	5.31	5.51	5.68	5.55	5.49	5.06	4.77	4.78	5.04	4.96	5.06	5.12
1927	5.65	5.83	6.19	6.38	6.31	6.04	6.21	6.29	6.20	6.44	6.83	7.03
1928	7.92	8.02	8.11	8.15	8.03	7.92	8.07	8.08	8.26	7.83	7.70	7.33
1929	8.01	7.89	8.69	8.98	8.88	8.29	7.98	7.20	6.92	7.16	7.08	7.45
1930	7.81	8.16	8.27	7.91	7.49	6.14	5.11	5.34	5.58	5.83	6.09	6.40
1931	6.64	6.28	6.82	6.31	6.06	5.53	4.77	5.40	4.85	4.92	5.35	4.65
1932	5.15	5.21	5.83	5.53	5.16	4.87	5.28	5.49	5.06	4.76	5.06	4.51
1933	4.99	5.01	5.19	5.43	5.99	4.93	4.30	4.14	3.93	3.54	3.38	3.45
1934	3.80	4.24	4.23	4.38	4.44	3.75	3.40	3.37	3.57	3.51	3.56	3.62
1935	5.15	5.91	6.28	6.40	6.58	5.91	5.45	5.88	5.99	5.86	5.54	5.78
1936	6.01	5.90	6.46	6.21	6.12	5.67	4.54	4.64	4.88	5.05	5.25	5.26
1937	5.79	5.81	6.12	5.97	6.12	6.18	6.45	6.72	6.34	6.08	5.87	5.62
1938	5.91	6.04	6.53	6.57	6.72	6.57	6.78	6.61	6.49	6.59	6.87	7.12
1939	7.59	7.83	8.20	8.28	7.99	7.19	6.91	6.79	6.94	6.94	6.88	6.89
1940	6.96	7.07	7.83	7.90	8.00	7.12	7.13	7.55	7.38	7.42	7.58	7.50
1941	8.61	8.50	8.65	8.50	8.12	7.78	7.40	7.43	7.45	7.06	6.93	7.60
Average	6.22	6.34	6.71	6.67	6.61	6.06	5.83	5.90	5.85	5.80	5.86	5.91

SOURCE: Computed from Table XXX.

Table XXXII.. Stocker and Feeder Steers: Average Prices of All Grades and Weights Shipped from Kansas City, Under Specified Conditions, 1925-1941

Conditions	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	Dollars Per 100 Pounds											
Increasing Price Level	7.18	7.38	7.75	7.78	7.82	7.26	7.12	7.31	7.35	7.15	7.06	7.19
Decreasing Price Level	8.23	8.27	8.74	8.59	8.39	7.60	7.30	7.28	7.24	7.29	7.46	7.44
Increasing Cattle Numbers 1/ 2/	5.77	5.87	6.22	6.11	6.09	5.47	5.01	5.20	5.09	4.94	5.01	5.01
Decreasing Cattle Numbers 1/ 2/	6.53	6.68	7.05	7.06	6.98	6.46	6.40	6.40	6.37	6.40	6.46	6.55
Large Feed Crops 1/ 3/	6.80	6.83	7.16	7.20	7.23	6.73	6.54	6.38	6.34	6.21	6.28	6.17
Small Feed Crops 1/ 3/	5.88	6.05	6.45	6.33	6.25	5.69	5.37	5.63	5.54	5.31	5.35	5.40

SOURCE: Computed from Tables XXII, XXX, and XXXI.

1/ Monthly prices adjusted for changes in the general price level.

2/ Numbers on farms January 1, United States.

3/ As of October 1, United States; crop year basis.

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