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RELATION OF CHANGES IN MEAT PRODUCTION AND CONSUMPTION TO CHANGES IN FARM INCOME FROM LIVE STOCK IN THE UNITED STATES

PRESTON RICHARDS

Bureau of Agricultural Economics, Washington, D.C., U.S.A.

A STUDY of the relationship between the changes in volume of meats produced and consumed and the changes in cash farm income from live stock involves several considerations. Among these are: first, factors that determine changes in retail prices and retail expenditure (aggregate retail value) for meats; second, factors affecting changes in the total volume of meat produced and consumed; and third, changes in relationship of meat prices and live-stock prices as well as the influences responsible for such changes. It will not be possible in this discussion to cover in detail these several factors, but attention will be given to the most important aspects of the problem.

Changes in the aggregate consumer expenditures for the commercial meat supply correspond closely with the changes in national income in the United States. Although national income in the United States is only a rough measure of consumer purchasing power or the demand for meats, it appears to be the most adequate measure available.¹ It will be observed in Fig. 1 that the annual changes in these two factors in the post-War period were nearly always in the same direction and were usually in about the same proportion. Similarly, it can be shown that the changes in total consumer expenditures for each of the two most important kinds of meats, pork and beef, are also closely related to the changes in national income. Thus it appears that the principal factor responsible for changes in retail expenditures for meat is the change in incomes of consumers. It follows, therefore, that the chief forces affecting retail meat prices are the changes in national income and the changes in the volume of meats consumed.

In the United States the total consumption of meats is determined largely by the total volume of meats produced or the aggregate

¹ The index numbers of national income used were based upon the estimates of national income for the years 1909-29 given in *America's Capacity to Consume*, a publication of the Brookings Institution, by Leven, Moulton, and Warburton, and upon estimates of national income published by the Department of Commerce for the years 1929-35.

slaughter of live stock. In the main meats are perishable, and they must be moved into consumption channels within a very short time after the live stock is slaughtered. Since exports and imports of meats are not large in relation to total meat production, the consumption

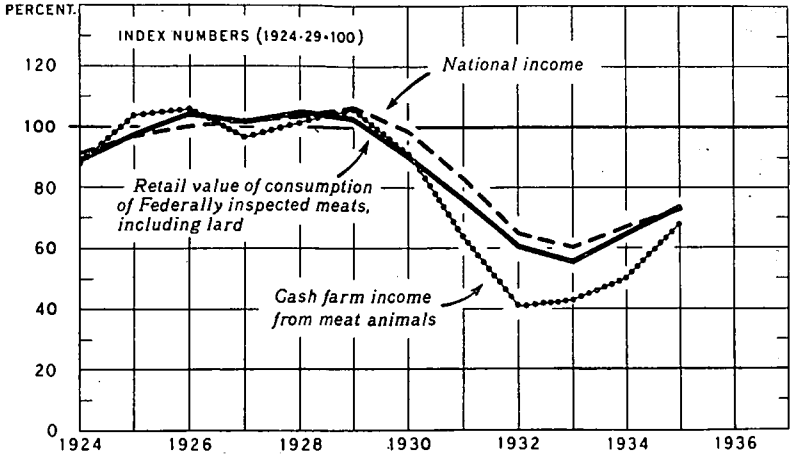


FIG. 1. RETAIL VALUE OF CONSUMPTION OF FEDERALLY INSPECTED MEATS (INCLUDING LARD) AND NATIONAL INCOME, AND CASH FARM INCOME FROM MEAT ANIMALS, U.S.A., 1924-35.

or disappearance of meats in any year is determined primarily by meat production in that year. The close relationship between production and consumption of Federally inspected meats and lard in the years from 1921 to 1935 is indicated in Fig. 2.

That the total commercial production and consumption of meats in the United States have been stable in most of the last 15 years is also shown in Fig. 2. This is especially true of meat consumption. In the 12 years from 1923 to 1934, the variation in production from the high point to the low point was 12 per cent.; and in that period the greatest deviation from the 1923-34 average was 8 per cent., and, in 9 years of the 12, production deviated from this average by less than 5 per cent. In the 1923-34 period the range of variation in consumption from the high point to the low point was only about 5 per cent. In 11 years out of the 12 in the period from 1923 to 1934 the deviation in the apparent consumption of Federally inspected meats from average was less than 3 per cent. Both production and consumption were reduced materially in 1935 because of a curtailment in feed production of about 50 per cent. resulting from the severe drought of 1934. Meat production under Federal inspection

in 1935 was 23 per cent. less than in 1934, and consumption of Federally inspected meats in 1935 was reduced by 17 per cent. In view of the severity of the drought of 1934 it is somewhat surprising that these decreases were not considerably greater.

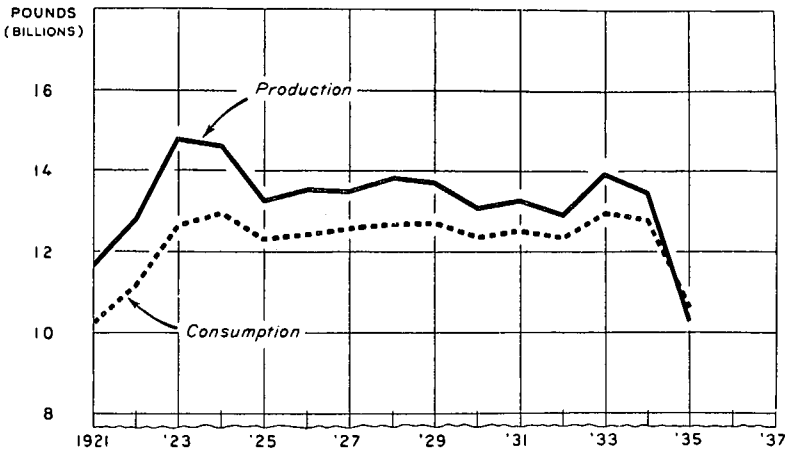


FIG. 2. PRODUCTION AND CONSUMPTION OF FEDERALLY INSPECTED MEATS, INCLUDING LARD, UNITED STATES, 1921-35.

The marked stability in total meat production, however, has been accompanied by material changes in the meat production from individual species of live-stock. In the period from 1923 to 1934 the dressed weight of Federally inspected hog slaughter at its lowest level was 21 per cent. smaller than at its highest level. In 5 years of this 12-year period the deviation in hog production from the 1923-34 average was greater than 9 per cent. In the years from 1923 to 1934 the dressed weight of inspected cattle slaughter at its lowest level was 25 per cent. smaller than its highest level, and in 5 years of the 12 the deviation from the 1923 to 1934 average was greater than 7 per cent.

Throughout the post-War period there has been a decided tendency for decreases in hog slaughter to be offset in considerable part by increases in cattle slaughter and likewise for decreases in cattle slaughter to be counterbalanced by increases in hog slaughter. Since meat production from cattle and hogs represents more than 90 per cent. of the total meat production, the offsetting tendency mentioned accounts largely for the stability in the total commercial production and consumption of meats already discussed.

Since the changes in the aggregate retail value of meats consumed in the United States in the post-War period were closely related to

changes in incomes of consumers, whereas the volume of consumption was relatively stable, it follows that most of the changes in retail prices of meats as a group have been associated with changes in consumer incomes, or in demand. For individual kinds of meats, however, the changes in the volume of consumption have been sufficiently large to cause material changes in retail prices.

Studies of the relationship between meat and live-stock prices indicate that the changes in retail meat prices resulting from changes in supply or in demand, or both, usually are fully reflected in prices received by producers for live-stock. That is to say, a change in the retail price of meats obtained from 100 pounds of live stock usually is accompanied by an approximately equivalent change in dollars in the price per 100 pounds of live stock. On the other hand, a given percentage change in price of a particular kind of meat or of all meats usually results in a percentage change in prices of live animals as sold by producers which is considerably greater than the relative changes in retail prices of meats.

With aggregate consumer expenditures for meat being affected principally by changes in consumer incomes, it would appear that a given percentage change in the supply of meat available for consumption results in an equivalent but inverse change in retail prices for meat. Since the margin between live-stock prices and meat prices tends to be relatively stable, or at least is not affected materially by changes in the volume of meats handled, it follows that a given percentage change in the supply of live-stock for slaughter would result in a greater percentage change in live-stock prices than in meat prices. With the unit margin between live-stock prices and meat prices remaining relatively constant, the total marketing charges for live-stock and meats are greater when the quantity of meats consumed is large than when it is small. Hence, the total value to producers either for all live-stock or for an individual species usually is greater when the supply is small than when it is large. This is especially important for a particular kind of live-stock such as cattle or hogs, since, as already pointed out, the variations in production of beef and of pork are considerably greater than for all meats combined. It is also important to note that producers of cattle frequently are not producers of hogs, and vice versa.

The tendency for the aggregate value of live-stock to decrease as the supply marketed increases is illustrated in Figs. 3 and 4 which show the chief factors affecting hog prices and cattle prices in the United States. In Fig. 3 is shown the relationship of changes in hog prices to changes in slaughter supplies of hogs, changes in national

income, and changes in export demand¹ for hog products for the period 1923-33.² It will be observed that the variations in the three factors last named are closely associated with the changes in hog prices. In section D of Fig. 3 is shown the inverse relation of changes in the total value of hog slaughter to changes in the volume of such

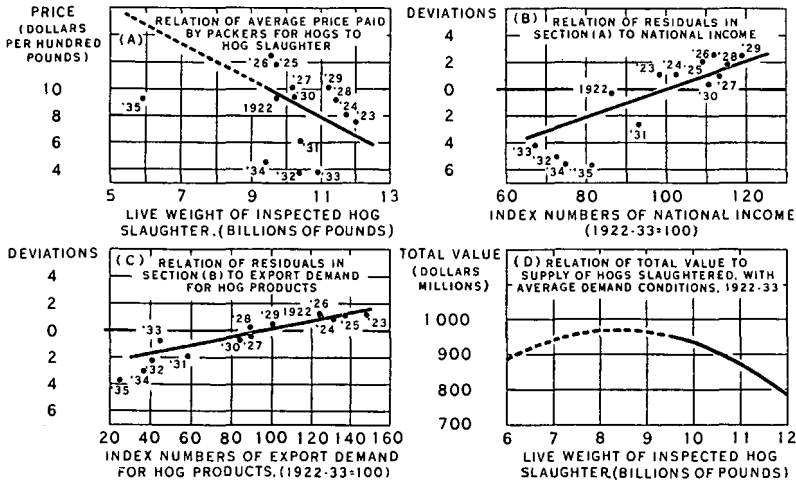


FIG. 3. HOG PRICES RELATED TO INSPECTED HOG SLAUGHTER, NATIONAL INCOME, AND EXPORT DEMAND FOR HOG PRODUCTS, U.S., 1922-33

[In sections A, B, and C the years 1934 and 1935 are not included in the analysis, as a processing tax on hogs was in effect in these years, but not in earlier years]

slaughter, with domestic and foreign demand at average levels. It appears, however, that after supplies of hogs are reduced beyond a certain point further decreases result in declines in the total value of supplies, but in only one year of the post-War period, 1935 (following the 1934 drought), were supplies of hogs reduced to so low a level. It should be observed here that, if the level of demand were different from average, the relationship between changes in total value and changes in the volume of supplies would be somewhat different from that indicated in section D of Fig. 3.

In Fig. 4 it will be noted that most of the variations in prices for cattle are associated with changes in slaughter supplies of cattle, changes in national income, and changes in the value of inedible

¹ The index of export demand as here shown was computed on the basis of the relation between changes in the value per pound of exports of hog products from the United States and changes in the quantity of such exports.

² In the correlation analysis of prices of hogs shown in Fig. 3, data for the years 1934 and 1935, while shown in the figures, were not included in the analysis, since a substantial tax on hog slaughter was in effect in both of these years.

products obtained from cattle. As is indicated in section D of Fig. 4, the relationship between changes in the total value of cattle slaughtered and changes in the volume of such slaughter is inverse for most of the range of variations in slaughter supplies occurring in the post War period. But when cattle supplies are reduced to a level consider-

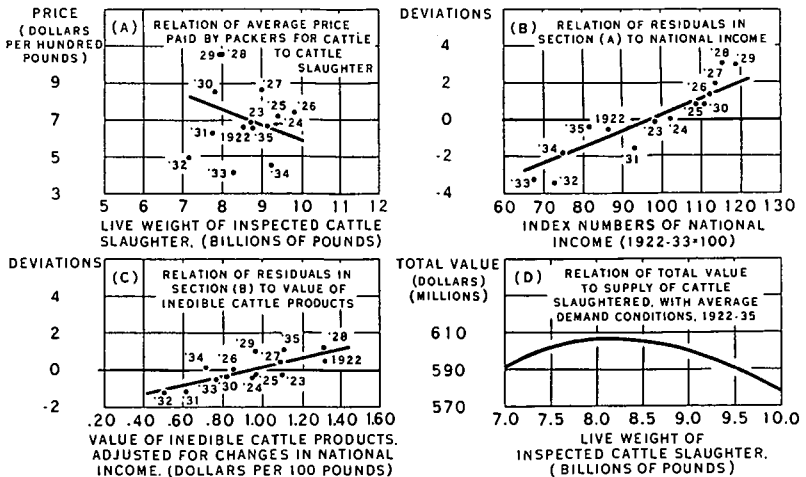


FIG. 4. CATTLE PRICES RELATED TO INSPECTED SLAUGHTER, NATIONAL INCOME, AND VALUE OF INEDIBLE CATTLE PRODUCTS, U.S., 1922-35

ably below average, decreases in supplies are accompanied by decreases in total value. Since meat production from hogs and cattle in the United States represents the bulk of the total production, it would appear that for all live-stock combined a negative relationship between supplies and total value has existed during most of the post-War period. It is noteworthy, however, that for sheep and lambs, which normally represent only 4 to 5 per cent. of the total live-stock slaughter, there has been a decided tendency for the total value of slaughter supplies to increase as the volume of sheep and lamb supplies increases.

The stability of the unit margin between live-stock prices and meat prices, which is the direct cause of inverse relation between changes in volume of slaughter supplies of live-stock and the value of such supplies, is largely a result of the relative inflexibility of wage rates, rents, and transportation charges, which are the most important items in total marketing costs for live-stock and meats. During the period from 1921 to 1930 these principal items included in marketing costs did not change greatly, whereas there was considerable variation in marketings of cattle and hogs. This period affords ample

evidence that little relation existed between the changes in the margin between the price of one species of live-stock and the value of products obtained therefrom on the one hand, and changes in the supply of the particular species of live-stock on the other. However, in this period also, total meat production was relatively stable, so that the 1921-30 period does not necessarily indicate a lack of relationship between the live-stock price spread and changes in aggregate live-stock slaughter. But from 1930 to 1934 this spread was reduced considerably as wage rates and rents declined, whereas meat production was well maintained. It appears, therefore, that there is little relation between changes in the margin or spread and changes in live-stock slaughter either in total or for a single species. Consequently, it would seem that, regardless of the level of marketing charges per unit, so long as they do not fluctuate with changes in slaughter supplies, the inverse relationship between changes in the volume of live-stock slaughter supplies and changes in the value of such supplies will persist.

As already indicated, from 1930 to 1934 meat production and consumption were well maintained in the United States. Because of the severe business depression, retail prices of meat declined materially during the first four years of this period, and consumer expenditures for meat were reduced about 40 per cent. from 1929 to 1932. The decrease in cash farm income from meat animals, however, was considerably greater, amounting to about 60 per cent. from 1929 to 1932. This greater decline in farm income than in consumer expenditures for meat was due to the fact that declines in the margin between live-stock prices and meat prices were relatively much less than the declines in retail prices of meats. Since the volume of meat production and consumption from 1929 to 1933 was maintained with only a relatively small decrease in the margin between live-stock prices and meat prices, total marketing charges for live stock and meats were reduced relatively little. Consequently, with total consumer expenditures being sharply reduced, the residual remaining for live-stock producers was reduced even more. In this period, and probably in other major depressions, the maintenance of meat production and consumption at normal levels, while advantageous to handlers and processors of live-stock and to consumers of meat, proved decidedly costly to live-stock producers.