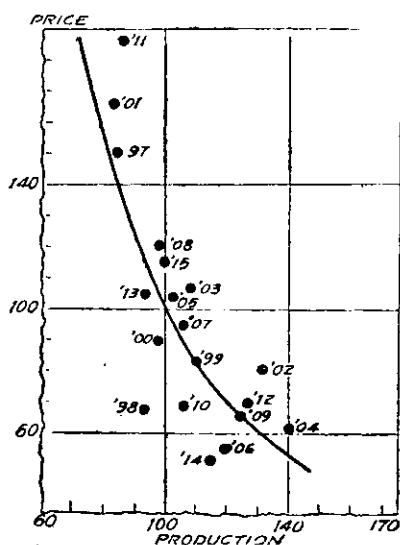


# Interrelationships of Supply and Price

G. F. Warren and F. A. Pearson



RELATION OF THE UNITED STATES PRODUCTION OF POTATOES TO THE PURCHASING POWER OF THE DECEMBER PRICES PAID TO PRODUCERS AT BATAVIA, NEW YORK, 1897-1915

When the United States production was 20 per cent below normal, farm prices at Batavia were 54 per cent above normal

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## INTERRELATIONSHIPS OF SUPPLY AND PRICE

G. F. WARREN AND F. A. PEARSON

The increasing spread between farm and retail prices and the increasing violence in the fluctuation of farm prices were a serious problem even before the World War. With deflation, the maladjustment between farm and retail prices has been the most serious single factor in causing the agricultural depression.

The statement is commonly made that supply and demand govern prices. Even if such a generalization were always true it would be of little value, because it does not state what effect any given supply will have on prices, nor does it state how demand affects prices. One might make a similar generalization about bridges. Gravitation, loads, strength of material, winds, and other like factors govern bridges, but no engineer would waste his time merely enumerating these. He makes careful calculations for each factor. This bulletin is an attempt to express mathematically some of the relationships of supply to price, relationships of price to supply, relationships of farm and retail prices, and the effect of supply on these relationships.

Of course every added bushel reduces the price. How much reduction takes place depends on the particular product sold and the point at which the price is taken. A large supply reduces the farm price by a much greater percentage than it reduces the consumers' price.

Most of the price quotations are wholesale prices. They do not represent what the farmer gets or what the consumer pays. Their relationship to supply is very different from the relationship of farm or retail prices to supply. A number of writers have calculated the relationship of supply to wholesale prices, and have called the answer *demand-curves*. A demand-curve, of course, must be the relation of consumers' prices to consumers' supply.

The only price that affects consumption is the price that the consumer pays. The only price that affects production is the price that the producer receives. Wholesale prices do not govern consumption nor do they govern production.

For agricultural products, supply is much more variable than is demand.

The price to the farmer in a surplus-producing region grows steadily lower as the supply grows higher, and approaches zero. As the supply grows smaller the price grows steadily higher so that a very small supply would sell for an indefinitely high price. In a deficit area also, or in a city market, a very small supply sells for an indefinitely high price, but a very large supply does not approach a zero price. It approaches a fixed quantity above zero. This fixed quantity is the charge for assembling, transporting, and distributing.

For most farm products, there are regions where the local supply is not sufficient for local needs. In such a region the farm price has the characteristics of a retail price, so that when the United States crop is indefinitely large, the farm price approaches the cost of getting a supply

from the surplus area. The average farm price for the entire United States is therefore a mixture of prices that are like retail prices and producers' prices. In surplus areas, prices fluctuate much more violently than do average prices for the United States.

Cotton, wool, and a few other farm products are not consumed on farms without passing through the channels of trade. The United States farm prices for such products, therefore, have the characteristics of prices in surplus areas; that is, they would approach a zero price if there were an infinite supply.

Even within States the same principle holds. For example, there are parts of New York where hay and potatoes are shipped in. The farm price in such a district has the characteristics of a retail price.

Farm prices as published by the United States Department of Agriculture include these deficit areas, so that they are less variable than prices in the surplus centers.

All staple farm products produced by American farmers are consumed either on farms or in cities. The price to the ultimate consumer, therefore, has to be such that consumers will take all the marketed product at that price. That is, supply and demand determine what the retail price shall be.

It is not possible to raise retail prices just because handling charges or any other costs have risen. The consumer is not concerned with who gets the cash. He is concerned with what he pays. Retail prices have to be set at such a point that he will take all of the product at that price.

The amount of the hold-over of nonperishable commodities can be increased to a limited extent. This raises prices for the year when it takes place, and lowers them for the next year.

#### EFFECT OF SUPPLY ON PRICES

Curves showing the relation of supply to price for many products have been prepared. In many cases the price data are not sufficient to make certain the exact shape of the curves. Since changes in demand and changes in the cost of production occur, the curves for different periods vary somewhat.

Curves such as are here included are sometimes called *demand-curves*. They are in fact supply-price curves. For some farm products a portion of a large crop is never marketed. A demand-curve shows the relationship between the consumers' price and the quantity consumed at that price. The relation of production to farm prices is not merely a supply-demand relationship. It is a relationship that involves handling charges as well as demand.

Over a series of years there are changes in supply and demand, and therefore it is probably better to make comparison of changes in production from year to year than to compare with an assumed normal. In making the calculations on which most of the curves are based, the percentage change in production as compared with the preceding five years has been related to the percentage change in price as compared with the preceding five years.

In all cases, the prices are expressed in terms of purchasing power. That is, prices have been divided by the index number of wholesale prices of all commodities as published by the United States Bureau of Labor

Statistics. Therefore they are prices in terms of dollars, with the value that the dollar had for the purchase of commodities from 1910 to 1914.

The word "price" is used throughout this publication as synonymous with "purchasing power." When used in this sense, "price" means the comparative quantities of all kinds of commodities which a bushel or a pound of the given product would exchange for. It is the price at which a product would sell if the dollar represented all commodities rather than a single commodity, gold.

Details of methods of calculation are given on page 116.

POTATOES

EFFECT OF SUPPLY ON PRICES

The relation of the United States production of potatoes to the purchasing power of the December 1 farm price of potatoes, from 1895 to 1915, inclusive, is shown in figure 1. A potato crop that was 80 per cent

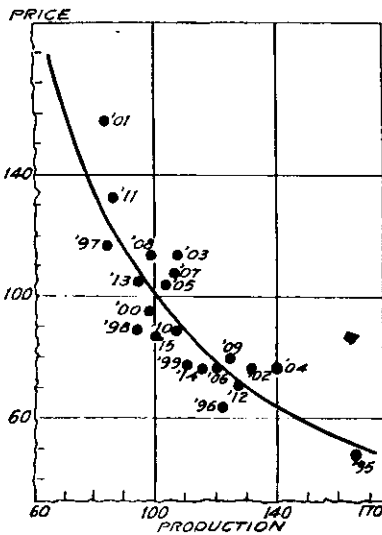


FIGURE 1. RELATION OF THE UNITED STATES PRODUCTION OF POTATOES TO THE PURCHASING POWER OF THE UNITED STATES DECEMBER 1 FARM PRICE, 1895-1915

When the United States production was 20 per cent below normal, farm prices were 35 per cent above normal

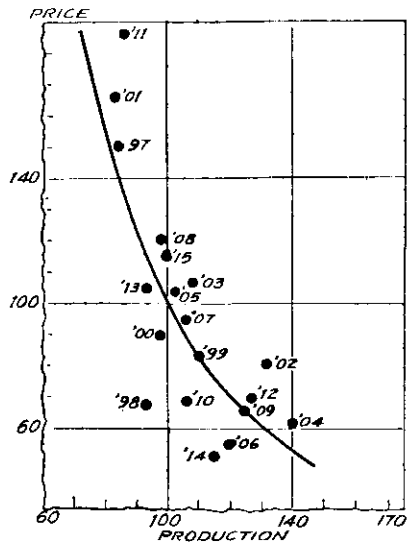


FIGURE 2. RELATION OF THE UNITED STATES PRODUCTION OF POTATOES TO THE PURCHASING POWER OF THE DECEMBER PRICES PAID TO PRODUCERS AT BATAVIA, NEW YORK, 1897-1915

When the United States production was 20 per cent below normal, farm prices at Batavia were 54 per cent above normal

of the average for the preceding five years, sold on farms in the United States for an average of 35 per cent more than the price for the preceding five years. A crop that was 20 per cent above that of the preceding five years, sold for 22 per cent less than the price for the preceding five years. A crop deficit has a more striking effect on price than does an increase in the crop. If the price in a given year were a dollar a bushel, a United

States crop of 20 per cent more would sell for 78 cents per bushel and a crop of 20 per cent less would sell for \$1.35.

Since the United States farm price includes many areas where there is a deficit of potatoes, the farm price is somewhat like a retail price. In surplus areas, the price is more affected by supply than is the average price in the United States.

The relation of the United States crop to prices at Batavia, New York, is shown in figure 2 and in table 1. When the United States crop was 20 per cent below normal, prices at Batavia were 54 per cent above normal but prices in the United States averaged only 35 per cent above normal. Prices at Batavia do not represent a strictly surplus area because Batavia is so near large cities.

The Minnesota farm prices are shown in figure 3. These fluctuate slightly less than do prices at Batavia. There are deficit areas in Minnesota, so that the average farm price is a mixture of surplus and deficit prices.

If one had prices for such a district as Aroostook County, Maine, the fluctuations would be even greater.

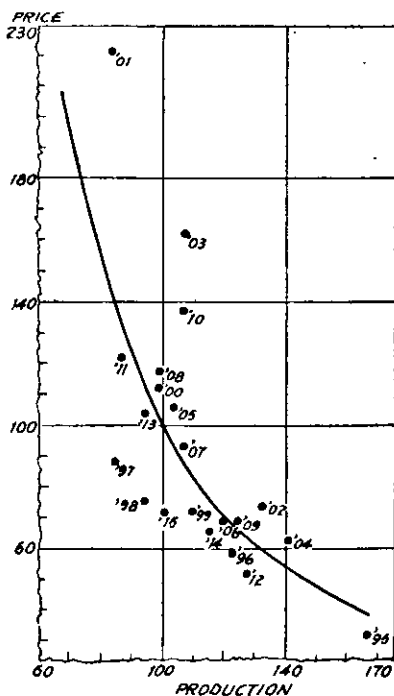


FIGURE 3. RELATION OF THE UNITED STATES PRODUCTION OF POTATOES TO THE PURCHASING POWER OF THE MINNESOTA DECEMBER 1 FARM PRICE, 1895-1915

When the United States production was 20 per cent below normal, farm prices in Minnesota were 50 per cent above normal

Rhode Island farm prices give a suggestion as to how supply affects retail prices. When the United States crop was 20 per cent below normal, the Batavia prices were 54 per cent above the average of the preceding five years, but the Rhode Island prices were only 22 per cent above (figure 4).

Retail prices as reported by the United States Bureau of Labor Statistics before 1913 are for the calendar year, which includes two crop years. Therefore these prices cannot be related to the size of the crop. The writers obtained prices from three grocery stores in New York City, which, combined with the Bureau of Labor Statistics series, give retail prices from 1890 to date. A United States crop 20 per cent below normal was accompanied by retail prices 6 per cent above normal.

A comparison of prices at Batavia, New York, and wholesale prices at New York City, is shown in figure 5. When the United States crop was 20 per cent below normal, the Batavia farm prices were 54 per cent above normal, but wholesale prices in New York City were only 38 per cent above normal.

A comparison of prices at Batavia, New York, and retail and hotel prices



TABLE I. RELATION OF SIZE OF THE UNITED STATES POTATO CROP TO DECEMBER PRICES, 1895-1915\*  
(From table 129)

Locality	Crop 20 per cent below normal	Crop 20 per cent above normal
	Per cent that prices were above normal	Per cent that prices were below normal
Farm prices, Batavia, New York.....	54	30
Farm prices, Minnesota.....	50	28
Wholesale prices, New York City.....	38	23
Farm prices, United States.....	35	22
Farm prices, Rhode Island.....	22	15
Retail prices, New York City.....	6	5

\* Batavia prices are for 1897-1915. Retail prices in New York City are for the crop year October to June.

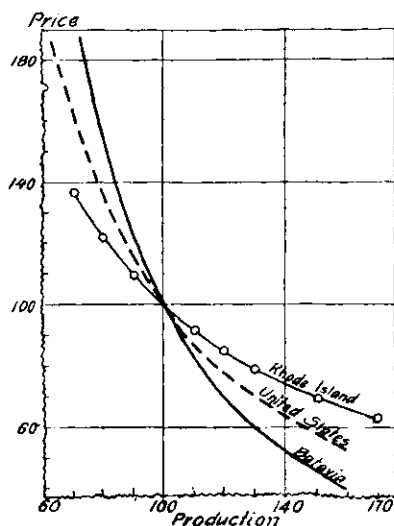


FIGURE 4. RELATION OF THE UNITED STATES PRODUCTION OF POTATOES TO THE PURCHASING POWER OF FARM PRICES FOR THE UNITED STATES (DECEMBER 1, 1895-1915), FOR RHODE ISLAND (DECEMBER 1, 1895-1915), AND FOR BATAVIA, NEW YORK (DECEMBER, 1897-1915)

When the United States production was 20 per cent below normal, prices at Batavia were 54 per cent above normal, United States farm prices were 35 per cent above normal, and Rhode Island farm prices were 22 per cent above normal

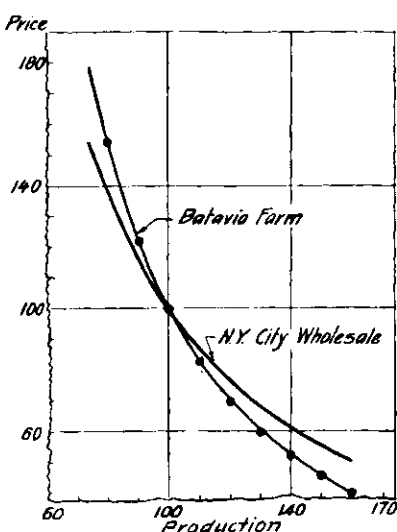


FIGURE 5. RELATION OF THE UNITED STATES PRODUCTION OF POTATOES TO THE PURCHASING POWER OF DECEMBER PRICES AT BATAVIA, NEW YORK (1897-1915), AND WHOLESALE PRICES IN NEW YORK CITY (1895-1915)

When the United States crop was 20 per cent below normal, prices at Batavia were 54 per cent above normal, but wholesale prices in New York City were only 38 per cent above normal

at New York City, is shown in figure 8 and in table 2. In recent years, 1921 to 1926, a crop 20 per cent below normal would be expected to sell at Batavia, New York, for 177 per cent above normal, but would be expected to retail in New York City for only 68 per cent above the normal price. A United States crop 20 per cent above normal would be

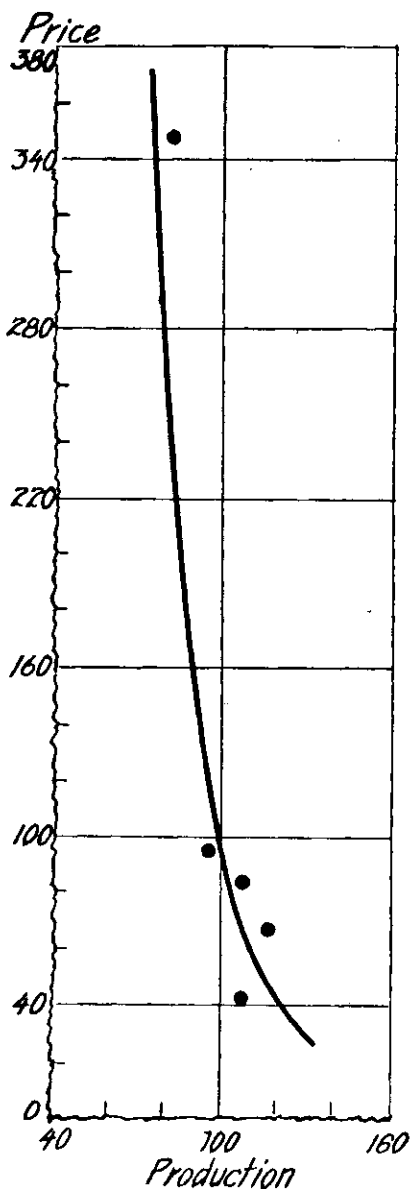


FIGURE 6. RELATION OF THE SIZE OF THE UNITED STATES POTATO CROP TO THE PURCHASING POWER OF PRICES PAID BY PRODUCERS; AT BATAVIA, NEW YORK, NOVEMBER-MAY, 1920-21 TO 1925-26

In 1925, when the United States crop was 22 per cent below normal, the season's average price received by farmers at Batavia was \$2.16 per bushel

expected to sell at Batavia for only 56 per cent below the normal price, but would be expected to sell at retail in New York City for 21 per cent below normal.

It is often said that the same amount of potatoes is consumed regardless of price. When the retail price at New York City was dropped 21 per cent, an American crop 20 per cent above normal was disposed of. This does not give the exact increased consumption for those persons whose prices were dropped 21 per cent. Persons eating in hotels received less drop. Persons living on farms had more drop.

In one New York City hotel the price of potatoes remained constant for the eight years 1910 to 1917. Prices were then raised 67 per cent, and up to the present time (1927) have remained constant. In another hotel, prices were constant for the eleven years 1910 to 1920. They were raised 14 per cent in 1921, and again raised in 1926, so that they are now (1927) selling at 24 per cent above pre-war prices.<sup>1</sup>

Hotel prices had no relation to variations in production. In fact, when the supply-price curve was constructed, it happened that higher prices occurred with larger crops. The portion of the population that ate in these hotels had no means of expressing its demand at different prices. Since a constantly increasing proportion of the population eats in hotels and restaurants, prices of farm products may be expected to fluctuate with increasing violence. In some of the cheapest restaurants prices fluctuate to some extent with supply.

The pre-war relationships of size of the potato crop in different countries to wholesale prices, are shown in figure 9 and in table 3.

<sup>1</sup>Canon, Helen. Index numbers of à-la-carte prices of food. *Farm economics*, no. 49, p. 798-800. December, 1927.

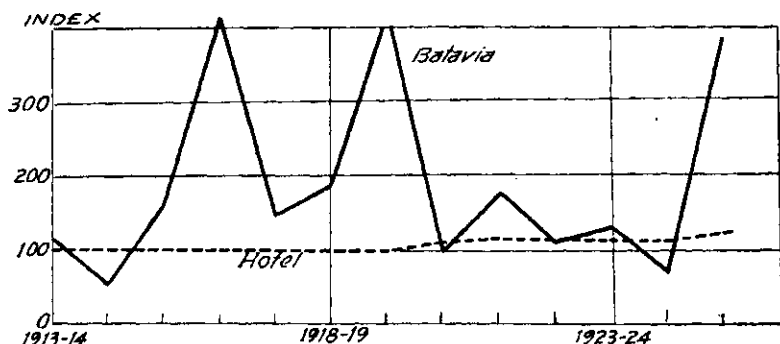


FIGURE 7. INDEX NUMBERS OF FARM PRICES OF POTATOES AT BATAVIA, NEW YORK, AND OF POTATOES SERVED IN A NEW YORK HOTEL, OCTOBER-JUNE, 1913-14 TO 1925-26

Yearly variations in supply and in farm prices had no effect on prices charged for potatoes at this New York hotel

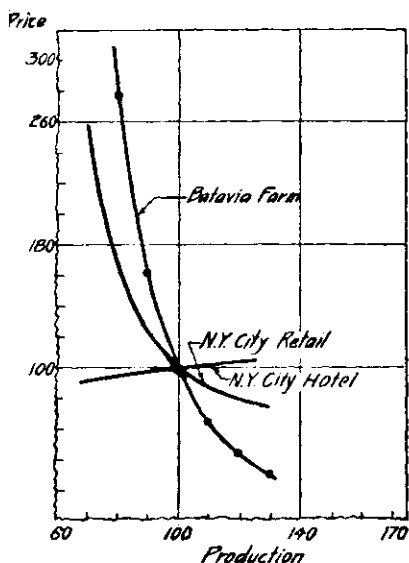


FIGURE 8. RELATION OF THE UNITED STATES PRODUCTION OF POTATOES TO THE PURCHASING POWER OF THE FARM PRICES AT BATAVIA, NEW YORK, AND THE RETAIL AND HOTEL PRICES AT NEW YORK CITY, 1921-22 TO 1925-26

A 20-per-cent shortage in potato production increased prices at Batavia 177 per cent, but increased retail prices in New York City only 68 per cent and had no effect on prices in New York hotels

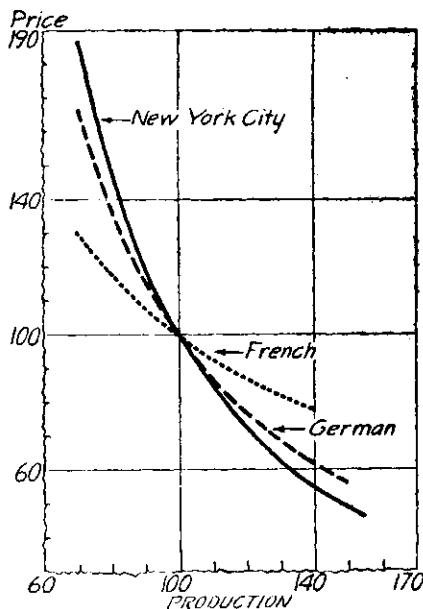


FIGURE 9. RELATION OF THE PRODUCTION OF POTATOES TO THE PURCHASING POWER OF WHOLESALE PRICES OF POTATOES IN NEW YORK CITY, IN BERLIN, GERMANY, AND IN FRANCE

When the United States crop was 20 per cent below normal, the New York wholesale price was 48 per cent above normal. When the German potato crop was 20 per cent below normal, the wholesale price of eating potatoes in Berlin was 37 per cent above normal. When the French potato crop was 20 per cent below normal, the French farm price was 18 per cent above normal

TABLE 2. RELATION OF SIZE OF THE UNITED STATES POTATO CROP TO FARM, WHOLESALE, AND RETAIL PRICES, OCTOBER TO JUNE, 1921-22 TO 1925-26\*

(From table 129)

Locality	Crop 20 per cent below normal	Crop 20 per cent above normal
	Per cent that prices were above normal	Per cent that prices were below normal
Farm prices, Batavia, New York .....	177	56
Wholesale prices, New York City .....	106	45
Retail prices, New York City .....	68	21

\* The number of crops since the war is not sufficient to determine the shape of the curve with certainty, but the principle shown is certain.

TABLE 3. RELATION OF SIZE OF THE NATIONAL POTATO CROP TO WHOLESALE PRICES

(From table 129)

Locality	Crop 20 per cent below normal	Crop 20 per cent above normal
	Per cent that prices were above normal	Per cent that prices were below normal
New York, October to June, 1895-1915 .....	48	28
Berlin, October to June, 1890-1915 .....	37	23
France, crop year, 1887-1914 .....	18	13

Before the war, when the United States crop was 20 per cent below normal, wholesale prices of potatoes in New York City, October to June, were 48 per cent above normal. When the German potato crop was 20 per cent below normal, wholesale prices in Berlin were 37 per cent above normal. When the French crop was 20 per cent below normal, farm prices in France averaged 18 per cent above normal.

In Europe the farmers are nearer to the consumers. For this and other reasons, distributing charges appear to constitute a smaller percentage of the retail price. This allows retail prices to fluctuate more with supply and makes it possible to get rid of a large crop because the consumer pays a lower price. It is probable also that less change in price is required to affect consumption because food takes a larger proportion of the income.

From 1902 to 1914, a German potato crop 20 per cent below normal raised the wholesale price in Berlin 45 per cent, but raised retail prices only 31 per cent.

Prices of manufacturing potatoes fluctuated more than did prices of eating potatoes (table 129).

## EFFECT OF DEFLATION ON PRICE RELATIONSHIPS

Many persons cite the changes in wholesale or retail prices as evidence of farm conditions. The curves here presented indicate the unsoundness of such a practice. If farm prices were as stable as retail prices, farming would be a more stable business. In the present agricultural depression,

farmers who retail their products and those who sell at wholesale in a deficit area have not suffered so severely from the depression as have those in the surplus areas. The prices in deficit areas include freight and handling charges. These are so high that the farmer who gets the benefit of them is protected from competition with surplus centers. For example, hay in Connecticut and in southeastern New York has continued to be a profitable crop, but in surplus-producing areas the price is often below pre-war prices. The doubled freight rates and handling charges prevented prices from declining in the deficit areas.

The effects of inflation and deflation on price fluctuations are shown in figures 10 to 13, inclusive, and in table 4. When financial inflation occurs, freight rates and wages respond slowly, so that charges for distribution remain relatively small. Farm-price fluctuations are then less than normal. When deflation occurs and prices fall, the amount paid to farmers is such a small percentage of the retail price that a slight percentage change in retail prices makes a violent change in farm prices. Before the war, when the United States crop of potatoes was 20 per cent below normal, the price at Batavia was 54 per cent above normal, but in the

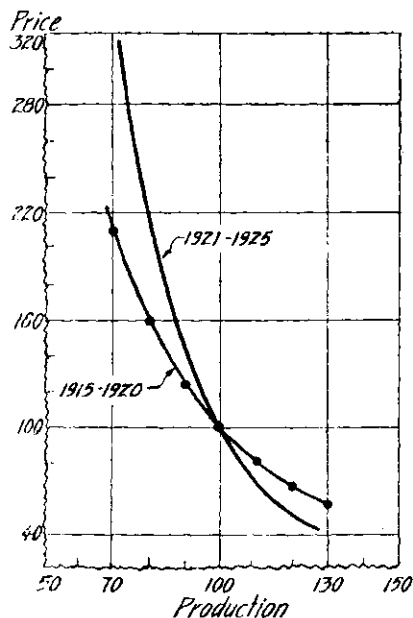


FIGURE 10. EFFECTS OF INFLATION AND DEFLATION ON THE RELATIONSHIP OF THE UNITED STATES PRODUCTION OF POTATOES TO THE PURCHASING POWER OF FARM PRICES

When the United States crop was 20 per cent below normal, it caused a 24-per-cent increase in prices from 1915 to 1920, but caused a 116-per-cent increase in prices from 1921 to 1925

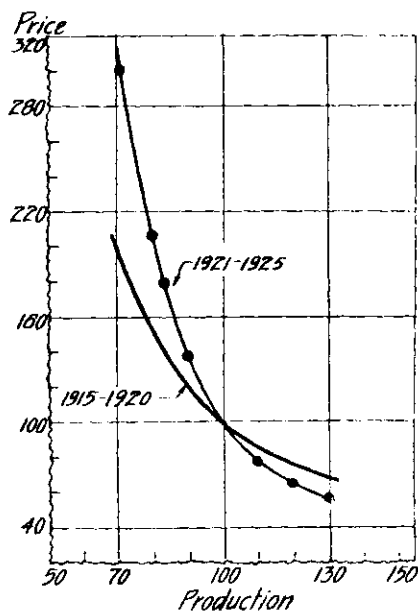


FIGURE 11. EFFECTS OF INFLATION AND DEFLATION ON THE RELATIONSHIP OF THE UNITED STATES PRODUCTION OF POTATOES TO THE PURCHASING POWER OF THE RHODE ISLAND FARM PRICE

When the United States potato crop was 20 per cent below normal in 1915 to 1920, the Rhode Island farm price was 51 per cent above normal. In the next five years, a similar shortage resulted in a price 105 per cent above normal

TABLE 4. EFFECT OF INFLATION AND DEFLATION ON THE RELATIONSHIP OF DECEMBER 1, FARM PRICES TO SIZE OF THE UNITED STATES POTATO CROP

(From table 129)

Period	Crop 20 per cent below normal	Crop 20 per cent above normal
	Per cent that prices were above normal	Per cent that prices were below normal
Farm prices, United States, 1895-1915.....	35	22
Farm prices, United States, 1915-1920.....	23	16
Farm prices, United States, 1921-1925.....	116	47

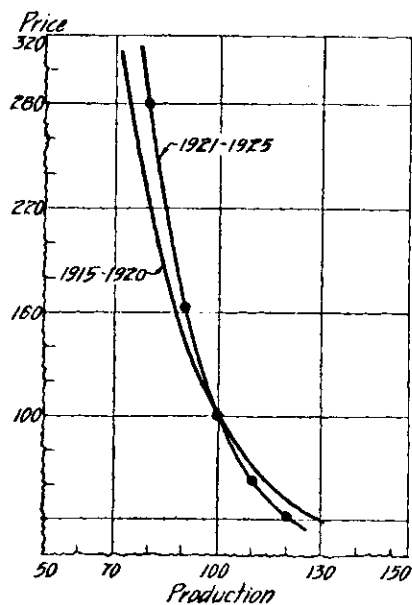


FIGURE 12. EFFECTS OF INFLATION AND DEFLATION ON THE RELATIONSHIP OF THE UNITED STATES PRODUCTION OF POTATOES TO THE PURCHASING POWER OF PRICES PAID FARMERS AT BATAVIA, NEW YORK

When the United States production was 20 per cent below normal from 1915 to 1920, the Batavia price was 119 per cent above normal. In the next five years, a similar shortage resulted in a price 177 per cent above normal

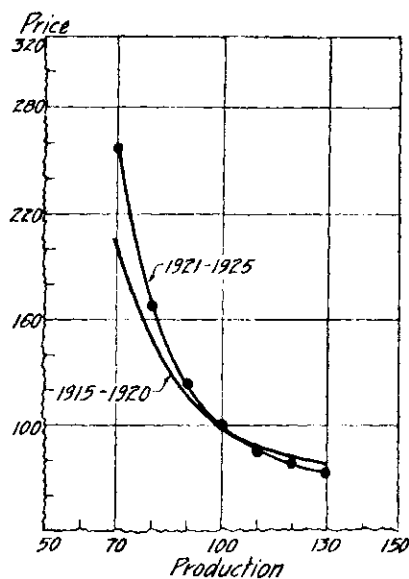


FIGURE 13. EFFECTS OF INFLATION AND DEFLATION ON THE RELATIONSHIP OF THE UNITED STATES PRODUCTION OF POTATOES TO THE PURCHASING POWER OF THE NEW YORK CITY RETAIL PRICE, OCTOBER-JUNE, 1915-16 TO 1920-21 AND 1921-22 TO 1925-26

When the United States potato crop was 20 per cent below normal from 1915 to 1920, the New York retail price was 47 per cent above normal. In the next five years, a similar shortage resulted in a price 68 per cent above normal

past six years a similar shortage raised the price 177 per cent. Likewise, a production of 20 per cent above normal before the war dropped the price about 30 per cent, but now causes a price reduction of 56 per cent. Whenever financial deflation occurs, it results in a great increase in the violence of price fluctuations.

## INCREASING VIOLENCE OF FARM-PRICE FLUCTUATIONS

Over a series of years, there has been a general tendency for an increase in the violence of farm-price fluctuations. A crop that is 10 per cent above or below normal causes a greater change in prices than formerly.

This may be due to an increase in the commercialization of agriculture, a decrease in the flexibility of demand, or an increase in handling charges relative to retail prices. Probably all these and other forces have combined to bring about the result.

The increasing violence of price fluctuations is not merely a result of inflation and deflation. It is a growing national problem. All the studies thus far made indicate that even before the war there was a steady increase in the violence of fluctuations of farm prices.

In the twenty-four-year period 1871 to 1894, a potato crop 20 per cent below normal tended to raise the United States farm price by 29 per cent (table 5). In the following twenty-one-year period, it tended to raise the United States farm price by 35 per cent. It now raises farm prices by 116 per cent. A similar shortage tended to raise Rhode Island farm prices in the period from 1871 to 1894, by 19 per cent; in the period from 1895 to 1915, by 22 per cent; and at the present time, by 105 per cent (figures 14 and 15).

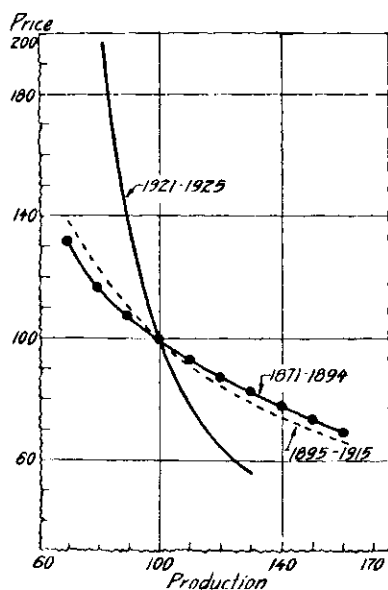


FIGURE 14. RELATION OF THE UNITED STATES PRODUCTION OF POTATOES TO THE PURCHASING POWER OF THE DECEMBER 1 FARM PRICE

When the United States crop was 20 per cent below normal, the United States farm prices were 29 per cent above normal during the period from 1871 to 1894. With a similar crop shortage in the period from 1895 to 1915, prices were 35 per cent above normal; and in the period from 1921 to 1925, prices were 116 per cent above normal

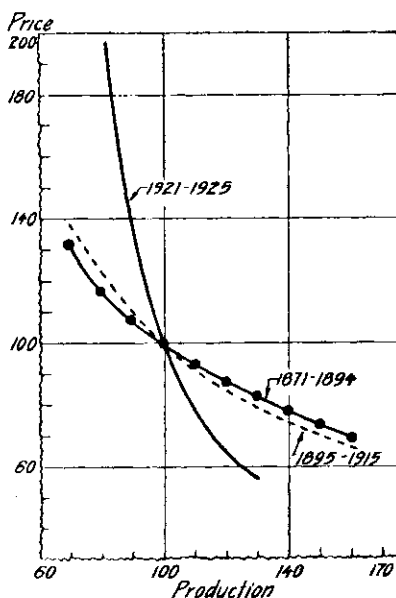


FIGURE 15. RELATION OF THE UNITED STATES PRODUCTION OF POTATOES TO THE PURCHASING POWER OF THE RHODE ISLAND FARM PRICE

Prices now fluctuate much more violently than formerly

TABLE 5. CHANGES IN THE RELATIONSHIP OF DECEMBER 1 FARM PRICES TO THE SIZE OF THE UNITED STATES POTATO CROP, 1871 TO 1894 AND 1895 TO 1915

(From table 129)

Period	Crop 20 per cent below normal	Crop 20 per cent above normal
	Per cent that prices were above normal	Per cent that prices were below normal
Farm prices, United States, 1871-1894	29	19
Farm prices, United States, 1895-1915	35	22
Farm prices, Rhode Island, 1871-1894	19	13
Farm prices, Rhode Island, 1895-1915	22	15

There are two distinct demands for farm products -- the demand for farm use, and city demand. When the farmer consumed 90 per cent of what he grew, he could use a crop surplus on the farm at any time when prices became unsatisfactory. Since the amount sold was the amount that affected prices, price fluctuations were relatively small. When practically all of the product is sold, fluctuations become large because little or none of the product reaches a consumer at the low farm price.

When farmers ate half the potato crop, a low price resulted in a heavy farm consumption, which prevented the commercial supply from fluctuating violently. Now that farmers use a very small proportion of the crop, the commercial supply fluctuates nearly as much as does production.

When the farmer sells to the consumer, the consumer's price fluctuates as much as does the farm price, and a large supply is readily disposed of. When a large proportion of the population lived in villages, they bought directly or nearly directly from farmers. The consumer's price fluctuated almost as much as did the farm price.

Formerly, a large part of the farm products were grown in the vicinity where they were consumed. As the country developed, certain areas were found in which it is possible to produce crops more cheaply than in other areas. Farming is therefore becoming much more specialized. This movement makes the centers of production farther from market than was the case before farming became specialized, and hence increases the cost of distribution. Costs of production are being lowered by this process at the same time that the costs of distribution are rising.

Even if the population had continued to live in villages, the distributing charges would have increased because of this increasing tendency to produce crops in regions best adapted to them. Under modern conditions, it is cheaper to produce potatoes where the soil and the climate are favorable and ship them to the villages, than to produce them near a village with unfavorable natural conditions. Such specialization increases the percentage of the retail price that is absorbed by distributing charges, and consequently increases the violence in farm-price fluctuations. Anything that makes farm prices low relative to retail prices increases the violence of farm-price fluctuations, because a given percentage change in retail price, which is necessary to cause a larger supply to be used, represents a large percentage of the farm price. The consumer has moved away from the farmer and the farmer has moved away from the consumer.



An increasing number of persons are eating in restaurants and hotels, where prices fluctuate very little. Therefore the consumer does not have an opportunity to express his demands in terms of fluctuating prices.

Processing of food before it reaches the consumer tends to make farm prices fluctuate violently.

Consumption of that portion of the supply which is used on the farm is affected by farm prices, which fluctuate violently. Consumption of that portion of the supply which sells at retail is affected by retail prices, which fluctuate little. Consumption of that portion of the supply which sells in tin cans is affected by prices of canned goods, which fluctuate still less. Consumption of that portion of supply that is consumed in hotels is affected by prices on the bill of fare, which are practically indifferent to supply.

There appears to be an increasing tendency to keep consumers' prices constant, regardless of supply and demand. There seems to be a growing sentiment favorable to stable retail prices. From 1908 to 1916, the retail price of milk in New York City remained constant.

Since food now represents so small a part of the cost of living, demand is less flexible than it was when nearly all of the money went for food. If nearly all the income is required for food, the consumer must watch prices very closely and change consumption quickly. If food takes only a small percentage of the income, prices are less important. Consumers tend to resist change in their food habits and hence raise prices very high in case of shortage. They do not increase consumption to absorb a large crop even though prices drop very low.

Changes in demand are less important than changes in the percentage of the retail price that is taken by distributing costs. Retail prices are not much more affected by supply than they were before the war (figure 13). In the period from 1915 to 1920, a United States potato crop 20 per cent below normal resulted in a retail price 47 per cent above normal. In the next five years it resulted in a retail price 68 per cent above normal. But the corresponding United States farm prices were 59 and 118 per cent above normal.

Some persons have studied the increasing flexibility of wholesale and farm prices and have attributed it to changes in consumers' demand. Retail prices do not substantiate this view.<sup>2</sup> Changes in demand have some effect, but the result at the present time is due primarily to high handling charges. The long-time tendency is due in part to increased inflexibility in demand, but other factors are more important.

Farm prices fluctuate violently for any product for which distributing charges take a large part of the retail price. They fluctuate much less for a product that is distributed at small cost compared with retail prices.

If handling charges are one-half of retail prices, a 10-per-cent change in retail prices results in a 20-per-cent change in farm prices. If handling charges amount to three-fourths of the retail price, a 10-per-cent change in retail prices causes a 40-per-cent change in farm prices.

Any change in conditions that makes distributing charges high relative to retail prices, causes violent fluctuations in farm prices. Financial deflation lowers prices without reducing distributing charges, and causes

<sup>2</sup> Effect of the supply of potatoes on farm prices and crop values. U. S. Dept. Agr., Crops and Markets, vol. 3, sup. no. 10, p. 325. October, 1926.

Minnesota potato market letter, vol. 3, no. 2. December 6, 1926.

violent fluctuations in farm prices. Even in a period of deflation, any product that retails at a price that is more above previous retail prices than distributing costs are above previous distributing costs, has relatively small price fluctuations.

Financial deflation increases the violence of farm-price fluctuations. Freight rates and handling charges remain high, and represent such a large part of the retail prices that any given change in retail prices which is necessary to dispose of a large supply represents a very high percentage of the farm price. One of the serious effects of financial deflation is the increasing violence in farm-price fluctuations. For the 1924 crop year, potatoes retailed in New York City for \$1.74. Batavia farmers received 39 cents. In the following year retail prices changed to \$3.66 and Batavia farm prices changed to \$2.16, or increased more than five times when retail prices doubled.

One factor tending to stabilize prices is the increasing availability of supplies from distant areas, which may have had more or less favorable crops. For some commodities, this offsets the other factors. For many commodities, there is an increase in the violence of fluctuations of farm prices. There can be an increased stability in such a large center as Liverpool or New York due to drawing supplies from many countries; and at the same time an increased instability on farms, because of increasing commercialization of agriculture and high handling charges.

Eating in restaurants, stabilized retail prices, increased use of package goods, commercialized agriculture, specialized farming, living in large cities rather than in small villages, all tend to make farm prices fluctuate violently. Every step in agricultural progress and urban growth increases the violence of farm-price fluctuations. The rapid progress in farm efficiency in America is making this problem a national question.

#### EFFECT OF SUPPLY ON TOTAL VALUE

Before the war, a potato crop 20 per cent below normal would have sold at 135 per cent of the normal United States December 1 farm price. The total crop would have brought 80 per cent of 135, or 108, or would have brought \$108 for each \$100 received for a normal crop.

A crop 20 per cent above normal would have brought 78 per cent of a normal price, or \$94 for each \$100 brought by a normal crop. A small crop brings more money than does a large crop.

In surplus areas a small crop brings much more than does a large one. At Batavia, New York, for each \$100 brought by a normal crop, the small crop would have brought \$123 and the large crop \$84 (table 6). With the large crop the farmer had to dig and handle one-third more potatoes for two-thirds as much money.

TABLE 6. RELATION OF PRODUCTION OF POTATOES IN THE UNITED STATES TO TOTAL VALUE OF THE CROP AT BATAVIA, NEW YORK, FARM PRICES

Period	Value of crop 20 per cent below normal	Value of normal crop	Value of crop 20 per cent above normal
1897-1915 .....	123	100	84
1915-1920 .....	175	100	64
1921-1925 .....	222	100	53

In the period from 1921 to 1925, a United States potato crop 20 per cent below normal made Batavia prices 177 per cent above normal, whereas a crop 20 per cent above normal sold for 44 per cent of the normal price. For each \$100 brought by a normal crop, the small crop would have brought \$222 and the large crop \$53. Two-thirds as many potatoes brought four times as much money.

If the yield at Batavia bore the same relationship to normal yields that the United States crop bore to normal yields, these comparisons would indicate the approximate comparative quantities of money that farmers received.

Where potatoes are high in price there is a tendency to use smaller quantities for seed and for use by farm families. There are no data indicating whether a larger or a smaller percentage of a small crop is sold.

Farm prices fluctuate much more violently now than formerly.

The smaller the percentage that the farm price is of the retail price, the more violently does the farm price fluctuate with supply.

The less the consumers' price fluctuates, the more violently does the farm price fluctuate. The consumers' price may fluctuate less violently because of the tendency of retail prices to become constant, or because of the tendency to eat in restaurants and hotels. Package goods also tend to make retail prices constant.

Before the war, a large crop of potatoes in Rhode Island brought more dollars than did a small crop (table 7). At the present time, the small crop brings more, but there is much less variation than in a surplus area.

TABLE 7. RELATION OF PRODUCTION OF POTATOES IN THE UNITED STATES TO VALUE OF THE CROP AT RHODE ISLAND FARM PRICES

Period	Value of crop 20 per cent below normal	Value of normal crop	Value of crop 20 per cent above normal
1871-1894	95	100	101
1895-1915	98	100	102
1915-1920	121	100	90
1921-1925	164	100	77

In many parts of Europe, farmers are so near the consumers that conditions are similar to Rhode Island conditions. In such regions, price stability leads the farmer to give more attention to production. Since he has a fairly dependable price, he can use more fertilizer and give greater care to his crop.

With any given average income, the nearer uniform from year to year, the more highly will agriculture be developed.

#### RELATION BETWEEN FARM, WHOLESALE, AND RETAIL PRICES

For the last seven years, prices paid to farmers for potatoes at Batavia, New York, averaged 92 cents. Wholesale prices in New York City averaged \$1.27, and retail prices \$2.39. It cost 35 cents to get potatoes from the Batavia receiving station through the wholesale channels in New York, and cost \$1.12 more to get them from the wholesale to the retail buyer.

The amount received by the farmer was 92 cents and distributing charges averaged \$1.47.

TABLE 8. RETAIL AND WHOLESALE PRICES OF POTATOES AT NEW YORK CITY AND ON BATAVIA FARMS FOR THE CROP YEAR, OCTOBER TO JUNE,\* 1913-14 TO 1925-26

Crop year	New York City retail prices	New York City wholesale prices	Batavia, New York, farm prices	Spread between New York retail prices and Batavia farm prices
1910-11	\$1.38	\$0.54	\$0.39	\$0.99
1911-12	2.04	1.06	1.01	1.03
1912-13	1.44	0.62	0.47	0.97
1913-14	1.50	0.78	0.65	0.85
1914-15	1.14	0.47	0.29	0.85
1915-16	1.68	1.03	0.89	0.79
1916-17	3.36	2.38	2.32	1.04
1917-18	2.22	1.29	0.83	1.39
1918-19	2.52	1.27	1.03	1.49
1919-20	4.26	2.84	2.35	1.91
1920-21	2.10	0.94	0.55	1.55
1921-22	2.46	1.16	0.98	1.48
1922-23	1.92	0.91	0.60	1.32
1923-24	2.23	1.08	0.71	1.51
1924-25	1.74	0.70	0.39	1.35
1925-26	3.66	2.38	2.16	1.50
1926-27	2.64	1.66	1.03	1.61

\* The Batavia prices are for the eight months October to May.

For the five years 1910 to 1914, retail prices averaged \$1.50 and Batavia farm prices 56 cents. It then cost 94 cents to get potatoes from the Batavia farmer to the consumer. It now costs \$1.47.

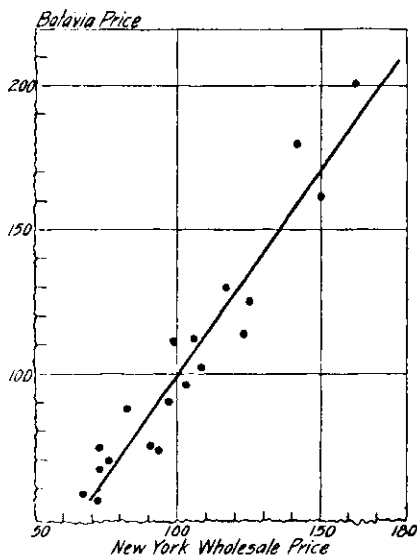


FIGURE 16. RELATION OF THE NEW YORK CITY WHOLESALE PRICE OF POTATOES TO THE BATAVIA, NEW YORK, DECEMBER FARM PRICE, 1897-1915

In the period from 1897 to 1915, a 20-per-cent change in wholesale prices in New York City caused a 29-per-cent change in farm prices at Batavia. At the present time a similar change in wholesale prices causes a 33-per-cent change in prices at Batavia

In 1924, farmers received the same price that they did in 1911, but retail prices were \$1.74 in 1924 and \$1.38 in 1910 (table 8).

How to farm intelligently when prices may be 39 cents a bushel (as they were in 1924) or \$2.16 (as they were in 1925), is a problem in higher mathematics.

From 1897 to 1915, a 20-per-cent change in New York City wholesale prices was, on the average, accompanied by a 29-per-cent change in prices at Batavia (table 9).

From 1921 to 1926, a 20-per-cent change in the New York City retail prices was, on the average, accompanied by a 38-per-cent change in New York City wholesale prices, by a 40-per-cent change in the United States farm prices, and by a 62-per-cent change in farm prices at Batavia, New York (table 10).

In the period from 1874 to 1894 a 20-per-cent change in wholesale prices in New York City was accompanied by a 13-per-cent change in United

TABLE 9. RELATION OF FARM AND WHOLESALE PRICES OF POTATOES, 1897-1915

Per cent change in New York City wholesale prices compared with five-year average	Corresponding per cent change in farm prices at Batavia, New York
20	29
40	57
60	86

TABLE 10. RELATION OF FARM, WHOLESALE, AND RETAIL PRICES OF POTATOES, 1921-1926

Per cent change in New York City retail prices compared with five-year average	Corresponding per cent change in		
	New York City wholesale prices	United States farm prices	Batavia, New York, farm prices
20.....	38	40	62
40.....	76	81	125
60.....	114	121	188

TABLE 11. RELATION OF FARM AND WHOLESALE PRICES OF POTATOES FOR THREE PERIODS, 1874-1894, 1895-1915, AND 1921-22 TO 1925-26

Per cent change in New York wholesale prices compared with five-year average	Corresponding per cent change in United States farm prices		
	1874-1894	1895-1915	1921-22 to 1925-26
20.....	13	16	21
40.....	26	32	43
60.....	39	47	64

States farm prices, and in the period from 1921 to 1925 by a 21-per-cent change (table 11). This shows the general principle of increasing violence in farm-price fluctuations.

The reason for the present violent change in farm prices when there is only a small change in retail prices is that handling charges constitute such a high percentage of the retail price. Freight rates remain exactly the same, and most other handling charges remain about the same, regardless of retail prices. Since farm prices are low compared with handling charges, they are low compared with retail prices, and a small change in the large figure (retail prices) causes a large percentage change in the small figure (farm prices).

EFFECT OF SIZE OF THE POTATO CROP ON RELATIONSHIPS OF FARM, WHOLESALE, AND RETAIL PRICES

In ten years when the United States potato crop was large compared with the crop of the preceding five years, the price paid to farmers at Batavia, New York, was 37 cents per bushel. In eleven years when the crop was small, the price averaged 60 cents. Wholesale prices in New York City for these years were 49 and 73 cents, respectively (table 12).

TABLE 12. RELATION OF SIZE OF THE UNITED STATES POTATO CROP TO DECEMBER PRICE PER BUSHEL, 1895-1915

	Eleven small crops	Ten large crops	Difference
Batavia, New York, farm prices.....	\$0.60	\$0.37	\$0.23
United States farm prices.....	0.62	0.45	0.17
Rhode Island farm prices.....	0.87	0.68	0.19
Georgia farm prices.....	0.98	0.93	0.05
New York City wholesale prices.....	0.73	0.49	0.24
New York City retail prices.....	1.27	1.10	0.11

It cost 12 cents to get 37-cent potatoes from Batavia into the wholesale market of New York City, whereas it cost 13 cents to get 60-cent potatoes through. The handling charges were practically the same regardless of price.

To get 37-cent potatoes from Batavia to the retail buyer in New York City cost 79 cents; but it cost only 67 cents to get 60-cent potatoes through. When potatoes are high the retailer cuts his margins and makes less profit than usual. When they are cheap he makes more profit than usual, because he receives a wider margin and sells more goods.

From the producer to the New York wholesaler, the spread was 1 cent more for cheap potatoes than for high-priced ones. From the wholesaler to the retail buyer, the spread was 13 cents more for cheap potatoes than for high-priced ones.

It is often said that when farm prices drop, the consumer does not get the benefit of the decline. He gets a part of the benefit but not all. When potatoes rise in price, the consumer does not pay the full increase. For twenty-one years the average spread between Batavia farm prices and New York retail prices was 73 cents. If this is assumed to be the necessary margin, then the margin when the crop was large was 6 cents more and in addition the distributors had the profit from a large volume of business. When the crop was small, the distributors received 6 cents less per bushel and handled fewer potatoes. Retailers recognize the fact that it is difficult to make a profit when prices are high. This is the time when the consumer imagines that the retailer is making an excessive profit.

Potatoes are shipped into Georgia, so that the farm price is essentially a retail price and is even less flexible than retail prices in a large city. It is to be expected that retail prices in small communities in deficit areas will be less flexible than retail prices in large communities. The smaller the units to be assembled, the greater is the cost of assembling. The smaller the amount to be distributed in any geographic area, the greater is the cost of distribution. The most difficult market to reach is a farm market in a deficit area.

When the United States potato crop was small, the average United States farm price was 62 cents, while the Georgia farm price was 98 cents. When the United States price was 45 cents, the Georgia price was 93 cents. It costs more to get a cheap United States bushel of potatoes to Georgia than a high-priced bushel.

All of the preceding data are for prices before the war. At the present time farm prices fluctuate more violently than formerly. In seven of

the past fourteen years, when the potato crop was small, the Batavia farm price averaged \$1.48 and the New York retail price averaged \$2.79 (tables 13 and 14). In seven years when the crop was large, the Batavia price averaged 63 cents and the New York City retail price \$1.98. It cost \$1.35 to get a bushel of cheap potatoes from the farmer to the consumer, and \$1.31 to get a high-priced bushel through.

TABLE 13. RELATION OF THE SIZE OF THE UNITED STATES POTATO CROP TO FARM PRICES AT BATAVIA, NEW YORK, AND WHOLESALE PRICES AT NEW YORK CITY, OCTOBER-JUNE, 1913-14 TO 1926-27

	Seven small crops	Seven large crops	Difference
Wholesale prices, New York City.....	\$1.75	\$0.96	\$0.79
Farm prices, Batavia, New York.....	1.48	0.63	0.85
Difference.....	\$0.27	\$0.33	

TABLE 14. RELATION OF THE SIZE OF THE UNITED STATES POTATO CROP TO FARM RETAIL PRICES, OCTOBER-JUNE, 1913-14 TO 1926-27

	Seven small crops	Seven large crops	Difference
Retail prices, New York City.....	\$2.79	\$1.98	\$0.81
Farm prices, Batavia, New York.....	1.48	0.63	0.85
Difference.....	\$1.31	\$1.35	

Repeated illustrations of this principle will be shown later in this bulletin for other farm products. For some farm products, the spread between the farm and the retail price is greater when the farm price is high, but usually the results are as here shown. Farmers have realized this situation, but most other persons have assumed that a large part of the charges between the farmer and the consumer were percentage increases, so that the retail price varied with the farm price. Apparently, it costs more to get a cheap bushel brought to the consumer than to get a high-priced bushel through. Probably the explanation of the problem is in the difference between a "buyers' market" and a "sellers' market." When there is a large supply it is more difficult for the retailer to sell. He knows that all wholesalers are anxious for his business and there is no hurry to buy. He will not buy except at a low price. The country buyer has difficulty in selling. He knows that the farmers have a large supply and is reluctant to buy except at a very low price. The farmer finds difficulty in selling because wherever he turns he is met by the same indifference. Sometimes no one will buy at any price.

If there is a short supply, the country buyer is eager to get the farmer's crop, but the farmer does not need to take the first offer. Plenty of other buyers want the crop.

#### EFFECT OF PRICES ON ACRES OF POTATOES PLANTED

Crop estimates of the United States Department of Agriculture are reliable as to the condition of the crop and the resulting yield per acre. The estimates of acreage are less reliable. However, comparisons over

a series of years before the war indicate that the potato acreage of the United States tended to change about 1 per cent for every 10-per-cent change in the farm price (table 15).

TABLE 15. RELATION OF PERCENTAGE CHANGE IN FARM PRICES OF POTATOES COMPARED WITH PRECEDING FIVE YEARS, TO PERCENTAGE CHANGE IN ACREAGE THE FOLLOWING YEAR, 1895-1911

Per cent change in United States farm prices	Per cent change in United States acreage the following year	Per cent change in Minnesota farm prices	Per cent change in Minnesota acreage the following year
20.....	2	20.....	4
30.....	4	40.....	7
60.....	6	60.....	11
80.....	8	80.....	14
100.....	10	100.....	18

When the farm price doubles, the acreage may be expected to increase 10 per cent the following year. At the present time changes in acreage and in prices are all much more violent.

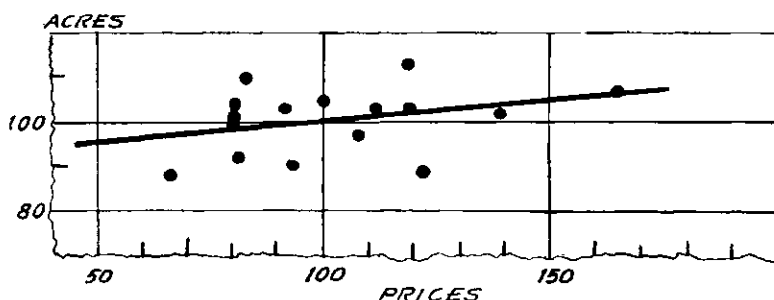


FIGURE 17. RELATION OF THE PURCHASING POWER OF THE UNITED STATES DECEMBER 1 FARM PRICE OF POTATOES TO THE UNITED STATES ACREAGE OF POTATOES IN THE FOLLOWING YEAR, 1895-1911

On the average, a 50-per-cent change in the United States farm price of potatoes results in a 5-per-cent increase in the acreage the following year

Since weather is the dominating factor in production and prices, the effects of price on acreage and of acreage on price are obscured.

Much of the planted acreage is not commercial. Prices therefore have considerably greater effect on the commercial acreage than on the total acreage. No figures are available for a strictly commercial area, but a doubling of the farm price in Minnesota is, on the average, accompanied by an 18-per-cent increase in acreage. The acreage in commercial areas is more responsive to prices than is the total acreage, and much more responsive than the acreage in deficit areas.

These figures do not represent the full effect of price on acreage. Few farmers expect that a high price will be fully repeated in another year. If it were known that prices would continue to be 20 per cent above prices of the preceding five years, a very great increase in acreage would occur.

The acreage fluctuates more in a commercial than in a noncommercial area (figure 18).



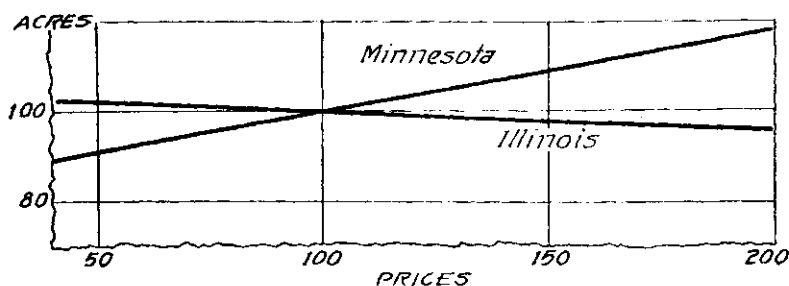


FIGURE 18. RELATION OF THE PURCHASING POWER OF THE MINNESOTA AND THE ILLINOIS FARM PRICE OF POTATOES TO ACREAGES IN THE FOLLOWING YEAR, 1895-1911

Illinois produces few potatoes and the acreage does not change with prices. In Minnesota a 50-per-cent increase in price results in an average increase of 9 per cent in acreage

In a commercial area far from market, prices fluctuate more than in a commercial area near market. Therefore, acreage fluctuates more in areas far from market.

If crop yields per acre were normal, a change of 10 per cent in acreage resulting from a 100-per-cent change in the United States farm price would have reduced farm prices in the following year by 12 per cent before the war and by 28 per cent now.

#### SWEET POTATOES

The effect of production on the price of Irish potatoes and of sweet potatoes is shown in figure 19. Prices of sweet potatoes are less influenced by the United States crop than are prices of Irish potatoes. Before the World War, when the sweet-potato crop was 10 per cent below normal the United States farm prices were 8 per cent above normal; when the Irish potato crop was 10 per cent below normal, the United States farm prices were 15 per cent above normal.

#### HAY

##### EFFECT OF SUPPLY ON PRICES

Hay prices are less affected by supply than are the prices of potatoes. Before the war, a United States crop of hay that was 20 per cent below normal sold on farms for 17 per cent above the normal price. The New York hay crop sold for 23 per cent above the normal price (table 16 and figure 21).

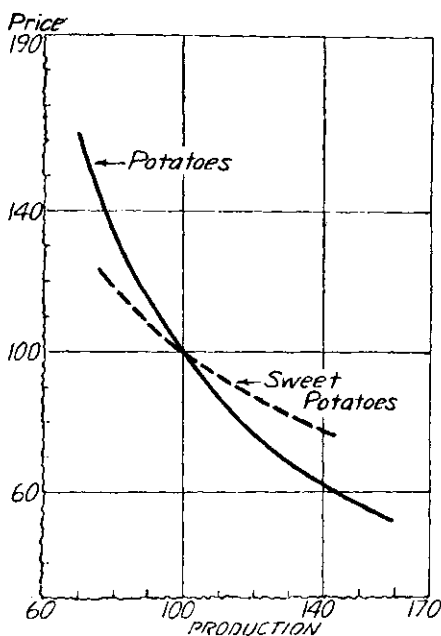


FIGURE 19. RELATION OF THE UNITED STATES PRODUCTION TO THE PURCHASING POWER OF THE UNITED STATES DECEMBER 1 FARM PRICE OF IRISH POTATOES (1895-1915) AND OF SWEET POTATOES (1904-1914)

Prices of Irish potatoes fluctuate more violently than do prices of sweet potatoes

TABLE 16. EFFECT OF SIZE OF THE UNITED STATES HAY CROP ON DECEMBER FARM PRICES IN NEW YORK AND IN GEORGIA, 1875-1913  
(From table 129)

Locality	Crop 20 per cent below normal	Crop 20 per cent above normal
New York.....	Per cent that prices were above normal 23	Per cent that prices were below normal 16
Georgia.....	3	3

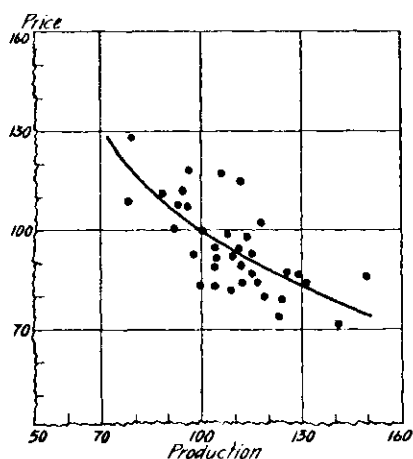


FIGURE 20. RELATION OF THE UNITED STATES PRODUCTION OF HAY TO THE PURCHASING POWER OF THE UNITED STATES DECEMBER 1 FARM PRICE, 1875-1913

When the United States crop was 20 per cent below normal, the United States farm price averaged 17 per cent above normal

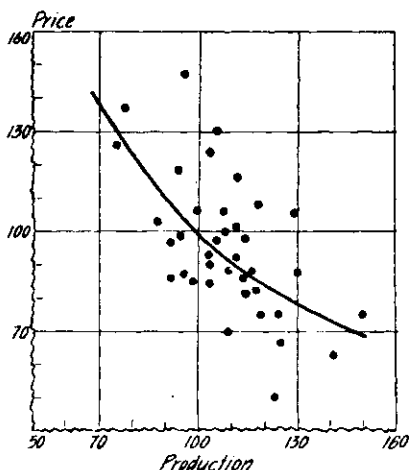


FIGURE 21. RELATION OF THE UNITED STATES PRODUCTION OF HAY TO THE PURCHASING POWER OF THE NEW YORK DECEMBER 1 FARM PRICE, 1875-1913

When the United States crop was 20 per cent below normal, the New York farm price was 23 per cent above normal

Retail prices of hay are not available, but the Rhode Island farm price approximates a retail price. The farm price of hay in Georgia is also approximately the same as a retail price, as both of these are deficit areas. Before the war, a crop 20 per cent below normal sold for 23 per cent above normal on New York farms, but for only 3 per cent above normal on Georgia farms. Similarly, a crop 20 per cent above normal cut the price on New York farms 16 per cent, but cut it only 7 per cent on Rhode Island farms and 3 per cent on Georgia farms.

A part of New York State is in a deficit area. In southeastern New York, farm prices vary about as they do in Rhode Island. If prices were available for the surplus areas, the fluctuations would be much greater than those here given. A crop 20 per cent below normal probably raised the farm price in the vicinity of Ithaca, New York, by about 35 per cent.

Prices in New York City for different grades of hay all appear to vary about equally with the total crop (table 129, page 107).

## EFFECT OF SUPPLY ON TOTAL VALUE

Before the war, when the United States production of hay was 20 per cent below normal the United States crop was worth 2 per cent less than the normal total value at New York farm prices; and a crop 20 per cent above normal was worth 1 per cent more than the normal total value. In surplus areas a large crop undoubtedly brought less money than did a small crop, but the difference was much less than for potatoes. Such a large proportion of the hay is consumed on farms that a small percentage increase in farm use which accompanies low prices will dispose of a large part of the surplus. The possibility of carrying over a part of the crop also prevents the fluctuations from being as violent as in the case of potato prices.

Since farm prices fluctuate violently with supply, the portion of any crop that is used on the farm obtains the full benefit of the drop in farm value. Farm consumption is increased accordingly. Since retail prices fluctuate much less, the portion that is marketed receives the benefit of only the small drop in city prices. Consumption in cities is, therefore, increased only moderately; the higher the percentage of the crop marketed, the more violent are the farm-price fluctuations.

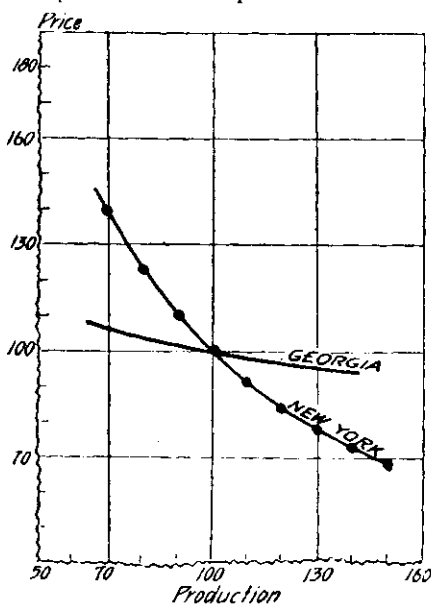


FIGURE 22. RELATION OF THE UNITED STATES PRODUCTION OF HAY TO THE PURCHASING POWER OF DECEMBER 1 FARM PRICES IN NEW YORK AND IN GEORGIA, 1875-1913

When the United States production was 20 per cent below normal, the New York farm price was 23 per cent above normal but the Georgia farm price was only 3 per cent above normal. Georgia ships in large quantities of hay. The price is so largely made up of freight rates and handling charges that the size of the United States crop has little effect on farm prices in Georgia.

## EFFECT OF SIZE OF THE HAY CROP ON RELATIONSHIPS OF FARM AND WHOLESALE PRICES

Before the war, considerable quantities of hay were shipped from New York to Rhode Island. With a large crop of hay the Rhode Island farm price was \$7.12 more than the New York farm price (table 17). With a short crop of hay the Rhode Island farm price was \$5.63 more than the New York farm price. Apparently it cost more to get \$10 hay from New York farms to Rhode Island farms than to get \$13 hay there.

Considerable hay is shipped from Ohio, Indiana, and Illinois to various southern States. Comparative prices of hay in Georgia and Ohio are given in table 18. In short-crop years the difference between Georgia and Ohio farm prices was \$3.54 per ton, whereas the difference in large-crop years was \$5.04. It cost more to get hay worth \$8.80 from Ohio to Georgia than to get hay worth \$11.53 through the channels of trade.

TABLE 17. RELATION OF SIZE OF THE UNITED STATES HAY CROP TO DECEMBER 1 FARM PRICES, 1874-1913

Locality	Twenty small crops	Twenty large crops	Difference
Rhode Island.....	\$18.64	\$17.35	\$1.29
New York.....	13.01	10.23	2.78
Difference.....	\$5.63	\$7.12	.....

TABLE 18. RELATION OF SIZE OF UNITED STATES HAY CROP TO DECEMBER 1 FARM PRICES OF HAY IN GEORGIA AND OHIO, 1874-1913

Locality	Twenty small crops	Twenty large crops	Difference
Georgia.....	\$15.07	\$13.84	\$1.23
Ohio.....	11.53	8.80	2.73
Difference.....	\$3.54	\$5.04	.....

The same principle is shown when the prices in Illinois and Georgia are compared (table 19).

TABLE 19. RELATION OF SIZE OF UNITED STATES HAY CROP TO DECEMBER 1 FARM PRICES OF HAY IN GEORGIA AND ILLINOIS

Locality	Twenty small crops	Twenty large crops	Difference
Georgia.....	\$15.07	\$13.84	\$1.23
Illinois.....	10.13	7.47	2.66
Difference.....	\$4.94	\$6.37	.....

## EFFECT OF PRICES ON ACRES OF HAY

The price of hay last year and the year before are about equally important in their effect on the acreage of hay in New York State.<sup>3</sup>

<sup>3</sup> GROSS AND MULTIPLE CORRELATION BETWEEN THE NEW YORK PRICE OF HAY AND THE NEW YORK ACREAGE THE FOLLOWING YEAR, 1897-1912

$X_1$  = December 1 New York farm price of hay in the  $y$  year;  
 $X_2$  = December 1 New York farm price of hay in the following, or  $y + 1$ , year;  
 $X_3$  = December 1 New York farm price of hay in the second following, or  $y + 2$ , year;  
 $X_4$  = the New York acreage of hay in the third following, or  $y + 3$ , year.

Gross correlations	Multiple correlation
$r_{15} = -0.023$ $r_{16} = -0.548$ $r_{17} = -0.520$	$R_{4,123} = 0.74$

PER CENT THAT NEW YORK ACREAGE OF HAY IS DETERMINED BY DECEMBER 1 NEW YORK FARM PRICE OF HAY IN THE THREE PRECEDING YEARS, 1897-1912

Farm price	Per cent determination
Preceding year, $X_3$ .....	25.4
Second year preceding, $X_2$ .....	20.2
Third year preceding, $X_1$ .....	0.1
Total.....	54.7

On the average, a 30-per-cent change in the December 1 New York farm price of hay before the war, changed the acreage 2 per cent the following year and 2 per cent two years later (tables 20 and 21). The combined influence of a 30-per-cent change two years in succession resulted in a 4-per-cent increase in acreage (table 22). Undoubtedly the acreage change would have been much greater had it not been for the fact that farmers have learned by experience that weather has much more influence than has acreage on production and prices.

#### RELATION OF PRICES TO IMPORTS OF HAY

From 1895 to 1913, when United States farm prices of hay were 20 per cent above normal, imports were 82 per cent above normal (table 23). Prices 20 per cent below normal reduced imports by one-half. Many other factors affect imports, so that in any given year the effect of prices may be obscured.

The total imports of hay are very small in proportion to the United States crop, but are a large proportion of the commercial hay in New York.

Location of supply is extremely important on price. An addition to the United States hay crop equal to the imports, but scattered uniformly throughout the country, would have no appreciable effect on price because a large part of it would be scattered on farms where it would have no effect on purchases or sales of hay. Such a supply baled and in the channels of trade might have a material effect on prices.

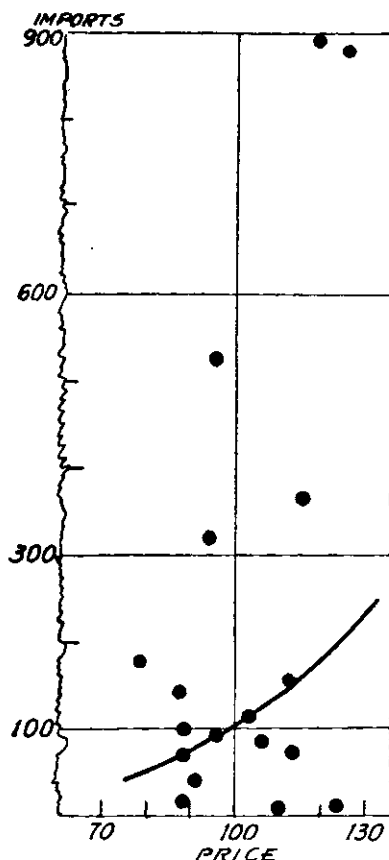


FIGURE 23. RELATION OF THE PURCHASING POWER OF THE UNITED STATES DECEMBER 1 FARM PRICE OF HAY TO IMPORTS OF HAY INTO THE UNITED STATES, 1895-1913

When the price is low, imports are low. Conversely, when prices are high, imports are high.

#### APPLES

The relation of the United States apple crop to wholesale prices of sixteen varieties at New York City is shown in figure 24. The demand for apples is more elastic than the demand for potatoes. Before the war, a United States crop of potatoes that was 20 per cent below normal sold at wholesale in New York City at 48 per cent above the normal price. A 20-per-cent shortage of apples resulted in a 17-per-cent rise in the wholesale price of apples at New York City. Probably a 10-per-cent

TABLE 20. EFFECT OF CHANGES IN DECEMBER 1 NEW YORK FARM PRICE OF HAY ON THE NEW YORK ACREAGE THE FOLLOWING YEAR, ELIMINATING THE EFFECT OF PRICES TWO YEARS BEFORE, 1897-1912

Per cent change in farm price	Corresponding per cent change in acreage
10	0.8
20	1.5
30	2.3
40	3.0

TABLE 21. EFFECT OF CHANGES IN DECEMBER 1 NEW YORK FARM PRICE OF HAY ON THE NEW YORK ACREAGE TWO YEARS LATER, ELIMINATING THE EFFECT OF PRICES THE PRECEDING YEAR, 1897-1912

Per cent change in farm price	Corresponding per cent change in acreage
10	0.6
20	1.3
30	1.9
40	2.6

TABLE 22. EFFECT OF CHANGES IN DECEMBER 1 NEW YORK FARM PRICE OF HAY FOR TWO PRECEDING YEARS ON THE NEW YORK ACREAGE, 1897-1912

Per cent change in farm price	Corresponding per cent change in acreage
10	1.4
20	2.8
30	4.2
40	5.6

TABLE 23. RELATION OF THE DECEMBER 1 UNITED STATES FARM PRICE OF HAY TO THE IMPORTS OF HAY INTO THE UNITED STATES, 1895-1913

Per cent change in price	Per cent change in imports
-30	-69
-20	-52
-10	-29
+10	+37
+20	+82
+30	+137

drop in the price of apples stimulates consumption more than does a 10-per-cent drop in the price of potatoes. Conversely, a 10-per-cent advance in the price of apples curtails consumption more than does a 10-per-cent advance in the price of potatoes.

Curves for individual varieties indicate that prices respond to size of crop to about the same degree for each variety. There seems to be a tendency for Greenings and Baldwins to fluctuate more violently than the average for sixteen varieties.

As in the case of all other farm products for which the retail price is now low compared with handling charges, price fluctuations for apples are more violent than before the war. Since the war, a given variation in size of the apple crop has caused nearly twice as much percentage variation in the wholesale price of apples in New York City as was caused by a similar crop variation before the war.

Prices of cider apples fluctuate more violently than do prices of other apples, as indicated in figure 25. When there is a large apple crop, the price of cider apples is just enough to get a part of the apples hauled from the orchard to the vinegar factories (table 24 and figure 25).

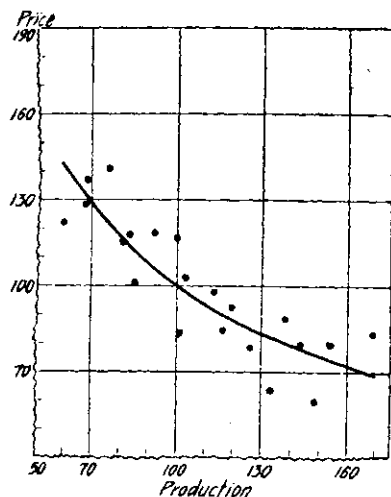


FIGURE 24. RELATION OF THE UNITED STATES PRODUCTION OF APPLES TO THE PURCHASING POWER OF THE AVERAGE AUGUST-JUNE WHOLESALE PRICES OF SIXTEEN VARIETIES IN NEW YORK CITY, 1894-1914

When the crop was 20 per cent below normal, the New York City wholesale price of sixteen varieties of apples was 17 per cent above normal

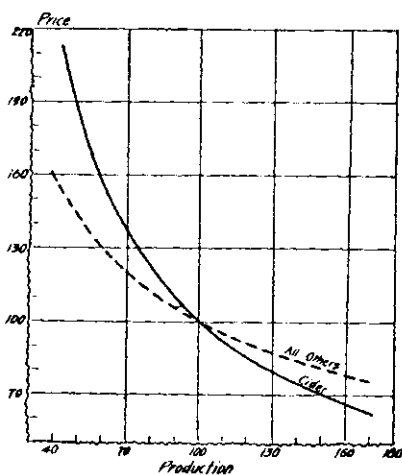


FIGURE 25. RELATION OF THE UNITED STATES PRODUCTION OF APPLES TO THE PURCHASING POWER OF FARM PRICES OF CIDER APPLES AND OTHER APPLES IN NIAGARA COUNTY, NEW YORK, 1913-1925

When the United States crop was 20 per cent below normal, cider apples in Niagara County were 22 per cent above normal and other apples were 12 per cent above normal

TABLE 24. EFFECT OF SIZE OF THE UNITED STATES APPLE CROP ON PRICES PAID TO FRUIT GROWERS IN NEWFANE TOWNSHIP, NIAGARA COUNTY, NEW YORK, 1913-1925

(From table 129)

Kind	Crop 20 per cent below normal	Crop 20 per cent above normal
	Per cent that prices were above normal	Per cent that prices were below normal
Eating apples.....	12	9
Cider apples.....	22	15

The price of apples fluctuates more violently than does the price of bananas. Retail prices for bananas are not available. If they were in proportion to wholesale prices, a given change in the price of bananas

TABLE 25. RELATION OF SIZE OF THE UNITED STATES APPLE CROP TO DECEMBER FARM PRICES, 1910-1925

Locality	Nine small crops	Seven large crops	Difference
Rhode Island.....	\$1.07	\$0.92	\$0.15
New York.....	0.84	0.64	0.20
Difference.....	\$0.23	\$0.28	.....

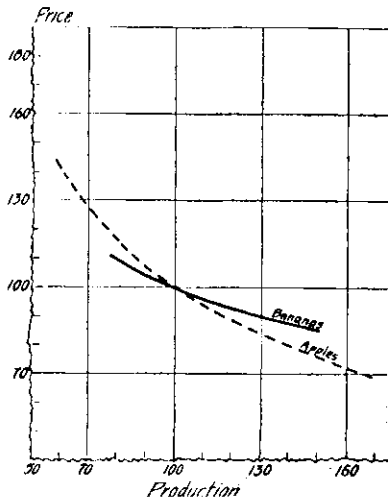


FIGURE 26. RELATION OF UNITED STATES NET IMPORTS OF BANANAS TO THE PURCHASING POWER OF WHOLESALE PRICES OF "JAMAICAS" IN NEW YORK CITY, AND RELATION OF THE UNITED STATES PRODUCTION OF APPLES TO THE PURCHASING POWER OF WHOLESALE PRICES OF SIXTEEN VARIETIES IN NEW YORK CITY

When the imports of bananas were 20 per cent below normal, wholesale prices in New York City were 9 per cent above normal. When the United States production of apples was 20 per cent below normal, wholesale prices of apples were 17 per cent above normal. Possibly the demand for bananas is more flexible than the demand for apples

When the Georgia crop was 20 per cent below normal, the July jobbing price of peaches at New York City was 9 per cent above normal. When the crop was 20 per cent above normal the price was 7 per cent below normal.

In seven years when the Georgia crop of peaches was large, the New York City jobbing price was \$2.12 per bushel and the Georgia farm price was \$1.33 (table 26). The difference was 79 cents. When the crop was small, the New York jobbing price was \$2.15 and the Georgia farm price was \$1.54. The difference was 61 cents. The spread between the New York jobbing price and the Georgia farm price was thus 61

would affect consumption more than would a similar change in the price of apples (figure 26).

A comparison of New York and Rhode Island farm prices is shown in table 25. As in all such cases, the Rhode Island farm price is much more stable than the New York farm price. When the crop was large, apples worth 64 cents on New York farms were worth 92 cents in Rhode Island. The difference is 28 cents. When the New York price is higher, the difference is less. The surplus depresses prices in producing centers so that it costs more to get cheap apples to the market than high-priced ones.

## PEACHES

From 1915 to 1925, when the United States crop of peaches was 20 per cent below normal the price was 7 per cent above normal. When the crop was 20 per cent above normal the price was 5 per cent below normal.

The monthly price of peaches in different areas is influenced more by the size of the crop in the different areas than by the United States production.



TABLE 26. RELATION OF SIZE OF THE GEORGIA PEACH CROP TO JULY PRICES, 1911-1924

Locality	Seven small crops	Seven large crops	Difference
Jobbing price, New York City.....	\$2.15	\$2.12	\$0.03
Farm price, Georgia.....	1.54	1.33	0.21
Difference.....	\$0.61	\$0.79	.....

cents for high-priced peaches and 79 cents for cheap peaches. Apparently it cost more per unit to distribute a large crop of peaches than a small crop.

In six years when the peach crop in New York State was small, the New York City jobbing price was \$2.21 and the farmers in Newfane received \$1.73 (table 27). The difference was 48 cents. In six years of

TABLE 27. RELATION OF THE SIZE OF THE NEW YORK PEACH CROP TO THE FARM PRICE PER BUSHEL IN NEWFANE TOWNSHIP, NIAGARA COUNTY, NEW YORK, AND TO THE JOBBING PRICE IN NEW YORK CITY, 1913-1924

Locality	Six small crops	Six large crops	Difference
Jobbing price, New York City.....	\$2.21	\$1.61	\$0.60
Farm price, Newfane.....	1.73	0.93	0.80
Difference.....	\$0.48	\$0.68	.....

large crops, the New York price dropped to \$1.61 and the Newfane farm price to 93 cents. The difference was 68 cents. As in previous cases, it cost more to get cheap peaches through the channels of trade than to get high-priced ones through.

## PEARS AND CRANBERRIES

Pears show little relationship between the United States production and the United States farm price, probably because the farm prices are not for commercial production.

In the few years for which data are available, the prices of cranberries fluctuated violently with supply (table 129, page 108).

## CABBAGE

### EFFECT OF SUPPLY ON PRICES

The prices of cabbage are exceedingly variable. One year cabbage may rot in the field, while the next year farmers may receive \$30 a ton.

A production 20 per cent below normal in the ten States producing late cabbage resulted in an increase of 82 per cent in the farm price at Little York, and increased the wholesale price in New York City by 61 per cent (table 28).

Yields per acre are exceedingly variable, depending largely upon rainfall of July, August, and September.<sup>4</sup> Changes in yields per acre are about twice as important as changes in acres harvested, in determining production.<sup>5</sup>

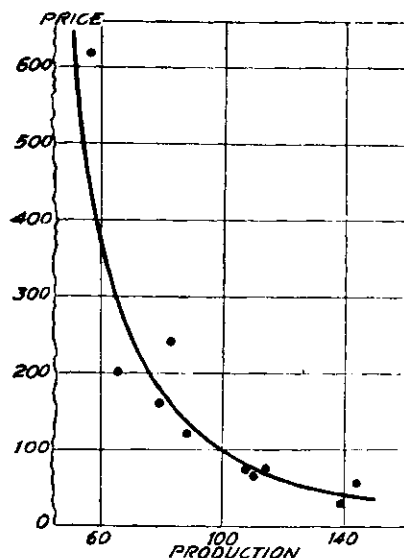
<sup>4</sup> Misner, E. G. Production and prices of cabbage. *Farm economics*, no. 16, p. 149. July, 1924.

<sup>5</sup> Scoville, G. P. Cabbage prices and the next year's acreage. *Farm economics*, no. 43, p. 635. March, 1927.

TABLE 28. RELATION OF SIZE OF CROP IN TEN STATES PRODUCING LATE CABBAGE, TO WHOLESALE PRICE OF DANISH CABBAGE AT NEW YORK CITY, AND FARM PRICE AT LITTLE YORK, CORTLAND COUNTY, NEW YORK, DECEMBER, 1915-1924

(From table 129)

Locality	Crop 20 per cent below normal	Crop 20 per cent above normal
Farm price, Little York.....	82	39
Wholesale price, New York City.....	61	32



#### EFFECT OF SUPPLY ON TOTAL VALUE

From 1914 to 1925, when the late cabbage crop was 20 per cent below normal, farm prices at Little York, Cortland County, New York, were 82 per cent above normal (table 28). The total crop would have brought 80 per cent of 182, or \$146 for each \$100 received for a normal crop (table 29). When the crop was 20 per cent above normal, it would have brought 61 per cent of the normal price, or \$73 when a normal crop was worth \$100.

The farmers received exactly twice as much for a small crop as for a large one. If they delivered 50 per cent more cabbage they received 50 per cent less money.

#### RELATION BETWEEN FARM AND WHOLESALE PRICES

In the five years 1910 to 1914, Danish cabbage was worth \$15.70 per ton at New York City and \$11.58 at Little York (table 30). The difference was \$4.12. In the five years 1920 to 1924, the difference was \$7.10. The spread in the latter period was 172 per cent of the pre-war spread.

FIGURE 27. RELATION OF THE PRODUCTION IN THE TEN STATES PRODUCING LATE CABBAGE, TO THE PURCHASING POWER OF THE DECEMBER FARM PRICES AT LITTLE YORK, NEW YORK, 1915-1924

Cabbage prices fluctuate violently with changes in production. When the late crop was 20 per cent below normal, prices at Little York were 82 per cent above normal

TABLE 20. RELATION OF PRODUCTION OF CABBAGE IN TEN STATES PRODUCING LATE CABBAGE, TO THE VALUE OF THE CROP AT LITTLE YORK, NEW YORK, FARM PRICE, AND NEW YORK CITY WHOLESALE PRICE, 1919-1925

Locality	Value of crop 20 per cent below normal	Value of normal crop	Value of crop 20 per cent above normal
Wholesale price, New York City.....	129	100	82
Farm price, Little York.....	146	100	73

TABLE 30. FARM AND WHOLESALE PRICE OF DANISH CABBAGE, DECEMBER, 1910-1926

Year	Wholesale price, New York City	Farm price, Little York, Cortland County	Difference
1910.....	\$12.90	\$ 7.57	\$ 5.33
1911.....	21.60	18.50	3.10
1912.....	6.50	3.00	3.50
1913.....	26.00	20.81	5.19
1914.....	11.50	8.00	3.50
1915.....	7.88	5.00	2.88
1916.....	54.50	67.01	12.51
1917.....	38.50	30.66	7.84
1918.....	22.25	18.37	3.88
1919.....	68.75	58.68	10.07
1920.....	12.50	7.00	5.50
1921.....	47.40	36.40	11.00
1922.....	21.10	11.93	9.17
1923.....	23.88	16.87	7.01
1924.....	12.83	10.00	2.83
1925.....	36.12	25.00	11.12
1926.....	31.40	15.00	16.40
Average:			
1910-14.....	\$15.70	\$11.58	\$4.12
1920-24.....	23.54	16.44	7.10

## EFFECT OF SUPPLY ON RELATIONSHIP OF FARM AND WHOLESALE PRICES

In five years when the crop was short, cabbage at Little York sold for \$41.93 per ton (table 31). When the crop was large it sold for \$10.46. The difference is \$31.47.

TABLE 31. RELATION OF SIZE OF CROP IN TEN STATES PRODUCING LATE CABBAGE, TO PRICES AT LITTLE YORK, NEW YORK, AND AT NEW YORK CITY, 1915-1924

Locality	Five small crops	Five large crops	Difference
Wholesale price, New York City.....	\$46.61	\$15.31	\$31.30
Farm price, Little York.....	41.93	10.46	31.47
Difference.....	\$4.68	\$4.85	.....

In the five years when the crop was small, the difference between the New York City wholesale price, \$46.61, and the Little York farm price, \$41.93, was \$4.68. In the five years when the crop was large, the difference was \$4.85. It cost more to move \$10.46 cabbage from Little York to New York City than it cost to move \$41.93 cabbage.

## EFFECT OF PRICES ON ACRES OF CABBAGE

During the thirteen years 1913 to 1925, the acreage of cabbage grown in Newfane Township, Niagara County, New York, was closely associated with the price for the preceding year. In 1919, cabbage sold for \$39.10 per ton. The following year 58 per cent of the farmers grew cabbage and received \$5.15 per ton. The next year only 39 per cent of the farmers grew cabbage.

## CORN

## EFFECT OF SUPPLY ON PRICES

From 1877 to 1913, the Iowa farm price of corn on December 1 was 42 per cent above normal when the United States crop was 20 per cent

below normal (table 32). A crop 20 per cent above normal reduced the Iowa farm price to 25 per cent below normal.

TABLE 32. RELATION OF PRODUCTION OF CORN IN THE UNITED STATES TO DECEMBER PRICES\*  
(From table 129)

Locality	Crop 20 per cent below normal	Crop 20 per cent above normal
	Per cent that prices were above normal	Per cent that prices were below normal
Farm price, Iowa.....	42	25
Farm price, United States.....	28	18
Wholesale price, No. 2 cash, Chicago.....	26	17
Wholesale price, No. 2 western, New York City.....	23	15
Wholesale price, mixed American, Liverpool.....	15	11
Farm price, Georgia.....	12	9

\* The Iowa farm price is for the 37 years 1877-1913; the United States farm price, for the 39 years 1875-1913; the Chicago wholesale price, for the 38 years 1876-1913; the New York wholesale price, for the 29 years 1885-1913; the Liverpool wholesale price, for the 16 years 1898-1913; and the Georgia farm price, for the 39 years 1875-1913.

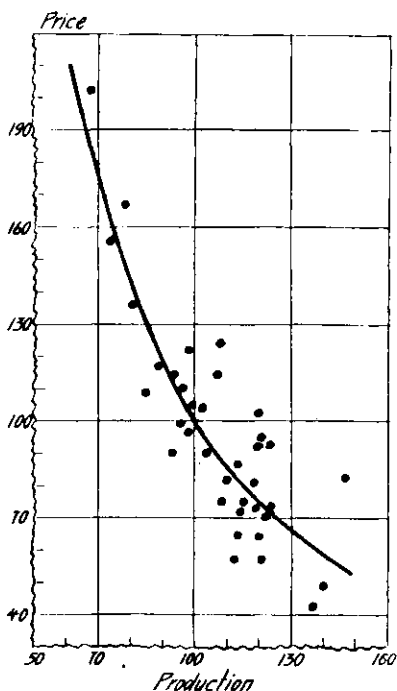


FIGURE 28. RELATION OF THE UNITED STATES PRODUCTION OF CORN TO THE PURCHASING POWER OF THE IOWA DECEMBER I FARM PRICE, 1877-1913

When the United States production of corn was 20 per cent below normal, the Iowa farm price was 42 per cent above normal.

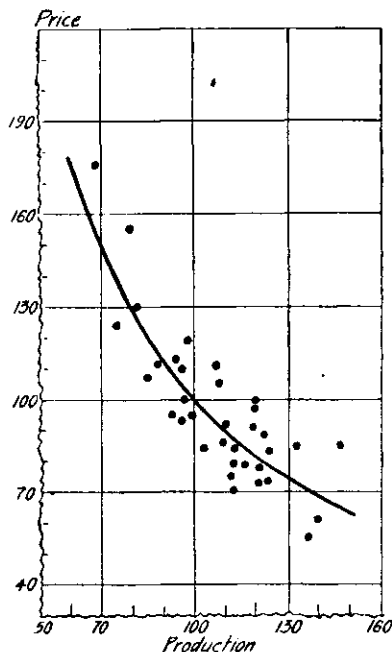


FIGURE 29. RELATION OF THE UNITED STATES PRODUCTION OF CORN TO THE PURCHASING POWER OF THE UNITED STATES DECEMBER I FARM PRICE, 1875-1913

When the United States production of corn was 20 per cent below normal, the United States farm price was 28 per cent above normal.

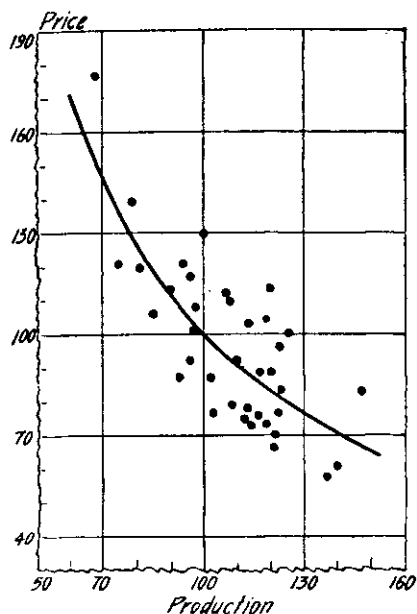


FIGURE 30. RELATION OF THE UNITED STATES PRODUCTION OF CORN TO THE PURCHASING POWER OF THE DECEMBER PRICE OF NO. 2 CASH CORN AT CHICAGO, 1876-1913

When the United States production of corn was 20 per cent below normal, the Chicago price was 26 per cent above normal

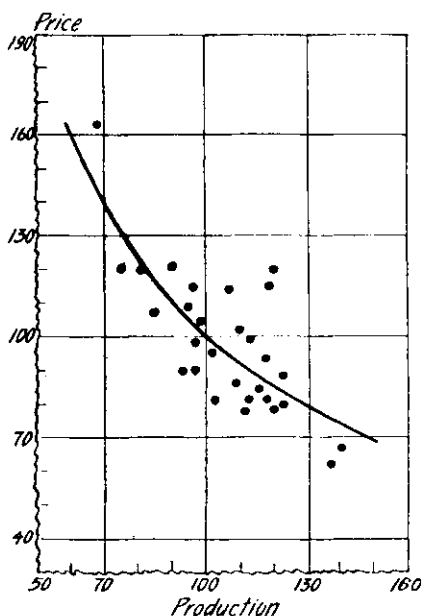


FIGURE 31. RELATION OF THE UNITED STATES PRODUCTION OF CORN TO THE PURCHASING POWER OF THE DECEMBER PRICE OF NO. 2 WESTERN MIXED CORN AT NEW YORK CITY, 1885-1913

When the United States production of corn was 20 per cent below normal, the New York City price was 23 per cent above normal

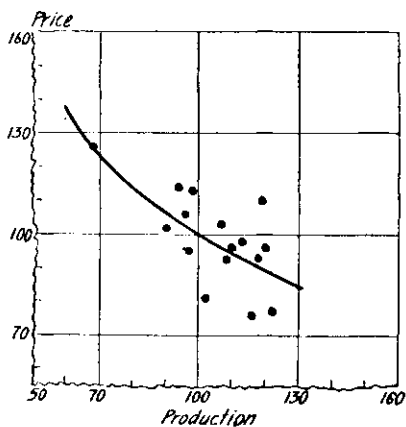


FIGURE 32. RELATION OF THE UNITED STATES PRODUCTION OF CORN TO THE PURCHASING POWER OF THE DECEMBER PRICE OF MIXED AMERICAN CORN AT LIVERPOOL, ENGLAND, 1898-1913

When the United States production of corn was 20 per cent below normal, the price of American corn at Liverpool was 15 per cent above normal

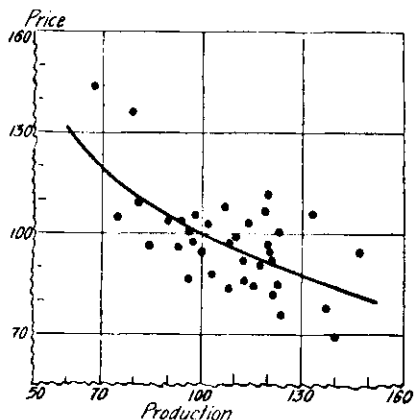


FIGURE 33. RELATION OF THE UNITED STATES PRODUCTION OF CORN TO THE PURCHASING POWER OF THE DECEMBER 1 FARM PRICE OF CORN IN GEORGIA, 1875-1913

When the United States production of corn was 20 per cent below normal, the Georgia farm price was 12 per cent above normal

For a crop 20 per cent below normal, the United States farm price averaged 28 per cent above normal. The smaller rise in price may be accounted for by the fact that in many parts of the United States the farm price of corn is a retail price. It does not represent either the consumers' or the producers' price. It is a mixture of both.

The price of corn at Chicago includes some handling charges so that it fluctuates less violently. In the same period, when the crop was 20 per cent less than normal the price of No. 2 cash corn at Chicago was 26 per cent above normal. A United States crop 20 per cent above normal decreased the Chicago price 17 per cent below normal. Additional handling charges are involved before the corn reaches New York City; hence the New York price is less variable than the Chicago price.

The Liverpool price is still less variable. A crop 20 per cent below normal increased the Liverpool price 15 per cent, the New York City wholesale price 23 per cent, the Chicago wholesale price 26 per cent, and the Iowa farm price 42 per cent. A crop 20 per cent larger than normal depressed the Liverpool price 11 per cent, the New York City price 15 per cent, the Chicago price 17 per cent, and the Iowa farm price 25 per cent.

No retail prices of corn are available, but the Georgia farm price of corn is practically a retail price because Georgia does not produce enough

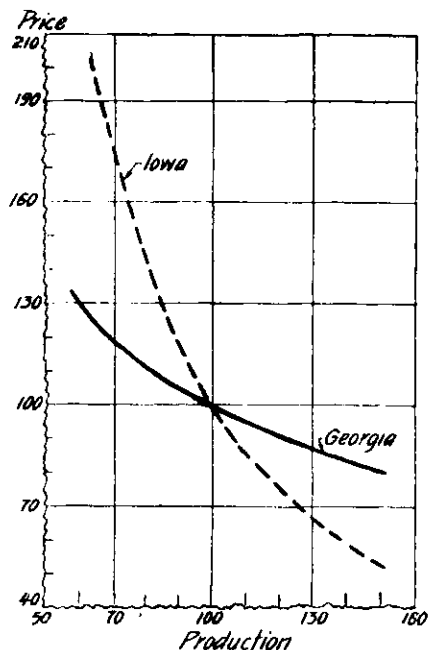


FIGURE 34. RELATION OF THE UNITED STATES PRODUCTION OF CORN TO THE PURCHASING POWER OF THE FARM PRICES OF CORN IN IOWA AND IN GEORGIA

Prices in Iowa are exceedingly variable. Those in Georgia fluctuate much less

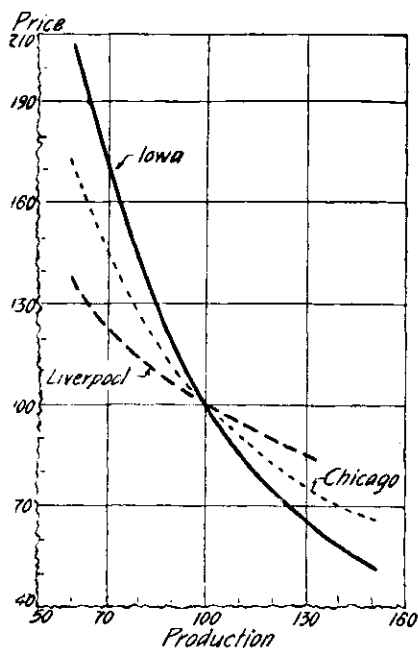


FIGURE 35. RELATION OF THE UNITED STATES PRODUCTION OF CORN TO THE PURCHASING POWER OF PRICES ON IOWA FARMS, IN CHICAGO, AND IN LIVERPOOL

Prices paid to producers are much more variable than prices in cities, because the latter include so many fixed handling charges

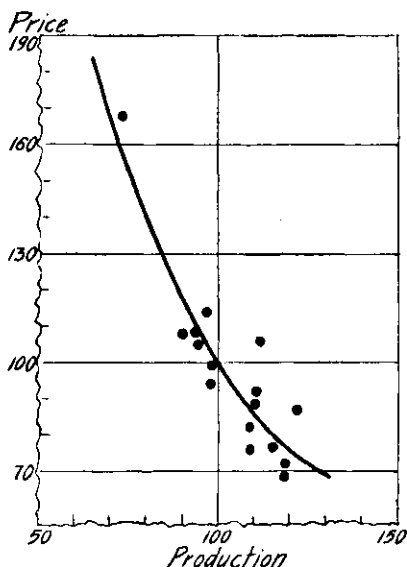
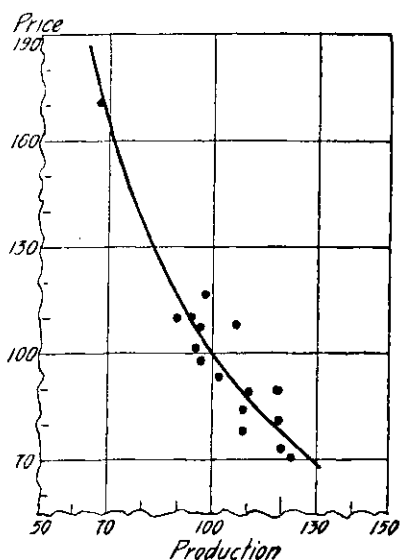


FIGURE 36. RELATION OF THE UNITED STATES PRODUCTION OF CORN TO THE PURCHASING POWER OF THE UNITED STATES DECEMBER 1 FARM PRICE, 1900-1915

FIGURE 37. RELATION OF THE WORLD PRODUCTION OF CORN TO THE PURCHASING POWER OF THE UNITED STATES DECEMBER 1 FARM PRICE, 1900-1915

The two curves are practically identical, owing to the fact that the United States production dominates in both cases

corn for farm use. The farm price, therefore, includes not only the handling charges for assembling the corn in wholesale centers, but also the costs of distributing it through stores in Georgia. When the United States crop was 20 per cent below normal, the Georgia farm price was increased only 12 per cent, whereas the Iowa farm price was increased 42 per cent. The Georgia price includes so many handling charges that the increase in price in Iowa due to a short crop has very little effect on the Georgia farm price.

The United States farm price before the war fluctuated a trifle more violently with world production than with United States production (table 33). This is because a small United States crop might be counterbalanced by good crops elsewhere.

TABLE 33. RELATION OF PRODUCTION OF CORN IN THE UNITED STATES AND THE WORLD, TO THE UNITED STATES FARM PRICES, DECEMBER 1, 1900-1915  
(From table 129)

Crop	Crop 20 per cent below normal	Crop 20 per cent above normal
	Per cent that prices were above normal	Per cent that prices were below normal
World .....	40	24
United States .....	37	23

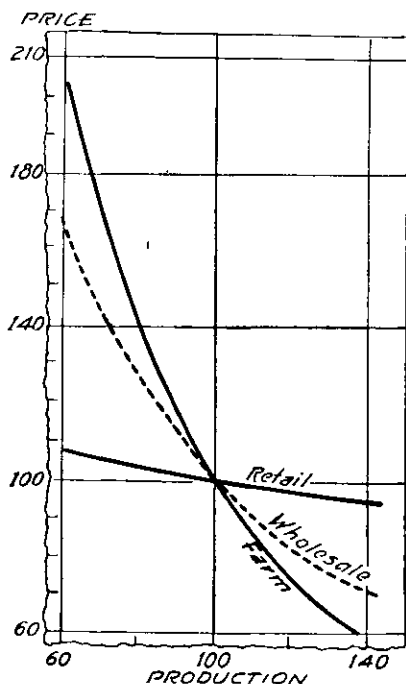


FIGURE 38. RELATION OF THE UNITED STATES PRODUCTION OF CORN TO THE PURCHASING POWER OF THE COLUMBUS, NEBRASKA, FARM PRICE, THE CHICAGO WHOLESALE PRICE OF NO. 2 CORN, AND THE UNITED STATES RETAIL PRICE OF CORNMEAL. PRICES ARE FOR THE CALENDAR YEAR FOLLOWING THE CROPS OF 1895 TO 1913

Retail prices of cornmeal are only slightly affected by the size of the corn crop. Wholesale prices and farm prices are decidedly affected

From 1895 to 1913, a crop 20 per cent below normal increased the farm price at Columbus, Nebraska, in the following calendar year 43 per cent (table 34). It increased the Chicago wholesale price 25 per cent, but increased the retail price of cornmeal only 4 per cent. The price at which cornmeal retails in American cities is very little influenced by yearly variations in the price of corn. If data were available for the crop year, Columbus, Nebraska, farm prices would fluctuate much more violently but cornmeal prices would be little affected.

From 1895 to 1913, a United States crop 20 per cent below normal increased the May futures quoted in September 37 per cent, and the July futures quoted in May 28 per cent (tables 35 and 36).

December future prices quoted in July were influenced in part by the previous crop and in part by the prospective crop. In years when the prospective crop turned out to be 20 per cent below normal, December futures quoted in July were 19 per cent above normal (table 37). A

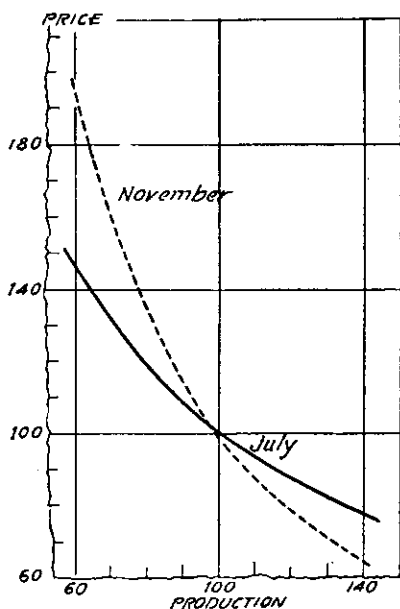


FIGURE 39. RELATION OF THE UNITED STATES PRODUCTION OF CORN TO THE PURCHASING POWER OF DECEMBER FUTURE PRICES QUOTED IN JULY AND IN NOVEMBER, 1895-1913

The size of the corn crop is not certain in July, and therefore it has less effect on December future price than it does in December, after the size of the crop has been determined



TABLE 34. RELATION OF PRODUCTION OF CORN IN THE UNITED STATES, 1895-1913, TO PRICES IN THE FOLLOWING CALENDAR YEAR

(From table 129)

Locality	Crop 20 per cent below normal	Crop 20 per cent above normal
	Per cent that prices were above normal	Per cent that prices were below normal
Farm price, Columbus, Nebraska.....	43	25
Wholesale price, No. 2 cash corn, Chicago.....	25	17
Retail price, cornmeal, United States.....	4	3

TABLE 35. RELATION OF PRODUCTION OF CORN IN THE UNITED STATES TO MAY FUTURE PRICES AT CHICAGO DURING SEPTEMBER AND DECEMBER, 1895-1913, AND IN MARCH, 1896-1914

(From table 129)

May futures quoted in	Crop 20 per cent below normal	Crop 20 per cent above normal
	Per cent that prices were above normal	Per cent that prices were below normal
September.....	37	23
December.....	39	23
March.....	33	20

TABLE 36. RELATION OF PRODUCTION OF CORN IN THE UNITED STATES, 1895-1913, TO JULY FUTURES DURING MARCH AND MAY OF THE FOLLOWING YEAR, 1896-1914

(From table 129)

July futures quoted in	Crop 20 per cent below normal	Crop 20 per cent above normal
	Per cent that prices were above normal	Per cent that prices were below normal
March.....	32	20
May.....	28	18

TABLE 37. RELATION OF PRODUCTION OF CORN IN THE UNITED STATES TO DECEMBER FUTURE PRICES QUOTED IN JULY, SEPTEMBER, AND NOVEMBER, 1895-1913

(From table 129)

December futures quoted in	Crop 20 per cent below normal	Crop 20 per cent above normal
	Per cent that prices were above normal	Per cent that prices were below normal
July.....	19	13
September.....	36	22
November.....	35	22

prospective short crop did not always develop into a short crop. By September, the size of the corn crop was more definitely known and the December future prices quoted in September were increased 36 per cent.

The price of cash corn in December, and May futures in December, were equally affected by the size of crop (table 38).

TABLE 38. RELATION OF UNITED STATES PRODUCTION OF CORN TO THE DECEMBER PRICE OF CASH CORN AND THE DECEMBER PRICE OF MAY FUTURES, 1895-1913  
(From table 129)

	Crop 20 per cent below normal	Crop 20 per cent above normal
	Per cent that prices were above normal	Per cent that prices were below normal
Cash corn in December .....	39	24
May futures in December .....	39	23

#### INCREASING VIOLENCE OF FARM-PRICE FLUCTUATIONS

A United States corn crop 20 per cent below normal from 1877 to 1894 increased Iowa farm prices 30 per cent (table 39). In the next nineteen years, it increased prices 57 per cent.

TABLE 39. EFFECT OF INFLATION AND DEFLATION ON RELATIONSHIP OF IOWA DECEMBER 1 FARM PRICES TO SIZE OF UNITED STATES CORN CROP  
(From table 129)

Period	Crop 20 per cent below normal	Crop 20 per cent above normal
	Per cent that prices were above normal	Per cent that prices were below normal
1877-1894 .....	30	19
1895-1913 .....	57	31
1915-1920 .....	51	28
1921-1925 .....	93	41

In the first period a 20-per-cent shortage in the crop increased United States farm prices 21 per cent, and in the second period 41 per cent (table 40).

TABLE 40. EFFECT OF INFLATION AND DEFLATION ON RELATIONSHIP OF UNITED STATES DECEMBER 1 FARM PRICES TO SIZE OF UNITED STATES CORN CROP  
(From table 129)

Period	Crop 20 per cent below normal	Crop 20 per cent above normal
	Per cent that prices were above normal	Per cent that prices were below normal
1877-1894 .....	21	14
1895-1913 .....	41	24
1915-1920 .....	30	19
1921-1925 .....	63	33

Increasing violence in farm-price fluctuations had become a serious problem even before the war. A discussion of this is given on pages 12 to 18.

#### EFFECT OF INFLATION AND DEFLATION ON PRICE RELATIONSHIPS

Before the war, the violence with which farm prices were fluctuating was steadily increasing. During the period from 1915 to 1920, farm prices for Iowa, Georgia, and the United States as a whole, fluctuated less violently with supply than was the case before the war.

One of the factors affecting the violence of price fluctuations is the ratio of farm prices to consumers' prices. When farm prices are high compared with consumers' prices, they tend to be less influenced by supply. In order to get rid of a given supply, consumers' prices must fluctuate by a certain amount. If consumers' prices are only a little higher than farm prices, farm prices need not fluctuate much more than consumers' prices.

With deflation, freight and other handling charges are so high that the farm price represents only a small percentage of the consumer's price; therefore a little change in the consumer's price makes a violent change in the farm price.

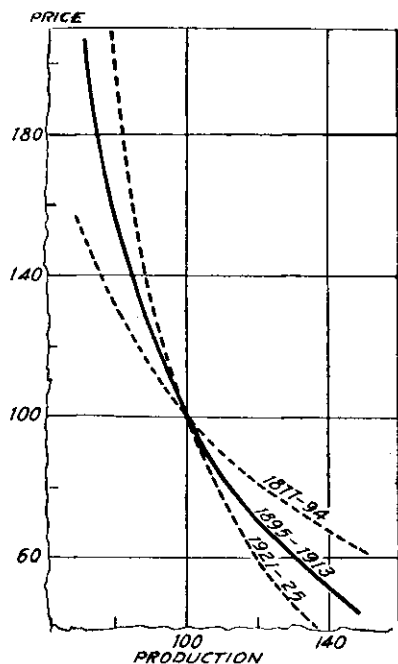


FIGURE 40. EFFECT OF INFLATION AND DEFLATION ON IOWA FARM PRICES OF CORN

Before the war, there was a steady increase in the violence with which prices fluctuated with production. Deflation has greatly increased this violence

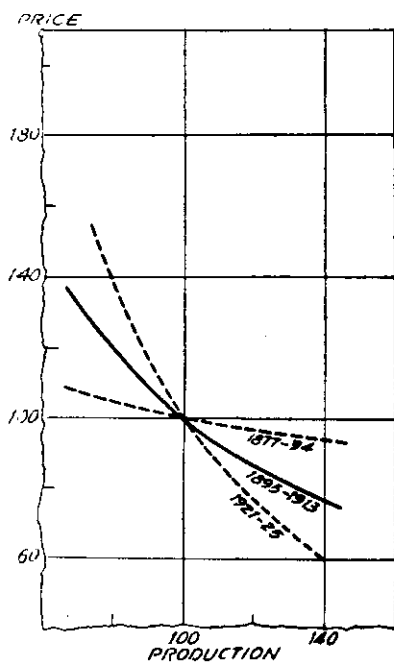


FIGURE 41. RELATION OF THE UNITED STATES PRODUCTION OF CORN TO THE PURCHASING POWER OF GEORGIA FARM PRICES

Georgia farm prices fluctuate much less than do Iowa farm prices, but they now fluctuate much more violently than they did before the war

Before the war, a 20-per-cent shortage in the corn crop increased Iowa farm prices 57 per cent. From 1921 to 1925, a similar shortage increased them 93 per cent. Before the war, such a crop shortage increased United States farm prices 41 per cent. It now increases them 63 per cent. It formerly increased Georgia farm prices 19 per cent (table 41). It now increases them 39 per cent.

TABLE 41. EFFECT OF INFLATION AND DEFLATION ON RELATIONSHIP OF GEORGIA DECEMBER 1 FARM PRICES TO SIZE OF UNITED STATES CORN CROP  
(From table 129)

Period	Crop 20 per cent below normal	Crop 20 per cent above normal
	Per cent that prices were above normal	Per cent that prices were below normal
1877-1894.....	5	4
1895-1913.....	19	13
1913-1920.....	5	4
1921-1925.....	39	23

#### EFFECT OF SUPPLY ON TOTAL VALUE

Before the war, a crop of corn 20 per cent below normal, or an 80-per-cent crop, made prices in Iowa 157 per cent of normal. The crop would therefore be worth 157 per cent of 80, or 126 per cent of normal (table 42). The small crop sold for 26 per cent more than a normal crop.

A crop 20 per cent above normal was worth 83 per cent of the normal total value. For handling 50 per cent more corn, the farmer received two-thirds as much money.

With the increasing violence in farm-price fluctuations, a crop 20 per cent above normal is now worth less than half as much as a crop 20 per cent below normal at Iowa farm prices. So few years are included in this period that the figures may not be exactly correct, but there is no question of the striking change.

Before the war, a large crop was worth more at Georgia farm prices, and worth much more at prices of cornmeal, than a small crop (table 44). Those who purchased corn for consumption paid more money for a large supply than for a small supply, but not enough more to pay the extra freight and handling charges.

#### RELATION BETWEEN FARM, WHOLESALE, AND RETAIL PRICES

For the two years 1913 and 1914, the Iowa farm price of corn averaged 63 cents and the Chicago price of No. 2 corn averaged 72 cents (table 46). The spread was 9 cents. For the five years 1921 to 1925, the comparable prices were 69 and 84 cents, or a spread of 15 cents. This is an increase of 67 per cent in the spread.

Before the war, the difference between the price of a bushel of corn in Iowa and the retail price of 56 pounds of cornmeal at New York City was \$1.33. In the five years 1921 to 1925, the spread averaged \$2.61. The spread has doubled. This is somewhat less than the increase in wages.

Before the war, the Iowa farm price was about one-third the retail price of cornmeal at New York City. It is now a little more than one-fifth the price of cornmeal.

TABLE 42. RELATION OF PRODUCTION OF CORN IN THE UNITED STATES TO TOTAL VALUE OF CROP AT DECEMBER FARM PRICES IN IOWA

Period	Value of crop 20 per cent below normal	Value of normal crop	Value of crop 20 per cent above normal
1877-1894.....	104	100	97
1895-1913.....	126	100	83
1915-1920.....	121	100	86
1921-1926.....	154	100	71

TABLE 43. RELATION OF PRODUCTION OF CORN IN THE UNITED STATES TO TOTAL VALUE OF CROP AT UNITED STATES FARM PRICES

Period	Value of crop 20 per cent below normal	Value of normal crop	Value of crop 20 per cent above normal
1877-1894.....	97	100	103
1895-1913.....	113	100	91
1915-1920.....	104	100	97
1921-1926.....	130	100	80

TABLE 44. RELATION OF PRODUCTION OF CORN IN THE UNITED STATES TO TOTAL VALUE OF CROP AT GEORGIA FARM PRICES

Period	Value of crop 20 per cent below normal	Value of normal crop	Value of crop 20 per cent above normal
1877-1894.....	84	100	115
1895-1913.....	95	100	104
1915-1920.....	84	100	115
1921-1926.....	111	100	92

TABLE 45. RELATION OF PRODUCTION OF CORN IN THE UNITED STATES TO TOTAL VALUE OF CROP AT CHICAGO WHOLESALE PRICES OF NO. 2 CORN IN DECEMBER

Period	Value of crop 20 per cent below normal	Value of normal crop	Value of crop 20 per cent above normal
1877-1894.....	89	100	110
1895-1913.....	111	100	91
1915-1920.....	86	100	114
1921-1926.....	145	100	74

## EFFECT OF SIZE OF THE CORN CROP ON RELATIONSHIPS OF FARM, WHOLESALE, AND RETAIL PRICES

In twenty years when the corn crop was low compared with the average for the preceding five years, the Iowa farm price averaged 40 cents per bushel and the Georgia farm price averaged 73 cents (table 47). In twenty years when the United States corn crop was large compared with the previous five years, the Iowa farm price averaged 24 cents and the Georgia farm price 63 cents. The difference in price between a large and a small crop in Iowa was 16 cents, whereas in Georgia it was only 10 cents. When there was a small crop, there was a 33-cent charge for taking a bushel of the expensive corn from the Iowa farm to the Georgia farm. When corn was cheap, this charge was 39 cents.

TABLE 46. RETAIL PRICE OF CORNMEAL AT NEW YORK CITY, WHOLESALE PRICE OF CORN AT CHICAGO, AND FARM PRICE OF CORN IN IOWA, NOVEMBER-OCTOBER, 1913-1926

Crop year	Retail price of cornmeal, 50 pounds, New York City	Wholesale price of corn, Chicago	Farm price of corn, Iowa	Spread between retail price of cornmeal in New York City and farm price of corn in Iowa
1913-14.....	\$1.96	\$0.71	\$0.62	\$1.34
1914-15.....	1.96	0.73	0.65	1.31
1915-16.....	2.13	0.78	0.66	1.47
1916-17.....	3.42	1.49	1.28	2.14
1917-18.....	4.54	1.69	1.33	3.21
1918-19.....	3.92	1.60	1.44	2.48
1919-20.....	4.37	1.56	1.32	3.05
1920-21.....	3.81	0.64	0.44	3.37
1921-22.....	3.08	0.59	0.44	2.64
1922-23.....	3.02	0.82	0.67	2.35
1923-24.....	3.14	0.92	0.77	2.37
1924-25.....	3.70	1.11	0.97	2.73
1925-26.....	3.58	0.78	0.61	2.97
Average:				
1913-14.....	\$1.96	\$0.72	\$0.63	\$1.33
1921-25.....	3.30	0.84	0.69	2.61

TABLE 47. RELATION OF SIZE OF UNITED STATES CORN CROP TO THE DECEMBER I FARM PRICE IN GEORGIA AND IN IOWA, 1874-1913

Locality	Twenty small crops	Twenty large crops	Difference
Georgia.....	\$0.73	\$0.63	\$0.10
Iowa.....	0.40	0.24	0.16
Difference.....	\$0.33	\$0.39	

Apparently the depressing effect of a large crop is serious enough to make the charge for handling a cheap bushel more than the charge for handling an expensive one. With a large crop, all buyers are unwilling or indifferent buyers.

In twenty years when the United States corn crop was small, the Rhode Island farm price was 42 cents above the Iowa farm price (table 48). In twenty years when the crop was large, it was 46 cents above that in Iowa. It cost more to move cheap corn from Iowa to Rhode Island farms than it did to move high-priced corn.

TABLE 48. RELATION OF SIZE OF UNITED STATES CORN CROP TO THE DECEMBER I FARM PRICE IN RHODE ISLAND AND IN IOWA, 1874-1913

Locality	Twenty small crops	Twenty large crops	Difference
Rhode Island.....	\$0.82	\$0.70	\$0.12
Iowa.....	0.40	0.24	0.16
Difference.....	\$0.42	\$0.46	

The spread between the Iowa farm price of corn and the Chicago wholesale price of No. 2 corn was 13 cents when the crop was small and 14 cents when the crop was large (table 49). Fourteen cents was deducted

from the 38-cent Chicago price to get the Iowa farm price, but only 13 cents was deducted from the 54-cent Chicago price. The lower the price, the greater are the handling charges.

TABLE 49. RELATION OF SIZE OF UNITED STATES CORN CROP TO THE DECEMBER PRICE OF CORN IN IOWA AND THE WHOLESALE PRICE OF NO. 2 CORN IN CHICAGO, 1874-1913

Locality	Twenty small crops	Twenty large crops	Difference
Chicago.....	\$0.536	\$0.383	\$0.153
Iowa.....	0.403	0.243	0.160
Difference.....	\$0.133	\$0.140	.....

In eleven years when the United States corn crop was small, the spread between Chicago and Liverpool prices was 16 cents (table 50). In eleven years when the crop was large, it was 19 cents. The opinion is commonly held that the price of corn is made at Liverpool, and that the Chicago prices are Liverpool prices less a constant differential. This is far from true. With a large crop, the farm price is depressed in comparison with the Chicago price, and the Chicago price is depressed in comparison with the Liverpool price.

TABLE 50. RELATION OF SIZE OF UNITED STATES CORN CROP, 1892-1913, TO MARCH PRICES OF NO. 2 CORN AT CHICAGO AND OF MIXED AMERICAN CORN AT LIVERPOOL, ENGLAND

Locality	Eleven small crops	Eleven large crops	Difference
Liverpool.....	\$0.70	\$0.58	\$0.12
Chicago.....	0.54	0.39	0.15
Difference.....	\$0.16	\$0.19	.....

#### PRICES OF CORN IN ARGENTINA, THE UNITED STATES, AND ENGLAND

The statement is commonly made that Liverpool is the world market that sets the price for all other markets. In 1921 Liverpool prices were 49 cents higher, in 1923 they were 26 cents higher, and in 1924 they were 34 cents higher, than Chicago prices (table 51).

TABLE 51. WHOLESALE GOLD PRICE OF AMERICAN MIXED CORN AT LIVERPOOL AND OF NO. 2 CORN AT CHICAGO, FEBRUARY, 1912-1924

Year	Liverpool*	Chicago	Difference
1912.....	\$0.95	\$0.65	\$0.30
1913.....	0.82	0.50	0.32
1914.....	0.91	0.62	0.29
1915.....	1.11	0.75	0.36
1916.....	1.47	0.76	0.71
1917.....	2.00	1.01	0.99
1918.....	2.16	1.75	0.41
1919.....	2.11	1.32	0.79
1920.....	1.93	1.48	0.45
1921.....	1.15	0.66	0.49
1922.....	0.90	0.56	0.34
1923.....	1.00	0.74	0.26
1924.....	1.15	0.81	0.34

\* U. S. Dept. Agr., Yearbook 1925, p. 803.

In 1923, corn from Argentina was 22 cents higher at Liverpool than at Buenos Aires (table 52). In the following year it was 33 cents higher than at Buenos Aires.

TABLE 52. WHOLESALE GOLD PRICE OF ARGENTINIAN CORN AT LIVERPOOL AND AT BUENOS AIRES, FEBRUARY, 1913-1926\*

Year	Liverpool	Buenos Aires	Difference
1913	\$0.75	\$0.54	\$0.21
1914	0.66	0.56	0.10
1915	1.06	0.61	0.45
1916	1.44	0.60	0.84
1917	1.92	1.07	0.85
1918	2.23	0.79	1.44
1919	2.04	0.52	1.52
1920	1.77	0.71	1.06
1921	1.22	0.91	0.31
1922	1.08	0.73	0.35
1923	1.04	0.82	0.22
1924	1.15	0.82	0.33
1925	1.29	1.08	0.21
1926	0.91	0.73	0.18

\* U. S. Dept. Agr., Yearbook 1926, p. 847.

In February, 1921, the Liverpool price was 69 cents higher than the Iowa farm price (table 53). In February, 1923, it was only 40 cents higher. Comparing these two years, the Iowa farm price rose nearly one-third, but the Liverpool price dropped one-eighth. From 1923 to 1924, the Liverpool price rose 15 cents but the Iowa farm price rose only 6 cents.

TABLE 53. IOWA FARM PRICES AND LIVERPOOL WHOLESALE PRICES OF AMERICAN MIXED CORN, FEBRUARY, 1912-1924

Year	Wholesale price, Liverpool	Farm price, Iowa	Difference
1912	\$0.95	\$0.56	\$0.39
1913	0.82	0.38	0.44
1914	0.91	0.56	0.35
1915	1.11	0.66	0.45
1916	1.47	0.62	0.85
1917	2.00	0.90	1.10
1918	2.16	1.28	0.88
1919	2.11	1.24	0.87
1920	1.93	1.28	0.65
1921	1.15	0.46	0.69
1922	0.90	0.41	0.49
1923	1.00	0.60	0.40
1924	1.15	0.66	0.49

The relationship between prices at Buenos Aires and at Chicago is shown in table 54. In February, 1924, prices at Buenos Aires were one cent higher than at Chicago. A year later they were 20 cents lower than at Chicago. The discrepancies are so irregular that one would not suspect that the prices were for the same grain.

The erratic relationships of the prices of corn at Chicago and at Buenos Aires are shown in figure 42 and in table 55. In the period from 1922 to 1924, Buenos Aires prices varied from 22 cents higher than those at Chicago to 41 cents lower. Changes of 10 cents a bushel in the difference between the prices in successive months were common.



TABLE 54. WHOLESALE PRICES OF CORN, IN GOLD, AT BUENOS AIRES AND AT CHICAGO, FEBRUARY, 1913-1926

Year	Buenos Aires*	Chicago	Difference
1913.....	\$0.54	\$0.50	\$0.04
1914.....	0.56	0.62	0.06
1915.....	0.61	0.75	0.14
1916.....	0.60	0.76	0.16
1917.....	1.07	1.01	0.06
1918.....	0.79	1.75	0.96
1919.....	0.52	1.32	0.80
1920.....	0.71	1.48	0.77
1921.....	0.91	0.66	0.25
1922.....	0.73	0.56	0.17
1923.....	0.82	0.74	0.08
1924.....	0.82	0.81	0.01
1925.....	1.08	1.28	0.20
1926.....	0.73	0.80	0.07

\* U. S. Dept. Agr., Yearbook 1926, p. 847.

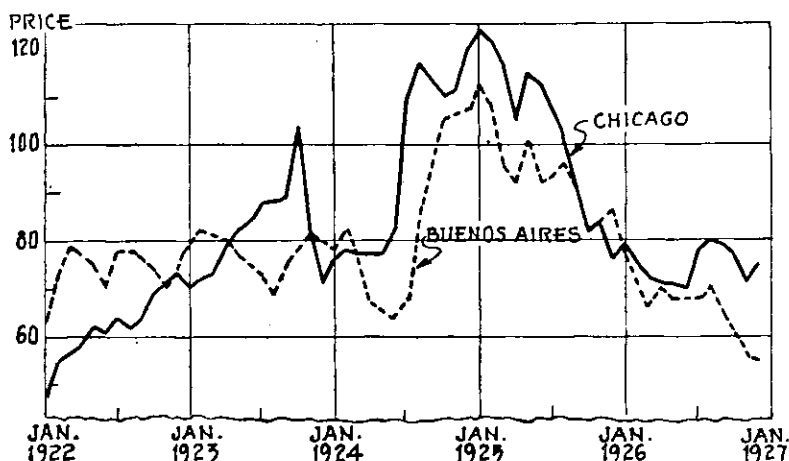


FIGURE 42. PRICES OF CORN AT BUENOS AIRES AND AT CHICAGO, JANUARY, 1922, TO DECEMBER, 1926

Prices in these two markets do not have a constant relationship to each other

Prices of American mixed corn on the Liverpool market in March, 1922, were 23 cents less than those of Argentinian corn on the same market. In January, 1927, American corn was 25 cents higher than Argentinian corn. In two successive months, Argentinian corn changed from 7 cents above to 22 cents below American corn.

#### EFFECT OF LOCATION OF SUPPLY ON PRICES

The Iowa farm price of corn is primarily controlled by United States production (table 56). But prices in Nebraska are much influenced by the Nebraska crop, independently of the United States crop. The Nebraska crop is about one-third as important as the United States crop in influencing Nebraska prices.

There are thousands of markets in which corn is sold, and each of these markets is more or less independent. Most of them have an influence on many of the other markets. This influence varies from time to time, so that price relations in different markets are constantly changing.

TABLE 55. PRICES OF CORN AT CHICAGO AND AT BUENOS AIRES,\* 1921-1927

Month	Price at Chicago, No. 3 yellow (cents)	Price at Buenos Aires (cents)	Amount by which Chicago price differs from Buenos Aires price (cents)
1921			
November	47	61	-14
December	47	63	-16
1922			
January	48	63	-15
February	55	73	-18
March	57	79	-22
April	58	77	-19
May	62	75	-13
June	61	71	-10
July	64	78	-14
August	62	78	-16
September	64	76	-12
October	69	74	-5
November	71	70	+1
December	73	74	-1
1923			
January	70	80	-10
February	72	82	-10
March	73	81	-8
April	79	80	-1
May	82	77	+5
June	84	75	+9
July	88	73	+15
August	88	69	+19
September	80	74	+15
October	104	78	+26
November	82	81	+1
December	71	79	-8
1924			
January	76	78	-2
February	78	82	-4
March	77	77	0
April	77	67	+10
May	77	65	+12
June	82	64	+18
July	109	68	+41
August	117	85	+32
September	114	93	+21
October	110	105	+5
November	111	106	+5
December	120	107	+13
1925			
January	124	112	+12
February	122	108	+14
March	117	96	+21
April	105	92	+13
May	115	100	+15
June	113	92	+21
July	108	93	+15
August	102	96	+6
September	91	91	0
October	82	82	0
November	83	84	-1
December	76	86	-10
1926			
January	79	78	+1
February	75	73	+2
March	72	66	+6
April	71	70	+1
May	71	68	+3
June	70	68	+2
July	78	68	+10
August	80	70	+10
September	79	65	+14
October	77	60	+17
November	71	56	+15
December	75	55	+20
1927			
January	74	60	+14
February	73	63	+10
March	68	62	+6
April	71	60	+11

\* Chicago prices compiled from Chicago Daily Trade Bulletin. Weighted average price per bushel of reported cash sales. Buenos Aires prices compiled from International Yearbook of Agricultural Statistics and Review of the River Plate. The corn situation. U. S. Dept. Agr., Foreign Crops and Markets, vol. 14, no. 25, p. 833, June 20, 1927.

TABLE 56. PER CENT TO WHICH IOWA AND NEBRASKA DECEMBER FARM PRICES OF CORN ARE DETERMINED BY UNITED STATES PRODUCTION AND BY STATE PRODUCTION, 1895-1913

Production	Iowa price	Nebraska price
United States.....	84.0	65.2
Iowa.....	0	.....
Nebraska.....	.....	18.5
Total.....	84.0	83.7

## EFFECT OF PRICES ON ACRES OF CORN PLANTED

In the period from 1895 to 1913, a 25-per-cent change in the farm price of corn in Iowa resulted in a 2-per-cent change in Iowa corn acreage the following year (table 57). If the farmers had expected the 25-per-cent increase to be permanent, the change in acreage would have been greater.

TABLE 57. EFFECT OF CHANGES IN DECEMBER 1 IOWA FARM PRICE OF CORN, ON IOWA ACREAGE THE FOLLOWING YEAR, ELIMINATING THE EFFECT OF PRICES OF TWO YEARS PRECEDING, 1895-1913

Per cent change in farm price	Corresponding per cent change in acreage*
25.....	1.9
50.....	3.7
75.....	5.6
100.....	7.4

\* Based on the net regression coefficient  $b_{12.34}$ .

## MULTIPLE CORRELATION AND PER CENT DETERMINATION OF IOWA ACREAGE OF CORN BY IOWA FARM PRICES FOR THE THREE PRECEDING YEARS, 1895-1913

$X_1$  = Iowa acreage of corn in the  $y$  year;

$X_2$  = December 1 Iowa farm price of corn in the preceding, or  $y-1$ , year;

$X_3$  = December 1 Iowa farm price of corn in the second preceding, or  $y-2$ , year;

$X_4$  = December 1 Iowa farm price of corn in the third preceding, or  $y-3$ , year.

Preceding year, $X_2$ .....	31.7
Second year preceding, $X_3$ .....	0.8
Third year preceding, $X_4$ .....	3.5
Total.....	36.0

$R_{1.234} = 0.600$

Corn is a minor crop in Texas, and is comparatively stable in price. From 1902 to 1926 the price of corn was only 9 per cent of the factors influencing the changes in acreage of corn. The price of cotton for two preceding years was 34 per cent of the factors affecting changes in corn acreage.

In Kansas, the price of corn represents 3 per cent of the factors governing the acreage of corn, and the abandonment of the wheat acreage represents 30 per cent of those factors.

## OATS

## EFFECT OF SUPPLY ON PRICES

Before the war, the Iowa farm price of oats was slightly less affected by United States production than was the price of corn. A corn crop

20 per cent below normal raised the Iowa farm price of corn 42 per cent, but a similar shortage in the oat crop raised the price of oats only 28 per cent (table 58).

TABLE 58. RELATION OF SIZE OF UNITED STATES OAT CROP TO FARM PRICES OF OATS, DECEMBER 1, 1875-1913  
(From table 129)

Locality	Crop 20 per cent below normal	Crop 20 per cent above normal
	Per cent that prices were above normal	Per cent that prices were below normal
United States.....	23	16
Iowa.....	28	18

#### EFFECT OF SUPPLY ON TOTAL VALUE

When the United States oat crop was 20 per cent below normal, Iowa farm prices were 28 per cent above normal. The value of the crop at Iowa farm prices would be 102, or 2 per cent above normal. When the crop was 20 per cent above normal, the value of the crop at Iowa farm prices would be 98 per cent of normal. For each \$100 that a normal crop would bring, a short crop was worth \$102 and a large crop \$98.

#### EFFECT OF SIZE OF THE OAT CROP ON RELATIONSHIPS OF FARM PRICES

In the forty years 1874 to 1913, the average difference in the price of oats on Iowa farms and on Georgia farms was 34 cents per bushel. When the United States crop was below normal, the average difference was 33 cents (table 59). When the crop was large, the difference was 36 cents. The Georgia farm price of oats is somewhat similar to a retail price because Georgia is a deficit area. Large crops depress Iowa prices more than they do Georgia prices.

TABLE 59. RELATION OF SIZE OF UNITED STATES OAT CROP TO FARM PRICE OF OATS IN GEORGIA AND IN IOWA, DECEMBER, 1874-1913

Locality	Twenty small crops	Twenty large crops	Difference
Georgia.....	\$0.62	\$0.58	\$0.04
Iowa.....	0.29	0.22	0.07
Difference.....	\$0.33	\$0.36	.....

The same principle is shown when the United States and the Rhode Island farm prices are compared (table 60).

TABLE 60. RELATION OF SIZE OF UNITED STATES OAT CROP TO FARM PRICE OF OATS IN RHODE ISLAND AND IN THE UNITED STATES, DECEMBER, 1874-1913

Locality	Twenty small crops	Twenty large crops	Difference
Rhode Island.....	\$0.50	\$0.46	\$0.04
United States.....	0.36	0.30	0.06
Difference.....	\$0.14	\$0.16	.....

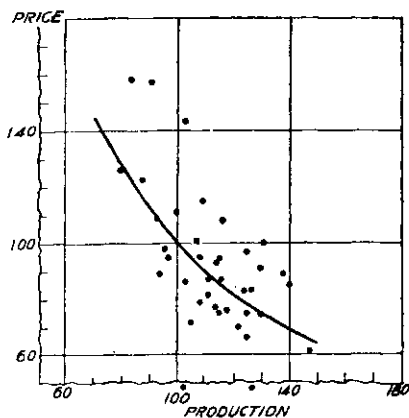


FIGURE 43. RELATION OF THE UNITED STATES PRODUCTION OF OATS TO THE PURCHASING POWER OF IOWA DECEMBER 1 FARM PRICES, 1875-1913

When the United States production of oats was 20 per cent below normal, the Iowa farm price was 28 per cent above normal

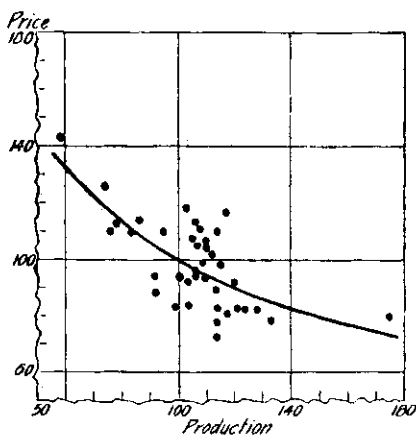


FIGURE 44. RELATION OF THE UNITED STATES PRODUCTION OF BUCKWHEAT TO THE PURCHASING POWER OF NEW YORK DECEMBER 1 FARM PRICES, 1875-1913

When the United States production of buckwheat was 20 per cent below normal, the New York farm price was 13 per cent above normal

#### BARLEY AND BUCKWHEAT

Barley prices were less flexible than corn prices. Buckwheat prices were much less affected by supply than were corn prices. When the United States crop was 20 per cent below normal, the New York farm price was 13 per cent above normal. New York is the leading surplus State in the production of buckwheat. When there is a large crop, New York prices are depressed more than are United States prices (table 61).

#### RYE AND RICE

When the United States crop of rye was 10 per cent below normal, the United States farm price was 2 per cent above normal. When the world production of rye was 10 per cent below normal, the United States farm price was 8 per cent above normal.

When the world production of rice was 10 per cent below normal, the New Orleans wholesale price of rice

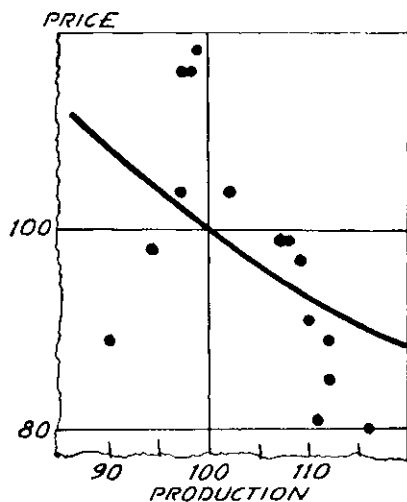


FIGURE 45. RELATION OF THE WORLD PRODUCTION OF RYE TO THE PURCHASING POWER OF THE UNITED STATES DECEMBER 1 FARM PRICE, 1899-1913

When the world production of rye was 10 per cent below normal, the United States farm price of rye was 8 per cent above normal but the relationships are uncertain

TABLE 61. RELATION OF SIZE OF UNITED STATES BUCKWHEAT CROP TO PRICES, DECEMBER 1, 1874-1913

Locality	Twenty small crops	Twenty large crops	Difference
United States.....	\$0.64	\$0.59	\$0.05
New York.....	0.64	0.56	0.08
Difference.....		\$0.03	

was 14 per cent above normal. No doubt prices of rice fluctuate more in Japan and China than in the United States.

Although the United States is a relatively small producer of rye, prices at Chicago are determined more by the United States crop than by the crops in other parts of the world.<sup>6</sup>

## WHEAT

## EFFECT OF SUPPLY ON PRICES

In the period from 1899 to 1913, a United States wheat crop 20 per cent below normal increased the Minnesota farm price 37 per cent and the Minneapolis price of No. 1 northern spring wheat 35 per cent (table 62). Kansas farm prices increased 34 per cent, and Kansas City wholesale prices of No. 2 hard winter wheat increased 27 per cent.

TABLE 62. RELATION OF THE UNITED STATES WHEAT CROP TO PRICES, 1899-1913 (From table 129)

Locality	Crop 20 per cent below normal	Crop 20 per cent above normal
	Per cent that prices were above normal	Per cent that prices were below normal
Farm price, December 1, Minnesota.....	37	23
Wholesale price, No. 1 northern spring, August-July, Minneapolis.....	35	22
Farm price, December 1, Kansas.....	34	21
Wholesale price, No. 2 hard, July-June, Kansas City.....	27	17

Before the war, when the world wheat crop was 10 per cent below normal, wholesale prices were 9 per cent above normal in Berlin, 11 per cent above normal in Liverpool, 14 per cent above normal in Kansas-

<sup>6</sup> PER CENT DETERMINATION OF CHICAGO WHOLESALE PRICES OF RYE BY RUSSIAN PRODUCTION, UNITED STATES PRODUCTION, AND WORLD PRODUCTION LESS UNITED STATES AND RUSSIAN PRODUCTION, AUGUST-JULY, 1899-1900 to 1913-14.

$X_1$  = Chicago August-July wholesale prices of rye;

$X_2$  = Russian production;

$X_3$  = United States production;

$X_4$  = world production less United States and Russian production.

Production	Total	Direct	Joint
Russian, $X_2$ .....	22.2	31.4	-9.2
United States, $X_3$ .....	33.0	42.1	-9.1
World production less United States and Russian, $X_4$ .....	00.1	00.0	-0.1
	55.3		

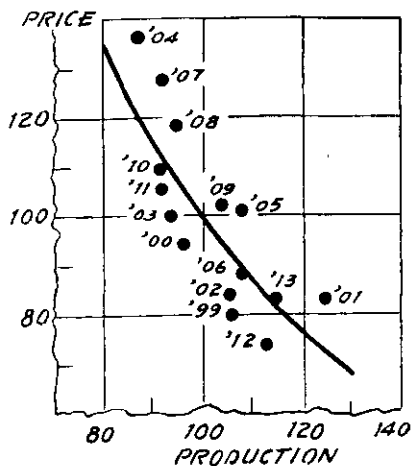


FIGURE 46. RELATION OF THE UNITED STATES PRODUCTION OF WHEAT TO THE PURCHASING POWER OF THE MINNESOTA FARM PRICE, 1899-1913

When the United States crop was 20 per cent below normal, Minnesota farm prices averaged 37 per cent above normal

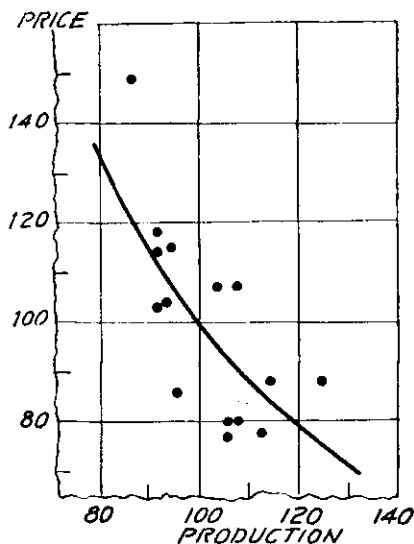


FIGURE 48. RELATION OF THE UNITED STATES PRODUCTION OF WHEAT TO THE PURCHASING POWER OF THE KANSAS DECEMBER 1 FARM PRICE, 1899-1913

When the United States crop was 20 per cent below normal, the Kansas farm price was 34 per cent above normal

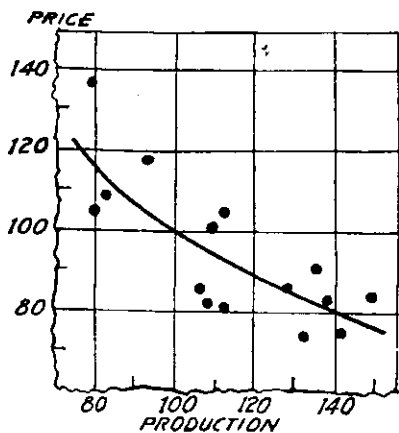


FIGURE 47. RELATION OF THE RUSSIAN PRODUCTION OF WHEAT TO THE PURCHASING POWER OF THE AUGUST-JULY PRICES AT SARATOV, RUSSIA, 1899-1900 TO 1913-14

When the Russian crop was 20 per cent below normal, the price at Saratov was 52 per cent above normal

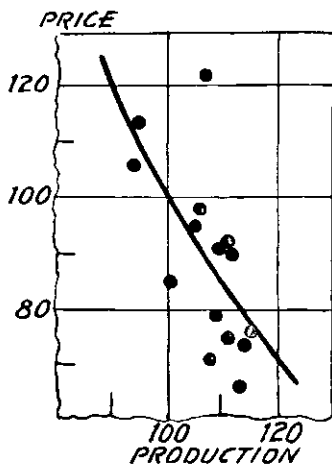


FIGURE 49. RELATION OF THE WORLD PRODUCTION OF WHEAT TO THE PURCHASING POWER OF THE MINNESOTA FARM PRICE, 1899-1900 TO 1913-14

When the world production of wheat was 20 per cent below normal, the Minnesota farm price was 53 per cent above normal

City, and 16 per cent above normal in Minneapolis (table 63). At Saratov, Russia, wholesale prices were 22 per cent above normal.

TABLE 63. RELATION OF SIZE OF WORLD WHEAT CROP TO WHOLESALE PRICES, 1899-1900 TO 1913-14  
(From table 129)

Market	Crop 10 per cent below normal	Crop 10 per cent above normal
Berlin, Germany.....	9	7
Liverpool, England.....	11	9
Kansas City, United States.....	14	11
Minneapolis, United States.....	16	13
Saratov, Russia.....	22	16

The more resistance there is to be overcome in order to reach deficit areas, the more violently do prices fluctuate. The small crop had twice as much effect on Saratov prices as on Liverpool prices.

When the United States crop was 10 per cent below normal, the Minnesota farm price was 16 per cent above normal. When the world crop was 10 per cent below normal, the Minnesota farm price was 22 per cent

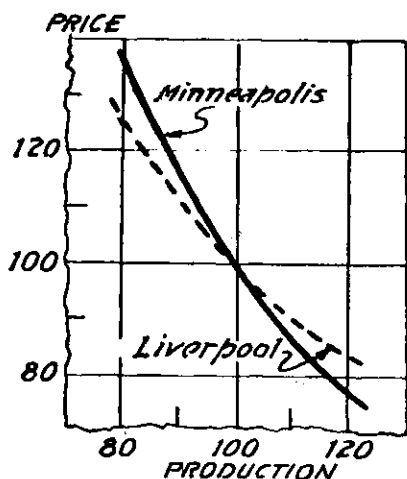


FIGURE 50. RELATION OF THE WORLD PRODUCTION OF WHEAT TO THE PURCHASING POWER OF THE AUGUST-JULY PRICE AT MINNEAPOLIS AND AT LIVERPOOL, 1899-1900 TO 1913-14

When the world production of wheat was 20 per cent below normal, the Minneapolis price was 38 per cent above normal and the Liverpool price was 25 per cent above normal

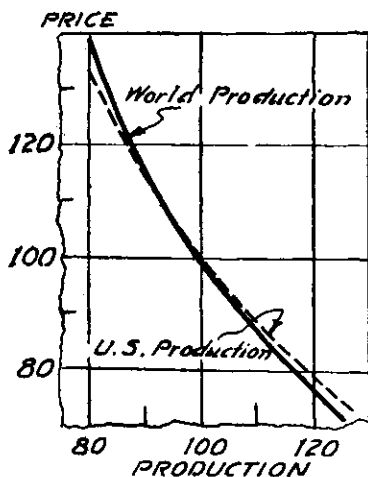


FIGURE 51. RELATION OF THE UNITED STATES PRODUCTION AND THE WORLD PRODUCTION OF WHEAT TO THE PURCHASING POWER OF THE MINNESOTA AUGUST-JULY FARM PRICE, 1899-1900 TO 1913-14

When the United States crop was 10 per cent below normal, the Minnesota farm price was 16 per cent above normal. When the world crop was 10 per cent below normal, the Minnesota farm price was 22 per cent above normal



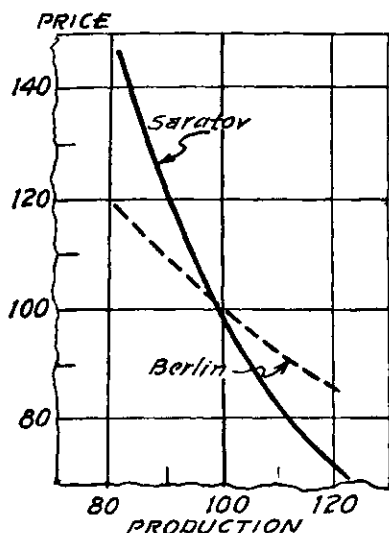


FIGURE 52. RELATION OF THE WORLD PRODUCTION OF WHEAT TO THE PURCHASING POWER OF PRICES AT SARATOV, RUSSIA, AND AT BERLIN, AUGUST-JULY, 1899-1900 TO 1913-14

A world crop 10 per cent below normal raised prices at Berlin 9 per cent and raised prices at Saratov 22 per cent. It undoubtedly raised prices to Russian farmers even more.

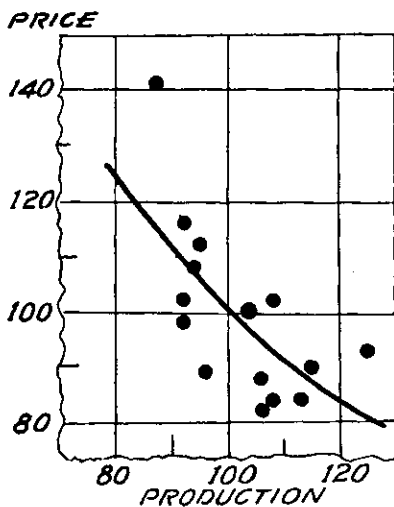


FIGURE 53. RELATION OF THE UNITED STATES PRODUCTION OF WHEAT TO THE PURCHASING POWER OF THE DECEMBER PRICE OF MAY FUTURES, 1899-1913

When the United States crop was 20 per cent below normal, the December prices of wheat for May delivery were 24 per cent above normal. Future prices, like cash prices, fluctuate with the size of the crop.

above normal. A given percentage increase in the world wheat crop on the average has a greater effect on Minnesota farm prices than has a similar change in the United States production (table 129 on page 110, and figure 51).

A world production 10 per cent below normal tended to increase Liverpool prices 11 per cent (table 64). North American production 10 per cent below normal tended to increase Liverpool prices 5 per cent.

TABLE 64. RELATION OF A 10-PER CENT SHORTAGE IN THE WHEAT CROP IN DIFFERENT REGIONS, TO LIVERPOOL PRICES, AUGUST-JULY, 1899-1900 TO 1913-14 (From table 129)

Region	Per cent that Liverpool prices were above normal when the crop was 10 per cent below normal
World production.....	11
North-American production.....	5
West-European production.....	4
East-European production.....	2

Before the war, a 10-per-cent shortage in the world wheat crop raised Liverpool prices 11 per cent in the fall, 13 per cent in the winter, and 15 per cent in April and May (table 65). This shows the failure of prices to rise sufficiently in the fall when the crop is short. Conversely, a large

TABLE 65. RELATION OF SIZE OF WORLD WHEAT CROP TO LIVERPOOL PRICES DURING DIFFERENT SEASONS OF THE YEAR, 1899-1900 TO 1913-14

(From table 129)

Season	Crop 10 per cent below normal	Crop 10 per cent above normal
	Per cent that prices were above normal	Per cent that prices were below normal
September-October.....	11	9
January-February.....	13	10
April-May.....	15	12

crop sells for too high a price in the fall. Price inertia accounts for both discrepancies.

In countries where famine occurs, the people starve in the late spring and early summer. In Europe the wheat prices in the spring illustrate the same principle.

Relation of the size of the United States wheat crop to May future prices in September and December, as quoted on the Chicago Board of Trade, is shown in table 66. When the United States crop is 20 per cent below normal, May future prices, as quoted in the fall, average lower than the actual cash price in May. If there is a large crop, the May future prices tend to be higher than the May cash price. In each case, December quotations are more out of line than September quotations.

TABLE 66. RELATION OF SIZE OF THE UNITED STATES WHEAT CROP TO MAY FUTURE PRICES OF WHEAT AT CHICAGO, SEPTEMBER AND DECEMBER, 1899-1900 TO 1913-14

(From table 129)

Period	Crop 20 per cent below normal	Crop 20 per cent above normal
	Per cent that prices were above normal	Per cent that prices were below normal
May future prices quoted in September.....	28	18
May future prices quoted in December.....	24	16
Cash price quoted in September.....	22	15
Cash price quoted in May.....	32	20

#### EFFECT OF SUPPLY ON TOTAL VALUE

When the world wheat crop was 10 per cent below normal, prices at Saratov, Russia, were 22 per cent above normal. The value of a 90-per-cent crop at 122-per-cent prices would be represented by 110, or 10 per cent above the normal total value (table 67).

When the crop was 10 per cent above normal, the total value at Saratov prices averaged 8 per cent below normal. For each \$100 that a normal crop would bring, a short crop would bring \$110 and a large crop \$92. The difference would, of course, be much greater at Russian farm prices. The smaller the farm crop, the greater is the income of the Russian or the American farmer, provided his crop is as near to his normal as is the world crop.

TABLE 67. RELATION OF WORLD PRODUCTION OF WHEAT TO TOTAL VALUE OF CROP AT PARIS, BERLIN, LIVERPOOL, SARATOV, AND KANSAS CITY PRICES

Market	Value of crop to per cent below normal	Value of normal crop	Value of crop to per cent above normal
Saratov, Russia.....	110	100	92
Minneapolis, United States.....	104	100	96
Kansas City, United States.....	103	100	98
Liverpool, England.....	100	100	100
Berlin, Germany.....	98	100	102
Paris, France.....	87	100	113

At Liverpool prices, large crops and small crops sell for the same amount (table 67). Liverpool pays the same for 90 bushels of wheat in a short-crop year that it pays for 110 bushels in a large-crop year.

As a product passes through the channels of trade, prices become more nearly uniform regardless of size of the crop. Probably the consumer always pays more for a large crop than he does for a small one, but the farmer practically always gets less for the large crop.

The income of railroads from crops carried is usually exactly in proportion to the size of the crop shipped, so that a large crop is of advantage to railroads. It is also of great advantage to the cities, but it is of great disadvantage to farmers.

## RELATION BETWEEN FARM, WHOLESALE, AND RETAIL PRICES

From 1890 to 1900, the Chicago price of spring wheat averaged 12 cents above the Minnesota farm price (table 68). In the seven years from 1921 to 1926, the Chicago price was 29 cents above the Minnesota farm price.

TABLE 68. PRICES OF WHEAT AND FLOUR IN MINNESOTA AND IN CHICAGO\*

Period	Minnesota, farm price of wheat per bushel	Chicago, whole- sale price of No. 1 spring wheat per bushel	United States, retail price of flour per 44 pounds
1890-1900.....	\$0.619	\$0.710	\$1.160
1901-1913.....	0.792	0.977	1.381
1921-1926.....	1.138	1.433	2.391

\* The Minnesota farm prices are for December 1; the Chicago wholesale prices are for the crop year; retail prices of flour are for the calendar year.

From 1890 to 1900, Chicago prices were 19 cents above Kansas farm prices (table 69). In the seven years from 1921 to 1926, the Chicago

TABLE 69. PRICES OF WHEAT AND FLOUR IN KANSAS AND IN CHICAGO\*

Period	Kansas, farm price of wheat per bushel	Chicago, whole- sale price of No. 2 red winter wheat per bushel	United States, retail price of flour per 44 pounds
1890-1900.....	\$0.570	\$0.759	\$1.160
1901-1913.....	0.758	0.932	1.381
1921-1926.....	1.128	1.432	2.391

\* The Kansas farm prices are for December 1; the other prices are for the calendar year.

prices were 30 cents above Kansas farm prices. Retail prices of 44 pounds of flour in the earlier period were 59 cents more than a bushel of wheat on Kansas farms. The difference is now \$1.26.

In 1913-14, 44 pounds of flour at New York City was worth 62 cents more than a bushel of wheat on Kansas farms (table 70). In 1925-26, the difference was \$1.25. The difference was twice the pre-war amount.

TABLE 70. KANSAS FARM PRICE OF WHEAT AND NEW YORK CITY RETAIL PRICE OF WHEAT FLOUR, FOR THE CROP YEAR JULY-JUNE, 1913-14 TO 1925-26

Crop year	New York City, retail price of flour per 44 pounds	Kansas, farm price of wheat per bushel	Difference
1913-14	\$1.41	\$0.79	\$0.62
1914-15	1.76	1.08	0.68
1915-16	1.72	0.97	0.75
1916-17	2.64	1.76	0.88
1917-18	3.30	2.07	1.23
1918-19	3.17	2.09	1.08
1919-20	3.70	2.22	1.48
1920-21	3.21	1.59	1.62
1921-22	2.38	1.06	1.32
1922-23	2.29	0.96	1.24
1923-24	2.07	0.92	1.15
1924-25	2.55	1.35	1.20
1925-26	2.73	1.48	1.25

In 1913-14, 60 pounds of bread in New York City retailed for \$2.87 more than the price of a bushel of wheat on Kansas farms (table 71). In 1925-26, the difference was \$4.28.

TABLE 71. KANSAS FARM PRICE OF WHEAT AND NEW YORK CITY RETAIL PRICE OF BREAD, FOR THE CROP YEAR JULY-JUNE, 1913-14 TO 1925-26

Crop year	New York City, retail price of bread per 60 pounds	Kansas, farm price of wheat per bushel	Difference
1913-14	\$3.66	\$0.79	\$2.87
1914-15	3.90	1.08	2.82
1915-16	4.02	0.97	3.05
1916-17	4.86	1.76	3.10
1917-18	5.76	2.07	3.69
1918-19	6.00	2.09	3.91
1919-20	6.42	2.22	4.20
1920-21	6.72	1.59	5.13
1921-22	5.76	1.06	4.70
1922-23	5.82	0.96	4.86
1923-24	5.70	0.92	4.78
1924-25	5.79	1.35	4.35
1925-26	5.76	1.48	4.28

In 1925, the Kansas and Minnesota farm prices of wheat were a little more than half the retail price of 44 pounds of flour. The Kansas farm price of wheat per bushel was worth a little more than one-fourth of the New York City retail price of bread.

#### EFFECT OF SIZE OF THE WHEAT CROP ON RELATIONSHIPS OF FARM, WHOLESALE, AND RETAIL PRICES

In the forty years 1874 to 1913, the average difference in prices of wheat on Kansas farms and on New York farms averaged 27.4 cents. In

twenty years when the United States crop was short, the average difference was only 24 cents (table 72); when the crop was large, the difference was 31 cents. The New York farm price is much like a retail price

TABLE 72. RELATIONSHIP OF SIZE OF UNITED STATES WHEAT CROP TO DECEMBER FARM PRICES IN KANSAS AND IN NEW YORK, 1874-1913

Locality	Twenty small crops	Twenty large crops	Difference
New York.....	\$0.98	\$0.97	\$0.01
Kansas.....	0.74	0.66	0.08
Difference.....	\$0.24	\$0.31	.....

because wheat is always imported into New York State. The Kansas farm price is depressed by a large crop much more than is the New York farm price.

In the eighteen years 1896 to 1913, Minnesota farm prices averaged 13 cents below wholesale prices of No. 1 northern spring wheat in Minneapolis (table 73). The difference was the same when the crop was large and when it was small.

TABLE 73. RELATION OF SIZE OF WORLD WHEAT CROP TO DECEMBER FARM PRICES IN MINNESOTA AND TO MINNEAPOLIS WHOLESALE PRICES, 1896-1913

Locality	Nine small crops	Nine large crops	Difference
Wholesale prices, Minneapolis.....	\$0.93	\$0.82	\$0.11
Farm prices, Minnesota.....	0.80	0.69	0.11
Difference.....	\$0.13	\$0.13	.....

The average spread between Liverpool prices and Minnesota farm prices was 24.7 cents. In nine years when the world crop was small it averaged 21.7 cents (table 74). In nine years when the world crop was large it averaged 27.7 cents. This again illustrates the general principle

TABLE 74. RELATION OF SIZE OF WORLD WHEAT CROP TO DECEMBER FARM PRICES IN MINNESOTA AND TO DECEMBER LIVERPOOL WHOLESALE PRICES OF RED WHEAT OF GOOD AVERAGE QUALITY, 1896-1913

Locality	Nine small crops	Nine large crops	Difference
Wholesale prices, Liverpool.....	\$1.019	\$0.971	\$0.048
Farm prices, Minnesota.....	0.802	0.694	0.108
Difference.....	\$0.217	\$0.277	.....

that a large supply usually depresses prices in the surplus-producing areas so much that the marketing charge is greater when the product is sold at a low price than when the product is sold at a high price.

The average spread between Minneapolis and New York City prices of No. 1 northern spring wheat for the eighteen years 1896 to 1913, was

10.8 cents. In nine years when the world crop was small the spread averaged 10.6 cents, whereas when the world crop was large it averaged 11.0 cents (table 75).

TABLE 75. RELATION OF SIZE OF WORLD WHEAT CROP TO WHOLESALE PRICES OF NO. 1 NORTHERN SPRING WHEAT AT NEW YORK CITY AND AT MINNEAPOLIS, AUGUST-JULY, 1896-97 TO 1913-14

Locality	Nine small crops	Nine large crops	Difference
New York City.....	\$1.051	\$0.950	\$0.101
Minneapolis.....	0.945	0.840	0.105
Difference.....	\$0.106	\$0.110	.....

Even with wheat, which is supposed to move with great fluidity to the so-called world market, the effect of a large supply is much more depressing on prices in surplus areas than it is on prices in deficit areas. The assumption is often made that some one central market dominates prices and that other markets have a definite ratio to this market. This is far from true. It is exceedingly expensive, in cents per bushel, to get cheap wheat moved. If wheat is higher in price, it moves with less resistance and the cost of moving it is less per bushel.

The depressing effect of a large crop in the interior of Russia is indicated by prices at Saratov as compared with seaport prices at Odessa (table 76). When the Russian crop was large, there was a difference of

TABLE 76. RELATION OF SIZE OF THE RUSSIAN WHEAT CROP TO NOVEMBER PRICES OF WHEAT AT SARATOV AND AT ODESSA, RUSSIA, 1894-1913

Locality	Ten small crops	Ten large crops	Difference
Odessa.....	\$0.92	\$0.76	\$0.16
Saratov.....	0.87	0.57	0.30
Difference.....	\$0.05	\$0.19	.....

19 cents between Saratov and Odessa. When the crop was small, the difference was only 5 cents. A large crop always depresses local prices as compared with central markets, but is most depressing in a region where the market machinery is not perfected.

The average spread in price between Liverpool and Chicago was 10.8 cents. In nine years when the world crop was small, the spread was 11.2 cents (table 77). In nine years when the crop was large, it was 10.4 cents. In this case the large crop showed a smaller spread than did the small crop.

In nine years when the crop was small, the spread between Liverpool and Kansas City prices was 20.7 cents (table 78). When the crop was large, it was 21.7 cents. Again it costs more to market cheap wheat than high-priced wheat. The same principle is shown in the comparison of prices at Liverpool and at Odessa, Russia (table 79).

TABLE 77. RELATION OF SIZE OF WORLD WHEAT CROP TO WHOLESALE PRICES OF RED WHEAT OF GOOD AVERAGE QUALITY AT LIVERPOOL AND TO CHICAGO PRICES OF NO. 2 RED WINTER WHEAT, AUGUST-JULY, 1896-97 TO 1913-14

Locality	Nine small crops	Nine large crops	Difference
Liverpool.....	\$1.032	\$0.976	\$0.056
Chicago.....	0.920	0.872	0.048
Difference.....	\$0.112	\$0.104	.....

TABLE 78. RELATIONSHIP OF SIZE OF WORLD WHEAT CROP TO WHOLESALE PRICES AT LIVERPOOL AND AT KANSAS CITY, 1896-1913\*

Locality	Nine small crops	Nine large crops	Difference
Liverpool.....	\$1.032	\$0.976	\$0.056
Kansas City.....	0.825	0.759	0.066
Difference.....	\$0.207	\$0.217	.....

\* Wheat prices at Kansas City are for No. 2 best yellow hard wheat, for the crop year July-June; those at Liverpool are spot prices of red wheat of good average quality, for the crop year August-July

TABLE 79. RELATION OF SIZE OF WORLD WHEAT CROP TO WHOLESALE PRICES AT LIVERPOOL, ENGLAND, AND AT ODESSA, RUSSIA, AUGUST-JULY, 1896-97 TO 1913-14\*

Locality	Nine small crops	Nine large crops	Difference
Liverpool, England.....	\$1.032	\$0.976	\$0.056
Odessa, Russia.....	0.918	0.845	0.073
Difference.....	\$0.114	\$0.131	.....

\* The wheat prices at Liverpool are spot prices of red wheat of good average quality; those at Odessa are spring-wheat prices.

TABLE 80. RELATION OF SIZE OF UNITED STATES SPRING-WHEAT CROP TO WHOLESALE PRICES OF NO. 1 NORTHERN SPRING WHEAT AT MINNEAPOLIS AND AT NEW YORK CITY, AUGUST-JULY, 1896-97 TO 1913-14

Locality	Nine small crops	Nine large crops	Difference
New York City.....	\$1.057	\$0.944	\$0.113
Minneapolis.....	0.958	0.827	0.131
Difference.....	\$0.099	\$0.117	.....

If two surplus areas ship their surplus to the same market, and if in a given year one has a large crop and the other has a small crop, prices will be more favorable in the region with the small local crop than in the region with the large local crop.

The price in any given region is the algebraic sum of all the forces affecting prices. The most depressing influence on local prices is a large

TABLE 81. RELATION OF SIZE OF HARD-WINTER-WHEAT CROP IN FIVE STATES TO WHOLESALE PRICES OF RED WHEAT AT LIVERPOOL AND AT KANSAS CITY, 1896-97 TO 1913-14\*

Locality	Nine small crops	Nine large crops	Difference
Liverpool.....	\$1.047	\$0.961	\$0.086
Kansas City.....	0.977	0.804	0.173
Difference.....	\$0.070	\$0.157	.....

\* The wheat prices at Liverpool are spot prices of red wheat, for the crop year August-July; those at Kansas City are for No. 2 choice dark hard wheat, for the crop year July-June.

TABLE 82. RELATION OF SIZE OF HARD-WINTER-WHEAT CROP IN FIVE STATES TO WHOLESALE PRICES OF RED WHEAT AT LIVERPOOL AND AT CHICAGO, 1896-97 TO 1913-14

Locality	Nine small crops	Nine large crops	Difference
Liverpool.....	\$1.047	\$0.961	\$0.086
Chicago.....	0.959	0.832	0.127
Difference.....	\$0.088	\$0.129	.....

world crop due to a large United States crop, with the state crop large compared with crops of other States and the county crop large compared with crops of other counties. If the state crop is short, it tends to offset the effects of the large world and national crops.

There is no such thing as a world market that dominates other markets. There are thousands of markets, the relations between which are constantly fluctuating. The farmer is decidedly concerned, not only with the price in the central market to which his product moves, but also with the world production and with the local production. These affect his prices in comparison with prices in the central market.

Prices are somewhat like atmospheric pressure. Atmospheric pressure is supposed to support a column of mercury 30 inches high. Only rarely does the barometer register 30 inches. Pressure is constantly fluctuating. Wheat is much less fluid than air, and its prices cannot be explained by a "world-market" theory.

The more important factors governing prices of wheat are size of world crop and location of world crop.

When the world crop is large, prices in surplus areas are unusually low compared with prices in central markets. The farther the market in the deficit area is removed from the surplus area, the greater the discrepancy tends to be.

With a given-sized world crop, a large United States crop depresses American prices in comparison with Liverpool prices.

With a given-sized world crop and United States crop, a large crop in any State depresses prices in that State as compared with Liverpool and Chicago prices.

#### EFFECT OF LOCATION OF SUPPLY ON PRICES

The local supply of wheat has an important effect on local prices. In 1911, 34 per cent of the United States wheat crop was produced east of



the Mississippi River (table 83). Average farm prices east of the river were 4 cents above prices west of the river. In the following year, only 16 per cent of the crop was produced east of the Mississippi River. Prices in the East were 21 cents above prices west of the river. Evidently something other than world production and world demand is the cause of these striking differences.

TABLE 83. RELATION OF SIZE OF THE WHEAT CROP TO PRICES IN DIFFERENT REGIONS

Year	Production, in millions of bushels			Per cent of the total crop		Prices, in cents		
	United States	West of Mississippi River	East of Mississippi River	West of Mississippi River	East of Mississippi River	West of Mississippi River	East of Mississippi River	Difference
1909.....	700	504	196	72	28	93.6	110.2	16.6
1910.....	635	425	210	67	33	88.8	95.1	6.3
1911.....	621	410	211	66	34	90.2	94.1	3.9
1912.....	730	613	117	84	16	76.8	97.6	20.8

Timoshenko<sup>7</sup> has shown that Russian interior prices of wheat are more affected by the Russian production than by world production.

Average prices of No. 1 northern spring wheat in Minneapolis and in New York City are shown in table 84. In the eighteen years from 1896 to 1913, the New York price averaged 10.8 cents above the Minneapolis price. The variations were from 7.7 cents to 14.6 cents in different years. In 1908-09 the difference averaged 7.7 cents, and in the following year 12.9 cents.

TABLE 84. PRICES OF NO. 1 NORTHERN WHEAT IN MINNEAPOLIS AND IN NEW YORK CITY, CROP YEAR AUGUST-JULY, 1896-97 TO 1913-14

Crop year	Prices in New York City (cents)	Prices in Minneapolis (cents)	Difference (cents)
1896-97.....	81.1	70.6	10.5
1897-98.....	107.7	94.1	13.6
1898-99.....	79.7	69.0	10.7
1899-1900.....	79.1	67.7	11.4
1900-01.....	84.0	72.9	11.1
1901-02.....	82.0	72.2	9.8
1902-03.....	86.1	75.7	10.4
1903-04.....	99.3	89.9	9.4
1904-05.....	120.5	110.9	9.6
1905-06.....	93.4	83.6	9.8
1906-07.....	93.4	83.9	9.5
1907-08.....	116.4	107.0	9.4
1908-09.....	124.0	116.3	7.7
1909-10.....	121.2	108.3	12.9
1910-11.....	113.8	103.2	10.6
1911-12.....	118.9	107.8	11.1
1912-13.....	100.1	85.5	14.6
1913-14.....	100.0	88.1	11.9
Average.....	100.0	89.3	10.8

Average prices of No. 2 red wheat in Chicago and of red wheat of good average quality in Liverpool are given in table 85. For sixteen years

<sup>7</sup> Timoshenko, V. P. Wheat prices and the world wheat market, p. 107. Thesis in Cornell University Library. 1927.

the Liverpool price was 9.9 cents above the Chicago price. The variations were from 17.8 cents higher in Liverpool, to 12.7 cents higher in Chicago. In 1909-10, Liverpool prices were 3 cents higher than Chicago prices. In the following year they were 11 cents higher.

TABLE 85. AVERAGE WHOLESALE PRICES OF NO. 2 RED WINTER WHEAT AT CHICAGO AND OF RED WINTER WHEAT OF GOOD AVERAGE QUALITY AT LIVERPOOL CROP YEAR AUGUST-JULY, 1898-99 TO 1913-14

Crop year	Prices in Liverpool (cents)	Prices in Chicago (cents)	Difference (cents)
1898-99	85.2	69.9	15.3
1899-1900	86.9	69.1	17.8
1900-01	86.4	72.5	13.9
1901-02	87.0	73.4	14.2
1902-03	88.8	75.3	13.5
1903-04	90.4	91.0	-1.2
1904-05	96.8	109.5	-12.7
1905-06	98.0	85.3	12.7
1906-07	93.8	78.0	15.8
1907-08	109.9	95.0	14.9
1908-09	121.9	116.1	5.8
1909-10	117.1	114.1	3.0
1910-11	106.8	95.8	11.0
1911-12	114.1	100.7	13.4
1912-13	112.3	103.9	8.4
1913-14	105.6	92.9	12.7
Average	100.1	90.2	9.9

The Kansas farm price of wheat for sixteen years averaged 18 cents below the Chicago price of No. 2 red winter wheat (table 86). In 1911, Kansas farm prices were 4 cents below Chicago prices; in the following year they were 32 cents below.

TABLE 86. KANSAS FARM PRICES OF WHEAT AND CHICAGO WHOLESALE PRICES OF NO. 2 RED WINTER WHEAT, DECEMBER, 1898-1913

Year	Chicago wholesale price (cents)	Kansas farm price (cents)	Difference (cents)
1898	67	50	17
1899	67	52	15
1900	70	55	15
1901	77	59	18
1902	74	55	19
1903	83	59	24
1904	114	89	25
1905	88	71	17
1906	74	58	16
1907	97	82	15
1908	104	88	16
1909	122	96	26
1910	93	84	9
1911	95	91	4
1912	106	74	32
1913	96	79	17
Average	89	71	18

Kansas farm prices for seventeen years averaged 29 cents below Liverpool prices (table 87). In 1911 they were 16 cents below and in the following year they were 35 cents below.

Russian prices are even less related to Liverpool prices. Prices at Saratov varied from 4 to 41 cents below those at Liverpool (table 88).

TABLE 87. KANSAS FARM PRICES OF WHEAT AND LIVERPOOL WHOLESALE PRICES OF RED WHEAT OF GOOD AVERAGE QUALITY, DECEMBER, 1896-1913

Year	Liverpool wholesale price (cents)	Kansas farm price (cents)	Difference (cents)
1896	99	63	36
1897	109	74	35
1898	87	50	37
1899	81	52	29
1900	86	55	31
1901	90	59	31
1902	88	55	33
1903	88	59	29
1904	.....	89	.....
1905	96	71	25
1906	90	58	32
1907	113	82	31
1908	116	88	28
1909	121	96	25
1910	104	84	20
1911	107	91	16
1912	109	74	35
1913	105	79	26
Average for 17 years	99	70	29

TABLE 88. WHOLESALE PRICES OF WHEAT IN LIVERPOOL, ENGLAND, AND IN SARATOV, RUSSIA, CROP YEAR AUGUST-JULY, 1896-97 TO 1913-14

Crop year	Liverpool, England (cents)	Saratov, Russia (cents)	Difference (cents)
1896-97	89.2	48.2	41.0
1897-98	116.8	76.2	40.6
1898-99	85.2	76.3	8.9
1899-1900	86.9	60.3	26.6
1900-01	86.4	58.9	27.5
1901-02	87.6	71.1	16.5
1902-03	88.8	62.1	26.7
1903-04	90.4	61.3	29.1
1904-05	95.8	62.4	33.4
1905-06	98.0	75.4	22.6
1906-07	93.8	87.8	6.0
1907-08	109.9	105.9	4.0
1908-09	121.9	97.4	24.5
1909-10	117.1	77.7	39.4
1910-11	106.8	74.1	32.7
1911-12	114.1	108.2	5.9
1912-13	112.3	88.9	23.4
1913-14	105.6	76.0	29.6
Average	100.4	76.0	24.4

Timoshenko<sup>8</sup> has demonstrated that prices of wheat are not fixed in the world market. For different countries and different markets the relative importance of local-crop conditions and world-crop conditions is very different. The importance of the world market on prices decreases as one passes from great importing markets to harbor markets of exporting countries, to interior terminal markets, to local markets, and finally to farm prices. Local prices are not "world prices" minus the "cost of marketing."

Russian-interior prices of wheat are more closely associated with Russian production than with world production. Prices in France are about equally affected by home and by world production. German prices are

<sup>8</sup> Timoshenko, V. P. Wheat prices and the world wheat market. Thesis in Cornell University Library. 1927.

more closely associated with world production. Liverpool prices are more closely associated with the amount of wheat directly at the disposal of western Europe, than with the world production. Imports of wheat into western Europe influence prices there more than prices influence imports. Imports depend more on the size of the crop in surplus countries than on prices in importing countries.

Timoshenko has shown also that spring-to-fall changes in wheat prices at Liverpool, Berlin, and Paris are more closely associated with fluctuations in the production of wheat in the east-European surplus area and the west-European deficit area, than with American production. The Southern-Hemisphere wheat production is the major factor influencing changes in prices from fall to spring. The fall-to-spring changes in prices are not so highly associated with Southern-Hemisphere production, as are the spring-to-fall changes with Northern-Hemisphere production.

#### EFFECT OF PRICES ON PRODUCTION

Of the factors affecting acreage of wheat in North Dakota, the price of spring wheat on December 1 represents 10 per cent, and the price of spring wheat the second year preceding represents 18 per cent; or, prices for the past two years represent 28 per cent of the factors affecting changes in acreage. The price has more effect on the acreage of the second year than it does on the acreage of the first year.<sup>9</sup> A 25-per-cent change in price tends to increase the acreage the following year 3 per cent, and the second year 5 per cent.

The price of wheat represents 20 per cent of the factors affecting change in the number of homestead entries the following year, and 19 per cent of the factors the second following year. Prices of wheat for the two years in succession are 39 per cent of factors affecting the changes in the number of homestead entries.<sup>10</sup>

<sup>9</sup> PER CENT DETERMINATION OF THE ACRES OF WHEAT IN NORTH DAKOTA BY THE DECEMBER 1 PRICE OF SPRING WHEAT IN NORTH DAKOTA THE FIRST AND SECOND PRECEDING YEARS, 1892-1915

$X_1$  = acres of wheat in North Dakota in  $y$  year;  
 $X_2$  = December 1 price of spring wheat in North Dakota in  $y-1$  year;  
 $X_3$  = December 1 price of spring wheat in North Dakota in  $y-2$  year.

	Per cent
December 1 price of spring wheat in North Dakota in $y-1$ year.....	10.2
December 1 price of spring wheat in North Dakota in $y-2$ year.....	18.2
Total.....	28.4

$$R_{1.22} = 0.533$$

<sup>10</sup> PER CENT DETERMINATION OF THE HOMESTEAD ENTRIES IN THE PRAIRIE PROVINCES OF CANADA BY THE UNITED STATES DECEMBER 1 PRICE OF WHEAT IN THE PRECEDING AND THE SECOND PRECEDING YEAR, 1890-1914

$X_1$  = homestead entries in the Prairie Provinces of Canada in  $y$  year;  
 $X_2$  = United States December 1 farm price of wheat in the preceding, or  $y-1$ , year;  
 $X_3$  = United States December 1 farm price of wheat in the second preceding, or  $y-2$ , year.

United States farm price	Per cent
Preceding year, $X_2$ .....	20.0
Second preceding year, $X_3$ .....	18.9
Total.....	38.9

$$R_{1.22} = 0.624$$

## SIX GRAIN CROPS

The total pounds of the six grain crops,<sup>11</sup> corn, wheat, oats, barley, rye, and buckwheat, in relation to the average price per pound of these crops as affected by production, is shown in table 129 (page 106). When the United States production of these six crops was 20 per cent below normal, prices were 13 per cent above normal.

The prices of the important individual grains fluctuate more violently with supply than do the prices of the six grains combined. Theoretically it might be assumed that when wheat is scarce other grains are substituted, so that the full effect of the scarcity is not evident in prices. On this theory a shortage in the total of all grains would make prices fluctuate more violently than would a shortage in any one crop, because substitution would be more difficult. This does not seem to be the case. Apparently the prices of each crop fluctuate fairly independently, and putting the six crops together smoothes the curve—probably because in a given year one grain may be scarce and high in price, and another may be abundant and cheap. Such prices tend to counterbalance each other.

## HOGS

## EFFECT OF SUPPLY ON PRICES

The figures for the number of hogs slaughtered in western markets, and the average weights per hog, are available since 1870. This makes it possible to know the total pounds of live hogs entering the markets in the corn-belt territory. The number packed in the winter months,

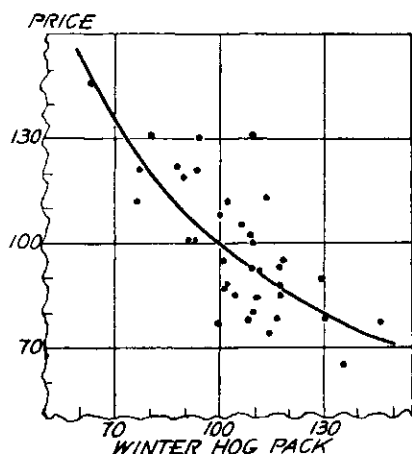


FIGURE 54. RELATION OF THE WESTERN WINTER HOG PACK TO THE PURCHASING POWER OF THE NOVEMBER-FEBRUARY PRICE OF THE WESTERN WINTER HOG PACK, 1877-78 TO 1913-14

When the hog pack in the West was 20 per cent below normal, the price was 21 per cent above normal

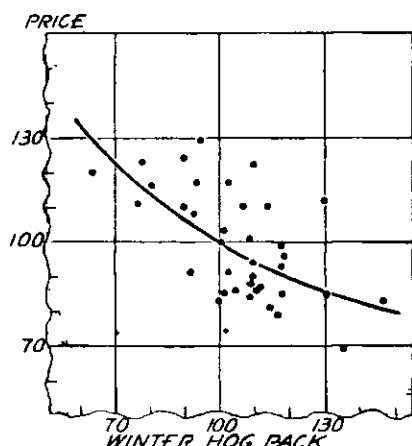


FIGURE 55. RELATION OF THE WESTERN WINTER HOG PACK TO THE PURCHASING POWER OF THE UNITED STATES JANUARY 1 FARM PRICE, 1878-1914

When the hog pack in the West was 20 per cent below normal, the United States farm price was 14 per cent above normal. When the pack was 20 per cent above normal, the price was 10 per cent below normal

<sup>11</sup> Warren, G. F. Prices of farm products in the United States. U. S. Dept. Agr., Bul. 999, p. 6. 1921.

November to February inclusive, has been used as an indication of the supply coming on the market. The variations in these months in successive years probably give a reliable index of the variations in the total year's supply.

From 1877-78 to 1913-14, a supply of hogs 20 per cent below normal brought prices 21 per cent above normal in these markets (figure 54 and table 89). This indicates that the price of hogs fluctuates violently with supply.

In the same period, receipts 20 per cent below normal made the United States farm price of hogs 14 per cent above normal (figure 55 and table 89). The United States farm price includes many deficit areas and is therefore a mixture of deficit and surplus prices.

In the same period, receipts 20 per cent below normal made the January 1 farm price on Iowa farms 18 per cent above normal (figure 56 and table 89). The farm price is the value per head of hogs and pigs of all ages. If prices were available for hogs ready for market, Iowa farm prices undoubtedly would fluctuate more violently than do prices in the central markets. It is probable that, on the average, there is an unusual supply of pigs on farms when hogs are high, and a small supply of pigs when hogs are cheap. This extra supply of pigs would tend to lower the average farm value, when market hogs are high. This would tend to reduce the violence in farm-price fluctuations for all hogs and pigs.

When the supply of hogs going into western markets is 20 per cent below normal, the Rhode Island farm price averaged only 9 per cent above normal (figure 57 and table 89). Rhode Island prices were very

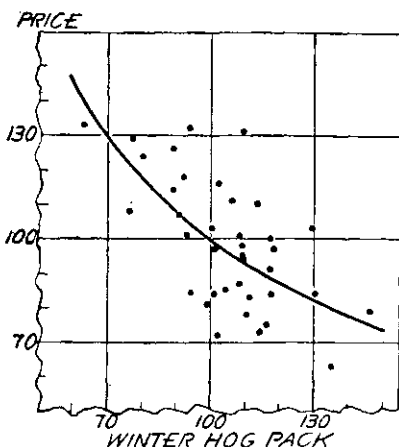


FIGURE 56. RELATION OF THE WESTERN WINTER HOG PACK TO THE PURCHASING POWER OF THE IOWA JANUARY 1 FARM PRICE, 1878-1914

When the hog pack in the West was 20 per cent below normal, the Iowa farm price was 18 per cent above normal. When the pack was 20 per cent above normal, the price was 13 per cent below normal

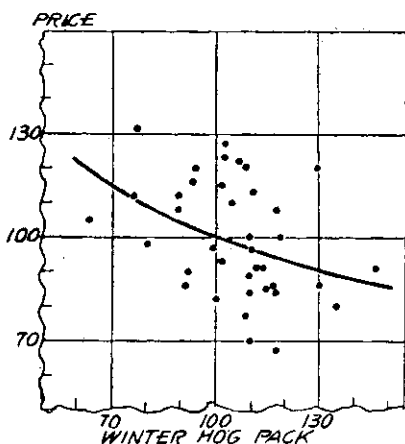


FIGURE 57. RELATION OF THE WESTERN WINTER HOG PACK TO THE PURCHASING POWER OF THE RHODE ISLAND JANUARY 1 FARM PRICE OF HOGS, 1878-1914

When the hog pack was 20 per cent below normal, the Rhode Island farm price was only 9 per cent above normal. When the pack was 20 per cent above normal, the price was 7 per cent below normal

TABLE 89. RELATION OF POUNDS OF HOGS PACKED IN THE WESTERN MARKETS IN THE WINTER PERIOD, 1877-78 TO 1913-14, TO PRICES

(From table 129)

	Pack 20 per cent below normal	Pack 20 per cent above normal
Western market prices, 1877-78 to 1913-14.....	21	14
United States value per head of hogs on farms, January 1, 1878-1914.....	14	19
Iowa value per head of hogs and pigs on farms, January 1, 1878-1914.....	18	13
Rhode Island value per head of hogs and pigs on farms, January 1, 1878-1914.....	9	7

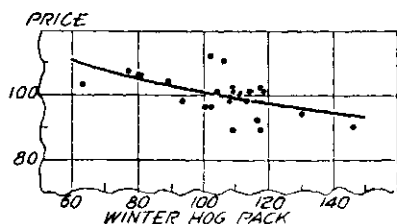


FIGURE 58. RELATION OF THE WESTERN WINTER HOG PACK TO THE PURCHASING POWER OF THE UNITED STATES RETAIL PRICE OF PORK CHOPS, 1890-1914

When the hog pack was 20 per cent below normal, the retail price of pork chops was 4 per cent above normal. When the pack was 20 per cent above normal, the retail price was 3 per cent below normal

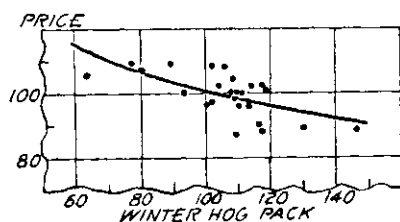


FIGURE 59. RELATION OF THE WESTERN WINTER HOG PACK TO THE PURCHASING POWER OF THE UNITED STATES RETAIL PRICE OF HAM, 1890-1914

When the hog pack was 20 per cent below normal, the retail price of ham was 6 per cent above normal. When the pack was 20 per cent above normal, the retail price was 4 per cent below normal

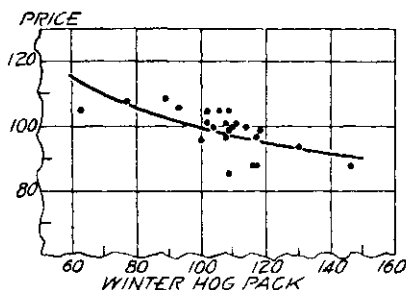


FIGURE 60. RELATION OF THE WESTERN WINTER HOG PACK TO THE PURCHASING POWER OF THE UNITED STATES RETAIL PRICE OF BACON, 1890-1914

When the hog pack was 20 per cent below normal, the retail price of bacon was 6 per cent above normal. When the pack was 20 per cent above normal, the retail price was 4 per cent below normal

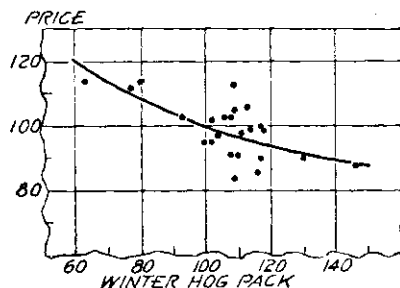


FIGURE 61. RELATION OF THE WESTERN WINTER HOG PACK TO THE PURCHASING POWER OF THE UNITED STATES RETAIL PRICE OF LARD, 1890-1914

When the hog pack was 20 per cent below normal, the retail price of lard was 8 per cent above normal. When the pack was 20 per cent above normal, the retail price was 6 per cent below normal

erratic, which is a further indication that the number of hogs in western markets was not the only factor affecting Rhode Island farm prices.

When the pounds of hogs packed in the West from 1889-90 to 1913-14 were 20 per cent below normal, retail prices of pork chops were only 4 per cent above normal. Retail prices of ham and bacon were 6 per cent above normal. Lard was 8 per cent above normal.

When the retail prices of pork chops, ham, bacon, and lard are combined in the proportion in which these commodities are marketed,<sup>12</sup> an approximate retail price for the entire hog is obtained. When the hog pack in western markets was 20 per cent below normal, the retail price for all pork was 6 per cent above normal (table 90 and figure 62).

TABLE 90. RELATION OF POUNDS OF HOGS PACKED IN THE WESTERN MARKETS IN THE WINTER PERIOD, 1889-90 TO 1913-14, TO PRICES  
(From table 129)

	Pack 20 per cent below normal	Pack 20 per cent above normal
	Per cent that prices were above normal	Per cent that prices were below normal
Western market prices, 1889-90 to 1913-14.....	21	15
United States retail price of pork chops, 1890-1914.....	4	3
United States retail price of ham, 1890-1914.....	6	4
United States retail price of bacon, 1890-1914.....	6	4
United States retail price of lard, 1890-1914.....	8	6
Pork chops, bacon, ham, and lard combined, 1890-1914.....	6	5

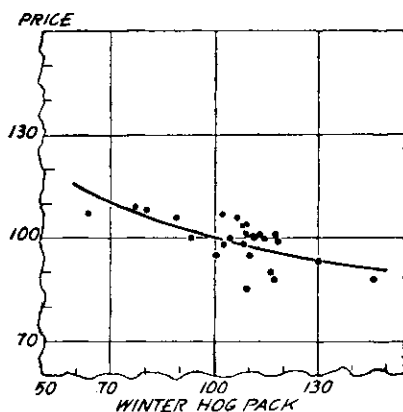


FIGURE 62. RELATION OF THE WESTERN WINTER HOG PACK TO THE PURCHASING POWER OF THE AVERAGE UNITED STATES RETAIL PRICE OF PORK CHOPS, BACON, HAM, AND LARD, 1890-1914

When the hog pack was 20 per cent below normal, the United States average retail price of pork products was 6 per cent above normal. When the pack was 20 per cent above normal, the price was 5 per cent below normal

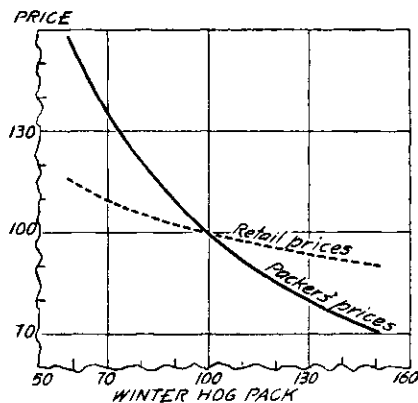


FIGURE 63. RELATION OF THE WESTERN WINTER HOG PACK TO THE PURCHASING POWER OF THE PACKERS' PRICE OF THE WESTERN WINTER HOG PACK AND THE RETAIL PRICE OF FOUR PORK PRODUCTS, 1890-1914

When the pack was 20 per cent below normal, the retail price was 6 per cent above normal and the packers' price was 21 per cent above normal

<sup>12</sup> The United States Bureau of Labor Statistics reports that the actual family consumption was: pork chops, 36 pounds; bacon, 17 pounds; ham, 22 pounds; and lard, 34 pounds. (U. S. Dept. Labor, Bur. Labor Statistics, Bul. 306, p. 5, 1925.)



A 20-per-cent shortage raised prices paid by packers 21 per cent, but raised retail prices only 6 per cent (figure 63). A 20-per-cent surplus depressed packers' prices 15 per cent, but depressed retail prices 5 per cent. If prices actually paid to farmers for market hogs were available, even more striking differences would be shown. The farm price is the "cracker on the whip."

## EFFECT OF SUPPLY ON TOTAL VALUE

Since farm prices of market hogs are not available, the effect of the supply on farm prices is unknown, but the effect of supply on prices paid by packers is available.

From 1877-78 to 1913-14, receipts 80 per cent of normal brought prices 21 per cent above normal. The total value may therefore be represented by 80 per cent of 121, or 97. A 20-per-cent surplus of receipts sold for 85 per cent of normal prices, or had a total value of 2 per cent above normal. For every \$100 brought by normal receipts, the small receipts brought \$97 in the market, whereas 50 per cent more hogs brought \$102. A 50-per-cent increase in the supply added only 5 per cent to the income at the central market. Taking out freight rates and other

TABLE 91. RETAIL VALUE OF PORK

Year	Pork chops	Bacon	Ham	Lard	Average*	Value of products per 100 pounds of live hogst
1890	\$0.107	\$0.125	\$0.152	\$0.093	\$0.102	
1891	0.109	0.126	0.153	0.091	0.103	
1892	0.111	0.129	0.157	0.098	0.106	
1893	0.118	0.142	0.168	0.112	0.116	
1894	0.112	0.135	0.157	0.101	0.108	
1895	0.110	0.130	0.152	0.095	0.104	
1896	0.107	0.126	0.150	0.088	0.100	
1897	0.108	0.127	0.151	0.085	0.100	
1898	0.109	0.131	0.146	0.089	0.101	
1899	0.112	0.134	0.153	0.092	0.105	
1900	0.119	0.143	0.162	0.099	0.111	
1901	0.130	0.158	0.169	0.112	0.122	
1902	0.141	0.177	0.184	0.127	0.134	
1903	0.140	0.182	0.187	0.120	0.133	
1904	0.137	0.180	0.182	0.111	0.129	
1905	0.139	0.181	0.182	0.110	0.129	
1906	0.152	0.196	0.196	0.121	0.141	
1907	0.156	0.201	0.204	0.127	0.146	
1908	0.160	0.207	0.209	0.127	0.149	
1909	0.174	0.224	0.221	0.142	0.161	
1910	0.192	0.255	0.246	0.164	0.182	\$14.09
1911	0.179	0.247	0.240	0.140	0.169	13.11
1912	0.192	0.244	0.243	0.148	0.175	13.59
1913	0.210	0.270	0.269	0.158	0.191	14.86
1914	0.220	0.275	0.273	0.156	0.195	15.16
1915	0.203	0.269	0.261	0.148	0.185	14.36
1916	0.227	0.287	0.294	0.175	0.208	16.15
1917	0.319	0.410	0.382	0.276	0.296	22.97
1918	0.390	0.529	0.479	0.331	0.367	28.46
1919	0.423	0.554	0.534	0.369	0.400	31.02
1920	0.423	0.523	0.555	0.295	0.379	29.30
1921	0.349	0.427	0.488	0.180	0.309	23.25
1922	0.330	0.398	0.488	0.170	0.287	22.29
1923	0.304	0.391	0.455	0.177	0.275	21.31
1924	0.308	0.377	0.453	0.190	0.277	21.51
1925	0.366	0.467	0.526	0.233	0.332	25.75
1926	0.395	0.503	0.574	0.219	0.350	27.16
1927	0.368	0.472	0.550	0.193	0.326	25.32

\* Prices are as quoted by the United States Bureau of Labor Statistics. Weights were: pork chops, 36; bacon, 17; ham, 22; lard, 34. For method of calculation, see tables 99 and 100.

† From table 100.

fixed charges, it is clear that the farmers received much less for 120 hogs than for 80 hogs.

For each \$100 paid by consumers for a normal supply of pork, \$85 would be paid for 20 per cent less pork, and \$114 for 20 per cent more pork. As compared with a short supply, consumers would pay 34 per cent more for 50 per cent more hogs, whereas the farmers would receive less for the larger supply. This additional money paid by consumers remains in the hands of city persons.

In the four years 1923 to 1926, the number of hogs slaughtered in the United States under federal inspection varied from 41 million to 53 million (table 92). The total amounts paid for the pork at retail prices were fairly constant during the four years. The consumers paid about 3 per cent more for the larger amount than for the smaller. In these years the pork bill of the consumer was constant, regardless of supply. Prices were so adjusted that quantity times price equaled about two and one-half billion dollars

TABLE 92. NUMBER OF HOGS SLAUGHTERED UNDER FEDERAL INSPECTION\*

Year	Number of hogs slaughtered under federal inspection	Value of live hogs at farm prices	Value of live hogs at Chicago prices	Value of pork at United States retail prices
1923.....	53,300,000	\$ 855,000,000	\$ 905,000,000	\$2,556,000,000
1924.....	52,900,000	890,000,000	965,000,000	2,560,000,000
1925.....	43,000,000	1,064,000,000	1,143,000,000	2,491,000,000
1926.....	40,600,000	1,078,000,000	1,127,000,000	2,481,000,000

\* U. S. Dept. Agr., Yearbook 1926, p. 1102, 1106. Live hogs were assumed to weigh 225 pounds.

For 53 million hogs the packers paid 905 million dollars. For 41 million hogs they paid 1127 million dollars, but the consumers paid slightly more for the larger supply.

Consumers paid 75 million dollars more for the larger supply, but farmers received 223 million dollars less for the larger supply. The cities kept the difference in the form of handling charges.

#### RELATION OF WHOLESALE PRICES OF HOGS TO RETAIL PRICES OF PORK

Prices for heavy hogs in Chicago since 1890, and retail prices of pork, are shown in table 93.

TABLE 93. RELATION OF WHOLESALE PRICES OF HEAVY HOGS AT CHICAGO TO UNITED STATES RETAIL PRICES OF PORK PRODUCTS

	Thirteen years, 1890-1902	Seven years, 1903-1909	Five years, 1910-1914	Six years, 1915-1920	Six years, 1921-1926
Retail prices of products per 100 pounds of live hogs.....	\$7.95	\$10.43	\$13.75	\$22.87	\$23.63
Wholesale prices per 100 pounds of live hogs.....	4.77	5.99	7.90	13.48	9.46
Difference, or charge for distribution.....	\$3.18	\$4.44	\$5.85	\$9.39	\$14.17
Per cent wholesale price is of retail price	60	57	57	59	40

In the period from 1890 to 1902, it cost \$3.18 to retail products from 100 pounds of live hogs. In the five years before the war, it cost \$5.85. In the six years 1921 to 1926, it cost \$14.17.

In the past six years, pork retailed at 72 per cent above the five-year pre-war average, but packers paid only 20 per cent above pre-war prices for hogs. The Iowa farmer's position is even less favorable than these figures indicate, because freight and handling charges from the farm to Chicago have risen more than have farm prices.

Retail prices are high enough compared with pre-war prices to provide a prosperous agriculture if the farmer receives his pre-war share of the retail price. The proportion of the money left in the hands of city people is now high. In the five years before the war, the packers paid 57 per cent of the retail price. If packers had paid 57 per cent of the retail price in the six years 1921 to 1926, they would have paid an average of \$13.47 instead of \$9.46. This difference has not all been kept by the packers or by any other single agency. It has been absorbed by the entire distributing system. Most of it is represented by wages.

The costs of distribution have risen much faster than wages have. When compared with the five years before the war, costs of distribution have risen 142 per cent, whereas union wage rates have risen only 126 per cent (table 94). Since the period from 1890 to 1902, wages have risen 213 per cent but costs of distribution have risen 348 per cent.

TABLE 94. RELATION OF WAGES TO COST OF DISTRIBUTING PORK

	1890-1902	1903-1909	1910-1914	1915-1920	1921-1925
Index number of cost of distribution.....	54	76	100	161	242
Index number of wages.....	72	87	100	158	226

Supply and demand have been such that the pork produced on American farms was disposed of at retail in the six years 1921 to 1926 at 72 per cent above pre-war prices.

Those persons who attempt to explain farm prices solely on the basis of supply and demand, believe that because farm prices are low, supply must be high or demand low. Some theorize one way and some the other. The consumer's price does not indicate that there has been a low demand or a high supply. Retail prices have been 72 per cent above pre-war prices.

#### EFFECT OF SUPPLY ON RELATIONSHIPS OF FARM, WHOLESALE, AND RETAIL PRICES

Before the war, when the hog pack was small the packers paid an average of \$6.01 for hogs (table 95). The pork from these hogs retailed

TABLE 95. RELATION OF POUNDS OF HOGS PACKED IN THE WEST, TO PRICES, 1890-1914

	Twelve years of small pack	Thirteen years of large pack	Difference
Per cent of normal pack.....	80	110	.....
Retail price per 100 pounds of live hogs.....	\$10.85	\$9.81	\$1.04
Prices paid by packers per 100 pounds of live hogs.....	6.01	4.60	1.41
Difference.....	\$4.84	\$5.21	.....

at \$10.85, a difference of \$4.84 to cover all charges from the time when the hogs were bought by packers until the pork was sold at retail. When the pack was large, the packers paid \$4.60 and the product retailed at \$9.81. The difference was \$5.21.

As for practically all other farm products, it cost more to get cheap hogs to the consumer than high-priced hogs. When the packers paid \$4.60, it cost \$5.21 to get the pork to the consumer. When the packers paid \$1.41 more for hogs, it cost 37 cents less to get the pork to the consumer.

If prices paid to farmers were available, the discrepancy between farm and retail prices when hogs are high and when they are cheap would be even more striking. With the yearly variations in supply, the less the farmer gets, the more the channels of distribution absorb. Expressed in terms of cause and effect, the more the retail price drops, the more the channels of trade absorb.

Rhode Island and Iowa farm prices are shown in table 96. Rhode Island prices are much higher than Iowa prices, and are more stable.

TABLE 96. RELATION OF POUNDS OF HOGS PACKED IN THE WEST, TO FARM PRICES PER HEAD, JANUARY 1, 1890-1914

	Twelve years of small pack	Thirteen years of large pack	Difference
Rhode Island.....	\$11.47	\$9.61	\$1.86
Iowa.....	8.94	7.02	1.92
Difference.....	\$2.53	\$2.59	.....

The effects of the size of pack on retail prices of individual products are shown in table 97. Prices of bacon are the most flexible and those of lard the least flexible. Apparently the demand for bacon is an insistent

TABLE 97. RELATION OF POUNDS OF HOGS PACKED IN THE WEST, TO UNITED STATES RETAIL PRICES OF DIFFERENT PORK PRODUCTS, 1890-1914

	Twelve years of small pack (cents)	Thirteen years of large pack (cents)	Difference	
			Cents	Per cent
Ham.....	19.8	17.9	1.9	11
Bacon.....	18.9	16.7	2.2	13
Chops.....	14.9	13.5	1.4	10
Lard.....	12.1	11.2	0.9	8

one, but substitutes are used for lard which prevent the price from rising so much when the supply is short. Since lard is preferable, the use of lard substitutes decreases when lard is cheap.

#### COST OF DISTRIBUTION

In 1917 the products from 100 pounds of live hogs retailed at \$22.97 (table 91, page 73). In 1921 these products retailed at \$23.25. In the former year farmers received \$13.59, and in the latter year \$7.84 (table 98).

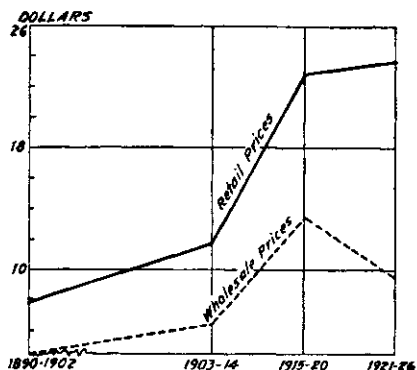


FIGURE 64. PRICES PAID BY PACKERS, AND RETAIL PRICES OF PORK

Retail prices of pork have trebled, but prices paid by packers have only doubled because distributing charges have risen nearly five times

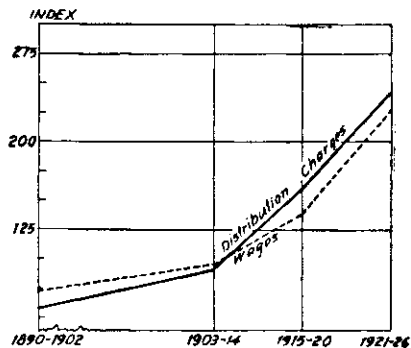


FIGURE 65. UNION WAGE RATES AND THE CHARGES FOR DISTRIBUTING PORK

Costs of distribution have risen even more rapidly than have wages

The low prices of 1921 are commonly attributed to high supply or low demand. Consumers paid more in 1921 than they did in 1917, although farmers received a little over one-half as much. Costs of distribution had risen enough to make up the difference. Costs of distributing pork have been fairly constant in the past eight years. Farm and retail prices and costs of distribution are shown in table 91 and in tables 98 to 102.

TABLE 98. AVERAGE PRICES PAID TO FARMERS IN THE UNITED STATES PER 100 POUNDS FOR HOGS, AS REPORTED BY THE UNITED STATES DEPARTMENT OF AGRICULTURE

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1910-14.	\$ 7.03	\$ 7.12	\$ 7.41	\$ 7.59	\$ 7.23	\$ 7.16	\$ 7.25	\$ 7.47	\$ 7.61	\$ 7.38	\$ 6.97	\$ 6.72	\$ 7.25
1910....	7.76	7.87	8.93	9.26	8.59	8.40	8.15	7.78	8.27	8.08	7.61	7.16	8.16
1911....	7.41	7.04	6.74	6.17	5.72	5.66	5.92	6.54	6.53	6.09	5.86	5.72	6.29
1912....	5.74	5.79	5.94	6.78	6.79	6.65	6.64	7.11	7.47	7.70	7.05	6.89	6.71
1913....	6.77	7.17	7.62	7.94	7.45	7.61	7.81	7.79	7.68	7.60	7.33	7.16	7.49
1914....	7.45	7.75	7.80	7.80	7.60	7.43	7.72	8.11	8.11	7.43	7.00	6.67	7.57
1915....	6.57	6.34	6.33	6.48	6.77	6.80	6.84	6.61	6.79	7.18	6.35	6.02	6.59
1916....	6.32	7.07	7.80	8.21	8.37	8.21	8.40	8.61	9.22	8.67	8.74	8.76	8.20
1917....	9.16	10.33	12.32	13.61	13.72	13.59	13.35	14.24	15.69	16.15	15.31	15.73	13.59
1918....	15.26	15.03	15.58	15.76	15.84	15.37	15.58	16.89	17.50	16.50	15.92	15.82	15.92
1919....	15.69	15.53	16.13	17.39	18.00	17.80	19.22	19.30	15.81	13.88	13.36	12.66	16.23
1920....	13.30	13.02	13.59	13.73	13.44	13.18	13.65	13.59	13.98	13.57	11.64	8.90	13.02
1921....	8.72	8.58	9.13	7.96	7.62	7.22	8.09	8.73	7.51	7.31	6.66	6.52	7.84
1922....	6.89	8.24	9.08	8.83	9.05	9.11	9.12	8.51	8.23	8.33	7.78	7.63	8.10
1923....	7.77	7.65	7.52	7.45	7.13	6.37	6.68	6.85	7.81	7.23	6.66	6.39	7.13
1924....	6.59	6.51	6.63	6.70	6.68	6.55	6.60	8.54	8.50	9.45	8.62	8.39	7.48
1925....	9.31	9.62	11.83	11.64	10.78	10.82	12.02	12.19	11.50	11.16	10.66	10.51	11.00
1926....	10.99	11.76	11.65	11.49	11.97	12.80	12.69	11.66	12.07	12.06	11.45	10.97	11.80
1927....	10.97	11.19	10.89	10.41	9.41	8.40	8.58	9.24	9.78	10.16	8.99	8.14	9.68

TABLE 99. RETAIL VALUE OF PORK IN THE UNITED STATES, IN CENTS PER POUND\*

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1910-14.	\$17.58	\$17.55	\$17.74	\$18.07	\$18.17	\$18.23	\$18.51	\$18.99	\$19.06	\$18.88	\$18.28	\$17.77	\$18.24
1910....	17.55	17.65	17.95	18.23	18.47	18.70	18.84	18.70	18.50	18.20	17.82	17.58	18.15
1911....	17.52	17.33	17.03	16.63	16.52	16.58	16.80	17.22	17.32	17.05	16.30	16.01	16.89
1912....	16.18	15.80	16.18	17.05	17.41	17.45	17.57	18.17	18.83	19.11	18.35	17.78	17.50
1913....	17.81	17.93	18.59	19.22	19.06	19.19	19.73	19.94	20.12	19.90	19.34	18.82	19.14
1914....	18.86	18.97	18.93	19.21	19.37	19.22	19.63	20.93	20.55	20.12	19.57	18.68	19.52
1915....	18.23	17.88	17.71	18.21	18.61	18.66	18.76	18.75	18.89	19.31	18.76	18.04	18.50
1916....	18.22	18.52	19.50	20.03	20.61	20.85	21.09	21.50	22.47	22.31	22.47	22.21	20.80
1917....	22.53	23.76	25.52	28.18	29.47	29.82	29.99	30.89	33.19	34.47	33.62	33.81	29.59
1918....	33.79	33.62	33.88	34.54	35.12	35.49	36.77	37.80	40.00	40.22	39.73	39.33	36.66
1919....	38.95	37.03	37.47	39.41	41.07	41.48	43.49	43.68	41.76	39.78	38.66	36.83	39.96
1920....	36.42	36.14	36.19	37.84	38.04	37.97	39.23	39.64	40.86	41.09	38.60	32.35	37.85
1921....	31.78	30.22	30.40	31.93	29.74	29.26	29.88	31.76	31.22	29.75	27.73	26.70	29.95
1922....	25.93	26.64	28.36	29.01	29.57	29.67	29.92	29.85	29.78	29.83	28.58	27.28	28.71
1923....	27.07	26.82	26.67	26.73	27.19	27.13	27.61	27.94	29.60	29.01	27.26	26.27	27.45
1924....	26.44	25.90	25.71	26.19	26.58	26.60	26.74	29.27	29.95	30.99	29.52	28.66	27.70
1925....	29.50	29.51	32.77	33.34	32.82	33.04	34.58	35.21	35.26	34.82	33.93	33.05	33.16
1926....	33.18	33.25	33.43	33.75	34.70	36.49	36.81	36.33	36.74	36.52	34.98	33.74	34.98
1927....	33.30	32.91	33.01	33.01	32.69	31.93	31.75	32.54	33.41	33.74	32.03	30.58	32.61

\* Retail prices are those reported by the United States Bureau of Labor Statistics. The weights are as follows: pork chops, 36; bacon, 17; ham, 22; lard, 34. A "good to choice medium butcher" hog weighing 215 pounds was killed in January, 1928, by C. D. Schutt, of the Department of Animal Husbandry at Cornell University, and every edible part sold at retail. Prices for the four products weighted as above, averaged 30.56 cents per pound. Because of the lower prices received for some cuts, the average retail price was 27.14 cents, or 89 per cent of the weighted average. Prices in this table are therefore 89 per cent of the Bureau of Labor Statistics weighted average.

TABLE 100. AVERAGE RETAIL VALUE OF PRODUCTS PER 100 POUNDS OF LIVE HOGS\*

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1910-14.	\$13.65	\$13.63	\$13.77	\$14.03	\$14.11	\$14.15	\$14.37	\$14.74	\$14.80	\$14.66	\$14.19	\$13.80	\$14.76
1910....	13.63	13.70	13.94	14.15	14.34	14.52	14.63	14.52	14.36	14.13	13.84	13.65	14.09
1911....	13.60	13.46	13.22	12.91	12.83	12.87	13.04	13.37	13.45	13.24	12.66	12.43	13.11
1912....	12.56	12.34	12.56	13.24	13.52	13.55	13.64	14.11	14.62	14.84	14.25	13.80	13.59
1913....	13.83	13.92	14.43	14.92	14.80	14.90	15.32	15.48	15.62	15.45	15.02	14.61	14.86
1914....	14.64	14.73	14.70	14.91	15.04	14.92	15.24	16.25	15.96	15.62	15.19	14.50	15.16
1915....	14.15	13.88	13.75	14.14	14.45	14.49	14.57	15.50	14.67	14.99	14.57	14.01	14.36
1916....	14.15	14.38	15.14	15.55	16.00	16.19	16.37	16.69	17.45	17.32	17.45	17.24	16.15
1917....	17.49	18.45	19.81	21.88	22.88	23.15	23.28	23.98	25.77	26.76	26.10	26.25	22.97
1918....	26.23	26.10	26.30	26.82	27.27	27.55	28.08	29.35	31.06	31.23	30.85	30.54	28.46
1919....	30.24	28.75	29.09	30.60	31.89	32.21	33.77	33.91	32.42	30.89	30.02	28.59	31.02
1920....	28.28	28.06	28.03	29.38	29.53	29.48	30.40	30.78	31.72	31.90	29.97	25.12	29.39
1921....	24.67	23.46	23.60	24.09	23.99	22.72	23.20	24.66	24.24	23.10	21.53	20.73	23.25
1922....	20.13	20.68	22.02	22.52	22.96	23.04	23.23	23.18	23.12	23.16	22.19	21.18	22.29
1923....	21.02	20.82	20.71	20.75	21.11	21.06	21.44	21.69	22.98	22.52	21.16	20.40	21.31
1924....	20.53	20.11	19.96	20.33	20.64	20.65	20.76	22.73	23.25	24.06	22.92	22.25	21.51
1925....	22.90	22.91	25.44	25.89	25.48	25.65	26.85	27.34	27.38	27.03	26.34	25.66	25.75
1926....	25.76	25.82	25.96	26.20	26.94	28.33	28.58	28.21	28.52	28.35	27.16	26.20	27.16
1927....	25.85	25.55	25.63	25.63	25.38	24.79	24.65	25.26	25.94	26.20	24.87	23.74	25.32

\* In 1921 and 1922, the dressed weight of hogs slaughtered under federal inspection averaged 76 per cent of the live weight. Shrinkage in shipment amounted to 1 to 2 per cent. Dressed weight was therefore about 75 per cent of the weight for which farmers were paid. (U. S. Dept. Agr., Yearbook 1922, p. 267, 903, 905.) Pork represents 96.6 per cent of the total value of the hog (Clemen, R. A., By-products of the packing industry, 1927, p. 9). The hog therefore produces products equivalent to 77.64 pounds. The values in this table are 77.64 per cent of the values shown in table 99.

## EFFECT OF PRICES ON CONSUMPTION

Since wholesale prices and farm prices fluctuate so violently, the assumption is commonly made that consumers use about the same quantity of food regardless of prices. But in the twenty-five years before the war, a 5-per-cent drop in the retail prices of pork led consumers in this country or in some other country to dispose of 20 per cent more hogs (table 90,

TABLE 101. COST OF DISTRIBUTING PRODUCTS PER 100 POUNDS OF LIVE HOGS  
(Table 100 minus table 98)

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1910-14.	\$ 6.62	\$ 6.51	\$ 6.36	\$ 6.44	\$ 6.88	\$ 6.99	\$ 7.12	\$ 7.27	\$ 7.19	\$ 7.28	\$ 7.22	\$ 7.08	\$ 6.91
1910.....	5.87	5.83	5.01	4.80	5.75	6.06	6.48	6.74	6.09	6.05	6.23	6.49	5.93
1911.....	6.16	6.42	6.48	6.74	7.11	7.21	7.12	6.83	6.92	7.15	6.80	6.71	6.82
1912.....	6.82	6.55	6.62	6.46	6.73	6.90	7.00	7.00	7.15	7.14	7.20	6.91	6.88
1913.....	7.06	6.75	6.81	6.98	7.35	7.29	7.51	7.69	7.94	7.85	7.69	7.45	7.37
1914.....	7.19	6.98	6.90	7.11	7.44	7.49	7.52	8.14	7.85	8.19	8.19	7.83	7.59
1915.....	7.58	7.54	7.42	7.66	7.68	7.69	7.73	7.95	7.88	7.81	8.22	7.99	7.77
1916.....	7.83	7.31	7.28	7.34	7.63	7.98	7.97	8.08	8.23	8.65	8.71	8.48	7.95
1917.....	8.33	8.12	7.49	8.27	9.16	9.65	9.93	9.74	10.08	10.61	10.79	10.52	9.38
1918.....	10.97	11.07	10.72	11.06	11.43	12.18	12.50	12.46	13.50	14.73	14.93	14.72	12.54
1919.....	14.55	13.22	12.96	13.21	13.89	14.41	14.55	14.61	16.01	17.01	16.66	15.93	14.79
1920.....	14.92	14.44	14.44	15.65	16.09	16.30	16.81	17.19	17.74	18.33	18.33	16.22	16.37
1921.....	15.95	14.88	14.47	16.13	15.47	15.50	15.11	15.93	16.73	15.79	14.87	14.21	15.41
1922.....	13.24	12.44	12.94	13.69	13.91	13.93	14.11	14.64	14.89	14.83	14.41	13.55	13.89
1923.....	13.25	13.17	13.19	13.30	13.98	14.69	14.76	14.84	15.17	15.20	14.50	14.01	14.18
1924.....	13.94	13.57	13.33	13.63	13.06	14.10	14.16	14.19	14.75	14.61	14.30	13.86	14.03
1925.....	13.59	13.26	13.61	14.25	14.70	14.83	14.83	15.15	15.88	15.87	15.68	15.15	14.75
1926.....	14.77	14.06	14.31	14.71	14.97	15.53	15.89	16.55	16.45	16.29	15.71	15.23	15.36
1927.....	14.88	14.36	14.74	15.22	15.97	16.39	16.07	16.02	16.16	16.04	15.88	15.60	15.64

TABLE 102. INDEX NUMBERS OF THE COST OF DISTRIBUTING PORK IN THE UNITED STATES  
(Corresponding months for 1910-14 = 100)

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1910.....	89	90	79	76	84	87	91	93	85	83	86	92	86
1911.....	93	99	102	105	103	103	100	94	96	98	94	95	99
1912.....	103	101	104	100	98	99	98	96	90	98	100	98	100
1913.....	107	104	107	108	107	104	105	106	110	108	107	105	107
1914.....	709	707	708	710	708	707	706	712	709	713	713	711	710
1915.....	115	116	117	119	112	110	109	109	110	107	114	113	112
1916.....	118	112	114	114	111	114	112	111	114	119	121	120	115
1917.....	126	125	118	128	133	138	139	134	140	146	149	149	136
1918.....	166	170	169	172	166	174	176	171	189	202	207	208	181
1919.....	220	203	204	205	202	206	204	201	231	234	231	225	214
1920.....	225	222	227	243	234	233	236	236	247	252	254	229	237
1921.....	241	220	228	250	225	222	212	219	233	217	200	201	223
1922.....	200	191	203	213	202	199	198	201	207	204	200	191	201
1923.....	200	202	207	207	203	210	207	204	211	210	201	198	205
1924.....	211	208	210	212	203	202	199	195	205	201	198	196	203
1925.....	205	204	214	221	214	212	208	208	221	218	217	214	213
1926.....	223	216	225	228	218	222	223	228	229	224	218	215	222
1927.....	225	221	232	236	232	234	226	220	225	220	220	220	226

page 72). In order to dispose of a supply of hogs 20 per cent above normal, it was necessary to drop the price of lard 6 per cent, ham and bacon 4 per cent, and pork chops 3 per cent. It is often stated that the human stomach cannot be expanded and that consumers are reluctant to buy an increased supply. Apparently this does not hold for pork or for beef.

The inflexibility is in distributing charges rather than in consumers' demand. In fact, distributing charges are worse than inflexible. They are highest when prices are lowest.

#### EFFECT OF PRICES ON SUPPLY

The weight of hogs received is affected by hog cholera, by effects of weather on the number of pigs saved, and by size of the corn crop. Therefore there is considerable irregularity in receipts in different years as related to previous prices.

Prices of hogs packed in the West were low in 1889, 1897, 1904, 1907, and 1911 (table 103). In those years, prices averaged 81 per cent of normal. Following these low prices, receipts were low in 1892, 1902, 1906, 1909, and 1913. They averaged 88 per cent of normal.

TABLE 103. RELATION OF PRICE PAID BY PACKERS FOR HOGS IN THE WEST, TO THE SUBSEQUENT SUPPLY\*  
(Normal = 100)

Years of low prices		Subsequent pack		Years of high prices		Subsequent pack	
Year	Prices paid by packers	Year	Pack	Year	Prices paid by packers	Year	Pack
1889.....	80	1892	63	1892.....	146	1898	146
1897.....	78	1902	93	1901.....	131	1904	110
1904.....	84	1906	100	1906.....	108	1907	114
1907.....	74	1909	80	1909.....	131	1911	117
1911.....	93	1913	102	1913.....	112	1915	136
Average.....	81	.....	88	.....	125	.....	125

\* The hog cycles varied in length, so that with any given lag over a series of years a complete reversal of cycles occurs for a part of the period. This obscures the effect of price on supply when any fixed lag is used. The writers have therefore compared prices with the subsequent supply according to the length of the particular cycle. This method shows the effect of prices on supply but does not show the exact date on which the supply will arrive.

In the years 1892, 1901, 1906, 1909, and 1913, prices were high, averaging 25 per cent above normal. These high prices were followed by high receipts in 1898, 1904, 1907, 1911, and 1915. The receipts in these years averaged 25 per cent above normal.

Under pre-war conditions, a given percentage change in prices paid by packers resulted in about the same percentage change in supply. In the years just before the war, the increased supply was likely to arrive two or three years later.

The effects of retail prices on subsequent supply are shown also in table 104. On the average, a 5-per-cent rise in retail prices of pork products, before the war, resulted in a 25-per-cent increase in the hogs packed in the West about two to three years later.

If hogs would remain high in price, the effect of any given price would be greater. The hog cycles are short, and many farmers, having had

TABLE 104. RELATION OF RETAIL PRICE OF FOUR PORK PRODUCTS TO THE SUBSEQUENT SUPPLY  
(Normal = 100)

Years of low prices		Subsequent pack		Years of high prices		Subsequent pack	
Year	United States retail price of four pork products	Year	Pack	Year	United States retail price of four pork products	Year	Pack
1889.....	85	1892	63	1892.....	108	1898	146
1897.....	94	1902	93	1901.....	104	1904	110
1904.....	96	1906	100	1906.....	96	1907	114
1907.....	101	1909	80	1909.....	109	1911	117
1911.....	102	1913	102	1913.....	108	1915	136
Average.....	96	.....	88	.....	105	.....	125



considerable expense in increasing the supply only to receive less income, do not respond to increased prices as they would if they expected to receive these prices when the hogs were grown.

### BEEF CATTLE

#### EFFECT OF SUPPLY ON PRICES

The purchasing power of cattle other than dairy cows at United States farm prices on January 1, from 1880 to 1927, is shown in figure 66. The major centers of high prices average about fifteen years apart. When

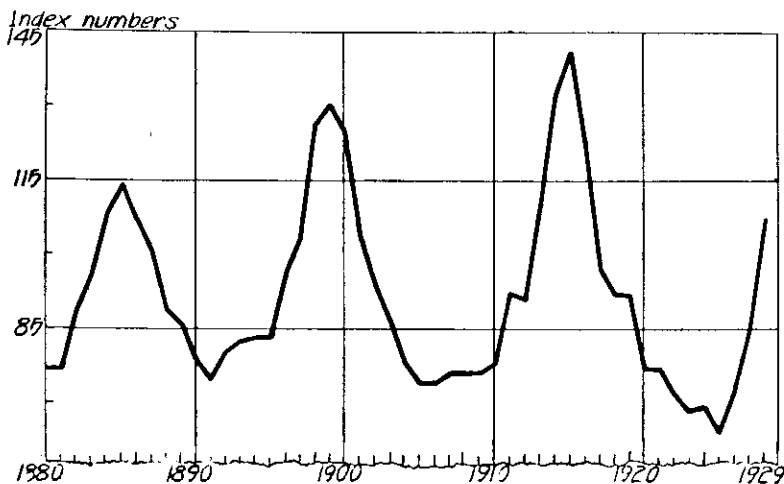


FIGURE 66. PURCHASING POWER OF THE UNITED STATES JANUARY 1 FARM PRICE OF BEEF CATTLE, 1880-1927

The major centers of high prices average about fifteen years apart. The last high was in 1915. If the cycle is of average length, beef cattle may be expected to rise in purchasing power until about 1930

cattle are high in price for a few years, farmers begin to produce them as rapidly as is feasible and prices are reduced as quickly as the new supply appears on the market. Liquidation then begins, and it takes from eight to ten years to reduce the supply sufficiently so that prices begin to rise. It will be noticed that the number of years of high prices is less than the number of years of low prices. The curve has a broad, flat period of low prices, and a short, sharp period of high prices.

Price cycles for dairy cows are about the same as cycles for beef cattle.<sup>13</sup>

The purchasing power compared with receipts at Chicago, from 1890 to 1926, is shown in figure 67. When receipts are high, prices are low.

For the period from 1890 to 1914, receipts at Chicago were compared with the purchasing power of prices of 1200-1500-pound steers at Chicago for the following January.<sup>14</sup> When receipts were 20 per cent below

<sup>13</sup> Warren, G. F., and Pearson, F. A. The dairy cycle. Farm economics, no. 45, p. 689, June, 1927.

<sup>14</sup> The purchasing power of the farm price of cattle other than dairy cows for two complete cycles from 1890 to 1922 had practically no secular trend. The average for the period was therefore taken as 100. The changes in purchasing power were calculated with this average as a base.

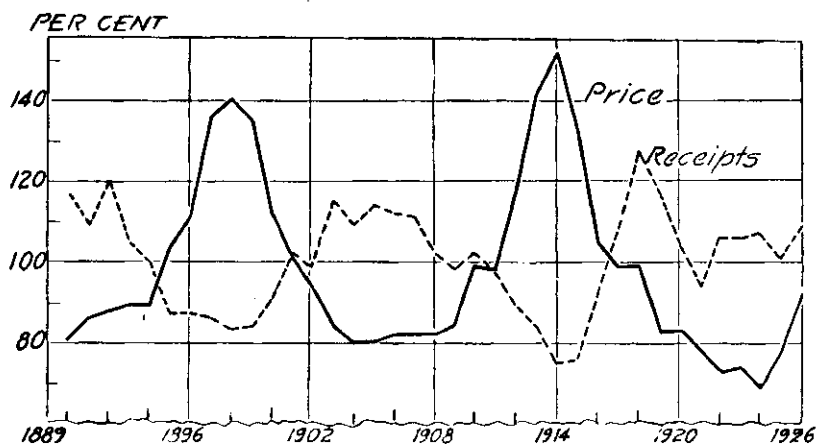


FIGURE 67. PURCHASING POWER OF THE UNITED STATES JANUARY I FARM PRICE OF BEEF CATTLE, AND RECEIPTS OF CATTLE AT CHICAGO, 1890-1926

When the receipts of cattle at Chicago are high, the prices for beef cattle are low. Conversely, low receipts of cattle at Chicago are accompanied by high prices

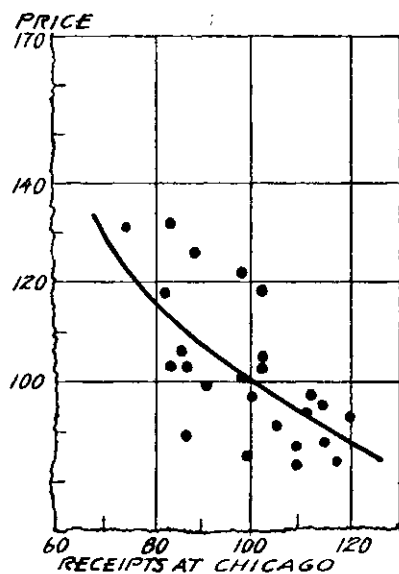


FIGURE 68. RELATION OF RECEIPTS OF CATTLE AT CHICAGO, 1890-1914, TO THE PURCHASING POWER OF PRICES OF 1200-1500-POUND STEERS AT CHICAGO THE FOLLOWING JANUARY

When receipts were 20 per cent below normal, prices were 17 per cent above normal

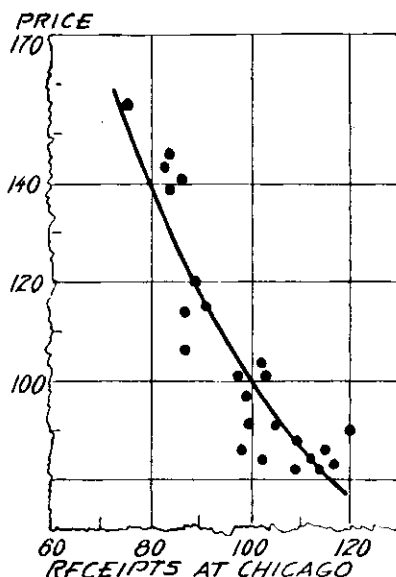


FIGURE 69. RELATION OF RECEIPTS OF CATTLE AT CHICAGO, 1890-1914, TO THE PURCHASING POWER OF THE UNITED STATES FARM PRICE OF BEEF CATTLE ON THE FOLLOWING JANUARY I

When receipts were 20 per cent below normal, prices were 39 per cent above normal

normal, steers brought 17 per cent more than normal. When receipts were 20 per cent above normal, steers brought 12 per cent less than the normal price (figure 68 and table 105).

TABLE 105. CATTLE RECEIPTS AT CHICAGO RELATED TO RETAIL PRICES, TO CHICAGO WHOLESALE PRICES, AND TO FARM PRICES, 1890-1914

(From table 129)

Locality	Receipts 20 per cent below normal	Receipts 20 per cent above normal
	Per cent that prices were above normal	Per cent that prices were below normal
Farm prices, Nebraska.....	50	28
Farm prices, United States.....	39	24
Prices of fat cows and heifers, Chicago.....	40	24
Prices of canner and cutter cows, Chicago.....	78	37
Prices of 1200-1500-pound steers, Chicago.....	17	12
Prices of top cattle, Chicago.....	15	11
Retail prices of round steak, United States.....	15	11

For the same period, the United States farm prices of cattle other than dairy cows were 39 per cent above normal when there was a 20-per-cent shortage in Chicago receipts, and were 24 per cent below normal when there was a 20-per-cent surplus in Chicago receipts (figure 69).

United States farm prices include many areas that are deficit areas, so that farm prices fluctuate less than in surplus areas. In Nebraska, the farm price on January 1 was 50 per cent above normal when Chicago receipts were 20 per cent short, and was 28 per cent below normal when there was a 20-per-cent excess of Chicago receipts. It is no wonder that farmers drastically curtail production when prices drop so violently, and it is no wonder that they so decidedly overproduce when a 20-per-cent shortage of cattle increases farm prices by 50 per cent.

When cattle receipts at Chicago were 20 per cent above normal, purebred Shorthorn cows sold at public auction brought 46 per cent above normal, indicating that prices of purebreds are more flexible than are prices of other cattle. If prices for identical classes of purebred cows were available, much greater flexibility would be indicated. When cattle are high in price, animals of inferior quality are sold at public auction. When cattle are cheap, only the best

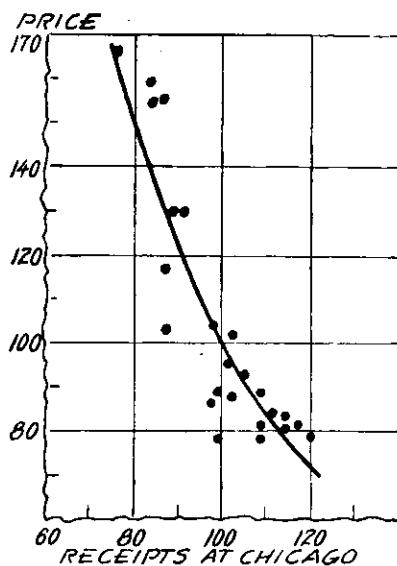


FIGURE 70. RELATION OF RECEIPTS OF CATTLE AT CHICAGO, 1890-1914, TO THE PURCHASING POWER OF THE NEBRASKA FARM PRICE OF BEEF CATTLE ON THE FOLLOWING JANUARY 1

When the receipts were 20 per cent below normal, prices were 50 per cent above normal

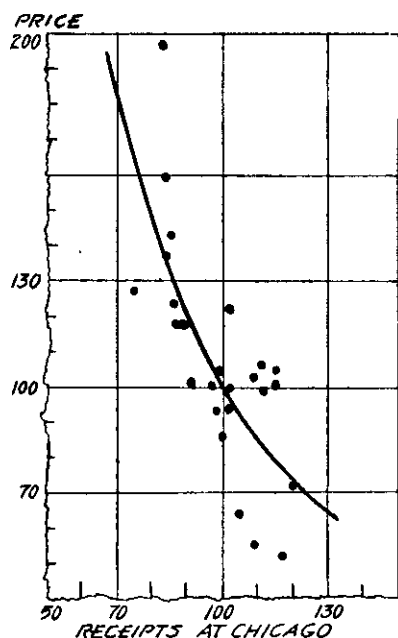


FIGURE 71. RELATION OF RECEIPTS OF CATTLE AT CHICAGO TO THE PURCHASING POWER OF THE PRICE OF PUREBRED SHORTHORN COWS SOLD AT PUBLIC AUCTION, 1893-1917

When the receipts of cattle were 20 per cent below normal, prices were 46 per cent above normal

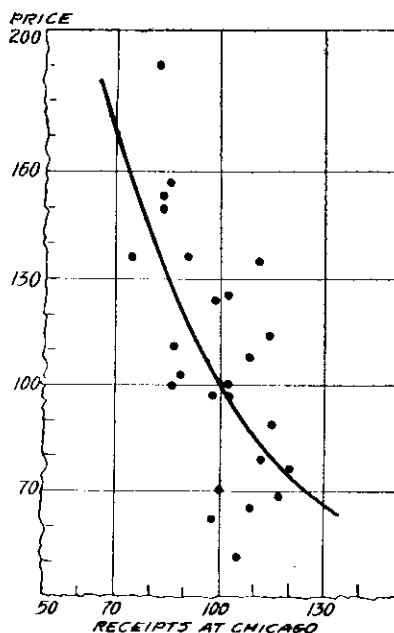


FIGURE 72. RELATION OF RECEIPTS OF CATTLE AT CHICAGO TO THE PURCHASING POWER OF THE PRICE OF PUREBRED ROAN SHORTHORN BULLS SOLD AT PUBLIC AUCTION, 1893-1917

When the receipts were 20 per cent below normal, prices were 42 per cent above normal

will bring enough to pay for the expenses of such sales. In 1920 there were 9164 Shorthorn cattle<sup>15</sup> sold at reported public sales, but only 1249 were sold in 1924.

The effect of receipts of cattle at Chicago on the Utah farm prices of cattle of different ages, is shown in table 106 and in figure 73. Prices

TABLE 106. CATTLE RECEIPTS AT CHICAGO, 1893-1914, RELATED TO THE UTAH JANUARY 1 FARM PRICE OF CATTLE OF DIFFERENT AGES THE FOLLOWING YEAR  
(From table 129)

Age	Receipts 20 per cent below normal	Receipts 20 per cent above normal
	Per cent that prices were above normal	Per cent that prices were below normal
Under one year	37	22
One year and under two years	35	22
Two years and over	31	20

<sup>15</sup> Warren, G. F., and Pearson, F. A. Prices of purebred and common beef cattle. Farm economics, no. 34, p. 448, May 15, 1926.

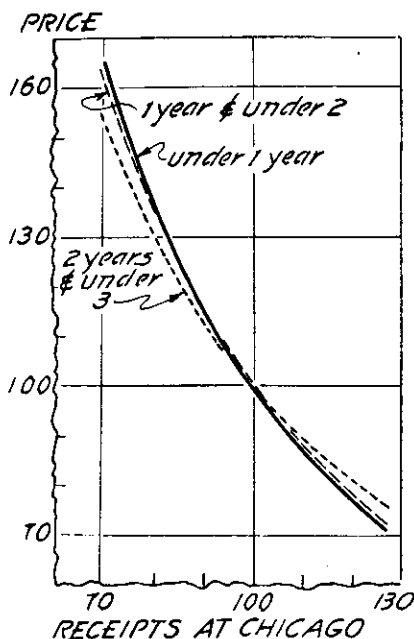


FIGURE 73. RELATION OF THE RECEIPTS OF CATTLE AT CHICAGO, 1893-1914, TO THE PURCHASING POWER OF THE UTAH FARM PRICE OF CATTLE OF DIFFERENT AGES THE FOLLOWING YEAR

Prices of yearling cattle fluctuate more than do prices of two-year-old cattle. The farther removed is the unfinished from the finished product, the more violently do prices fluctuate

of young cattle fluctuate more violently than do prices of old cattle. This illustrates the general principle that prices for finished products fluctuate less violently than do prices of unfinished products. The farther removed is the unfinished from the finished product, the more violently do prices fluctuate. Calves fluctuate more violently in price than do cows. Much of the value of purebred cattle in excess of grade prices is due to their ability to improve the quality of grade cattle. The highest-priced purebred cattle are the farthest removed from the market. The bulls from such a herd are bought by breeders of less valuable purebreds, who in turn produce bulls to be sold to farmers who have grade cattle. Therefore the prices of the best purebreds, being farthest removed from the finished product, fluctuate with extreme violence — so violently that many breeders are bankrupt every time the cattle cycle falls.

From 1890 to 1914, a 20-per-cent shortage in the receipts of cattle at Chicago was accompanied by a 15-per-cent increase in retail prices of round steak in the United States (table 105 and figure 74). When the receipts at Chicago were 20 per cent above normal, round-steak prices were 11 per cent below normal.

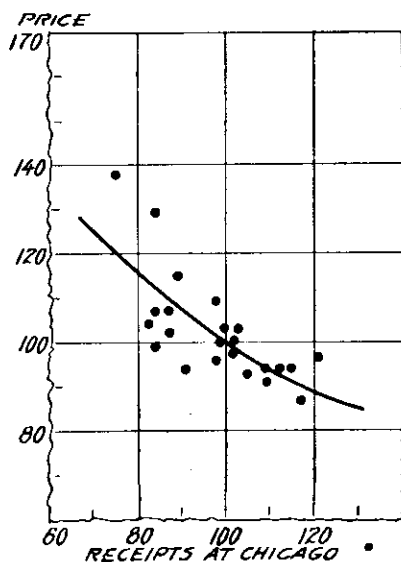


FIGURE 74. RELATION OF RECEIPTS OF CATTLE AT CHICAGO TO THE PURCHASING POWER OF THE UNITED STATES RETAIL PRICE OF ROUND STEAK, 1890-1914

When receipts were 20 per cent below normal, round steak was 15 per cent above normal

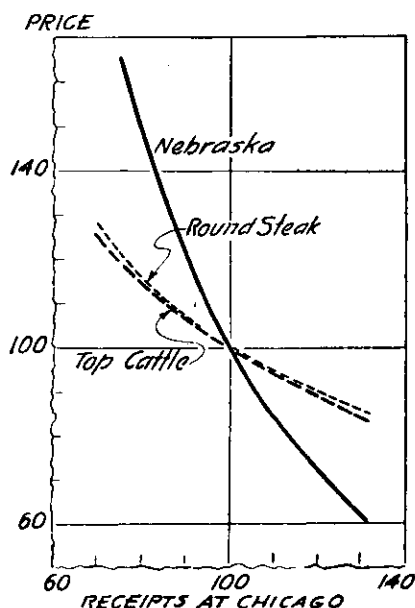


FIGURE 75. RELATION OF THE RECEIPTS OF CATTLE AT CHICAGO, 1890-1914, TO THE PURCHASING POWER OF THE PRICE OF TOP CATTLE AT CHICAGO, THE UNITED STATES RETAIL PRICE OF ROUND STEAK, AND THE NEBRASKA FARM PRICE OF BEEF CATTLE

The prices of top cattle, which are the most widely quoted prices of beef cattle, do not measure the changes in the prices that the farmer receives. The response of price of top cattle and retail price of round steak to the changing supply of beef is about the same. The much-quoted "top price" of cattle at Chicago is a much better measure of what the consumer pays than of what the farmer receives

When the Chicago receipts were 20 per cent below normal, the retail price of round steak was 15 per cent above normal, steers at Chicago brought 17 per cent above normal prices, and beef cattle on Nebraska farms were worth 50 per cent above normal.

The relationship of the Chicago price of steers to the retail price of round steak is shown in figure 77. Apparently, a given percentage change in the price of round steak is accompanied by about the same percentage change in the price of steers at Chicago. If prices for all cattle sold at Chicago were available, the relationship might be different. The expectation is that wholesale prices would be more flexible than retail prices.

When cattle receipts at Chicago were 20 per cent below normal, Chicago prices of country hides were 17 per cent above normal (table 107 and figure 76). Prices paid to farmers for country hides fluctuate much more violently.

#### EFFECT OF SUPPLY ON TOTAL VALUE

For each \$100 brought by a normal supply of steers, 20 per cent less would have brought \$94 at Chicago prices and a supply 20 per

TABLE 107. CATTLE RECEIPTS AT CHICAGO RELATED TO THE WHOLESALE PRICES OF COUNTRY HIDES AND PACKER HIDES AT CHICAGO, 1892-1914

	Receipts 20 per cent below normal	Receipts 20 per cent above normal
	Per cent that prices were above normal	Per cent that prices were below normal
Country hides.....	17	12
Packer hides.....	16	11

cent above normal would have brought \$106. If farm prices of market cattle were available, it is evident that a 50-per-cent increase in the number of cattle would reduce the total income.

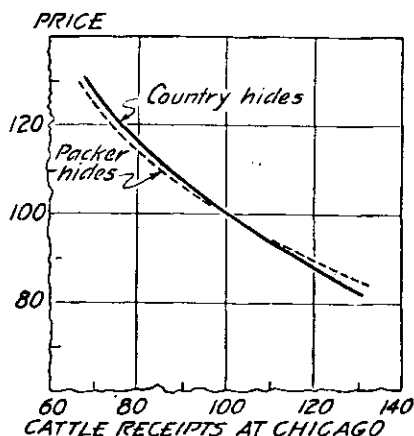


FIGURE 76. RELATION OF THE RECEIPTS OF CATTLE AT CHICAGO TO THE PURCHASING POWER OF WHOLESALE PRICES OF COUNTRY HIDES AND PACKER HIDES AT CHICAGO, 1892-1914

Chicago prices of country hides fluctuate more than do those of packer hides. Farm prices would show even greater fluctuation

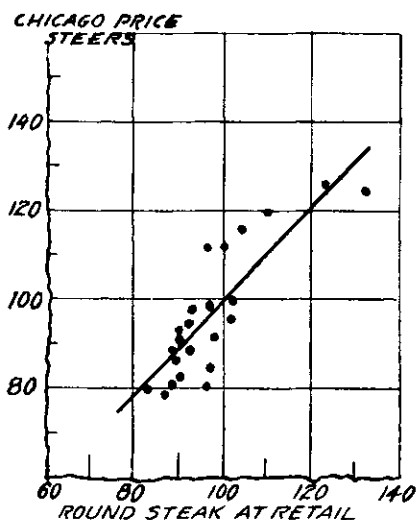


FIGURE 77. RELATION OF THE UNITED STATES RETAIL PRICE OF ROUND STEAK, 1890-1914, TO THE PRICE OF 1200-1500-POUND STEERS AT CHICAGO THE FOLLOWING JANUARY

When the price of round steak was 20 per cent above normal, the price of steers at Chicago was 21 per cent above normal

At Nebraska farm prices, an 80-per cent crop of cattle would have brought \$120, but a 120-per-cent crop would have brought only \$86. Fifty per cent more cattle brought 28 per cent less money.

#### RELATION BETWEEN WHOLESALE AND RETAIL PRICES

For five years before the war, the average retail price of round steak in the United States was 20.1 cents per pound (table 108). In the six years 1921 to 1926, the average retail price was 34.1 cents. Retail prices increased 70 per cent. Prices paid for steers in Chicago increased from \$7.89 to \$9.71, or only 23 per cent. Prices received by farmers increased only 9 per cent.

This again illustrates the fact that supply and demand are such as to make food sell in American cities at prices enough above pre-war

TABLE 108. RELATION OF WHOLESALE PRICES OF STEERS TO RETAIL PRICES OF ROUND STEAK

	Thirteen years, 1890-1902	Seven years, 1903-1909	Five years, 1910-1914	Six years, 1915-1920	Six years, 1921-1926
Round steak, United States retail price per pound.....	\$0.128	\$0.149	\$0.201	\$0.320	\$0.341
1200-1500-pound steers, Chicago wholesale price per 100 pounds.....	4.85	5.69	7.89	12.88	9.71

prices to sustain agriculture if the farmer received his usual share of the retail price.

Practically the same comparisons are shown for hogs. Compared with pre-war retail prices, pork rose 72 per cent whereas prices paid by packers increased only 20 per cent. The agreement is surprisingly close. When compared with the period from 1890 to 1902, retail prices for both steak and pork have nearly trebled, whereas prices paid by packers have doubled.

Low farm prices are repeatedly attributed to over-production or low consumption, but the total beef and pork supply is being consumed. Retail prices show that supply and demand are balancing at a high figure. The present low farm prices are primarily due to changes in who gets the money and not to changes in supply or demand. The extra money paid by consumers is not reaching the farmer. It remains in the cities and causes city expansion and not farm expansion.

#### EFFECT OF SUPPLY ON RELATIONSHIPS OF FARM, WHOLESALE, AND RETAIL PRICES

In twelve years when Chicago receipts were low, the cattle on Nebraska farms were worth 50 per cent more than in thirteen years when receipts were high (table 109). In these same years, round steak retailed for 2 cents more per pound than when receipts were high.

TABLE 109. PRICES IN YEARS OF HIGH AND IN YEARS OF LOW RECEIPTS OF CATTLE AT CHICAGO, 1890-1914

	Twelve years of low receipts	Thirteen years of high receipts	Difference
Farm price of cattle other than dairy cows, Nebraska.....	\$27.98	\$18.03	\$9.95
Farm price of cattle other than dairy cows, United States....	22.64	16.31	6.33
Wholesale price, 1200-1500-pound steers, Chicago.....	6.08	5.16	0.92
Retail price of round steak, United States.....	0.159	0.139	0.02

#### COST OF DISTRIBUTION

In 1917, beef sold at retail for an average of 23.11 cents per pound (table 111). Farmers received 8.14 cents per pound for beef cattle (table 110). There was a difference of 14.97 cents between the farmers' and the consumers' price. In 1921, beef retailed at 25.59 cents per pound but farmers received only 5.53 cents. Retail prices rose but farm prices declined.

The comparison can be better made on a basis of live weight, since the farmer sells on this basis. The retail receipts from a 1000-pound live animal are shown in table 112. In 1917, this amounted to \$143.70. In 1921, it amounted to \$159.20. In 1917 it cost \$62.30 to distribute the beef, and in 1921 it cost \$103.90 (table 113), so that farmers received \$81.40 in the first case and \$55.30 in the second. Some persons believe that the lower farm price in 1921 was due to overproduction, but retail prices were higher than in 1917.



TABLE 110. AVERAGE PRICES PAID TO FARMERS IN THE UNITED STATES PER 1000 POUNDS FOR BEEF CATTLE, AS REPORTED BY THE UNITED STATES DEPARTMENT OF AGRICULTURE

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1910-14	\$50.40	\$51.10	\$52.90	\$55.00	\$55.00	\$54.40	\$53.30	\$53.60	\$53.50	\$53.20	\$52.10	\$52.20	\$53.10
1910...	47.10	46.40	48.70	53.10	52.30	52.00	48.40	46.40	46.50	46.40	44.80	44.50	48.10
1911...	45.80	45.70	46.60	46.70	45.90	44.30	42.80	43.90	44.30	43.20	43.60	43.70	44.70
1912...	44.60	46.10	47.50	51.50	53.60	52.30	51.70	53.70	53.50	53.60	52.20	53.30	51.10
1913...	54.00	55.50	58.80	60.80	60.10	60.20	59.80	59.10	59.20	60.50	59.90	59.60	59.00
1914...	60.40	61.60	62.80	62.90	63.30	63.20	63.80	64.70	63.80	62.30	60.20	60.10	62.40
1915...	59.90	59.30	59.20	59.60	61.30	62.00	60.70	61.80	60.60	60.40	58.50	57.50	60.10
1916...	58.50	59.90	63.70	66.60	67.30	69.10	67.80	65.10	65.50	63.70	64.40	65.60	64.80
1917...	68.60	73.60	79.10	85.79	87.00	86.50	83.00	81.70	84.00	83.50	82.10	82.40	81.40
1918...	83.30	85.50	88.50	97.30	103.80	104.00	100.70	97.10	96.30	93.30	91.40	92.80	94.50
1919...	96.50	100.20	103.40	108.10	108.40	102.00	99.60	98.20	90.20	86.50	86.50	86.30	97.20
1920...	89.90	89.80	90.80	92.00	89.70	93.20	89.30	85.60	82.90	77.70	71.50	63.60	84.70
1921...	63.20	66.20	63.60	60.80	59.80	56.50	54.00	53.90	49.80	48.10	46.90	46.20	55.30
1922...	47.50	59.70	54.60	55.30	57.00	58.40	57.60	55.10	54.40	54.80	52.90	52.80	54.30
1923...	55.10	55.50	56.20	57.80	57.70	58.20	57.20	56.00	57.00	54.80	52.30	52.60	55.90
1924...	53.80	54.70	56.30	58.20	59.40	57.90	56.50	56.70	55.30	55.20	54.30	53.50	56.00
1925...	56.30	56.90	61.80	65.50	64.80	64.60	65.50	65.80	62.70	63.10	61.40	61.80	62.50
1926...	63.10	64.20	66.50	66.60	65.70	65.60	64.60	62.90	64.80	64.30	63.20	64.20	64.60
1927...	64.50	66.00	68.20	71.30	71.70	70.80	71.30	72.10	74.20	75.50	80.00	83.20	72.40

TABLE 111. RETAIL VALUE OF BEEF IN THE UNITED STATES, IN CENTS PER POUND\*

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1910-14	15.68	15.74	15.93	16.24	16.53	16.70	16.82	17.02	16.75	16.61	16.42	16.34	16.41
1910...	14.28	14.27	14.35	14.42	14.52	14.59	14.60	14.64	14.27	14.35	14.23	14.22	14.38
1911...	14.38	14.38	14.47	14.50	14.62	14.70	14.70	14.74	14.39	14.47	14.35	14.32	14.50
1912...	14.69	14.77	14.96	15.68	16.72	17.02	17.15	17.32	17.06	16.84	16.53	16.47	16.45
1913...	16.82	16.92	17.55	18.18	18.18	18.35	18.57	18.59	18.57	18.43	18.31	18.22	18.08
1914...	18.24	18.36	18.34	18.41	18.61	18.83	19.06	19.80	19.47	18.98	18.68	18.49	18.76
1915...	18.24	18.01	17.80	17.97	18.36	18.57	18.81	18.74	18.65	18.44	18.17	17.93	18.32
1916...	18.18	18.23	18.70	19.20	19.78	20.50	20.28	20.05	20.03	19.56	19.27	19.22	19.42
1917...	19.72	20.79	21.64	23.29	23.79	24.19	24.16	24.07	24.68	24.32	23.47	23.71	23.11
1918...	24.42	25.02	25.49	27.78	30.42	32.14	31.80	31.10	31.27	30.73	30.35	30.20	29.24
1919...	30.95	30.91	31.40	32.44	32.87	31.46	31.22	30.10	28.84	28.06	27.64	27.58	30.30
1920...	28.72	28.75	28.84	30.44	30.38	31.82	33.00	31.97	31.67	30.47	29.66	27.18	30.12
1921...	27.76	26.06	26.55	26.77	26.56	26.12	25.67	25.68	25.08	24.27	23.27	23.15	25.59
1922...	23.05	22.95	23.39	23.66	24.22	24.58	24.89	24.67	24.52	24.40	23.87	23.63	24.00
1923...	23.85	23.76	23.85	24.09	24.45	25.10	25.64	25.61	25.80	25.33	24.70	24.61	24.75
1924...	24.96	24.74	24.88	25.20	25.71	25.68	25.53	25.57	25.39	25.05	24.68	24.41	25.15
1925...	24.76	24.64	25.30	25.90	26.21	26.16	26.86	26.67	26.45	26.39	25.92	25.95	25.94
1926...	26.40	26.25	26.38	26.62	26.83	27.05	27.05	26.85	27.03	26.94	26.70	26.70	26.74
1927...	26.76	26.78	26.87	27.39	27.65	27.66	28.22	28.28	28.39	28.50	28.61	29.10	27.85

\* Retail prices are those reported by the United States Bureau of Labor Statistics. The weights are as follows: sirloin steak, 32; round steak, 32; rib roast, 31; chuck, 31; plate beef, 60. The Bureau of Labor Statistics gives plate beef a weight of 23. Every edible part of a "medium common" steer slaughtered by C. D. Schutt, of the Department of Animal Husbandry at Cornell University, was sold at retail. The inferior parts weighed 1.6 times the weight of the plate beef, and sold for exactly the same average price as the plate beef. For this reason, the plate beef is given a weight of 60 instead of 23. Weighted in this way and with the prices received for the products listed, the average value was 23.9 cents per pound. The actual sale price of the steer was 23.5 cents per pound.

The spread between the retail price and the farm price is shown in table 113. Since the war, to get the products from a 1000-pound live steer from the farmer to the consumer. Index numbers of the cost of distributing beef are shown in table 114 and in figure 78.

The cost of distribution is double the pre-war cost, and has been surprisingly uniform for the past eight years. It has very little relationship to the price of beef. It is primarily determined by freight rates, city wages, and like factors.

TABLE 112. AVERAGE RETAIL VALUE OF PRODUCTS FROM A 1000-POUND LIVE ANIMAL\*

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1910-14.	\$ 97.50	\$ 97.90	\$ 99.10	\$101.00	\$102.80	\$103.90	\$104.60	\$105.90	\$104.20	\$103.30	\$102.10	\$101.60	\$102.10
1910.....	88.80	88.80	89.30	89.70	90.30	90.70	90.80	91.10	88.80	89.30	88.50	88.40	89.40
1911.....	89.40	89.40	90.00	90.20	90.90	91.40	91.70	89.50	90.00	89.30	89.10	89.10	90.20
1912.....	91.40	91.90	93.10	97.50	104.00	105.90	106.70	107.70	106.10	104.70	102.80	102.40	101.70
1913.....	104.60	105.20	109.20	113.10	113.10	114.10	115.50	115.60	115.50	114.60	113.90	113.30	112.50
1914.....	113.50	114.20	114.10	114.50	115.80	117.10	118.60	123.20	121.10	118.10	116.20	115.00	116.70
1915.....	113.50	112.00	110.70	111.80	114.20	115.50	117.00	116.60	116.00	114.70	113.00	111.50	114.00
1916.....	113.10	113.40	116.30	119.40	123.00	127.50	126.10	124.70	124.60	121.70	119.90	119.50	120.80
1917.....	122.70	129.30	134.60	144.90	148.00	150.50	150.30	149.70	149.80	150.60	146.00	147.50	143.70
1918.....	151.90	155.60	158.50	172.80	189.20	199.90	197.80	193.40	194.50	191.10	188.80	187.80	181.90
1919.....	192.50	192.30	195.30	201.80	204.50	195.70	194.20	187.20	179.40	174.50	171.90	171.50	188.50
1920.....	178.60	178.80	179.40	189.30	189.00	197.90	205.30	198.90	197.00	189.50	184.50	169.18	187.30
1921.....	172.70	182.10	165.10	166.50	165.20	162.50	159.70	159.70	156.00	151.00	144.70	144.00	159.20
1922.....	143.40	142.70	145.50	147.20	150.60	152.90	154.30	153.40	152.50	151.80	148.50	147.00	149.30
1923.....	148.30	147.80	148.30	149.80	152.10	156.10	159.50	159.30	160.50	157.60	153.60	153.10	153.90
1924.....	155.30	153.90	154.80	156.70	159.90	159.70	158.80	159.00	157.90	155.80	153.50	151.90	156.40
1925.....	154.00	153.30	157.40	161.10	163.00	162.70	167.10	165.90	164.50	164.10	161.20	161.40	161.30
1926.....	164.20	163.30	164.10	165.60	166.90	168.30	168.30	167.00	168.10	167.60	166.10	166.10	165.30
1927.....	166.40	166.60	167.10	170.40	172.00	172.00	175.50	175.90	176.60	177.30	178.00	181.00	173.20

\* The average value per pound of the edible part of the beef is given in table 111. The edible part represents 54.3 per cent of the live steer, and the beef represents 87.3 per cent of the value. The average price of meat, times 0.543, divided by 0.873, therefore, gives the average value per pound of live weight. (Clemen, R. A., By-products of the packing industry, 1927, p. 9-10.) Results are expressed per 1000 pounds, as this seems easier to explain.

TABLE 113. COST OF DISTRIBUTING PRODUCTS FROM A 1000-POUND LIVE ANIMAL  
(Table 112 minus table 110)

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1910-14.	\$47.10	\$46.80	\$46.20	\$46.00	\$47.80	\$49.50	\$51.30	\$52.30	\$50.70	\$50.10	\$50.00	\$49.40	\$49.00
1910.....	41.70	42.40	40.60	36.60	38.00	38.70	42.40	44.70	42.30	42.90	43.70	43.90	41.30
1911.....	43.60	43.70	43.40	43.50	45.00	47.10	48.60	47.80	45.20	46.80	45.70	45.40	45.50
1912.....	46.80	45.80	45.60	46.00	50.40	53.60	55.00	54.00	52.60	51.10	50.60	49.10	50.60
1913.....	50.60	49.70	50.40	52.30	53.00	53.90	55.70	56.50	56.30	54.70	54.00	53.70	53.50
1914.....	53.10	52.60	51.30	51.60	52.50	53.90	54.80	58.50	57.30	55.80	56.00	54.90	54.30
1915.....	53.60	52.70	51.50	52.20	52.90	53.50	56.30	54.80	55.40	54.30	54.50	54.00	53.90
1916.....	54.60	53.50	52.60	52.80	55.70	58.40	58.30	59.60	59.10	58.00	55.50	53.90	56.00
1917.....	54.10	55.70	55.50	59.20	61.00	64.00	67.30	68.00	65.80	67.10	63.90	65.10	62.30
1918.....	68.60	70.10	70.00	75.50	85.40	95.90	97.10	96.30	98.20	97.80	97.40	95.00	87.40
1919.....	96.00	92.10	91.90	93.70	96.10	93.70	94.60	89.00	89.20	88.00	85.40	85.20	91.30
1920.....	88.70	89.00	88.60	97.30	99.30	104.70	110.00	113.30	114.70	111.80	113.00	105.50	102.60
1921.....	109.50	101.90	101.50	105.70	105.40	106.00	105.70	105.80	106.20	102.90	97.80	97.80	103.90
1922.....	95.90	92.00	90.90	91.90	93.60	94.50	97.20	98.30	98.10	97.00	95.60	94.20	95.00
1923.....	93.20	92.30	92.10	92.00	94.40	97.90	102.30	103.30	103.50	102.80	101.30	100.50	98.00
1924.....	101.50	99.20	98.50	98.50	100.50	101.80	102.30	102.30	102.60	100.60	99.20	98.30	100.40
1925.....	97.70	96.40	95.60	95.60	98.20	98.10	101.60	100.10	101.80	101.00	99.80	99.60	98.80
1926.....	101.10	99.10	97.60	99.00	101.20	102.70	103.70	104.10	103.30	103.30	102.90	101.90	101.70
1927.....	101.90	100.60	98.90	99.10	100.30	101.20	104.20	103.80	102.40	101.80	98.00	97.80	100.80

A portion of the costs of distribution is represented by buildings and equipment, charges for which have not risen so rapidly as have wages. There seems to be no tendency for distributing charges to decline.

## EFFECT OF PRICES ON CONSUMPTION

For the twenty-five years before the war, an 11-per-cent drop in the price of round steak at retail prices caused a 20-per-cent increase in consumption (table 105, page 83). A part of the beef was eaten in hotels and restaurants at less flexible prices. It is therefore evident that con-

TABLE 114. INDEX NUMBERS OF THE COST OF DISTRIBUTING BEEF IN THE UNITED STATES

(Corresponding months for 1910-14=100)

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1910...	89	91	88	80	79	78	83	85	83	86	87	89	84
1911...	93	93	94	95	94	95	95	91	89	93	91	92	93
1912...	99	98	99	100	105	108	107	103	104	102	101	99	103
1913...	107	106	109	114	111	109	109	108	111	108	108	109	109
1914...	113	112	111	112	110	109	107	112	113	111	112	111	111
1915...	114	113	111	113	111	108	110	105	109	108	109	109	110
1916...	116	114	114	115	117	118	114	114	117	116	111	109	114
1917...	115	119	120	129	128	129	131	130	130	134	128	132	127
1918...	146	150	152	164	179	194	189	184	194	195	195	192	178
1919...	204	197	199	204	201	189	184	170	176	176	171	172	186
1920...	188	190	192	212	208	212	226	217	225	223	225	214	209
1921...	232	218	220	230	221	214	206	202	209	205	196	198	212
1922...	204	197	197	200	196	191	189	188	193	194	191	191	194
1923...	198	197	199	200	197	198	199	198	204	205	203	203	200
1924...	215	212	213	214	210	206	199	196	202	201	198	199	205
1925...	207	206	207	208	205	198	198	191	201	202	200	202	202
1926...	215	212	211	215	212	207	202	199	204	206	206	206	208
1927...	216	215	214	215	210	204	203	198	202	203	196	198	206

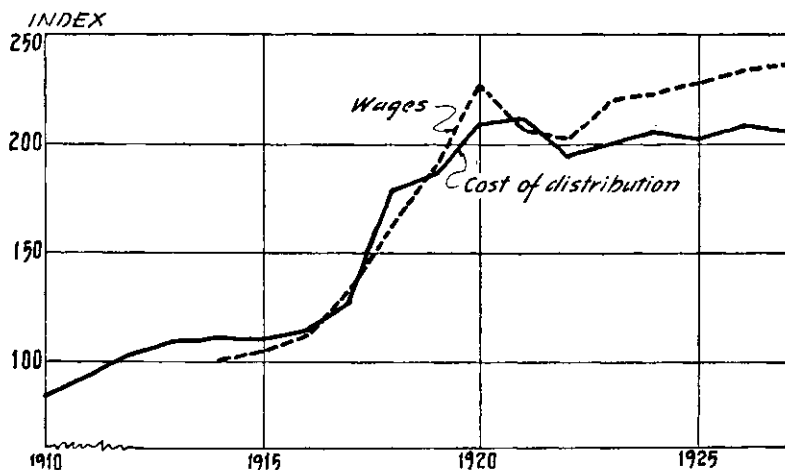


FIGURE 78. COST OF DISTRIBUTING BEEF, AND EARNINGS OF NEW YORK FACTORY WORKERS

Costs of food distribution follow wages, but they have risen less rapidly than have wages because freight rates, charges for buildings, and some other costs, are not so high as wages

sumers would have taken more than a 20-per-cent increase in the amount of round steak if all consumers' prices had been reduced 11 per cent.

Combining both beef and pork, a 10-per-cent increased supply was disposed of by dropping retail prices 2 per cent (table 117, page 94).

The flexibility of consumer demand has often been erroneously measured by wholesale prices. Apparently the conclusions as to the amount of food that consumers will buy at different prices need to be reconsidered.

## EFFECT OF PRICES ON THE FUTURE SUPPLY

The relation of the price of round steak to the receipts of cattle at Chicago eight years later, is shown in figure 79. In the period from 1890 to 1906, an increase of 20 per cent in the retail price of round steak resulted in a 32-per-cent increase in the receipts of cattle at Chicago eight years later (table 115).

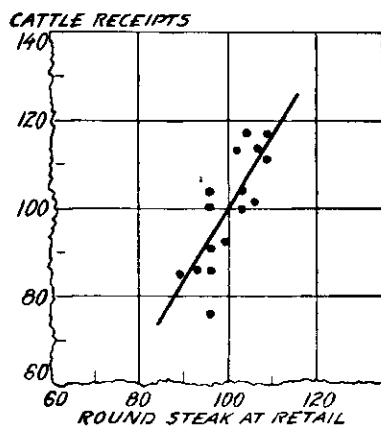


FIGURE 79. RELATION OF THE PURCHASING POWER OF THE UNITED STATES RETAIL PRICE OF ROUND STEAK, 1890-1906, TO RECEIPTS OF CATTLE AT CHICAGO EIGHT YEARS LATER

When the retail price of round steak was 20 per cent above normal, it resulted in a 32-per-cent increase in receipts of cattle at Chicago eight years later

prices of beef until about 1930. These prices will, in turn, cause an increased production and falling prices.

As soon as prices have been high long enough to lead farmers to believe that they can be depended on, farmers increase cattle production as quickly as it is possible to do so.

In mechanical industries, it is usually easy to change production quickly to meet changing prices. Agriculture responds to price changes just as surely and just as violently as does industry, but time is required because of biological facts. In a year when prices of pig iron are 20 per cent above normal, the supply is 12 per cent above normal. When round steak sells for 20 per cent above normal prices, the supply is increased by 32 per cent eight years later.

The low purchasing power of beef cattle in the past few years undoubtedly will cause a steady rise in retail prices of beef until about 1930. These prices will, in turn, cause an increased production and falling prices.

TABLE 115. RELATION OF A 20-PER-CENT INCREASE IN THE PURCHASING POWER OF THE UNITED STATES RETAIL PRICE OF ROUND STEAK, 1890-1906, TO THE NUMBER OF CATTLE EIGHT YEARS LATER

	Per cent increase eight years later
Total receipts of cattle, Chicago.....	32
Receipts of native cattle, Chicago.....	18
Receipts of range cattle, Chicago.....	74
Number of cattle other than dairy cattle, United States.....	25

Receipts of range cattle fluctuate much more violently than do receipts of other cattle. Changes in prices affect production most strikingly in strictly surplus areas.

The number of beef cattle fluctuates most violently on the ranges, less violently in the Corn Belt, and still less violently in a farming region near the consumer, as in Great Britain. This principle undoubtedly holds for all farm products.

## COMPARATIVE EFFECTS OF UNITED STATES SUPPLY ON PRODUCERS' PRICES

When the United States production of corn was 20 per cent below normal, the Iowa farm prices were 57 per cent above normal (table 116). A similar shortage in the wheat crop made Minnesota prices 37 per cent above normal. Similar shortages raised farm prices of potatoes at Batavia, New York, 54 per cent, Iowa farm prices of hogs 18 per cent, and Nebraska farm prices of cattle 50 per cent.

These figures do not indicate flexibility of demand. Retail prices with the quantities sold at retail prices are necessary to measure the flexibility of demand.

Before the war, when receipts of cattle at Chicago were 20 per cent below normal, retail prices of round steak were 15 per cent above normal. A similar shortage in hog receipts resulted in a 6-per-cent increase in the retail price of four pork products. Evidently the demand for pork is more flexible than the demand for steak.

## TOTAL FOOD SUPPLY

Thus far the relationship of the production of a single product to its price has been considered. The effect of a shortage in the total meat supply or the total crop supply is yet to be considered.

## EFFECT OF TOTAL MEAT SUPPLY ON PRICES

The major meat products are beef and pork. In preparing a meat index, beef and pork were given equal weight. When the combined beef and pork supply was 10 per cent below normal, retail prices were 3 per cent above normal and United States farm prices were 9 per cent above normal (table 117).

In the period from 1890 to 1912, a 10-per-cent shortage in the supply of cattle raised United States farm prices 16 per cent. A similar shortage in the supply of hogs raised the

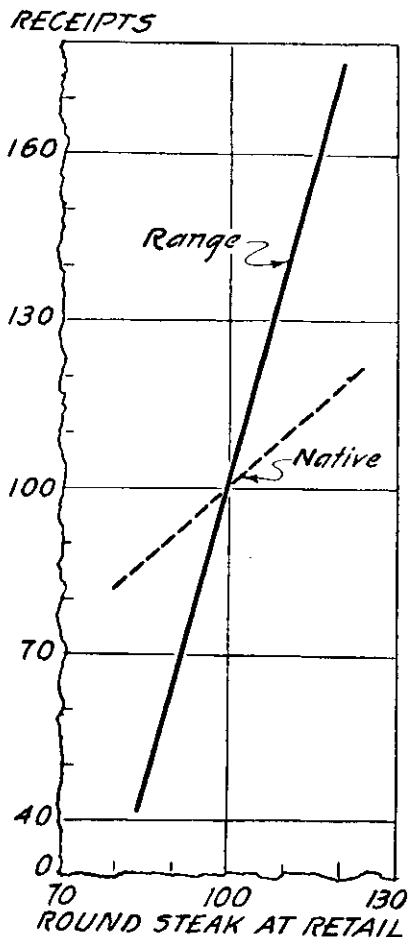


FIGURE 80. RELATION OF THE PURCHASING POWER OF THE UNITED STATES RETAIL PRICE OF ROUND STEAK, 1890-1906, TO RECEIPTS OF NATIVE CATTLE AND RANGE CATTLE AT CHICAGO EIGHT YEARS LATER

Changes in retail prices cause violent fluctuations in the number of cattle in surplus areas such as the ranges. An increase of 20 per cent in the retail price of round steak produced an 18-per-cent increase in the receipts of native cattle at Chicago and a 74-per-cent increase in range-cattle receipts eight years later

TABLE 116. RELATION OF UNITED STATES PRODUCTION TO PRICES OF DIFFERENT PRODUCTS IN SURPLUS AREAS\*

	Production 20 per cent below normal	Production 20 per cent above normal
	Per cent that prices were above normal	Per cent that prices were below normal
Corn, Iowa farm price.....	57	31
Potatoes, Batavia, New York, farm price.....	54	30
Wheat, Minnesota farm price.....	37	23
Hogs, Iowa farm price.....	18	13
Cattle, Nebraska farm price.....	50	28

\* Corn prices are for the years 1895 to 1913; potatoes, 1897 to 1915; wheat, 1899 to 1913; hogs, 1890 to 1914; and cattle, 1891 to 1915.

TABLE 117. MEAT PRODUCTION IN THE UNITED STATES RELATED TO PRICES, 1890-1912

(From table 129)

	Receipts 10 per cent below normal	Receipts 10 per cent above normal
	Per cent that prices were above normal	Per cent that prices were below normal
Farm prices:		
Beef cattle.....	16	12
Hogs.....	6	5
Cattle and hogs combined.....	9	7
Retail prices:		
Round steak.....	4	4
Four pork products.....	3	2
Beef and pork combined.....	3	2

United States farm prices 6 per cent. A 10-per-cent shortage in receipts of cattle and hogs combined, raised the average farm prices of the combined products by 9 per cent.

## EFFECT OF TOTAL CROP SUPPLY ON PRICES

In studying the relationship of production to prices, the three crops, corn, wheat, and potatoes, were given a weight approximately equivalent to sales. The weights were: wheat, 3; corn, 1; potatoes, 1. A 5-per-cent

TABLE 118. MEAT AND CROP PRODUCTION IN THE UNITED STATES RELATED TO UNITED STATES FARM PRICES, 1890-1912

(From table 129)

	Production 5 per cent below normal	Production 5 per cent above normal
	Per cent that prices were above normal	Per cent that prices were below normal
Meat.....	4	4
Crops.....	3	2
Meat and crops combined.....	1	1

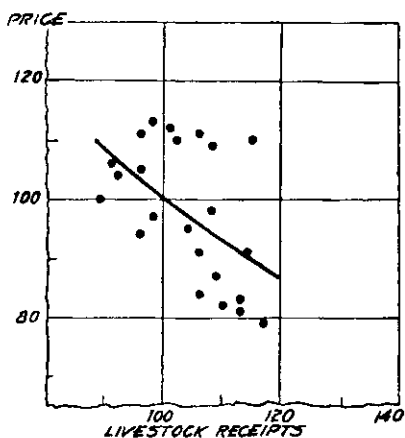


FIGURE 81. RELATION OF THE COMBINED RECEIPTS OF CATTLE AND HOGS TO THE PURCHASING POWER OF UNITED STATES JANUARY FARM PRICES, 1891-1913

A 10-per-cent shortage in the supply raised prices 9 per cent

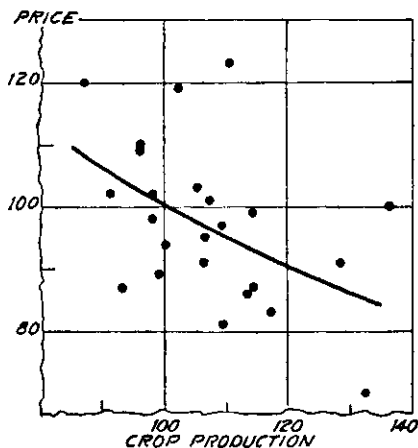


FIGURE 82. RELATION OF THE COMBINED UNITED STATES PRODUCTION OF CORN, POTATOES, AND WHEAT TO THE PURCHASING POWER OF UNITED STATES FARM PRICES, 1890-1912

A 10-per-cent shortage in the supply raised prices 6 per cent

shortage in the combined production of these crops resulted in a 3-per-cent increase in the United States farm prices (table 118). This is much less than the effect of a 5-per-cent shortage of any one of the crops on its price.

#### EFFECT OF TOTAL FOOD SUPPLY ON PRICES

The crop group and the livestock group were combined and given equal weights. A 5-per-cent shortage in total supply of meat and crops raised the combined prices only 1 per cent (table 118). In this, as in other cases, a given shortage of several crops seems to result in a smaller average price change than results from an equal shortage in a single crop. In a country where famine occurs, substitution might take place to such an extent that combined shortages would accentuate combined prices.

#### RELATION OF FARM AND RETAIL PRICES

The United States retail prices as reported by the United States Bureau of Labor Statistics, and the United States farm prices as reported by the United States Department of Agriculture, are given in table 119.

In the five years before the war, round steak retailed in the United States at 20.1 cents per pound. In the six years of agricultural depression, 1921 to 1926, the average retail price was 34.1 cents. Prices paid to farmers for beef cattle rose from 5.3 to 5.8 cents, or only 9 per cent.

Retail prices of bacon rose from 25.8 cents to 42.7 cents, or 66 per cent. Farm prices of hogs rose only 24 per cent.

Retail prices of hens increased 80 per cent and farm prices 75 per cent. This is the highest index of farm prices shown in table 119. The index number of the farm price of eggs is as high as the retail prices.

TABLE 119. RELATION OF UNITED STATES FARM PRICES AS REPORTED BY THE UNITED STATES DEPARTMENT OF AGRICULTURE, AND UNITED STATES RETAIL PRICES AS REPORTED BY THE UNITED STATES BUREAU OF LABOR STATISTICS

	Prices, in cents			Index number 1921-26, when 1910-14 = 100
	1910-14	1915-20	1921-26	
<b>Beef:</b>				
Sirloin steak, retail price per pound.....	23.1	33.3	39.5	171
Round steak, retail price per pound.....	20.1	32.0	34.1	170
Rib roast, retail price per pound.....	18.4	27.1	29.0	158
Beef cattle, farm price per pound.....	5.3	8.1	5.8	109
<b>Hogs:</b>				
Bacon, retail price per pound.....	25.8	42.9	42.7	166
Ham, retail price per pound.....	25.4	41.8	49.7	196
Lard, retail price per pound.....	15.3	26.6	19.5	127
Pork chops, retail price per pound.....	19.9	33.1	34.2	172
Hogs, farm price per pound.....	7.2	12.3	8.9	124
<b>Hens:</b>				
Retail price per pound.....	20.5	32.8	36.9	180
Farm price per pound.....	11.5	18.7	20.1	175
<b>Eggs:</b>				
Retail price per dozen.....	34.0	51.3	48.4	142
Farm price per dozen.....	21.6	35.3	31.4	145
<b>Milk:</b>				
New York City retail price per quart.....	9.0	12.9	14.8	164
Utica, New York, farm price per quart*.....	3.5	5.9	5.0	143
<b>Wheat:</b>				
Flour, retail price per pound.....	3.6	6.3	5.4	150
Wheat, farm price per pound.....	1.5	3.0	2.0	133
<b>Corn:</b>				
Cornmeal, retail price per pound.....	3.0	5.4	4.6	153
Corn, farm price per pound.....	1.2	2.2	1.4	117

\* New York farm prices of milk are those published by the New York State College of Agriculture at Cornell University.

Retail prices of milk in New York City increased 64 per cent, but prices paid to New York State farmers increased only 43 per cent.

Retail prices of flour increased 50 per cent, but farm prices of wheat rose only 33 per cent.

For the five years before the war, farmers received from 38 to 78 per cent of the retail price for the various products listed in table 120.

TABLE 120. PERCENTAGE OF RETAIL PRICES RECEIVED BY FARMERS

	1910-14	1917	1927
Beef.....	52	57	42
Pork.....	51	59	38
Milk.....	38	48	37
Butter.....	78	85	79
Hens.....	56	58	55
Eggs.....	70	76	64
Wheat flour.....	52	59	44
Wheat bread.....	23*	36	21
Cornmeal.....	39	43	27
Potatoes.....	60	74	58
Weighted average.....	51	59	45

\* 1913-14.



In 1917, prices had risen strikingly but distribution charges had not risen proportionately. Farmers received more than their pre-war share of the consumer's dollar. In 1927, prices had fallen but distributing charges remained high, and the farmers received less than their pre-war share of the consumer's dollar. The average percentage received by farmers in 1927 was 45.

#### COSTS OF DISTRIBUTION

From 1910 to 1914, farmers received \$7.25 per 100 pounds of live hogs, and in 1927 they received \$9.68 (table 98, page 77). The corresponding values of the pork from 100 pounds of live hogs were \$14.16 and \$25.32 (table 100). The differences, or costs of distribution, were \$6.91 and \$15.64. The costs of distribution increased 126 per cent (table 102).

In 1927, the costs of distributing beef were 106 per cent above pre-war costs (table 114, page 91).

For the five years before the war, milk retailed at 9 cents per quart in New York City and farmers received 3.4 cents for it, or, distribution costs were 5.6 cents. For December, 1927, the retail price was 16 cents. Farmers received 6.6 cents. Distribution cost 9.4 cents, or 92 per cent above the pre-war amount.

No United States farm prices of butter comparable with the United States retail prices are available. Dr. G. A. Pond, of the University of Minnesota, furnished prices paid to farmers for butterfat at a typical creamery in Minnesota. Comparison of these prices with the United States retail price of creamery extra butter, showed a spread of 8 cents during the five years 1910 to 1914, and 11.7 cents in 1927, or an increase of 46 per cent. This figure may be too low because of closer weighing at retail now.<sup>16</sup>

For the five years before the war, farmers received 11.5 cents per pound for chickens. Live hens retailed at 20.5 cents, a difference of 9 cents. In 1927, farmers received 20.3 cents and retail prices averaged 36.9, a difference of 16.6 cents. The spread between farm and retail prices increased from 9 to 16.6 cents, or 84 per cent.

Comparable farm and retail prices of eggs are not available for the United States. New York farm prices and New York City retail prices of strictly fresh nearby eggs appear to be comparable for the nine months April to December. These indicate that the cost of distribution is 83 per cent above pre-war costs.

A comparison of the price of wheat with the retail prices of flour and wheat middlings indicates that the spread between the farmers' prices of a bushel of wheat and the retail prices of its products has increased 84 per cent. If sold as bread the increased spread is 64 per cent.

Farm and retail prices of potatoes for the United States are comparable except for July and August. Omitting these two months, the average farm price before the war was 1.12 cents per pound. Retail prices averaged 1.89, a difference of 0.77 cent. In 1927, farm prices averaged 2.1 cents per pound and retail prices 3.8 cents, a difference of 1.7, or an increase of 121 per cent.

<sup>16</sup> In the earlier period a larger proportion of the butter was weighed out of tubs by the retailer. Estimates by three retailers indicate an average loss of 2.3 pounds per tub, or 4 per cent. At the present time losses are less because much of the butter is sold in cartons. The spread at the earlier date is therefore probably less than 8 cents. If it were as low as 7 cents, the present index of the cost of distribution would be 167 instead of 146.

In the case of sheep, retail prices are available for leg of lamb only. If the total retail value of the whole sheep varies in the same way as that of leg of lamb, the cost of distribution in 1927 would be 129 per cent above the pre-war costs.<sup>17</sup>

Index numbers of the cost of distribution are shown in figure 83 and in table 121. The weighted average cost of distribution of nine products is 91 per cent above the pre-war amounts. Costs of distribution have

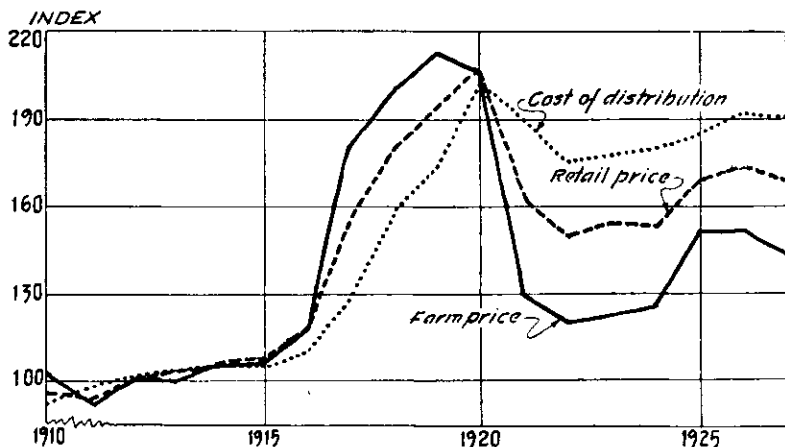


FIGURE 83. INDEX NUMBERS OF THE UNITED STATES FARM PRICE OF FOODS, THE COST OF DISTRIBUTION, AND THE UNITED STATES RETAIL PRICE

From 1916 to 1920, costs of distribution were low and farm prices were relatively high. Since 1920, costs of distribution have been high and farm prices have been low

risen in the past three years. Apparently, if farmers are to receive higher prices, this must be brought about by creating a scarcity, so that retail prices will rise high enough to pay distribution costs that are nearly twice as high as before the war, and yet leave the farmer a sustaining price. As has been shown previously, distributors' margins decline somewhat when the product rises in price. A scarcity which will raise retail prices will at the same time reduce margins somewhat, so that the farmers will receive a little more than all the increase in the price due to scarcity.

If farmers received nothing for the products listed in table 121, retail prices would be practically at the pre-war level, because the increases in the distributing charges for 1927 almost equal the amount paid to farmers before the war.

<sup>17</sup> Based on dressed weights and comparative prices furnished by C. D. Schutt, of the Department of Animal Husbandry at Cornell University.

TABLE 121. INDEX NUMBERS OF THE COST OF DISTRIBUTION OF FARM PRODUCTS  
(Corresponding months for 1910-14 = 100)

Year	Beef <i>a</i>	Pork <i>b</i>	Milk <i>c</i>	Butter <i>d</i>	Hens <i>e</i>	Eggs <i>f</i>	Wheat flour <i>g</i>	Wheat bread <i>h</i>	Corn- meal <i>i</i>	Pota- toes <i>j</i>	Weighted average <i>k</i>
1910	84	86	96	98	91	103	97	.....	97	104	92
1911	93	99	98	103	97	93	97	.....	97	121	98
1912	103	100	100	111	100	86	104	.....	101	113	102
1913	109	107	102	94	106	113	106	97	103	91	104
1914	111	110	100	95	107	107	101	109	103	77	105
1915	110	112	98	94	99	97	112	114	109	82	105
1916	114	115	96	97	114	99	117	119	111	123	110
1917	127	136	111	91	132	112	109	134	178	169	129
1918	178	181	134	120	188	126	150	145	223	140	159
1919	186	214	152	144	192	149	179	148	196	175	174
1920	209	247	163	180	213	170	210	177	214	204	202
1921	212	223	175	160	209	157	195	175	189	152	190
1922	194	201	179	143	188	149	175	155	155	169	175
1923	200	205	171	159	179	160	165	158	145	164	177
1924	205	203	168	163	179	167	158	155	167	173	180
1925	202	213	170	159	181	172	174	153	197	206	185
1926	208	222	171	159	188	175	185	158	209	248	192
1927	206	226	171	146	184	183	184	164	206	221	191

*a* From table 114, page 91.

*b* From table 102, page 79.

*c* Based on the New York City retail prices and on prices paid to farmers. (Farm economics, no. 44, p. 665, April, 1927.)

*d* Based on prices paid for butterfat in southern Minnesota as furnished by G. A. Pond, of the Minnesota Agricultural Experiment Station, and on the United States retail prices of creamery extra butter. An overrun of 23.1 per cent was used. (Black, J. D., and Guthrie, E. S. Economic aspects of creamery organization. Minnesota Agr. Exp. Sta. Technical bul. 26:7, 1924.)

*e* Based on United States retail prices of live hens and the United States farm price of chickens.  
*f* Comparable prices for the United States are not available, hence New York farm prices of eggs and New York City retail prices of strictly fresh nearby eggs were used. January and February omitted.

*g* Wheat is assumed to produce 70 pounds of flour and 30 pounds of by-products per 100 pounds. United States retail price of flour and New York price of standard middings were used. (Farm economics, no. 49, p. 805, December, 1927.)

*h* It is assumed that 100 pounds of wheat produces 30 pounds of by-products and 70 pounds of flour which will make 94 pounds of bread.

*i* Based on United States retail price of cornmeal and United States farm price of corn.

*j* Based on United States retail price of potatoes and United States farm price.

*k* Weighted as follows: beef, 21; pork, 18; milk, 10; butter, 11; hens, 4; eggs, 9; wheat flour, 5; wheat bread, 13; cornmeal, 5; potatoes, 4.

A comparison of farm and retail prices and costs of distribution also is shown in figure 83. When prices were rising, costs of distribution rose less rapidly than did retail prices. Farmers received the benefit of the difference. When prices fell, costs of distribution remained high. Farmers lost the difference. If farmers received their pre-war share of the retail price, the agricultural depression would be over.

The failure of distributing charges to decline is the primary cause of the agricultural depression. A depression always occurs with falling prices, because farm prices must fall disproportionately to retail prices and because agriculture cannot quickly reduce production and force consumers to pay the extra distributing costs.

## HORSES

### EFFECT OF SUPPLY ON PRICES

Before the war, when the receipts of horses at East St. Louis and at Chicago were 20 per cent below normal, the Nebraska farm prices were 11 per cent above normal (table 122).

TABLE 122. RELATION OF RECEIPTS OF HORSES AT CHICAGO AND AT EAST ST. LOUIS, 1880-1913, TO UNITED STATES FARM PRICES OF HORSES ON JANUARY 1 FOLLOWING

Locality	Receipts 20 per cent below normal	Receipts 20 per cent above normal
	Per cent that prices were above normal	Per cent that prices were below normal
Farm prices, United States.....	10	7
Farm prices, Nebraska.....	11	8
Farm prices, Vermont.....	9	7

When receipts were 20 per cent below normal, imports of horses for breeding purposes were 68 per cent above normal (table 123). When receipts were 40 per cent below normal, imports were 228 per cent above

TABLE 123. RELATION OF RECEIPTS OF HORSES AT CHICAGO AND AT EAST ST. LOUIS, TO IMPORTS OF HORSES FOR BREEDING PURPOSES, 1884-1913

Per cent that receipts were above or below normal	Corresponding per cent change in imports of horses
40 below.....	228 above
20 below.....	68 above
20 above.....	35 below
40 above.....	54 below

normal. This shows the length to which farmers are willing to go in their efforts to increase production. It will, of course, be many more years before the resulting supply will be on the market.

#### RELATION OF RETAIL PRICES OF HORSES TO CHARGES FOR DISTRIBUTION

The margin between the purchase price and the sale price of 2570 horses bought in Nebraska and sold in Vermont is shown in table 124. From 1903 to 1909, the margin on horses that sold for less than \$100 was \$41.75. On horses that sold for over \$200, the margin was \$28.64.

TABLE 124. DIFFERENCE BETWEEN PRICES PAID FOR HORSES IN NEBRASKA, AND THE SALE PRICE IN VERMONT, FOR HORSES SELLING AT DIFFERENT PRICES, 1903-1914

	Average spread
1903-1909:	
Sale price less than \$100.....	\$41.75
Sale price over \$200.....	28.64
1910-1914:	
Sale price less than \$125.....	53.33
Sale price over \$225.....	26.88

In the period from 1910 to 1914, the margin for horses selling for less than \$125 averaged \$53.33. For horses selling for over \$225, the margin was \$26.88. In every year the margin on horses sold at a high price

was less than the margin on cheaper animals (table 125). This shows the same principle that has been shown for practically every other farm product. The lower the retail price, the greater is the margin.

TABLE 125. DIFFERENCE BETWEEN PRICES PAID FOR HORSES IN NEBRASKA, AND THE SALE PRICE IN VERMONT, FOR HORSES SELLING AT DIFFERENT PRICES, 2570 HORSES, 1903-1914

Year	\$75- \$99.99	\$100- \$124.99	\$125- \$149.99	\$150- \$174.99	\$175- \$199.99	\$200- \$224.99	\$225- \$249.99
1903.....	\$38.13	\$32.41	\$23.01	\$25.52	.....	.....	.....
1904.....	.....	36.88	31.94	.....	.....	.....	.....
1905.....	41.40	30.19	35.53	20.52	.....	.....	.....
1906.....	53.75	28.17	35.28	32.47	\$23.55	.....	.....
1907.....	50.00	36.25	50.53	32.62	35.97	\$33.35	.....
1908.....	.....	.....	48.88	35.02	34.15	33.50	.....
1909.....	.....	.....	36.90	40.23	32.73	31.50	\$16.83
1910.....	.....	.....	.....	29.77	30.35	22.72	23.22
1911.....	.....	.....	.....	41.04	37.61	42.79	33.87
1912.....	.....	.....	.....	38.76	38.80	30.68	31.64
1913.....	.....	.....	.....	48.71	44.14	35.96	34.79
1914.....	.....	.....	.....	55.18	35.30	41.01	23.44

EFFECT OF DEFLATION ON PRICES OF HORSES IN VERMONT AND IN THE WEST

Before the war, horses on Vermont farms were worth \$121 per head (table 126). In the six years 1921 to 1926 they were worth \$111. Prices of horses on Montana farms dropped from \$90 to \$38 per head.

TABLE 126. FARM PRICES OF HORSES IN MONTANA AND IN VERMONT, JANUARY 1

	Prices		Index number
	1910-14	1921-26	1921-26, when 1910-14 = 100
Vermont.....	\$121	\$111	92
Montana.....	90	38	42
Difference.....	\$31	\$73	235

Horses are normally shipped from Montana to New England. In the six years 1921 to 1926, shipments were limited because of the difficulty of making any profit. The quotations for Montana may not be for the particular class of horses shipped to Vermont, but probably these figures indicate the increased spread for the horses that are shipped.

The spread between Montana prices and Vermont prices was \$31 before the war, but from 1921 to 1926 was \$73. Apparently, it costs

TABLE 127. FARM PRICES OF HORSES IN NEBRASKA AND IN VERMONT, JANUARY 1

	Prices		Index number
	1910-14	1921-26	1921-26, when 1910-14 = 100
Vermont.....	\$121	\$111	92
Nebraska.....	100	61	61
Difference.....	\$21	\$50	238

135 per cent more to get horses through the channels of trade now than it cost before the war.

Similar comparisons for Vermont and Nebraska are shown in table 127. The spread between Vermont prices and Nebraska prices has increased by 138 per cent. Probably this represents the approximate increase in the cost of getting horses from the Nebraska producer to the Vermont consumer.

### INDUSTRIAL PRODUCTS

In cities, many industrial products are made to order, or are made so shortly before they are consumed that the supply is kept in close relationship to the demand. For such products, price governs supply, whereas in agriculture, supply governs current prices. High-priced agricultural products and low supply go together, but high-priced industrial products go with high supply. In years when the production of phosphate rock was 10 per cent above normal, the price was 6 per cent above normal (table 128); but when potato production was 10 per cent above normal, the price of potatoes at Batavia, New York, was 17 per cent below normal. Similarly, when the production of pig iron was 10 per cent above normal, the price was 6 per cent above normal, but when receipts of hogs were 10 per cent above normal, the Chicago wholesale price was 8 per cent below normal.

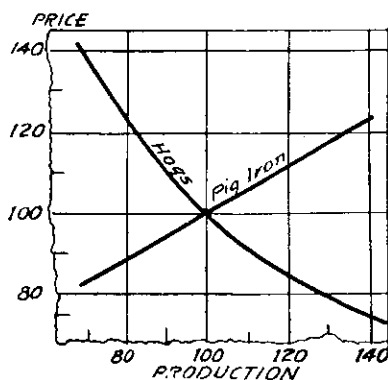


FIGURE 84. RELATION OF THE PRODUCTION OF PIG IRON, 1875-1913, AND HOGS, 1877-1913, TO THE PURCHASING POWER OF THE WHOLESALE PRICE OF PIG IRON AND THE WHOLESALE PRICE OF HEAVY HOGS

In a year when the receipts of hogs were 10 per cent below normal, prices were 10 per cent above normal. When pig-iron production was 10 per cent below normal, prices were 6 per cent below normal. In the steel industry, high prices make high production. In agriculture, high production makes low prices

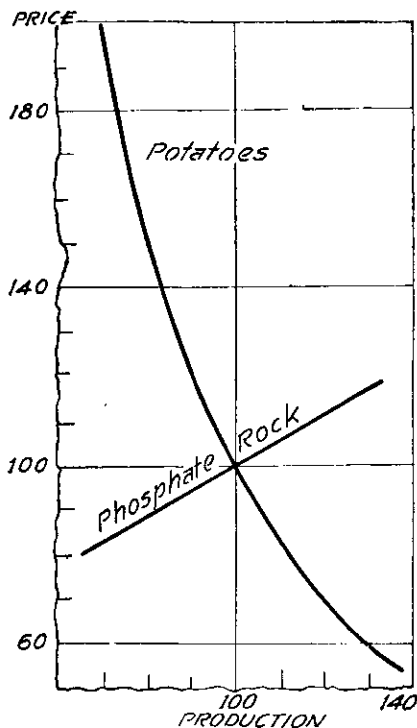


FIGURE 85. RELATION OF PRODUCTION OF PHOSPHATE ROCK, 1902-1913, AND POTATOES, 1897-1915, TO WHOLESALE PRICES OF PHOSPHATE ROCK AND BATAVIA PRICES OF POTATOES

When phosphate rock is low in price, production is low. Low production of potatoes goes with high prices

TABLE 128. RELATION OF PRODUCTION TO PRICES\*  
(From table 129)

	Production 10 per cent below normal	Production 10 per cent above normal
Potatoes, Batavia, New York, farm price.....	Per cent that prices were above or below normal	Per cent that prices were above or below normal
Phosphate rock, f.o.b. mines.....	22 above 6 below	17 below 6 above
Hogs, Chicago, wholesale price.....	10 above	8 below
Pig iron, wholesale No. 1 foundry.....	6 below	6 above

\* Potato prices are for the years 1897 to 1915; phosphate rock, 1902 to 1913; hogs, 1877 to 1913; and pig iron, 1875 to 1913.

Agricultural production must be started from one to many years before the product is ready for market, so that the demand cannot be foretold. Furthermore, the total production is usually dependent on weather, diseases, and other factors, which make it impossible to foretell the supply that any given effort will produce. It therefore follows that for agricultural products the price at any time is governed by the supply.

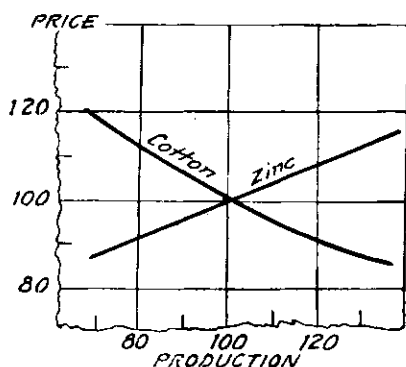


FIGURE 86. RELATION OF THE PRODUCTION OF COTTON, 1882-1913, AND ZINC, 1887-1914, TO THE PURCHASING POWER OF THE PRICE OF SHEET ZINC AND THE UNITED STATES FARM PRICE OF COTTON

For farm prices, high supply goes with low prices. For many industrial products, high supply goes with high prices

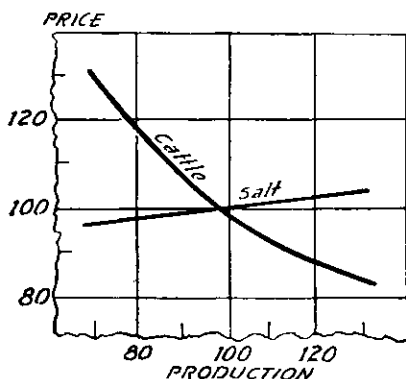


FIGURE 87. RELATION OF THE PRODUCTION OF SALT, 1895-1915, AND CATTLE RECEIPTS, 1890-1914, TO THE PURCHASING POWER OF THE WHOLESALE PRICE OF SALT AT CHICAGO AND THE WHOLESALE PRICE OF STEERS AT CHICAGO

When the receipts of cattle were 10 per cent below normal, prices of cattle at Chicago were 8 per cent above normal. When the production of salt was 10 per cent below normal, the price of salt was 1 per cent below normal

#### WHO PAYS THE FREIGHT

Many economists have drawn generalized conclusions from industrial conditions. For many industrial products, the price in any given year governs the production of that year. Operating expenses are high compared with fixed capital. Labor is hired or discharged in accordance

with orders. If prices are too low to justify operation, the plant is closed and the laborer seeks work elsewhere or is unemployed. If orders are offered at prices that are profitable, the plant operates. Under such conditions freight rates and all other costs are considered when making quotations. Since freight rates are considered in the cost, the consumer pays most of the freight at once.

In agriculture it takes from one to many years to produce a marketable product; even with annual crops, it usually takes several years to shift from one crop to another because of rotations and other factors. Many of the good potato sections follow a three-year rotation—small grain, clover, and potatoes. The preparation for the potato crop is begun three years in advance of the harvest.

Because of the very slow turnover, the fixed capital invested in agriculture must always be high in proportion to sales. For each 10 two-year-old steers and heifers sold, there must be on hand about 15 mature cows, 1 bull, 2 yearling heifers that are being raised to replace old cows, 12 calves, and the 10 head of yearling steers and heifers which are to be sold. In addition, there must be horses, fences, buildings, feed, water supply, and land. The turnover is inevitably slow. The business cannot be stopped and started at will. These facts are beyond man's control.

The steel plant may be left idle while the workmen are unemployed, but a farm cannot be put into cold storage.

The farmer is working for himself. He cannot discharge himself and stop production until prices rise. If the farm is closed up, the farmer must abandon his business and his home.

Variations in the size of the crop are more dependent on weather changes than on acreage changes.

For all these reasons, but basically because production precedes sales by so long a time, agricultural production governs prices.

When a given number of hogs are ready for market, they are sold and all consumed. The consumers' price must be set at such a level that consumers will take the entire supply. If the price to the consumer is placed at any higher figure, he will not eat all the hogs and the price must be lowered. The consumer gives no attention as to who gets the money. If freight rates are lowered, the farmer gets the benefit. The consumers' price is practically unaffected. The only possible effect on the consumer is the possibility that the higher farm price might lead some farmer to sell an additional hog instead of eating it. As a matter of fact, he is more likely to keep the hog for breeding purposes.

The only way that consumers can be made to pay the freight or any other handling charge on agricultural products is through a reduction in the supply. If the freight on steers is raised, it reduces the farm price. About eight to ten years later a corresponding reduction in the supply of steers will be made, and most of the freight charge will be passed on to the consumer.

When an agricultural region is once settled, homes built, and a lifetime of labor spent in creating a farm, a rise in distributing costs between this region and its markets will be borne by the farmers for an indefinite length of time, unless the rise is so drastic as to destroy all values and lead people to abandon all their property and go elsewhere.



It is much easier to settle an agricultural region than to drive settlers out. Once settled, a country will remain settled even though the rewards for labor drop to almost nothing.

When, for any reason, a settled agricultural region becomes submarginal, farmers cling to the region for generations. Dilapidated buildings, ramshackle fences, and brush lines indicate what is gradually taking place. The last straw which finally causes abandonment usually is the falling or the burning of the buildings.



<i>Potatoes</i> , French production related to:	146	130	118	108	100	93	87	82	78	.....
26. French farm price for the crop year, 1887-1914.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
<i>Potatoes</i> , German production related to:	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
27. Berlin wholesale price of eating potatoes, Oct.-June, 1890-91 to 1915-16.....	166	137	116	100	100	87	77	69	62	56
28. Berlin wholesale price of eating potatoes, Oct.-June, 1902-03 to 1913-14.....	181	145	119	100	100	85	74	65	.....	.....
29. Berlin wholesale price of manufacturing potatoes, Oct.-June, 1890-01 to 1913-14.....	176	143	118	100	100	86	75	66	59	53
30. Berlin retail price, Oct.-June, 1902-03 to 1913-14.....	153	131	113	100	100	89	80	73	.....	.....
<i>Sweet potatoes</i> , United States production related to:	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
31. United States farm price, Dec. 1, 1904-1914.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
<i>Hay</i> , United States production related to:	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
32. United States farm price, Dec. 1, 1875-1913.....	120	117	108	100	100	93	88	83	79	75
33. New York farm price, Dec. 1, 1875-1913.....	140	123	110	100	100	92	84	78	73	68
34. Rhode Island farm price, Dec. 1, 1875-1913.....	115	109	104	100	100	90	88	90	88	85
35. Georgia farm price, Dec. 1, 1875-1913.....	104	103	101	100	100	99	97	96	94	93
36. New York City wholesale price of No. 1 timothy, large bales, Sept.-Aug., 1904-05 to 1914-15.....	136	121	109	100	100	92	85	80	.....	.....
37. New York City wholesale price of No. 1 timothy, large bales, Sept.-Aug., 1917-18 to 1925-26.....	143	125	111	100	100	91	83	77	.....	.....
38. New York City wholesale price of No. 2 timothy, large bales, Sept.-Aug., 1904-05 to 1914-15.....	135	121	109	100	100	92	86	.....	.....	.....
39. New York City wholesale price of No. 3 timothy, large bales, Sept.-Aug., 1904-05 to 1924-25.....	133	119	109	100	100	93	87	81	77	.....
40. New York City wholesale price of No. 3 timothy, small bales, Sept.-Aug., 1910-11 to 1924-25.....	131	118	108	100	100	93	87	82	78	.....
41. New York City wholesale price of clover, mixed, Aug.-Sept., 1904-05 to 1921-22.....	135	121	109	100	100	92	86	80	75	.....
<i>Apples</i> , United States production related to:	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
42. New York City wholesale price of 16 varieties, Aug.-June, 1894-95 to 1914-15.....	142	128	117	108	100	94	88	84	79	76
43. New York City wholesale price of Baldwin, Oct.- June, 1898-99 to 1914-15.....	145	130	118	108	100	93	88	83	78	75
44. New York City wholesale price of Ben Davis, Oct.- June, 1898-99 to 1914-15.....	138	125	115	107	100	94	89	85	81	78
45. New York City wholesale price of Greenings, Sept.- May, 1898-99 to 1914-15.....	151	134	120	109	100	93	86	81	76	72
46. New York City wholesale price of Kings, Sept.- Apr., 1898-99 to 1914-15.....	141	127	116	107	100	94	89	84	80	76
47. New York City wholesale price of Northern Spy, Oct.-June, 1898-99 to 1914-15.....	131	121	112	106	100	95	91	87	84	81
<i>Apples</i> , New York State production related to:	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
48. Newfane, Niagara County, cider apples, 1913- 1925.....	157	137	122	110	100	92	85	79	74	70
49. Newfane, Niagara County, non-cider apples, 1913- 1925.....	130	120	112	106	100	95	91	88	84	81
<i>Peaches</i> , United States production related to:	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
50. United States farm price, June-Oct., 1915-1925.....	115	111	107	103	100	97	95	93	91	.....
<i>Peaches</i> , Georgia production related to:	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
51. New York City jobbing price, 6-basket carrier, June, 1904-1924.....	111	108	105	102	100	98	96	95	93	92
52. New York City jobbing price, 6-basket carrier, July, 1904-1924.....	122	115	109	104	100	96	93	90	88	86

TABLE 129 (continued)

Prices compared with normal when											
Production is	Production is	Production is	Production is	Production is	Production is	Production is	Production is	Production is	Production is	Production is	Production is
111	108	105	102	100	98	96	95	93	92	91	
113	109	105	103	100	98	96	94	92	91	90	
.....	.....	105	102	100	98	96	95	93	92	.....	
.....	.....	109	104	100	96	93	90	88	85	.....	
.....	.....	.....	121	100	84	72	62	54	48	.....	
392	260	182	133	100	78	61	50	41	34	.....	
352	241	173	130	100	70	64	52	44	37	.....	
270	204	156	124	100	83	69	59	51	44	.....	
156	137	122	110	100	92	85	80	75	70	.....	
296	213	161	125	100	82	68	57	49	42	.....	
299	215	161	125	100	82	68	57	49	42	.....	
300	215	162	126	100	82	68	57	49	42	.....	
177	149	128	113	100	90	82	75	69	63	.....	
.....	.....	135	121	109	92	86	80	75	71	.....	
220	173	141	118	100	86	76	67	60	54	.....	
295	165	137	116	100	88	77	69	.....	.....	.....	
.....	.....	130	113	100	89	81	.....	.....	.....	.....	
.....	.....	163	126	100	81	67	.....	.....	.....	.....	
218	163	142	118	100	86	75	66	59	53	.....	
224	175	142	118	100	86	75	66	59	53	.....	
.....	.....	132	113	100	89	81	73	67	62	.....	
282	206	157	124	100	82	69	59	51	44	.....	
.....	.....	102	121	100	84	72	.....	.....	.....	.....	
.....	.....	285	193	100	70	59	.....	.....	.....	.....	
226	177	143	118	100	86	75	66	58	51	.....	
130	120	112	106	100	95	91	88	84	81	.....	

*Peaches*, North Carolina production related to:  
53. New York City jobbing price, 6-basket carrier, Aug., 1904-1924.  
*Peaches*, New York production related to:  
54. New York City jobbing price, 6-basket carrier, Sept., 1904-1924.  
*Pears*, United States production related to:  
55. United States farm price, Aug.-Dec., 1910-1925.  
*Borax*, United States net supply related to:  
56. New York City store price of Jamaica, 9 s and 1 s, July-June, 1897-98 to 1914-15.  
*Cranberries*, United States production related to:  
57. United States farm price, Dec. 1, 1919-1925.  
*Cabbage*, production in ten late-cabbage States related to:  
58. Little York, New York, farm price of Danish, Dec., 1915-1924.  
59. Newfane, Niagara County, farm price, Dec., 1915-1925.  
60. New York farm price, Dec. 1, 1915-1925.  
61. United States farm price, Dec. 1, 1915-1925.  
62. New York City wholesale price of Danish, Dec., 1915-1924.  
63. New York City wholesale price of Danish, Dec., 1915-1925.  
64. New York City wholesale price of Danish, Dec., 1915-1926.  
*Corn*, United States production related to:  
65. United States farm price, Dec. 1, 1875-1913.  
66. United States farm price, Dec. 1, 1877-1894.  
67. United States farm price, Dec. 1, 1895-1913.  
68. United States farm price, Dec. 1, 1900-1915.  
69. United States farm price, Dec. 1, 1915-1920.  
70. United States farm price, Dec. 1, 1921-1925.  
71. Iowa farm price, Dec. 1, 1877-1913.  
72. Iowa farm price, Dec. 1, 1877-1894.  
73. Iowa farm price, Dec. 1, 1895-1913.  
74. Iowa farm price, Dec. 1, 1915-1920.  
75. Iowa farm price, Dec. 1, 1921-1925.  
76. Columbus, Nebraska, farm price, calendar year, 1896-1914.  
77. Georgia farm price, Dec. 1, 1875-1913.

78.	Georgia farm price, Dec. 1, 1877-1894.	108	105	102	100	98	96	95	93	92
79.	Georgia farm price, Dec. 1, 1895-1913.	133	119	109	100	93	87	81	77	73
80.	Georgia farm price, Dec. 1, 1915-1920.	150	105	102	100	98	96	86	82	79
81.	Georgia farm price, Dec. 1, 1921-1925.	160	139	117	100	87	83	77	73	70
82.	Chicago No. 2 cash, Dec. 1876-1913.	146	126	112	100	91	83	76	70	65
83.	Chicago No. 2 cash, Dec. 1877-1894.	118	111	105	100	96	93	89	86	83
84.	Chicago No. 2 cash, Dec. 1895-1913.	170	117	117	100	87	76	68	61	55
85.	Chicago No. 2 cash, Dec. 1915-1920.	259	137	103	100	97	95	88	82	77
86.	Chicago No. 2 cash, Dec. 1921-1925.	141	181	133	100	78	82	78	72	68
87.	Chicago No. 2 cash, March, 1876-1914.	103	124	111	100	91	84	78	73	68
88.	Chicago No. 2 cash, May, 1876-1914.	133	141	111	100	91	84	78	73	68
89.	Chicago No. 2 cash, July, 1876-1914.	159	119	109	100	93	87	81	77	72
90.	Chicago No. 2 cash, calendar year, 1896-1914.	167	125	111	100	91	83	77	71	67
91.	Chicago May future price in Sept., 1895-1913.	205	137	116	100	87	77	69	62	57
92.	Chicago May future price in Dec., 1895-1913.	212	133	117	100	87	77	68	61	55
93.	Chicago May future price in March, 1896-1914.	160	133	114	100	89	80	72	65	60
94.	Chicago July future price in March, 1896-1914.	157	132	114	100	89	80	72	66	61
95.	Chicago July future price in May, 1896-1914.	140	128	113	100	90	82	75	69	64
96.	Chicago December future price in July, 1895-1913.	177	119	108	100	93	87	82	77	73
97.	Chicago December future price in Sept., 1895-1913.	148	131	119	100	93	87	82	77	73
98.	Chicago December future price in Nov., 1895-1913.	203	136	116	100	88	78	70	63	57
99.	New York City No. 2 western mixed, Dec., 1885-1913.	198	135	115	100	88	78	71	64	58
100.	Liverpool mixed American, Dec., 1898-1913.	160	123	110	100	92	85	79	73	69
101.	United States retail price of cornmeal, calendar year, 1896-1914.	137	115	107	100	94	89	85	80	76
102.	United States retail price of cornmeal, calendar year, 1916-1921.	108	104	102	100	99	97	96	95	94
103.	United States retail price of cornmeal, calendar year, 1922-1926.	233	170	128	100	80	65	50	45	40
104.	New York City retail price of cornmeal, Dec., 1921-1925.	104	103	101	100	99	99	99	99	99
105.	Utica wholesale price of hominy, March, 1907-1926.	136	121	110	100	92	86	80	75	70
106.	New York State retail price of hominy, March, 1907-1926.	122	113	106	100	95	90	86	82	78
107.	Utica wholesale price of cornmeal, Dec., 1900-1915.	149	119	109	100	93	87	82	77	72
108.	Utica wholesale price of cornmeal, March, 1907-1926.	144	125	111	110	91	83	77	72	67
109.	New York State retail price of cornmeal for feeding, Dec. 1900-1915.	138	122	110	100	92	85	79	74	69
110.	New York State retail price of cornmeal for feeding, March, 1907-1926.	135	121	109	100	92	86	80	75	70
111.	Utica wholesale price of gluten, March, 1907-1926.	103	102	101	100	99	99	98	98	98
112.	New York State retail price of gluten, March, 1907-1926.	104	102	101	100	99	98	97	97	97
113.	United States farm price, Dec. 1, 1900-1915.	171	140	117	100	87	76	68	60	52
114.	United States production related to farm price, Dec. 1, 1875-1913.	140	123	110	100	91	84	78	73	68
115.	Iowa farm price, Dec. 1, 1875-1913.	149	128	112	100	90	82	75	69	64

Cont. world production related to:  
 113. United States farm price, Dec. 1, 1900-1915.  
 114. United States production related to:  
 115. Iowa farm price, Dec. 1, 1875-1913.

TABLE 129 (continued)

	Prices compared with normal when											
	Produc- tion is 40 per cent below normal	Produc- tion is 30 per cent below normal	Produc- tion is 20 per cent below normal	Produc- tion is 10 per cent below normal	Produc- tion is normal	Produc- tion is 10 per cent above normal	Produc- tion is 20 per cent above normal	Produc- tion is 30 per cent above normal	Produc- tion is 40 per cent above normal	Produc- tion is 50 per cent above normal	Produc- tion is 60 per cent above normal	
<i>Oats</i> , world production 1890-1914 related to:												
116. United States farm price, Dec. 1, 1899-1914.....				129	100	85	73	63				
<i>Barley</i> , United States production related to:												
117. United States farm price, Dec. 1, 1875-1913.....				107	100	94	89	84	80	77		
<i>Barley</i> , world production 1899-1913 related to:												
118. United States farm price, Dec. 1, 1899-1913.....				107	100	94	89	84	80			
<i>Buckwheat</i> , United States production related to:												
119. United States farm price, Dec. 1874-1915.....		114	109	104	100	97	94	91	88	86	84	
120. New York farm price, Dec. 1, 1875-1913.....	121	122	113	106	100	95	90	87	83	80	77	
<i>Rye</i> , United States production related to:												
121. United States farm price, Dec. 1, 1875-1913.....		105	103	102	100	99	98	96	95	95		
122. United States farm price, Dec. 1, 1899-1913.....			126	112	100	91	83	76				
<i>Rye</i> , world production 1899-1913 related to:												
123. United States farm price, Dec. 1, 1899-1913.....			117	108	100	93	88	83				
<i>Rice</i> , world production 1905-1915 related to:												
124. New Orleans wholesale price of rough rice, Aug- July, 1905-06 to 1915-16.....			133	114	100	89	79	72				
<i>Wheat</i> , world production March-Febr., 1899-1900 to 1913-14, related to:												
125. Liverpool spot price of red wheat, Aug.-July, 1899- 1900 to 1913-14.....			125	111	100	91	83					
126. Liverpool spot price of red wheat, Sept.-Oct., 1899-1913.....			124	111	100	91	84					
127. Liverpool spot price of red wheat, Jan.-Feb., 1900-1914.....			129	113	100	90	81					
128. Liverpool spot price of red wheat, April-May, 1900-1914.....			135	115	100	88	78					
129. Minneapolis wholesale price of No. 1 northern spring wheat, Aug.-July, 1899-1900 to 1913- 14.....			138	116	100	87	77					
130. Kansas City wholesale price of No. 2 yellow hard wheat, July-June, 1899-1900 to 1913-14.....			131	114	100	89	80					
131. Saratov price, Aug.-July, 1899-1900 to 1913-14.....			152	122	100	84	71					
132. Odessa price of spring wheat, Aug.-July, 1899- 1900 to 1913-14.....			152	122	100	84	71					
133. Berlin contract price, Aug.-July, 1899-1900 to 1913-14.....			120	109	100	93	86					
134. Paris contract price, Aug.-July, 1899-1900 to 1913-14.....			93	97	100	103	106					
135. Minnesota farm price, Dec. 1, 1899-1913.....			153	122	100	84	71					
136. Kansas farm price, Dec. 1, 1899-1913.....			137	116	100	87	77					



TABLE 129 (continued)

	Prices compared with normal when											
	Production is 40 per cent below normal		Production is 30 per cent below normal		Production is 20 per cent below normal		Production is 10 per cent above normal		Production is 30 per cent above normal		Production is 40 per cent above normal	
	Production is per cent below normal	Production is per cent below normal	Production is per cent below normal	Production is per cent below normal	Production is per cent above normal	Production is per cent above normal	Production is per cent above normal	Production is per cent above normal	Production is per cent above normal	Production is per cent above normal	Production is per cent above normal	Production is per cent above normal
<i>Wheat</i> , production of hard winter wheat in five States 1899-1913 related to:												
162. Kansas City wholesale price of No. 2 best yellow hard wheat, July-June, 1899-1900 to 1913-14.	111	107	103	100	97	95	93	91	89	87		
163. Kansas farm price, Dec. 1, 1899-1901.	117	111	105	100	90	92	89	86	84	81		
<i>Wheat</i> , British India production 1899-1900 to 1913-14 related to:												
164. Liverpool spot price of red wheat, April-May, 1900-1914.	108	105	102	100	98	96	94	93	91	89		
<i>Wheat</i> , Russian production 1899-1913 related to:												
165. Saratov price, Aug.-July, 1899-1900 to 1913-14.	127	116	107	100	94	89	84	80	76	76		
<i>Wheat</i> , German production 1899-1913 related to:												
166. Berlin contract price, Aug.-July, 1899-1900 to 1913-14.	113	108	104	100	97	94	91	88	85	81		
<i>Wheat</i> , French production 1899-1914 related to:												
167. Paris contract price, Aug.-July, 1899-1900 to 1913-14.	119	112	105	100	95	91	88	85	81	77		
Six starch crops, United States production per capita related to:												
168. United States farm price per pound, Dec. 1, 1871-1914.	122	113	106	100	95	90	87	83	80	75		
<i>Cotton</i> , United States production related to:												
169. United States farm price, Dec. 1, 1882-1913.	119	112	105	100	95	91	88	85	81	77		
<i>Hogs</i> , total weight packed in the West Nov.-Feb., 1877-78 to 1913-14, related to:												
170. Western winter hog pack price, Nov.-Feb., 1877-78 to 1913-14.	154	131	109	100	92	86	80	75	71	66		
171. Chicago price of heavy hogs, Nov.-Feb., 1877-78 to 1913-14.	157	137	122	110	100	92	85	79	74	69		
172. United States farm price, Jan. 1, 1878-1914.	134	123	114	100	95	90	86	83	79	74		
173. Iowa farm price, Jan. 1, 1878-1914.	146	130	118	100	93	87	82	78	74	69		
174. Rhode Island farm price, Jan. 1, 1878-1914.	122	115	109	100	90	93	90	88	86	84		
<i>Hogs</i> , total weight packed in the West Nov.-Feb., 1877-78 to 1915-16, related to:												
175. Chicago price of heavy hogs, 1877-1915.	139	126	107	100	94	89	85	81	77	73		
<i>Hogs</i> , total weight packed in the West Nov.-Feb., 1889-90 to 1913-14, related to:												
176. Western winter hog pack price, Nov.-Feb., 1889-90 to 1913-14.	156	136	121	110	100	92	85	80	75	71		
177. Iowa farm price, Jan. 1, 1890-1914.	146	131	118	108	100	93	87	82	78	74		



178. United States retail price of bacon, 1890-1914 (with c)	116	110	106	103	100	98	96	94	92	90	.....
179. United States retail price of ham, 1890-1914 (with c)	115	110	106	103	100	98	96	94	92	91	.....
180. United States retail price of pork chops, 1890-1914 (with c)	110	107	104	102	100	98	97	95	94	93	.....
181. United States retail price of lard, 1890-1914 (with c)	121	114	108	104	100	97	94	92	90	88	.....
182. United States weighted average retail price of lard, pork chops, ham, and bacon, 1890-1914 (with c) to 1912-13 related to:	115	110	106	103	100	98	95	94	92	90	.....
183. United States farm price, Jan. 1, 1891-1913, .....	135	123	114	106	100	95	90	86	82	79	.....
184. United States weighted average retail price of lard, pork chops, ham, and bacon, 1891-1913 (with c)	115	110	106	103	100	98	96	94	92	91	.....
185. United States farm price, Jan. 1, 1891-1913, .....	.....	.....	136	116	100	88	78	70	.....	.....	.....
186. United States retail price of round steak, 1890-1912, .....	.....	.....	109	104	100	96	93	90	.....	.....	.....
187. United States retail price of round steak, 1890-1914 related to:	.....	.....	139	117	100	87	76	68	.....	.....	.....
188. Nebraska farm price, Jan. 1, 1891-1915, .....	.....	170	139	117	100	87	76	68	.....	.....	.....
189. Chicago price of 1200-1500-pound steers, Jan., 1891-1915, .....	.....	191	121	100	84	72	62	.....	.....	.....	.....
190. Chicago top price of native beef cattle, 1890-1914, .....	.....	129	117	108	110	93	88	83	.....	.....	.....
191. United States retail price of round steak, 1890-1914, .....	.....	125	115	107	100	94	89	85	.....	.....	.....
192. United States retail price of round steak, 1890-1914 (with c), .....	.....	125	115	107	100	94	89	85	.....	.....	.....
193. Sale price of Shorthorn cows at public auction, 1893-1917, .....	.....	127	115	107	100	95	90	86	.....	.....	.....
194. Sale price of roan Shorthorn bulls at public auction, 1893-1917, .....	.....	183	146	120	100	85	74	64	.....	.....	.....
195. Low price of canner and cutter cows at Chicago, 1890-1914, .....	.....	175	142	118	100	86	75	66	.....	.....	.....
196. Low price of fat cows and heifers, 1890-1914, .....	.....	251	178	131	100	78	63	51	.....	.....	.....
197. Chicago wholesale price of packer hides, heavy active steers, 1892-1914, .....	.....	171	140	117	100	87	76	67	.....	.....	.....
198. Chicago wholesale price of country hides, heavy steers, 1892-1914, .....	.....	126	116	107	100	94	89	84	.....	.....	.....
199. Receipts at Chicago 1893-1914 related to:	.....	129	117	108	100	94	88	83	.....	.....	.....
200. Utah farm price of cattle under one year, Jan. 1, 1893-1915, .....	.....	164	137	116	100	88	78	.....	.....	.....	.....
201. Utah farm price of cattle one year and under two years, Jan. 1, 1891-1915, .....	.....	162	135	115	100	88	78	.....	.....	.....	.....
202. Utah farm price of cattle two years and over, Jan. 1, 1894-1915, .....	.....	154	131	114	100	89	80	.....	.....	.....	.....
203. United States farm price, Jan. 1, 1891-1923, .....	.....	135	132	114	100	89	80	72	.....	.....	.....
204. Nebraska farm price, Jan. 1, 1891-1923, .....	.....	171	140	117	100	87	76	67	.....	.....	.....
205. Chicago price of 1200-1500-pound steers, Jan., 1891-1923, .....	.....	118	111	105	100	96	92	89	.....	.....	.....
206. United States retail price of round steak, 1890-1922, .....	.....	121	113	106	100	95	91	87	.....	.....	.....

TABLE 129 (concluded)

	Prices compared with normal when											
	Produc- tion is 40 per cent below normal	Produc- tion is 30 per cent below normal	Produc- tion is 20 per cent below normal	Produc- tion is 10 per cent below normal	Produc- tion is 100 normal	Produc- tion is 20 per cent above normal	Produc- tion is 30 per cent above normal	Produc- tion is 40 per cent above normal	Produc- tion is 50 per cent above normal	Produc- tion is 60 per cent above normal		
<i>Beef and pork</i> , production 1800-1912 related to:												
206. United States farm price, Jan. 1, 1861-1913.....			119	109	100	93	87					
207. United States retail price, calendar year, 1800-1912.....			106	103	100	98	95					
<i>Wheat, corn, and potatoes</i> , United States production 1800-1912 related to:												
208. United States farm price, Dec. 1, 1809-1912.....			113	106	100	95	90	86	83			
209. United States farm price, 1890-1912 related to:												
200. United States farm price, 1890-1912.....			105	102	100	98	96	95				
<i>Horses</i> , Chicago and East St. Louis receipts 1880-1913 related to:												
210. United States farm price, Jan. 1, 1881-1914.....	123	116	110	104	100	96	93	90	87	85	83	
211. Vermont farm price, Jan. 1, 1881-1914.....	122	115	109	104	100	96	93	91	88	86	84	
212. Nebraska farm price, Jan. 1, 1881-1914.....	126	117	111	105	100	96	92	89	86	83	81	
<i>Horses</i> , Chicago and East St. Louis receipts 1884-1913 related to:												
213. Number of horses imported, July-June, 1884-85 to 1913-14.....	328	229	168	128	100	80	65	54	46	39		
<i>Lead</i> , United States production related to:												
214. New York City wholesale price of pig lead, 1875-1915.....					100	101	101	102	103	103	104	104
<i>Salt</i> , United States production related to:												
215. Chicago wholesale price of American medium salt, 1895-1915.....					100	101	103	104				
<i>Rock phosphate</i> , Florida production related to:												
216. Wholesale price of rock phosphate f. o. b. mines, Florida, 1902-1913.....			89	94	100	106	111	117				
<i>Pig iron</i> , United States production related to:												
217. Wholesale price of No. 1 foundry pig iron, 1875-1913.....		83	88	94	100	106	112	117	123			
<i>Zinc</i> , United States production related to:												
218. Factory price of sheet zinc, 1887-1914.....					100	104	108	112	116	120		
<i>Manufactures</i> , United States index of physical volume of manufactures related to:												
219. Wholesale price of 27 raw commodities, 1904-1915.....			97	98	100	102	103					
220. Wholesale price of 70 manufactured commodities, 1904-1915.....			99	100	100	100	101					
<i>Mining</i> , United States index of physical volume of mining 1895-1915 related to:												
221. Wholesale price of metal and of metal products, 1895-1915.....		85	92	92	100	108	115					

## APPENDIX

## SOURCES OF DATA

All data for United States production and for United States prices are from various publications of the United States Department of Agriculture. State prices are from the same source except as otherwise specified.

Prices are all expressed as purchasing power by dividing the prices in dollars by the index numbers of wholesale prices of all commodities as reported by the United States Bureau of Labor Statistics. Details of the method of calculation are given on page 116.

Farm prices of potatoes at Batavia, New York, were those reported by E. G. Misner in *Farm Economics*, no. 18, page 175, September, 1924.

Wholesale prices of potatoes at New York were tabulated by G. P. Scoville. Prices since 1896 are for "State" potatoes.

Retail prices of potatoes are those published for the United States and for New York City by the United States Bureau of Labor Statistics.

Retail prices of potatoes in New York City prior to 1913 are based on quotations obtained from Littlejohn and Crawford, G. E. Degen, and F. H. Ohlandt.

The French farm prices of potatoes are those published in *Annuaire Statistique de la France*, volume 38, page 51, 1922.

Wholesale prices of potatoes in Berlin were taken from *Vierteljahrshäfte zur Statistik des deutschen Reichs*, volume 4, part IV, page 43, 1895; volume 14, part III, page 53, 1905; volume 24, part III, page 19, 1915; volume 25, part 1, page 34, 1916.

Retail prices of potatoes in Berlin were taken from *Vierteljahrshäfte zur Statistik des deutschen Reichs*, volume 11, part IV, page 166, 1902; volume 16, part IV, page 68, 1907; volume 21, part IV, page 8, 1912; volume 23, part 11, page 194, 1914.

Wholesale prices of hay at New York City were tabulated by G. P. Scoville.

The wholesale prices of sixteen varieties of apples at New York City are those reported by H. B. Knapp in *Wholesale Prices of Apples and Receipts of Apples in New York City for Twenty Years*, Cornell University Agricultural Experiment Station, Circular 22, page 16, February, 1914. The prices from 1913 to date were tabulated by G. P. Scoville. The following varieties are included: McIntosh, Fameuse (Snow), Northern Spy, Rhode Island Greening, Alexander, Spitzenburg, Tompkins King, Baldwin, Fall Pippin, Twenty Ounce, Gravenstein, Dutchess, Maiden Blush, Pound Sweet, Roxbury Russet, and Ben Davis.

Prices of apples paid to producers in Newfane Township, Niagara County, were obtained from G. P. Scoville.

The jobbing prices of peaches in six-basket carriers at New York City were tabulated by J. S. Hathcock, of the United States Department of Agriculture, Bureau of Agricultural Economics.

The store prices of bananas (Jamaicas, 9's and 18's) were tabulated by G. P. Scoville.

Farm prices of White Danish cabbage at Little York, Cortland County, are those reported by E. G. Misner in *Farm Economics*, no. 16, page 150, July, 1924.

Farm prices of cabbage in Newfane Township, Niagara County, were tabulated by G. P. Scoville.

Wholesale prices of Danish cabbage at New York City are those reported by E. G. Misner in *The Marketing of Cabbage*, Cornell University Agricultural Experiment Station, Bulletin 443, page 113, October, 1925, and in *Farm Economics*, no. 16, page 152, July, 1924.

Farm prices of corn at Columbus, Nebraska, are those reported by H. C. Filley and E. A. Frerichs in *Purchasing Power of Nebraska Grains*, Nebraska Agricultural Experiment Station, Bulletin 187, page 14, March, 1923.

Wholesale and future prices of No. 2 cash corn at Chicago were tabulated from the annual reports of the Chicago Board of Trade.

Wholesale prices of No. 2 western mixed corn at New York City were tabulated from the annual statistical reports of the New York Produce Exchange.

Spot prices of mixed American corn, per bushel of 60 pounds, at Liverpool from 1893 to 1911, inclusive, were prepared by Dr. O. C. Stine, of the United States Department of Agriculture, Department of Agricultural Economics, Division of Statistics and Historical Research.

Retail prices of cornmeal in the United States and in New York City are those published by the United States Bureau of Labor Statistics.

Liverpool spot prices of red wheat were taken from *Wheat and Rye Statistics*, United States Department of Agriculture, Statistical Bulletin 12, page 84, January, 1926.

Minneapolis wholesale prices of No. 1 northern spring wheat were compiled by J. E. Boyle.

Kansas City prices of No. 2 best yellow hard winter wheat were compiled by the Department of Agricultural Economics, Kansas State College of Agriculture. Cited by V. P. Timoshenko in *Wheat Prices and the World Wheat Market*, 1927 (unpublished manuscript).

Wholesale prices of wheat at Saratov, Russia, were taken from *Свод Товарных цен на русских и иностранных рынках*, published by the Department of Commerce and Manufacture in Russia, cited by V. P. Timoshenko in *Wheat Prices and the World Wheat Market*, 1927 (unpublished manuscript).

Wholesale prices of wheat at Odessa, Russia, were taken from D. M. Rubinow, *Russian Wheat and Flour in European Markets*, United States Department of Agriculture, Bureau of Statistics, Bulletin 66; and for 1903 to 1914 from *Vierteljahrshäfte zur Statistik des deutschen Reichs*, volumes 14, 19, 22, and 23. Cited by V. P. Timoshenko in *Wheat Prices and the World Wheat Market*, 1927 (unpublished manuscript).

Contract prices of wheat at Berlin and at Paris were tabulated from *Vierteljahrshäfte zur Statistik des deutschen Reichs*, volumes 4, 9, 14, 19, 20, and 25.

The homestead entries in the prairie provinces of Canada were taken from *Wheat Studies of the Food Institute*, volume 1, no. 8, page 279, July, 1925.

The production of the six starch crops was taken from G. F. Warren, *Prices of Farm Products in the United States*, United States Department of Agriculture, Bulletin 990, page 6, August, 1921.

Wholesale prices of 1200-1500-pound steers at Chicago are those reported by the *Drover's Journal Yearbook of Figures*.

Retail prices of round steak in the United States are those published by the United States Bureau of Labor Statistics.

Sale prices of purebred Shorthorn cattle were tabulated by J. H. Knox, of the Illinois Agricultural Experiment Station.

Top prices of cattle, country hides, and packer hides at Chicago were tabulated from the *Drover's Journal Yearbook of Figures*.

Wholesale prices of hogs packed in the West were taken from S. Wright, *Corn and Hog Correlations*, United States Department of Agriculture, Department Bulletin 1300, page 11, January, 1925.

Wholesale prices of heavy hogs at Chicago were tabulated from the *Drover's Journal Yearbook of Figures*.

The retail prices of lard, pork chops, ham, and bacon are those published by the United States Bureau of Labor Statistics.

The receipts of horses were taken from *Horses, Mules, and Motor Vehicles*, United States Department of Agriculture, Statistical Bulletin 5, pages 14-18, January, 1925.

The Vermont sale price and the Nebraska purchase price of horses from 1903 to 1914 were taken from a study made by C. E. Ladd and reported in *Farm Economics*, no. 43, page 642, March, 1927.

Wholesale prices of pig lead at New York, and factory prices of sheet zinc, were taken from *Wholesale Prices, 1890-1923*, United States Bureau of Labor Statistics, Bulletin 367, pages 144 and 146, January, 1925; and from *Wholesale Prices, Wages, and Transportation*, reports by Mr. Aldrich, from the Committee on Finance, Senate Report 1394, 52d Congress, 2d Session, Part II, pages 192 and 219, March, 1893.

Wholesale prices of American medium salt per barrel at Chicago were tabulated from *Wholesale Prices, 1890-1923*, United States Bureau of Labor Statistics, Bulletin 367, page 88, January, 1925.

The prices of phosphate rock per long ton, f. o. b. mines, Florida, and the production of phosphate rock in Florida, were taken from E. E. Vail, *Prices of Fertilizer Materials, and Factors Affecting the Fertilizer Tonnage, 1927* (unpublished manuscript).

The prices of No. 1 foundry pig iron were tabulated from the *Statistical Abstract of the United States* for 1923, page 842, 1924.

The production of lead, salt, pig iron, and zinc was taken from the *Statistical Abstract of the United States* for 1923, pages 829-831, 1924.

The index of physical volume of manufacture and mining was taken from E. E. Day, *The Review of Economic Statistics*, volume 2, pages 298 and 305, 1920.

The index numbers of the prices of metals and metal products, of the prices of twenty-seven raw commodities, and of the prices of seventy manufactured commodities, were taken from *Wholesale Prices, 1890-1923*, United States Bureau of Labor Statistics, Bulletin 367, pages 8 and 25, 1925.

#### METHODS OF CALCULATION

Since an infinitely small supply would sell for an indefinitely high price at producers', wholesalers', and retailers' prices, supply-price curves all meet when the supply is very small. In all cases, the price declines as the supply increases. Retail prices approach a fixed quantity above the zero price. The fixed quantity represents the charges for moving the product from producers to consumers. The price of cooked foods in restaurants is so largely made up of these factors that it approximates a fixed price. Wholesale prices include less of the fixed charges and hence approach more nearly to a zero price, when the quantity is large. In most cases, prices to producers in surplus areas approach zero when the supply is large, but may approach a small fixed amount above zero if there is an alternative use on the farm, or if the cost to the farmers of marketing after the product is grown is a considerable item.

The writers tried different equations for calculating curves to fit supply-price data. Most of these equations, as well as most of the equations used by other writers, fail to agree with the known principles. A correct equation must express the facts that an infinitely small supply will sell at an indefinitely high price, and that an infinitely large supply will approach a fixed quantity above a zero price.

The writers presented these facts to Professor W. A. Hurwitz, who suggested that one of the best equations to comply with the facts is:

$$Y = \frac{B}{X^a} + C$$

In this equation,  $C$  is the fixed price at which a large supply would sell.<sup>18</sup> If the range in supply is relatively small, the portion of the curve actually used is little changed if  $C$  is omitted. For the United States retail price of potatoes from 1917-18 to 1925-26, when  $C$  is considered as zero the equation is as follows:

$$\log Y = 6.4016902 - 2.2008 \log x$$

For the five years 1910 to 1914, the spread between the United States farm price and the United States retail price was 39 per cent of the retail price. Apparently, if there had been an infinite supply on farms which was given away, the retail price would have been 39 per cent of the actual average retail price.<sup>19</sup>

<sup>18</sup> The following other equations were tried:

$$\begin{aligned} y &= ax + b \\ y &= ax^2 + bx + c \\ y &= ax^3 + bx^2 + cx + d \\ \frac{1}{y} &= ax^2 + bx + c \\ \frac{x}{y} &= ax^2 + bx + c \\ y &= ab^x \\ y &= ab(x - c) \\ y &= x^a c(x - 1) \end{aligned}$$

None of these equations conforms to the principles of supply-price relationships. They were therefore discarded even in cases when one of them gave the appearance of a good mathematical fit.

<sup>19</sup> The retail price would have been somewhat higher than this, since the spread widens as the price drops.

Inserting this constant, the equation becomes:

$$\log(Y - 39) = 8.6935266 - 3.4542 \log x$$

With a crop 20 per cent below normal, the price would be expected to be 63 per cent above normal; but if the constant had been omitted, the answer would have been 71 per cent above normal. The error increases with larger crops.

For farm prices, relatively little error results if  $C$  is called zero, and in any event there is little error with crops that fall within the usual range of production.

The methods used in calculating the supply-price curves are given in tables 130 and 131.

The United States production of corn, which is given in table 130, was expressed as per cent of the average for the preceding five years. In 1874, the United States corn crop was estimated at 850,000,000 bushels. The average production for the preceding five years was 907,000,000 bushels. The corn crop of 1874 was, therefore, 85 per cent of the production of the five preceding years. During the disastrous year of 1901, the United States corn production was only 1,614,000,000 bushels; the average for the five preceding years was 2,374,000,000 bushels. This short crop of 1901 was therefore only 68 per cent of normal.

The United States December 1 farm prices of corn from 1869 to 1913, inclusive, are given in table 130. These prices were converted to an index number by dividing the farm price for each year by the average price for 1910-14, 58.4 cents. Owing to the fact that there was a general decline in prices from 1869 to 1896, and a gradual rise thereafter, the index numbers of the price of corn were divided by the wholesale-price index of all commodities as published by the United States Bureau of Labor Statistics. The result is called the purchasing power of the farm price of corn.

TABLE 130. METHOD OF CALCULATING THE RELATION OF THE UNITED STATES PRODUCTION OF CORN TO THE UNITED STATES DECEMBER 1 FARM PRICE, 1869-1913

Year	Production, <sup>a</sup> in millions of bushels	Average for five preceding years, in millions of bushels	Production in per cent of five-year average (x)	United States December 1 farm price <sup>a</sup> (cents)	Farm-price index (1910-14 = 100)	Wholesale-price index, United States Bureau of Labor Statistics (1910-14 = 100)	Purchasing power of the farm price of corn (1910-14 = 100)	Average for five preceding years	Purchasing power in per cent of five-year average (y)
1869	874	.....	.....	73.0	125	.....	.....	.....	.....
1870	1,094	.....	.....	54.8	94	119	79	.....	.....
1871	992	.....	.....	47.3	81	122	66	.....	.....
1872	1,093	.....	.....	39.5	68	121	56	.....	.....
1873	932	.....	.....	48.6	83	117	71	.....	.....
1874	850	997	85	65.4	112	112	100	.....	.....
1875	1,321	992	133	41.8	72	104	69	74	93
1876	1,284	1,038	124	36.7	63	97	65	72	90
1877	1,343	1,096	123	35.8	61	89	69	72	96
1878	1,388	1,146	121	31.7	54	85	64	75	85
1879	1,823	1,237	147	37.1	64	94	68	73	93
1880	1,717	1,432	120	39.6	68	93	73	67	109
1881	1,195	1,511	79	63.6	109	95	115	68	169
1882	1,617	1,493	108	48.5	83	93	89	78	114
1883	1,551	1,548	100	42.4	73	87	84	82	102
1884	1,796	1,581	114	35.7	61	82	74	86	86
1885	1,936	1,575	123	32.8	56	81	69	87	79
1886	1,665	1,619	103	36.6	63	81	78	86	91
1887	1,456	1,713	85	44.4	76	83	92	79	116
1888	1,988	1,681	118	34.1	58	83	70	79	89
1889	1,999	1,768	113	27.4	47	80	59	77	77
1890	1,460	1,809	81	50.0	86	83	104	74	141
1891	2,056	1,714	120	39.7	68	79	76	81	106
1892	1,714	1,792	96	38.8	66	80	83	82	101
1893	1,708	1,843	93	35.9	61	74	82	80	103
1894	1,340	1,787	75	45.1	77	69	112	83	138
1895	2,311	1,656	140	25.0	43	71	61	83	66
1896	2,503	1,826	137	21.3	36	70	51	85	60
1897	2,145	1,915	112	26.0	45	70	64	78	82
1898	2,261	2,001	113	28.4	49	71	69	74	93
1899	2,455	2,112	116	29.9	51	83	61	71	86
1900	2,505	2,335	107	35.1	60	81	74	81	121
1901	1,614	2,374	68	60.1	103	84	123	64	192
1902	2,619	2,196	119	40.1	69	90	77	78	99
1903	2,347	2,291	102	42.1	72	85	85	81	105
1904	2,529	2,308	110	43.7	75	89	84	84	100
1905	2,749	2,323	118	40.8	70	89	79	89	89
1906	2,898	2,372	122	39.3	67	94	71	90	79
1907	2,512	2,628	96	50.9	87	92	95	79	120
1908	2,545	2,607	98	60.0	103	95	108	83	130
1909	2,672	2,647	97	58.6	100	105	95	87	109
1910	2,886	2,655	109	48.0	82	97	85	90	94
1911	2,631	2,683	94	61.8	106	95	112	81	123
1912	3,125	2,609	120	48.7	83	102	81	99	82
1913	2,447	2,732	90	69.1	118	100	118	86	123

<sup>a</sup> U. S. Dept. Agr., Yearbook 1923, p. 662. Prices prior to 1879 are currency prices. 1910-14 = 58.4 cents.

In 1901 the United States corn crop was the shortest on record, being only 68 per cent of normal. In December of 1901, the United States farm price of corn was 60.1 cents. This was 103 per cent of the 1910-14 average, 58.4 cents. In December of 1901, the wholesale price index was 84. The purchasing power of the price of corn for that year was 123 ( $103 \div 84 \times 100 = 123$ ). The purchasing power of the price of corn in 1901 was 123; the average purchasing power for the five preceding years was 64. Therefore, the purchasing power of the 1901 crop, 123, was 192 per cent of the average purchasing power for the five preceding years.

The United States production of corn in per cent of the average of the five preceding years is denoted by  $x$ ; the United States farm price of corn in per cent of the average of the five preceding years is denoted by  $y$ .

The determination of the constants for the supply-price curve,

$$y = \frac{b}{x^a}$$

is simplified by expressing the equation in terms of logarithms:

$$\log y = \log b - a \log x$$

The constants are determined from the solution of the two normal equations:

$$\begin{aligned} -\sum (\log x)^2 (a) + \sum \log x (\log b) - \sum \log x \log y &= 0 \\ -\sum \log x (a) + n \log b - \sum \log y &= 0 \end{aligned}$$

It will be noted that it is necessary to find the logarithm of  $x$ ; the logarithm of  $y$ ; the product of the logarithm of  $x$  and the logarithm of  $y$ ; and the square of the logarithm of  $x$ .

The method of arranging the data in tabular form for the calculation of the constants for the supply-price curve is given in table 131.

The production of corn,  $x$ , for the thirty-nine years from 1875 to 1913 inclusive (table 131), was arranged according to the size of the crop, with the corresponding purchasing power of the price of corn for each year in per cent of the average for the five preceding years. A seven-place logarithm table was used to find the logarithms of  $x$  and  $y$ .

In 1901, the production,  $x$ , was only 68 per cent of normal, and the logarithm of the production was 1.8325089. In the same year, the price of corn,  $y$ , was 192 per cent of normal, and the logarithm of the price was 2.2833012.

TABLE 131. METHOD OF CALCULATING THE RELATION OF THE UNITED STATES PRODUCTION OF CORN TO THE DECEMBER 1 FARM PRICE, 1875-1913

Year	Production (table 130) $x$	Price (table 130) $y$	$\log x$	$\log y$	$(\log x)^2$	$\log x \log y$
1901.....	68	192	1.8325089	2.2833012	3.358088869	4.184169770
1894.....	75	135	1.8750613	2.1303338	3.515854879	3.994506464
1881.....	79	169	1.8976271	2.2278867	3.600988611	4.227698178
1890.....	81	141	1.9084850	2.1492191	3.642314995	4.101752414
1887.....	85	116	1.9204189	2.0644580	3.722657292	3.983204283
1913.....	90	123	1.9542125	2.0899051	3.819063749	4.084181367
1893.....	93	103	1.9684820	2.0128372	3.874924928	3.962235009
1911.....	94	123	1.9731279	2.0899051	3.893233710	4.123650061
1907.....	96	120	1.9822712	2.0791812	3.929399110	4.121501012
1892.....	96	101	1.9822712	2.0043214	3.929399110	3.973108587
1909.....	97	107	1.9867717	2.0374265	3.947261788	4.047901311
1908.....	98	130	1.9912261	2.1139434	3.964981381	4.209339272
1883.....	100	102	2.0000000	2.0086002	4.000000000	4.017200400
1903.....	102	105	2.0086002	2.0211803	4.034474763	4.059761232
1886.....	103	91	2.0128372	1.9590414	4.051513504	3.943231406
1906.....	107	121	2.0293838	2.0827851	4.118308608	4.226770950
1882.....	108	114	2.0334438	2.0509049	4.134812450	4.182559378
1910.....	109	94	2.0374295	1.9731279	4.151106743	4.020103071
1904.....	110	100	2.04113927	2.0000000	4.167284156	4.082785400
1897.....	112	82	2.0492180	1.9138139	4.199294412	3.921821893
1880.....	113	77	2.0530784	1.8864907	4.215139917	3.873113308
1898.....	113	93	2.0530784	1.9684820	4.215139917	4.014497243
1884.....	114	86	2.0569049	1.9344985	4.230857768	3.979070444
1899.....	116	86	2.0644580	1.9344985	4.261986834	3.993009904
1888.....	118	89	2.0718820	1.9493990	4.292695022	4.038906052
1905.....	118	89	2.0718820	1.9493990	4.292695022	4.038906052
1902.....	119	99	2.0755470	1.9950352	4.307895319	4.142044652
1891.....	120	106	2.0791812	2.0253059	4.322094462	4.210977952
1880.....	120	109	2.0791812	2.0374265	4.322094462	4.236178875
1912.....	120	82	2.0791812	1.9138139	4.322094462	3.979165881
1878.....	121	85	2.0827854	1.9294189	4.337995022	4.018565515
1906.....	122	79	2.0863598	1.8976271	4.352897215	3.959132897
1885.....	123	79	2.0860051	1.8976271	4.367794327	3.965860554
1877.....	123	96	2.0899051	1.9822712	4.367794327	4.147586900
1876.....	124	90	2.0934217	1.9542125	4.382414414	4.091053657
1875.....	133	93	2.1238516	1.9684820	4.510745619	4.180765557
1896.....	137	60	2.1367206	1.7781513	4.565574922	3.799412513
1895.....	140	66	2.1461280	1.8195439	4.605865392	3.904974111
1879.....	147	93	2.1673173	1.9684820	4.697264279	4.266327044
Total.....	.....	.....	79.1945458	78.0889616	161.028591780	158.329835430

The square of the logarithm of the production was  $(1.8325089)^2$ , or 3.358088866. The product of the logarithm of the price and the logarithm of the production was  $(1.8325089)(2.2833012)$ , or 4.184169770. The production and the price for each year were treated in the same manner.

The constants,  $a$  and  $b$ , in the equation

$$y = \frac{b}{x^a}$$

are determined by substituting the values given in table 131 in the two normal equations:

$$-161.0285918a + 79.1945458 \log b - 158.3298354 = 0 \quad (1)$$

$$-79.1945458a + 39.0 \log b - 78.0889616 = 0 \quad (2)$$

Dividing by the coefficients of  $\log b$ :

$$-2.0333203a + \log b - 1.9992518 = 0 \quad (1)$$

$$-2.0306294a + \log b - 2.0022811 = 0 \quad (2)$$

Subtracting (2) from (1):

$$-0.0026999a = -0.0030293$$

$$a = 1.1220045$$

Substituting  $a$  in (2):

$$-2.2783753 + \log b - 2.0022811 = 0$$

$$\log b = 4.2806564$$

Substituting the values in the original equations:

$$\log y = 4.2806564 - 1.1220045 \log x$$

$$y = \frac{19083.43}{x^{1.1220}}$$

The normal price,  $y$ , for any size of crop,  $x$ , may be obtained by substituting the proper values in the above equation as follows:

$$\text{When } x = 100, \log y = 4.2806564 - 1.1220045(2.0)$$

$$= 4.2806564 - 2.2440090$$

$$= 2.0366474$$

$$y = 108.80$$

$$x = 70, y = 162.3$$

$$x = 80, y = 139.8$$

$$x = 90, y = 122.5$$

$$x = 100, y = 108.8$$

$$x = 110, y = 97.8$$

$$x = 120, y = 88.7$$

$$x = 130, y = 81.1$$

$$x = 140, y = 74.0$$

The fact that  $y = 108.8$  when  $x = 100$  is due primarily to the tendency for the price of corn to rise in purchasing power. It may be due in part to other causes. Since it is desired to determine the effect of the one factor, supply, on price, the equation is adjusted so that  $y = 100$  when  $x = 100$ . If one wishes to forecast the price of corn he would use the equation before making the adjustment, as this combines the effect of supply and other factors.

To make the adjustment,

$$\text{Let } y' = \frac{y}{1.088}$$

Divide the equation by 1.088:

$$y' = \frac{19083.43}{1.088; x^{1.1220}}$$

$$\log y' = 4.2806564 - 0.0366474 - 1.1220045 \log x$$

$$\log y' = 4.2440090 - 1.1220045 \log x$$

When the corn crop was 60 per cent of normal the equation becomes:

$$\log y' = 4.2440090 - 1.1220045 \log x$$

$$= 4.2440090 - 1.1220045(1.7781513)$$

$$y' = 177.1$$

In order to plot the individual years so that they agree with the revised equation, it is necessary to divide the price,  $y$ , by 1.088. For example, the price of corn according to the original data in 1913 was 123. To agree with the revised equation, it should be 113. The data for each year in figure 29 (page 36) were calculated in this manner.

The revised equation and the revised yearly prices merely move the dots and the supply-curve vertically, up or down on the chart, and do not affect the shape of the curve or the relation between supply and price.

The figures published in table 129 (pages 106 to 114) extend only far enough to include all of the actual data. For example, the shortest corn crop was 68 per cent of normal and the largest was 147 per cent of normal.

For all crops, the calculations were made by comparing production and prices for each year with the average of the preceding five years as normal. Calculations were also made for corn using a straight-line secular trend as normal. The differences in the curves calculated by the two methods are indicated by the following: When the United States corn crop was 20 per cent below normal, United States farm prices would be expected to be 1.8 per cent of normal if the five-year moving average were used. If the straight line were used they would be 1.26 per cent of normal.

The correlations between production and prices were:

$$\text{Five-year-moving-average method, } r = -0.839 \pm 0.032$$

$$\text{Straight-line method, } r = -0.757 \pm 0.046$$

The correlation by the five-year-moving-average method indicates that the curve fits the data more closely than does the curve calculated by the straight-line method. The difference in the correlation is  $0.082 \pm 0.056$ . Apparently, the five-year moving average is as good as or better than the straight-line method.

The average changes in prices caused by a change of 1 per cent in production were as follows:

$$\text{Five-year-moving-average method, } 1.122 \pm 0.044$$

$$\text{Straight-line method, } 1.035 \pm 0.052$$

The five-year-moving-average curve is slightly more flexible but the difference is not significant.

## OTHER WORK ON THIS SUBJECT

The effect of varying production on prices, and the elasticity of demand, have been subjects of discussion for many years. Until recently, the discussions have been largely qualitative rather than quantitative.

In the seventeenth century, Gregory King estimated the effect of size of wheat crop on price. The following quotation gives the Gregory King Law (1):<sup>20</sup>

"We take it, that a defect in the harvest may raise the price of corn in the following proportions:

Defect	Above the common rate
1 tenth } 2 tenths } 3 tenths } 4 tenths } 5 tenths }	{ Raises the price }
	{ 3 tenths 8 tenths 16 tenths 28 tenths 45 tenths }

so that when corn rises to treble the common rate, it may be presumed that we want above  $1/3$ 'd of the common produce; and if we should want  $5/10$ ths, or half the common produce, the price would rise to near five times the common rates."

Most of the theoretical discussions of the changes in production and price are based on the assumption that the average price of all commodities does not change. Necessaries of life cannot advance indefinitely without prices of other commodities falling. Buck (2) pointed out that during a famine in China, food prices rise rapidly, whereas plows, farm implements, and carts decline in price.

Economic literature contains voluminous discussions of supply and demand. Even as late as 1901, Edgeworth (3) stated: "It may be doubted whether Jevon's hope of constructing demand curves by statistics is capable of realization."

One of the earliest students working on the statistical aspect of this subject was Lehfeldt (4). After studying the relation between the price of English imported wheat and the world wheat crop for the period from 1888 to 1911, he found the coefficient of elasticity to be 0.8.

In 1913, Warren (5) pointed out the relation between yield per acre of corn, cotton, and potatoes, and value per acre.

Moore (6) studied the relation between the United States farm prices and production of corn, hay, oats, and potatoes.

Moore (7) in 1917 developed the dynamic law of demand for cotton as a linear relationship between the production and the price of cotton; and in 1919 (8) developed the concept of coefficient of flexibility of prices and an empirical law of demand for cotton.

Scoville studied the linear relationship between size of crop and price of potatoes (9) and size of crop and price of hay (10).

Murray (11) pointed out that it was difficult to measure the effect of local supply and of general supply on the local price. He was inclined to think that local conditions were underestimated and that general conditions were exaggerated.

In 1922, Moore (12) developed a typical equation for the law of elasticity of demand, and Working (13) developed a supply-price curve for potatoes.

Waugh (14) has pointed out that as the production of Giant and Cobbler potatoes decreases from normal, the price tends to increase faster than it is decreased by a corresponding increase in production.

During 1924, Scoville expressed the supply-curve for cabbage (15) as  $y = \frac{462}{x-12}$ , and pointed

out that a crop of apples (16) 50 per cent above normal depressed the price on the average 29 per cent, whereas a crop 50 per cent below normal increased the price 44 per cent.

Hedden (17) studied the relation between supply and price of watermelons, and pointed out that an increase or decrease of ten cars in the supply of watermelons at the New York market is accompanied by a decrease or increase of 8 per cent in the price.

Wallace (18) has stated that a corn crop 20 per cent below normal was accompanied by a price 30 per cent above normal, whereas a crop 10 per cent above normal was accompanied by a price about 8 per cent below normal.

In 1924, Schultz (19) studied the price of native beef cattle at Chicago and quantity of beef slaughtered under federal inspection, and found that the demand for beef is highly elastic.

Murray (20) has pointed out that in short-crop years the percentage increase in the December price of corn over the preceding December price has been apparently twice the percentage decrease of the size of the crop as compared with the preceding crop.

Moore (21) has pointed out that the correlation of the data for the law of demand for potatoes is  $r = -0.95$ ; the corresponding correlation for the law of supply is  $r = +0.80$ .

Ross (22) has shown that increasing the price of milk in the Chicago district tends to cut consumption slightly, while decreases in price stimulate consumption to an even slighter degree.

Brown (23) borrowed mathematical reasoning from the insurance field as it was used to develop a mathematical expression for the law of mortality, in order to develop the law of demand.

In 1925, Working (24) pointed out that when the production of potatoes is 20 per cent above normal, the price will probably be 29 per cent below normal; and that with a crop 20 per cent below normal, the price will be 70 per cent above normal.

Killough (25) states that the addition of 50,000,000 bushels of oats to a 1,400,000,000-bushel crop may lower the price per bushel less than the addition of the same amount to a crop of 800,000,000 bushels.

Ezekiel (26) showed that when the value of flax per acre was greater than the value of spring wheat, there was an increase in the acreage of flax the following year. Conversely, if flax was lower than wheat the acreage of flax declined the following year.

Working (27) pointed out that the demand-curve of potato prices at Cincinnati did not show the same elasticity as at St. Paul.

Schultz (28) pointed out that an increase of 1 per cent in the price of sugar is associated with a decrease of only 0.5 per cent in the relative consumption of sugar.

In 1926, Hedden (29) showed that an increase of 1 per cent in cars of Imperial Valley cantaloupes, shipped, caused a decline of 0.6 per cent in the price of a crate.

<sup>20</sup> The citations to which parenthetical numbers refer are listed on pages 124 and 125.



Smith (30), after studying the price of spot cotton at New Orleans and the supply of cotton, found that the curve representing the net relation between supply and price showed greater total value for small crops than for large.

Bloxom (31) fitted the hyperbolic curve,  $y = ax^{-b}$ , to the United States production of apples and the farm prices of apples for the fifteen years 1910 to 1924. The study shows that 76.5 per cent of the variation in apple prices is due to apple production, and 17.5 per cent to pear production; and that 56 per cent of the variation in the price of Washington apples is due to the total production of boxed-apple-growing States.

Bosland (32) reports a linear relationship between wheat prices and the world production plus carry-over.

McLeod (33) showed that in 1924, when the receipts of watermelons in New York City averaged 25 cars, a car of Tom Watson watermelons was worth about \$700 per car; when receipts averaged 150 cars, watermelons were worth only \$250 per car.

McLeod (34) used the hyperbolic curve,  $y = ax^{-b}$ , in studying the prices of watermelons, cantaloupes, and peaches at New York, Boston, and Philadelphia.

Holland (35) used a double logarithmic curve,  $\log y = \log a - b \log x$ , and found that a decrease of 10 per cent in the production of peaches in the United States is associated with an increase of 9.4 per cent in the farm price. Using the same type of curve, he found that a 10-per-cent decrease in the car-lot supply of commercial peaches at New York City during 1924 increased the price of Elberta peaches 5 per cent per crate.

Holland (36) reported that when the United States peach crop averaged 35,000,000 bushels, the farm price of peaches was about \$1.50 per bushel, whereas a crop of 60,000,000 bushels sold for about 90 cents per bushel.

The United States Department of Agriculture (37) pointed out that there has been a considerable change in the supply-price relationships of potatoes. During recent years, large crops depress the price more than they did before the war. The conclusion was that this is owing to changes in demand.

Studies of the Bureau of Agricultural Economics of the United States Department of Agriculture (38) indicate that during the period from 1920 to 1925, when cotton fell below 20 cents, there was only a small increase in consumption, and that even with high prices there was a carry-over of 3,000,000 bales of cotton. When prices drop below 20 cents, the carry-over demand becomes very large; and at 15 cents the quantity held over for the next season becomes almost as large as the quantity consumed.

Ilaas and Ezekiel (39), after studying various factors affecting the price of hogs, concluded that for an increase of 1 per cent in supply, the price decreases 0.62 per cent. The actual coefficient of elasticity is 1.61; that is, the change in quantity is at the rate of 1.61 times the rate of change in price.

Warren and Pearson (40) pointed out that farm price is retail price less all charges of collecting, transporting, and distributing the product, and that when prices fall materially, farm prices fall much more violently. They published a series of supply-price relationships.

In 1926 the Division of Agricultural Economics of the University of Minnesota (41) pointed out that the changing relationship between short crops of potatoes, and price, may indicate that incomes of consumers in general have become such that they will not curtail consumption of potatoes materially until prices rise to \$3 or \$4 per hundredweight.

Warren and Pearson (42) pointed out that consumers' prices of most farm products usually fluctuate sufficiently to allow of disposal of the total supply. However, a small reduction in retail prices causes a large reduction in farm prices.

Scoville (43) has shown that following years of high prices of cabbage, farmers set more plants. Conversely, following years of low prices, farmers set fewer cabbage plants.

In 1927, Ezekiel (44) showed that a 1-per-cent increase in lamb prices when prices were about average, resulted in about 1.5 per cent decrease in consumption. When prices were either very high or very low, a 1-per-cent increase in price reduced consumption nearly 4 per cent. When prices of lamb ranged from 20 to 28 cents per pound, the demand was only moderately elastic; when prices advanced above 28 cents, demand became much more elastic.

Schultz (45) has pointed out that an increase of 1 per cent in the price of sugar will cause an increase of from 0.6 to 0.8 per cent in the quantity of non-dutiable sugar.

The United States Department of Agriculture (46) studied the relation of the price of flax to the combined production of the United States, Canada, and Argentina. Flax prices were deflated by the wholesale price of building materials. Two demand curves were determined, the general-demand curve and the low-demand curve.

Kantor (47) has shown that on selected days when there was a large supply of peaches on the New York market, handling charges absorbed a much larger part of the price of Elberta peaches than when the supply was small.

Rauchenstein (48), after studying prices of Imperial Valley cantaloupes for the period from 1920 to 1925, concluded that a high purchasing power of cantaloupes was followed by increased acreage. Conversely, decreased acreages followed low prices.

Daggit (49) studied the relation of the total peach production to the United States farm price, and the relation of the production of peaches in the South to the Georgia farm price.

After studying the relation of flaxseed production to the price of No. 1 Minnesota flaxseed, Daggit (50) concluded that when prices fall to a certain level there is a tendency for them to become stable.

Bean (51) has shown that the supply of farm labor affects wages in very much the same way that the supply of commodities affects prices.

Tolley (52) has shown that a 25-per-cent increase in the slaughter of hogs lowers prices about 15 per cent.

Daggit (53) has pointed out that a large crop of potatoes is worth less than a small crop.

Ezekiel (54) has shown that the average elasticity in the price of beef, based on the amount of beef and veal slaughtered, is 1.97.

Working (55) has shown that when a wheat crop, available or in prospect, is 10 per cent above normal, the two limiting consumption-demand curves indicate that, if the wheat is to be consumed, prices must be between 70 and 78 per cent of normal.

Elliott (56) found that corn prices as well as hog prices had to be considered in a study of the elasticity of supply of hogs.

Warren and Pearson (57) have pointed out that it costs more to get a cheap bushel to the consumer than to get a high-priced bushel through; that is, more is deducted from a low retail price to get the farm price than is deducted from a higher retail price.

Schultz (58), in discussing the theoretical considerations relating to supply, develops the concept of the elasticity of supply, and states that in a closed economy the elasticity of supply tends to be numerically equal to the elasticity of demand.

Warren and Pearson (59) have shown that August jobbing prices of peaches are largely determined by New Jersey production, whereas the September jobbing price is largely influenced by the New Jersey and New York production.

Warren and Pearson (60) have shown that apples fluctuate more with changes in supply than do prices of bananas.

Smith (61) states that the price of cotton changes in an inverse direction, approximately 1.6 times as fast as the crop. The acreage of cotton is closely associated with prices of cotton in the preceding and second preceding years.

Warren and Pearson (62) have shown that the cost of distributing food in 1927 was 91 per cent above that in the five pre-war years.

Ross (63) has shown that a 1-cent change in the price of milk has little effect on the retail sales in the New York metropolitan area.

### SUPPLY-PRICE CURVES

In figure 88, curve no. 1,  $y = \frac{b}{x^a} + c$ , is the curve used by the writers (40), (42), (57), (60) (see discussion on page 116). Hedden (17), (29), Bloxom (31), McLeod (33), (34), Holland (35), (36), Haas and Ezekiel (39), Ezekiel (44), (54), and Rauchenstein (48), used the same curve but did not include the constant,  $c$ .

Curve no. 2,  $y = ax + b$ , was used by Moore (6), (7), (21), Scoville (9), (10), and Schultz (28). The writers have found practically no cases in which a straight line fits the actual data.

Curve no. 3,  $y = \frac{1}{ax + b}$ , was used by Working (13), (24), (27), (41), Waugh (14), and Killough (25). When the crop is infinitely large, the price is zero; when the crop is infinitely small, the price is  $\frac{1}{b}$ . The curve also has negative values. Within the sizes of the corn crop that have actually occurred, it is practically the same as no. 1.

Curve no. 4,  $y = x^a e^{\beta(x-1)}$ , was used by Moore (12), Schultz (19), (28), and Killough (25). A very large crop would be worth a zero price. A very small crop is worth nothing. The curve is different in shape from no. 1, and much steeper. It does not comply with the principle of supply-price relationships. For example, a corn crop 40 per cent above normal would result in two-thirds the normal price. According to curve no. 1, such a crop would sell for one-half the normal price. Such crops have occurred only twice in the last fifty-one years, and in no case has the price been depressed as much as this curve would indicate. The curve underestimates the effect of a small crop on price, and also overestimates the effect of a large crop on price. A crop 20 per cent below normal would be expected to sell for 72 per cent above the normal price, instead of 57 per cent above as indicated by curve no. 1.

Curve no. 5,  $y = ax^3 + bx^2 + cx + d$ , was used by Moore (8). This curve crosses both the  $x$  and the  $y$  axis, and is inaccurate within the large or small crops that actually have occurred.

Curve no. 6,  $y = ab^x$ , was used by Moore (21). A very large crop would sell for a zero price. The curve crosses the  $y$  axis.

Curve no. 7,  $y = \frac{a}{x} + c$ , was used by Scoville (15). The price of a very small crop would vary with the relative values of  $a$ ,  $b$ , and  $c$ . A very large crop would sell for a constant price,  $c$ . The curve is too straight for the data, and is incorrect for small crops.

Hedden (17) tried the same curve with  $b$  as zero.

Curve no.	Formula	y axis	x axis
1.	$y = \frac{b}{x^a} + c$	Approaches as a limit.	Approaches $c$ as a limit
2.	$y = ax + b$	Crosses.	Crosses
3.	$y = \frac{1}{ax + b}$	Approaches $\frac{1}{a}$ as a limit.	Approaches as a limit
4.	$y = x^a e^{\beta(x-1)}$	$x = 0, y = 0$	Approaches as a limit
5.	$y = ax^3 + bx^2 + cx + d$	Crosses.	Crosses
6.	$y = ab^x$	Crosses.	Approaches as a limit
7.	$y = \frac{a}{x} + c$	Approaches $b$ as a limit.	Approaches $c$ as a limit
8.	$\frac{x}{y} = ax^2 + bx + c$	$x = 0, y = 0$	Approaches as a limit
9.	$\frac{1}{y} = ax^2 + bx + c$	Crosses.	Approaches as a limit
10.	$y = ax^2 + bx + c$	Crosses	
11.	$y = a - \log x + b \log^2 x$	Approaches as a limit.	Crosses
12.	$y = ax^{bcx}$	$x = 0, y = 0$	Approaches as a limit

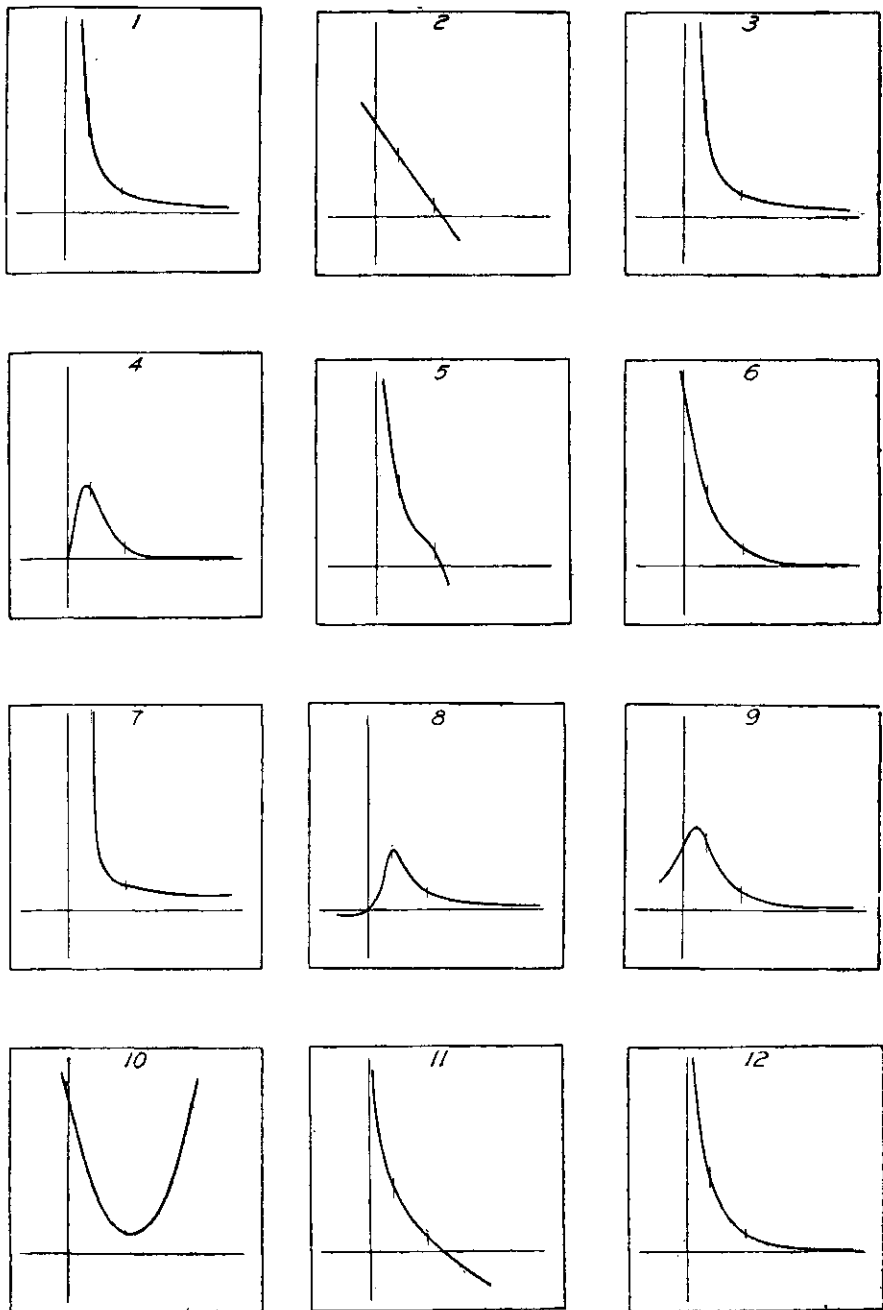


FIGURE 88. RELATION OF THE UNITED STATES PRODUCTION OF CORN TO THE UNITED STATES DECEMBER 1 FARM PRICE, 1875-1913, CALCULATED BY VARIOUS FORMULAS

The part of the curve between the marked points shows the limits of production that have actually occurred. Only the first curve is theoretically correct. Some of the other curves approximate this curve for the part included with the size of crops that have occurred

1. D'Avenant, C. Political and commercial works, 2: 224. 1771.
2. Buck, J. L. Price changes in China. Amer. Statist. Assn. Journ. 2<sup>13</sup>: 77. June, 1925.
3. Edgeworth, F. Y. Demand curves. Dictionary of political economy (Edited by R. H. I. Palgrave), 1: 544. 1901.
4. Leffeldt, R. A. The elasticity of demand for wheat. Econ. Journ. 24: 212-217. June, 1914.
5. Warren, G. F. Farm management, p. 78. 1913.
6. Moore, H. L. Economic cycles: their law and cause, p. 72. 1914.
7. Moore, H. L. Forecasting the yield and the price of cotton, p. 143. 1917.
8. Moore, H. L. Empirical laws of demand and supply and the flexibility of prices. Polit. sci. quart. 34<sup>1</sup>: 546-567. December, 1919.
9. Scoville, G. P. Per cent of the expected potato crop correlated with purchasing power of the price of potatoes for each of the past fifty-four years. Cornell Univ., Dept. Farm Mgt. (Mimeo.) 1919.
10. Scoville, G. P. Hay production in the North Atlantic States and the New York City prices. Cornell Univ., Dept. Farm Mgt. (Mimeo.) 1920.
11. Murray, Nat. C. The trend of prices. Journ. farm econ. 3<sup>2</sup>: 73. April, 1921.
12. Moore, H. L. The elasticity of demand and flexibility of prices. Amer. Statist. Assn. Journ. 23(N. S.)<sup>117</sup>: 8-19. March, 1922.
13. Working, H. Factors determining the price of potatoes in St. Paul and Minneapolis. Minnesota Agr. Exp. Sta. Tech. bul. 10: 16. October, 1922.
14. Waugh, F. V. Factors influencing the price of New Jersey potatoes on the New York market. New Jersey Dept. Agr. Circ. 66: 9. July, 1923.
15. Scoville, G. P. Cabbage production and price. Cornell Univ., Dept. Farm Mgt. (Mimeo. 1528.) 1924.
16. Scoville, G. P. Apple prices and production. Cornell Univ., Dept. Farm Mgt. (Mimeo. 2273.) 1924.
17. Hedden, W. P. Measuring the melon market. U. S. Dept. Agr. and Port of New York Authority, p. 9. (Mimeo.) August, 1924.
18. Wallace, H. A. Forecasting corn and hog prices. In Persons, W. N., and others, The problems of business forecasting, p. 240. 1924.
19. Schultz, H. The statistical measurement of the elasticity of demand for beef. Journ. farm econ. 6<sup>2</sup>: 278. July, 1924.
20. Murray, N. C. The corn situation. The agricultural situation, 6<sup>2</sup>: 19. November, 1924.
21. Moore, H. L. A moving equilibrium of demand and supply. Quart. Journ. econ. 39: 368. May, 1925.
22. Ross, H. A. The marketing of milk in the Chicago dairy district. Univ. Illinois Agr. Exp. Sta. Bul. 269: 510. June, 1925.
23. Brown, T. H. The law of demand and the theory of probability. Amer. Statist. Assn. Journ. 20(N. S.)<sup>150</sup>: 223-230. June, 1925.
24. Working, H. Factors affecting the price of Minnesota potatoes. Minnesota Agr. Exp. Sta. Tech. bul. 20: 13. October, 1925.
25. Killough, H. B. The price of oats. U. S. Agr. Dept. Dept. bul. 1351: 8-9. September, 1925.
26. Ezekiel, M. Flaxseed acreages and values for twenty years. U. S. Agr. Dept. Crops and markets, 2<sup>1</sup>: 117. April, 1925.
27. Working, H. The statistical determination of demand curves. Quart. Journ. econ. 39: 513. August, 1925.
28. Schultz, H. The statistical law of demand. Journ. polit. econ. 33<sup>5-6</sup>: 628. October, December, 1925.
29. Hedden, W. P. Studies of market supplies, price, and sales as a basis for control of distribution of perishables. Journ. farm econ. 8<sup>2</sup>: 220. April, 1926.
30. Smith, B. B. The adjustment of agricultural production to demand. Journ. farm econ. 8<sup>2</sup>: 151. April, 1926.
31. Bloom, J. Some determining factors in apple prices. New York Food Marketing Research Council. Food marketing studies, 1: sec. 2: 8, 12, 24. 1926.
32. Bosland, C. C. Forecasting the price of wheat. Amer. Statist. Assn. Journ. 21(N. S.)<sup>101</sup>: 150. June, 1926.
33. McLeod, A. S. Inter-market distribution of perishable fruits and vegetables. New York Food Marketing Research Council. Food marketing studies, 1: 13, chart 1. 1926.
34. McLeod, A. S. Inter-market distribution of perishable fruits and vegetables. New York Food Marketing Research Council. Food marketing studies, 1: 5. 1926.
35. Holland, H. H. The demand for peaches in metropolitan New York. New York Food Marketing Research Council. Food marketing studies, 3: 18, 20. 1926.
36. Holland, H. H. The demand for peaches in metropolitan New York. New York Food Marketing Research Council. Food marketing studies, 3: 18, chart 6. 1926.
37. Effect of the supply of potatoes on farm prices and crop values. U. S. Agr. Dept. Crops and markets, 3<sup>10</sup>: 325. October, 1926.
38. World cotton situation. U. S. Agr. Dept. Foreign crops and markets, 13<sup>10</sup>: 625-630. November 8, 1926.
39. Haas, G. C., and Ezekiel, M. Factors affecting the price of hogs. U. S. Agr. Dept. Dept. bul. 1410: 37. 1926.
40. Warren, G. F., and Pearson, F. A. Relation of supply to price. Farm econ. 40: 559-571. December, 1926.
41. Working, H. Minnesota potato market letter, 3<sup>2</sup>. Minnesota Agr. Exp. Sta. December 6, 1926.
42. Warren, G. F., and Pearson, F. A. Relationships of supply and price. Unpublished manuscript read before Amer. Statist. Assn. at St. Louis, December, 1926.
43. Scoville, G. P. Cabbage prices and the next year's acreage. Farm econ., no. 43: 641. March, 1927.
44. Ezekiel, M. Factors related to lamb prices. Journ. polit. econ. 35<sup>2</sup>: 241-242. April, 1927.
45. Schultz, H. Cost of production and the tariff. Journ. farm econ. 9<sup>2</sup>: 204. April, 1927.
46. The price situation. U. S. Agr. Dept. Crops and markets, 4<sup>1</sup>: 158. April, 1927.
47. Kantor, H. S. Analysis of the New York peach market. New York Food Marketing Research Council. Food marketing studies, 2: 63. 1927.

48. Rauchenstein, E. Economic aspects of the cantaloupe industry. Univ. California Agr. Exp. Sta. Bul. 419: 23. 1927.
49. Daggit, E. M. Peach prices are mainly governed by size of crop. U. S. Agr. Dept. Yearbook 1926: 509. 1927.
50. Daggit, E. M. Flaxseed price largely influenced by Argentine crop. U. S. Agr. Dept. Yearbook 1926: 366. 1927.
51. Bean, L. H. Wages of farm hands governed by three factors. U. S. Agr. Dept. Yearbook 1926: 758. 1927.
52. Tolley, H. R. Efficiency of United States agriculture is increasing. U. S. Agr. Dept. Yearbook 1926: 319. 1927.
53. Daggit, E. M. Potato supply — effect on markets. U. S. Agr. Dept. Yearbook 1926: 598. 1927.
54. Ezekiel, M. Correlations with beef prices, 1908-1914. Unpublished manuscript.
55. Working, H. Forecasting the price of wheat. Journ. farm econ. 9<sup>3</sup>: 276. July, 1927.
56. Elliott, F. F. The nature and measurement of the elasticity of supply of farm products. Journ. farm econ. 9<sup>3</sup>: 292. July, 1927.
57. Warren, G. F., and Pearson, F. A. Interrelationship of supply and price. (Mimeo. repts. 5181-5186.) August 5, 1927.
58. Schultz, H. Theoretical considerations relating to supply. Journ. polit. econ. 35: 438-439. August, 1927.
59. Warren, G. F., and Pearson, F. A. Peach prices. Farm econ., no. 47: 763-766. September, 1927.
60. Warren, G. F., and Pearson, F. A. Apple prices. Farm econ., no. 48: 777-779. October, 1927.
61. Smith, B. B. Forecasting the volume and value of the cotton crop. Amer. Statis. Assn. Journ. 22(N. S.)<sup>160</sup>: 446-447. December, 1927.
62. Warren, G. F., and Pearson, F. A. Cost of distributing food. Farm econ., no. 50: 830-835. January, 1928.
63. Ross, H. A. The demand side of the New York milk market. Cornell Univ. Agr. Exp. Sta. Bul. 459: 58. 1928.

TABLE 132. EQUATIONS

	Original equations	Revised so that $y = 100$ when $x = 100$
Potatoes, United States production reduced to:		
1. United States farm price, Dec. 1, 1871-1894.	$y = \frac{22,090.30}{x^{1.1566}}$	$\log y = 4.3440050 - 1.1566 \log x$
2. United States farm price, Dec. 1, 1895-1915.	$y = \frac{51,731.98}{x^{1.3460}}$	$\log y = 4.7137587 - 1.3460 \log x$
3. United States farm price, Dec. 1, 1915-1925.	$y = \frac{841,151.35}{x^{1.9638}}$	$\log y = 5.9248741 - 1.9638 \log x$
4. United States farm price, Dec. 1, 1915-1920.	$y = \frac{8,431.38}{x^{0.9554}}$	$\log y = 3.9259089 - 0.9554 \log x$
5. United States farm price, Dec. 1, 1921-1925.	$y = \frac{776,255,178.57}{x^{3.4564}}$	$\log y = 8.8900045 - 3.4564 \log x$
6. United States farm price, Oct.-June, 1915-16 to 1920-21.	$y = \frac{1,398,856.91}{x^{2.0651}}$	$\log y = 6.1457733 - 2.0651 \log x$
7. United States farm price, Oct.-June, 1921-22 to 1925-26.	$y = \frac{915,163,038.33}{x^{3.4875}}$	$\log y = 8.9814989 - 3.4875 \log x$
8. Batavia, N. Y., farm price, Dec., 1897-1915.	$y = \frac{770,554.21}{x^{1.92616}}$	$\log y = 5.8868032 - 1.92616 \log x$
9. Batavia, N. Y., farm price, Nov.-May, 1915-16 to 1920-21.	$y = \frac{982,277,727.27}{x^{3.5093}}$	$\log y = 8.9922343 - 3.5093 \log x$
10. Batavia, N. Y., farm price, Nov.-May, 1921-22 to 1925-26.	$y = \frac{127,541,876,832.84}{x^{4.5644}}$	$\log y = 11.1056528 - 4.5644 \log x$
11. Minnesota farm price, Dec. 1, 1895-1915.	$y = \frac{471,674.46}{x^{1.8312}}$	$\log y = 5.6736424 - 1.8312 \log x$
12. Rhode Island farm price, Dec. 1, 1871-1894.	$y = \frac{3,691.89}{x^{0.7702}}$	$\log y = 3.5672491 - 0.7702 \log x$
13. Rhode Island farm price, Dec. 1, 1895-1915.	$y = \frac{5,873.81}{x^{0.8790}}$	$\log y = 3.7689197 - 0.8790 \log x$
14. Rhode Island farm price, Oct.-June, 1915-16 to 1920-21.	$y = \frac{8,720,200.0}{x^{2.5603}} + 34$	$\log (y-34) = 6.9405264 - 2.5603 \log x$
15. Rhode Island farm price, Oct.-June, 1915-16 to 1925-26.	$y = \frac{210,218,883.50}{x^{3.2531}} + 34$	$\log (y-34) = 5.3226717 - 3.2531 \log x$
16. Rhode Island farm price, Oct.-June, 1921-22 to 1925-26.	$y = \frac{29,839,836,937.0}{x^{4.2802}} + 34$	$\log (y-34) = 10.3739445 - 4.2802 \log x$
17. New York City wholesale price, Dec., 1874-1894.	$y = \frac{14,791.39}{x^{1.0724}}$	$\log y = 4.1700090 - 1.0724 \log x$

18. New York City wholesale price, Dec., 1895-1915	$y = \frac{84,772.04}{x^{1.4494}}$	$\log y = 4.9282526 - 1.4494 \log x$	$y = \frac{79,224.74}{x^{1.4494}}$	$\log y = 4.8998608 - 1.4494 \log x$
19. New York City wholesale price, Oct.-June, 1895-96 to 1915-16	$y = \frac{362,451.08}{x^{1.7615}}$	$\log y = 5.5592494 - 1.7615 \log x$	$y = \frac{333,441.15}{x^{1.7615}}$	$\log y = 5.5230192 - 1.7615 \log x$
20. New York City wholesale price, Oct.-June, 1921-22 to 1925-26	$y = \frac{325,600,601.50}{x^3.2470}$	$\log y = 8.5126852 - 3.2470 \log x$	$y = \frac{311,921,294.96}{x^3.2470}$	$\log y = 8.4940450 - 3.2470 \log x$
20a. New York City retail price, Oct.-June, 1897-98 to 1915-16	$y = \frac{363.46}{x^{0.2723}}$	$\log y = 2.5604778 - 0.2723 \log x$	$y = \frac{350.49}{x^{0.2723}}$	$\log y = 2.5446739 - 0.2723 \log x$
21. United States retail price, Oct.-June, 1917-18 to 1925-26	$y = \frac{2,670,777.30}{x^2.2008}$	$\log y = 6.4266377 - 2.2008 \log x$	$y = \frac{2,521,681.40}{x^2.2008}$	$\log y = 6.4016902 - 2.2008 \log x$
22. United States retail price, Oct.-June, 1917-18 to 1925-26	$y = \frac{505,982,941.18}{x^3.4542} + 40$	$\log (y-40) = 8.7041359 - 3.4542 \log x$	$y = \frac{463,772,159.09}{x^3.4542} + 39$	$\log (y-39) = 8.0083266 - 3.4542 \log x$
23. New York City retail price, Oct.-June, 1915-16 to 1920-21	$y = \frac{2,439,051,685.39}{x^3.9455} + 63$	$\log (y-63) = 9.3872210 - 3.9455 \log x$	$y = \frac{2,585,110,714.29}{x^3.9455} + 66.8$	$\log (y-66.8) = 9.4124791 - 3.9455 \log x$
24. New York City retail price, Oct.-June, 1921-22 to 1925-26	$y = \frac{100,551,412.037.0}{x^4.7255} + 63$	$\log (y-63) = 11.0023982 - 4.7255 \log x$	$y = \frac{101,989,490,094.0}{x^4.7255} + 63.9$	$\log (y-63.9) = 11.0085553 - 4.7255 \log x$
25. New York City hotel price, Oct.-June, 1921-22 to 1925-26	$y = \frac{46.30}{x^{0.2085}}$	$\log y = 1.6656254 + 0.2085 \log x$	$y = \frac{38.28}{x^{0.2085}}$	$\log y = 1.5829364 + 0.2085 \log x$
26. French farm price for the crop year, 1887-1914	$y = \frac{3,186.87}{x^{0.7447}}$	$\log y = 3.5033643 - 0.7447 \log x$	$y = \frac{3,086.20}{x^{0.7447}}$	$\log y = 3.4894240 - 0.7447 \log x$
27. Berlin wholesale price of eating potatoes, Oct.-June, 1890-91 to 1915-16	$y = \frac{76,575.84}{x^{1.4210}}$	$\log y = 4.8840918 - 1.4210 \log x$	$y = \frac{69,514.44}{x^{1.4210}}$	$\log y = 4.8420750 - 1.4210 \log x$
28. Berlin wholesale price of eating potatoes, Oct.-June, 1902-03 to 1913-14	$y = \frac{222,341.69}{x^{1.6639}}$	$\log y = 5.3470209 - 1.6639 \log x$	$y = \frac{212,710.34}{x^{1.6639}}$	$\log y = 5.3277886 - 1.6639 \log x$
29. Berlin wholesale price of manufacturing potatoes, Oct.-June 1860-91 to 1913-14	$y = \frac{158,288.73}{x^{1.5864}}$	$\log y = 5.1994500 - 1.5864 \log x$	$y = \frac{149,838.05}{x^{1.5864}}$	$\log y = 5.1727140 - 1.5863570 \log x$
30. Berlin retail price, Oct.-June, 1902-03 to 1913-14	$y = \frac{24,809.95}{x^{1.1968}}$	$\log y = 4.3946259 - 1.1968 \log x$	$y = \frac{24,748.71}{x^{1.1968}}$	$\log y = 4.3935526 - 1.1967763 \log x$
31. United States farm price, Dec. 1, 1904-1914	$y = \frac{3,012.55}{x^{0.7255}}$	$\log y = 3.4789346 - 0.7255 \log x$	$y = \frac{2,825.01}{x^{0.7255}}$	$\log y = 3.4510194 - 0.7255 \log x$
32. United States farm price, Dec. 1, 1875-1913	$y = \frac{2,808.34}{x^{0.7133}}$	$\log y = 3.4484499 - 0.7133 \log x$	$y = \frac{2,670.02}{x^{0.7133}}$	$\log y = 3.4265148 - 0.7132374 \log x$

Sweet potatoes, United States production related to:

31. United States farm price, Dec. 1, 1904-1914

32. United States farm price, Dec. 1, 1875-1913

30.

31.

TABLE 132 (continued)

	Original equations	Revised so that $y = 100$ when $x = 100$
<i>Hay, United States production related to: (continued)</i>		
33. New York farm price, Dec. 1, 1875-1913	$y = \frac{7,952.00}{x^{0.9368}}$	$\log y = 3.9004762 - 0.9368 \log x$
34. Rhode Island farm price, Dec. 1, 1875-1913	$y = \frac{608.24}{x^{0.3883}}$	$\log y = 2.7840752 - 0.3883 \log x$
35. Georgia farm price, Dec. 1, 1875-1913	$y = -0.1435x + 114.80$	$y = -0.1428x + 114.28$
36. New York City wholesale price of No. 1 timothy, large bales, Sept.-Aug., 1904-05 to 1914-15	$y = \frac{5,352.28}{x^{0.8607}}$	$\log y = 3.7285386 - 0.8607 \log x$
37. New York City wholesale price of No. 1 timothy, large bales, Sept.-Aug., 1917-18 to 1925-26	$y = \frac{10,633.51}{x^{1.0109}}$	$\log y = 4.0266766 - 1.0109 \log x$
38. New York City wholesale price of No. 2 timothy, large bales, Sept.-Aug., 1904-05 to 1914-15	$y = \frac{4,944.54}{x^{0.8414}}$	$\log y = 3.6941255 - 0.8414 \log x$
39. New York City wholesale price of No. 3 timothy, large bales, Sept.-Aug., 1904-05 to 1924-25	$y = \frac{3,900.85}{x^{0.7911}}$	$\log y = 3.5941542 - 0.7911 \log x$
40. New York City wholesale price of No. 3 timothy, small bales, Sept.-Aug., 1910-11 to 1924-25	$y = \frac{3,059.77}{x^{0.7457}}$	$\log y = 3.4856882 - 0.7457 \log x$
41. New York City wholesale price of clover, mixed, Aug.-Sept., 1904-05 to 1921-22	$y = \frac{5,142.02}{x^{0.8511}}$	$\log y = 3.7112094 - 0.8511 \log x$
<i>Apples, United States production related to:</i>		
42. New York City wholesale price of 16 varieties, Aug.-June, 1894-95 to 1914-15	$y = \frac{2,273.28}{x^{0.6859}}$	$\log y = 3.3566539 - 0.6859 \log x$
43. New York City wholesale price of Baldwin, Oct.-June, 1898-99 to 1914-15	$y = \frac{2,678.77}{x^{0.7242}}$	$\log y = 3.4280969 - 0.7242 \log x$
44. New York City wholesale price of Ben Davis, Oct.-June, 1898-99 to 1914-15	$y = \frac{1,577.17}{x^{0.6231}}$	$\log y = 3.1978788 - 0.6231 \log x$



45. New York City wholesale price of Greenings, Sept.-May, 1898-99 to 1914-15	$y = \frac{4,015.45}{x^0.8125}$	$\log y = 3.6037340 - 0.8125 \log x$	$y = \frac{4,217.37}{x^0.8125}$	$\log y = 3.6250418 - 0.812509 \log x$
46. New York City wholesale price of Kings, Sept.-Apr., 1898-99 to 1914-15	$y = \frac{2,064.92}{x^0.6677}$	$\log y = 3.3149022 - 0.6677 \log x$	$y = \frac{2,164.34}{x^0.6677}$	$\log y = 3.3353246 - 0.6676623 \log x$
47. New York City wholesale price of Northern Spy, Oct.-June, 1898-99 to 1914-15	$y = \frac{1,103.29}{x^0.5257}$	$\log y = 3.0426895 - 0.5257 \log x$	$y = \frac{1,125.49}{x^0.5257}$	$\log y = 3.0513400 - 0.5258700 \log x$
<i>Apples, New York State production related to:</i>				
48. Newfane, Niagara County, cider apples, 1913-1925	$y = \frac{4,384.91}{x^0.8801}$	$\log y = 3.6419685 - 0.8801 \log x$	$y = \frac{5,756.81}{x^0.8801}$	$\log y = 3.7601816 - 0.8800608 \log x$
49. Newfane, Niagara County, non-cider apples, 1913-1925	$y = \frac{904.64}{x^0.5084}$	$\log y = 2.9564758 - 0.5084 \log x$	$y = \frac{1,039.68}{x^0.5084}$	$\log y = 3.068982 - 0.5084491 \log x$
<i>Peaches, United States production related to:</i>				
50. United States farm price, June-Oct., 1915-1925	$y = \frac{350.9}{x^0.2805}$	$\log y = 2.5451789 - 0.2805 \log x$	$y = \frac{363.99}{x^0.2805}$	$\log y = 2.5610870 - 0.2805635 \log x$
<i>Peaches, Georgia production related to:</i>				
51. New York City jobbing price, 6-basket carrier, June, 1904-1924	$y = \frac{247.92}{x^0.2072}$	$\log y = 2.3943108 - 0.2072 \log x$	$y = \frac{259.68}{x^0.2072}$	$\log y = 2.4144314 - 0.2072157 \log x$
52. New York City jobbing price, 6-basket carrier, July, 1904-1924	$y = \frac{555.49}{x^0.3869}$	$\log y = 2.7446440 - 0.3869 \log x$	$y = \frac{594.04}{x^0.3869}$	$\log y = 2.7738124 - 0.3869062 \log x$
<i>Peaches, North Carolina production related to:</i>				
53. New York City jobbing price, 6-basket carrier, Aug., 1904-1924	$y = \frac{241.14}{x^0.2035}$	$\log y = 2.3822645 - 0.2035 \log x$	$y = \frac{255.28}{x^0.2035}$	$\log y = 2.4070172 - 0.2035086 \log x$
<i>Peaches, New York production related to:</i>				
54. New York City jobbing price, 6-basket carrier, Sept., 1904-1924	$y = \frac{278.60}{x^0.2358}$	$\log y = 2.4449763 - 0.2358 \log x$	$y = \frac{298.15}{x^0.2358}$	$\log y = 2.4715094 - 0.2357647 \log x$
<i>Pears, United States production related to:</i>				
55. United States farm price, Aug.-Dec., 1910-1925	$y = \frac{271.97}{x^0.2109}$	$\log y = 2.4345274 - 0.2109 \log x$	$y = \frac{284.13}{x^0.2109}$	$\log y = 2.4218112 - 0.2109056 \log x$

TABLE 132 (continued)

	Original equations	Revised so that $y = 100$ when $x = 100$
<i>Bananas, United States net supply related to:</i>		
56. New York City store price of Jamaica, 9's and 1sts, July-June, 1897-98 to 1914-15	$y = \frac{609.76}{x^{0.3908}}$	$\log y = 2.7851560 - 0.3908 \log x$
<i>Cranberries, United States production related to:</i>		
57. United States farm price, Dec. 1, 1919-1925	$y = \frac{560.320.0}{x^{1.8123}}$	$\log y = 5.7484361 - 1.8123 \log x$
<i>Cabbage, production in ten late-cabbage States related to:</i>		
58. Little York, New York, farm price of Danish, Dec., 1915-1924	$y = \frac{14,268,963.93}{x^{2.6736}}$	$\log y = 7.1543316 - 2.6736 \log x$
59. Newfane, Niagara County, farm price, Dec., 1915-1925	$y = \frac{6,044,726.76}{x^{2.4453}}$	$\log y = 6.7813767 - 2.4453 \log x$
60. New York farm price, Dec. 1, 1915-1925	$y = \frac{932,631.30}{x^{2.0048}}$	$\log y = 5.9697100 - 2.0048 \log x$
61. United States farm price Dec. 1, 1915-1925	$y = \frac{5,222.96}{x^{0.8754}}$	$\log y = 3.7179183 - 0.8754 \log x$
62. New York City wholesale price of Danish, Dec., 1915-1924	$y = \frac{1,290,088.10}{x^{2.1320}}$	$\log y = 6.1108213 - 2.1320 \log x$
63. New York City wholesale price of Danish, Dec., 1915-1925	$y = \frac{1,478,055.44}{x^{2.1414}}$	$\log y = 6.1695907 - 2.1414 \log x$
64. New York City wholesale price of Danish, Dec., 1915-1926	$y = \frac{1,560,800.72}{x^{2.1505}}$	$\log y = 6.1933475 - 2.1505 \log x$
<i>Corn, United States production related to:</i>		
65. United States farm price, Dec. 1, 1875-1913	$y = \frac{19,083.26}{x^{1.1220}}$	$\log y = 4.2806473 - 1.1220 \log x$
66. United States farm price, Dec. 1, 1877-1894	$y = \frac{5,241.97}{x^{0.8446}}$	$\log y = 3.7194946 - 0.8446 \log x$
67. United States farm price, Dec. 1, 1895-1913	$y = \frac{135,996.77}{x^{1.5439}}$	$\log y = 5.1333308 - 1.5439 \log x$
68. United States farm price, Dec. 1, 1900-1915	$y = \frac{71,125.52}{x^{1.4018}}$	$\log y = 4.8520255 - 1.4018 \log x$
69. United States farm price, Dec. 1, 1915-1920	$y = \frac{21,877.90}{x^{1.1796}}$	$\log y = 4.3400656 - 1.1796 \log x$

70. United States farm price, Dec. 1, 1921-1925	$y = \frac{1,987,247.71}{x^2.1861}$	$\log y = 6.2926520 - 2.1861 \log x$	$y = \frac{2,356,140.54}{x^2.1861}$	$\log y = 6.3722012 - 2.1861006 \log x$
71. Iowa farm price, Dec. 1, 1877-1913	$y = \frac{157,899.93}{x^{1.5750}}$	$\log y = 5.1983819 - 1.5750 \log x$	$y = \frac{141,244.64}{x^{1.5750}}$	$\log y = 5.1499720 - 1.5749860 \log x$
72. Iowa farm price, Dec. 1, 1877-1894	$y = \frac{25,590.03}{x^{1.1779}}$	$\log y = 4.4086708 - 1.1779 \log x$	$y = \frac{22,685.04}{x^{1.1779}}$	$\log y = 4.3557396 - 1.1778698 \log x$
73. Iowa farm price, Dec. 1, 1895-1913	$y = \frac{1,269,514.33}{x^{2.0263}}$	$\log y = 6.1036376 - 2.0263 \log x$	$y = \frac{1,128,890.39}{x^{2.0263}}$	$\log y = 6.0528518 - 2.0263259 \log x$
74. Iowa farm price, Dec. 1, 1915-1920	$y = \frac{452,828.85}{x^{1.8351}}$	$\log y = 5.6559341 - 1.8351 \log x$	$y = \frac{468,025.59}{x^{1.8351}}$	$\log y = 5.6702696 - 1.8351348 \log x$
75. Iowa farm price, Dec. 1, 1921-1925	$y = \frac{61,982,295.00}{x^{2.9389}}$	$\log y = 7.7922676 - 2.9389 \log x$	$y = \frac{75,461,598.49}{x^{2.9389}}$	$\log y = 7.8777260 - 2.9388630 \log x$
76. Columbus, Nebraska, farm price, calendar year, 1896-1914	$y = \frac{178,202.09}{x^{1.5993}}$	$\log y = 5.2509128 - 1.5993 \log x$	$y = \frac{157,992.62}{x^{1.5993}}$	$\log y = 5.1986305 - 1.5993184 \log x$
77. Georgia farm price, Dec. 1, 1875-1913	$y = \frac{1,086.10}{x^{0.5092}}$	$\log y = 3.0358792 - 0.5092 \log x$	$y = \frac{1,043.10}{x^{0.5092}}$	$\log y = 3.0185340 - 0.5091670 \log x$
78. Georgia farm price, Dec. 1, 1877-1894	$y = \frac{267.38}{x^{0.2056}}$	$\log y = 2.4271295 - 0.2056 \log x$	$y = \frac{257.71}{x^{0.2056}}$	$\log y = 2.4111318 - 0.2055659 \log x$
79. Georgia farm price, Dec. 1, 1895-1913	$y = \frac{4,051.61}{x^{0.7895}}$	$\log y = 3.6072282 - 0.7895 \log x$	$y = \frac{3,793.51}{x^{0.7895}}$	$\log y = 3.5790416 - 0.7895208 \log x$
80. Georgia farm price, Dec. 1, 1915-1920	$y = \frac{228.78}{x^{0.1995}}$	$\log y = 2.3497261 - 0.1995 \log x$	$y = \frac{250.59}{x^{0.1995}}$	$\log y = 2.3989692 - 0.1994901 \log x$
81. Georgia farm price, Dec. 1, 1921-1925	$y = \frac{74,725.69}{x^{1.4651}}$	$\log y = 4.8734999 - 1.4651 \log x$	$y = \frac{85,155.39}{x^{1.4651}}$	$\log y = 4.9302122 - 1.4651061 \log x$
82. Chicago No. 2 cash, Dec., 1876-1913	$y = \frac{13,556.98}{x^{1.0504}}$	$\log y = 4.1321631 - 1.0504 \log x$	$y = \frac{12,614.79}{x^{1.0504}}$	$\log y = 4.1008802 - 1.0504401 \log x$
83. Chicago No. 2 cash, Dec., 1877-1894	$y = \frac{885.91}{x^{0.4664}}$	$\log y = 2.9473999 - 0.4664 \log x$	$y = \frac{856.09}{x^{0.4664}}$	$\log y = 2.9328156 - 0.4664078 \log x$
84. Chicago No. 2 cash, Dec., 1895-1913	$y = \frac{100,329.79}{x^{1.4788}}$	$\log y = 5.0014209 - 1.4788 \log x$	$y = \frac{90,719.28}{x^{1.4788}}$	$\log y = 4.9576996 - 1.4788498 \log x$
85. Chicago No. 2 cash, Dec., 1915-1920	$y = \frac{407.03}{x^{0.3104}}$	$\log y = 2.6105909 - 0.3104 \log x$	$y = \frac{417.71}{x^{0.3104}}$	$\log y = 2.6208784 - 0.3104392 \log x$
86. Chicago No. 2 cash, Dec., 1921-1925	$y = \frac{18,192,782.43}{x^{2.6688}}$	$\log y = 7.2598991 - 2.6688 \log x$	$y = \frac{21,756,959.79}{x^{2.6688}}$	$\log y = 7.3375982 - 2.6687991 \log x$
87. Chicago No. 2 cash, March, 1876-1914	$y = \frac{9,426.25}{x^{0.9707}}$	$\log y = 3.9748392 - 0.9707 \log x$	$y = \frac{8,734.36}{x^{0.9707}}$	$\log y = 3.9414794 - 0.9707397 \log x$
88. Chicago No. 2 cash, May, 1876-1914	$y = \frac{8,656.02}{x^{0.9530}}$	$\log y = 3.9374689 - 0.9530 \log x$	$y = \frac{8,052.34}{x^{0.9530}}$	$\log y = 3.9059224 - 0.9529612 \log x$
89. Chicago No. 2 cash, July, 1876-1914	$y = \frac{4,178.30}{x^{0.7953}}$	$\log y = 3.6209839 - 0.7953 \log x$	$y = \frac{3,894.96}{x^{0.7953}}$	$\log y = 3.5905034 - 0.7952517 \log x$

TABLE 132 (continued)

	Original equations	Revised so that $y = 100$ when $x = 100$
Corn, United States production related to: (continued)		
90. Chicago No. 2 cash, calendar year, 1896-1914.	$y = \frac{10,956.23}{x-1,001.7}$	$\log y = 4.0400572-1.0017 \log x$
91. Chicago May future price in Sept., 1895-1913.	$y = \frac{69,557.43}{x-1,408.8}$	$\log y = 4.8423435-1.4088 \log x$
92. Chicago May future price in Dec., 1895-1913.	$y = \frac{94,984.31}{x-1,470.5}$	$\log y = 4.9776519-1.4705 \log x$
93. Chicago May future price in March, 1896-1914.	$y = \frac{35,956.32}{x-1,259.8}$	$\log y = 4.5557675-1.2598 \log x$
94. Chicago July future price in March, 1896-1914.	$y = \frac{31,847.53}{x-1,233.1}$	$\log y = 4.5030757-1.2331 \log x$
95. Chicago July future price in May, 1896-1914.	$y = \frac{18,804.92}{x-1,121.6}$	$\log y = 4.2756549-1.1216 \log x$
96. Chicago December future price in July, 1895-1913.	$y = \frac{3,574.23}{x-0.7648}$	$\log y = 3.5551828-0.7648 \log x$
97. Chicago December future price in Sept., 1895-1913.	$y = \frac{65,317.73}{x-1,389.3}$	$\log y = 4.8150311-1.3893 \log x$
98. Chicago December future price in Nov., 1895-1913.	$y = \frac{50,144.53}{x-1,332.8}$	$\log y = 4.7002236-1.3328 \log x$
99. New York City No. 2 western mixed, Dec., 1885-1913.	$y = \frac{7,117.55}{x-0.9200}$	$\log y = 3.8523308-0.9200 \log x$
100. Liverpool mixed American, Dec., 1898-1913.	$y = \frac{1,782.57}{x-0.6112}$	$\log y = 3.2510483-0.6112 \log x$
101. United States retail price of corn-meal, calendar year, 1896-1914.	$y = \frac{211.16}{x-0.1558}$	$\log y = 2.3246180-0.1558 \log x$
102. United States retail price of corn-meal, calendar year, 1916-1921.	$y = \frac{140.64}{x-0.0767}$	$\log y = 2.1481209-0.0767 \log x$
103. United States retail price of corn-meal, calendar year, 1922-1926.	$y = \frac{5,270,096.27}{x-2,369.0}$	$\log y = 6.7218161-2.3699 \log x$
104. New York City retail price of cornmeal, Dec., 1921-1925.	$y = \frac{171.64}{x-0.1155}$	$\log y = 2.2346106-0.1155 \log x$
105. Ufca wholesale price of hominy, March, 1907-1926.	$y = \frac{5,206.53}{x-0.8615}$	$\log y = 3.7165475-0.8615 \log x$
106. New York State retail price of hominy, March, 1907-1926.	$y = \frac{1,331.12}{x-0.5629}$	$\log y = 3.1242165-0.5629 \log x$
	$y = \frac{10,078.78}{x-1,001.7}$	$\log y = 4.0034078-1.0017 \log x$
	$y = \frac{65,716.02}{x-1,408.8}$	$\log y = 4.816712-1.4088 \log x$
	$y = \frac{87,280.22}{x-1,470.5}$	$\log y = 4.9409158-1.4704679 \log x$
	$y = \frac{33,083.89}{x-1,259.8}$	$\log y = 4.5196166-1.2598083 \log x$
	$y = \frac{29,260.60}{x-1,233.1}$	$\log y = 4.4662832-1.2331416 \log x$
	$y = \frac{17,504.60}{x-1,121.6}$	$\log y = 4.2431522-1.1215761 \log x$
	$y = \frac{3,384.87}{x-0.7648}$	$\log y = 3.5295420-0.7647710 \log x$
	$y = \frac{60,094.18}{x-1,389.3}$	$\log y = 4.7786156-1.3893078 \log x$
	$y = \frac{46,297.68}{x-1,332.8}$	$\log y = 4.6655592-1.3327796 \log x$
	$y = \frac{6,916.78}{x-0.9200}$	$\log y = 3.8399038-0.9199519 \log x$
	$y = \frac{1,669.20}{x-0.6112}$	$\log y = 3.2224972-0.6112486 \log x$
	$y = \frac{204.95}{x-0.1558}$	$\log y = 2.3116506-0.1568253 \log x$
	$y = \frac{142.35}{x-0.0767}$	$\log y = 2.1533016-0.0766808 \log x$
	$y = \frac{5,494,084.81}{x-2,369.0}$	$\log y = 6.7398954-2.3699477 \log x$
	$y = \frac{170.23}{x-0.1155}$	$\log y = 2.2310264-0.1155132 \log x$
	$y = \frac{5,283.48}{x-0.8615}$	$\log y = 3.7292920-0.8614600 \log x$
	$y = \frac{1,336.24}{x-0.5629}$	$\log y = 3.1258854-0.5629427 \log x$

107. Utica wholesale price of corn-meal, Dec., 1900-1915.....	$y = \frac{3,700.95}{x^0.7736}$	$\log y = 3.5683146 - 0.7736 \log x$	$y = \frac{3,525.63}{x^0.7736}$	$\log y = 3.5472370 - 0.7736185 \log x$
108. Utica wholesale price of corn-meal, March, 1907-1926.....	$y = \frac{10,608.39}{x^1.0125}$	$\log y = 4.0256496 - 1.0125 \log x$	$y = \frac{10,590.87}{x^1.0125}$	$\log y = 4.0246316 - 1.0124658 \log x$
109. New York State retail price of cornmeal for feeding, Dec., 1900-1915.....	$y = \frac{6,427.48}{x^0.8403}$	$\log y = 3.8080408 - 0.8408 \log x$	$y = \frac{6,047.27}{x^0.8408}$	$\log y = 3.7815590 - 0.8407795 \log x$
110. New York State retail price of cornmeal for feeding, March, 1907-1926.....	$y = \frac{4,731.19}{x^0.8362}$	$\log y = 3.6749708 - 0.8362 \log x$	$y = \frac{4,702.20}{x^0.8362}$	$\log y = 3.6728014 - 0.8361507 \log x$
111. Utica wholesale price of gluten, March, 1907-1926.....	$y = \frac{141.85}{x^0.0789}$	$\log y = 2.1518419 - 0.0789 \log x$	$y = \frac{143.78}{x^0.0789}$	$\log y = 2.1577108 - 0.0788554 \log x$
112. New York State retail price of gluten, March, 1907-1926.....	$y = \frac{163.00}{x^0.1083}$	$\log y = 2.2121996 - 0.1083 \log x$	$y = \frac{164.68}{x^0.1083}$	$\log y = 2.2166400 - 0.1083200 \log x$
Corn, world production related to:				
113. United States farm price, Dec. 1, 1900-1915.....	$y = \frac{112,758.13}{x^1.4673}$	$\log y = 5.0521479 - 1.4673 \log x$	$y = \frac{98,786.50}{x^1.4673}$	$\log y = 4.9946976 - 1.4673488 \log x$
Oats, United States production related to:				
114. United States farm price, Dec. 1, 1875-1913.....	$y = \frac{8,417.09}{x^0.9421}$	$\log y = 3.9251619 - 0.9421 \log x$	$y = \frac{7,660.23}{x^0.9421}$	$\log y = 3.8842420 - 0.9421210 \log x$
115. Iowa farm price, Dec. 1, 1875-1913.....	$y = \frac{18,840.20}{x^1.1113}$	$\log y = 4.2753929 - 1.1113 \log x$	$y = \frac{16,652.12}{x^1.1113}$	$\log y = 4.2225116 - 1.1112558 \log x$
Oats, world production 1899-1914 related to:				
116. United States farm price, Dec. 1, 1899-1914.....	$y = \frac{354,255.33}{x^1.7431}$	$\log y = 5.5463164 - 1.7431 \log x$	$y = \frac{306,343.03}{x^1.7431}$	$\log y = 5.4862080 - 1.7431040 \log x$
Barley, United States production related to:				
117. United States farm price, Dec. 1, 1875-1913.....	$y = \frac{2,237.04}{x^0.6613}$	$\log y = 3.3496734 - 0.6613 \log x$	$y = \frac{2,102.10}{x^0.6613}$	$\log y = 3.3226528 - 0.6613264 \log x$
Barley, world production 1899-1913 related to:				
118. United States farm price, Dec. 1, 1899-1913.....	$y = \frac{2,241.42}{x^0.6601}$	$\log y = 3.3505231 - 0.6601 \log x$	$y = \frac{2,089.84}{x^0.6601}$	$\log y = 3.3201134 - 0.6600567 \log x$
Buckwheat, United States production related to:				
119. United States farm price, Dec. 1, 1874-1915.....	$y = \frac{554.45}{x^0.3690}$	$\log y = 2.7438640 - 0.3690 \log x$	$y = \frac{548.91}{x^0.3690}$	$\log y = 2.7379174 - 0.3686587 \log x$
120. New York farm price, Dec. 1, 1875-1913.....	$y = \frac{1,312.08}{x^0.5540}$	$\log y = 3.1179594 - 0.5540 \log x$	$y = \frac{1,282.11}{x^0.5540}$	$\log y = 3.1079250 - 0.5539625 \log x$

TABLE 132 (continued)

	Original equations	Revised so that $y = 100$ when $x = 100$
<b>Rye, United States production related to:</b>		
121. United States farm price, Dec. 1, 1875-1913.....	$y = \frac{189.78}{x^{0.1385}}$	$\log y = 2.2782408 - 0.1385 \log x$
122. United States farm price, Dec. 1, 1899-1913.....	$y = \frac{12,472.76}{x^{1.0398}}$	$\log y = 4.0959624 - 1.0398 \log x$
<b>Rye, world production 1899-1913 related to:</b>		
123. United States farm price, Dec. 1, 1899-1913.....	$y = \frac{2,777.46}{x^{0.7101}}$	$\log y = 3.4436480 - 0.7101 \log x$
<b>Rice, world production 1895-1915 related to:</b>		
124. New Orleans wholesale price of rough rice, Aug.-July, 1905-06 to 1915-16.....	$y = \frac{39,620.95}{x^{1.2792}}$	$\log y = 4.5979249 - 1.2792 \log x$
<b>Wheat, world production March-Feb., 1898-1900 to 1913-14, related to:</b>		
125. Liverpool spot price of red wheat, Aug.-July, 1899-1900 to 1913-14.....	$y = \frac{10,511.40}{x^{0.9997}}$	$\log y = 4.0216605 - 0.9997 \log x$
126. Liverpool spot price of red wheat, Sept.-Oct., 1899-1913.....	$y = \frac{8,763.47}{x^{0.9823}}$	$\log y = 3.9426739 - 0.9823 \log x$
127. Liverpool spot price of red wheat, Jan.-Feb., 1900-1914.....	$y = \frac{19,385.29}{x^{1.1339}}$	$\log y = 4.2874724 - 1.1339 \log x$
128. Liverpool spot price of red wheat, April-May, 1900-1914.....	$y = \frac{50,260.40}{x^{1.3357}}$	$\log y = 4.7012259 - 1.3357 \log x$
129. Minneapolis wholesale price of No. 1 northern spring wheat, Aug.-July, 1899-1900 to 1913-14.....	$y = \frac{76,436.70}{x^{1.4292}}$	$\log y = 4.8833019 - 1.4292 \log x$
130. Kansas City wholesale price of No. 2 yellow hard wheat, July-June, 1899-1900 to 1913-14.....	$y = \frac{27,968.56}{x^{1.2994}}$	$\log y = 4.4465701 - 1.2994 \log x$
131. Saratoga price, Aug.-July, 1899-1900 to 1913-14.....	$y = \frac{668,776.00}{x^{1.8845}}$	$\log y = 5.8252807 - 1.8845 \log x$
132. Odessa price of spring wheat, Aug.-July, 1899-1900 to 1913-14.....	$y = \frac{654,918.06}{x^{1.8820}}$	$\log y = 5.8161870 - 1.8820 \log x$

133. Berlin contract price, Aug.-July, 1899-1900 to 1913-14.....	$y = \frac{4,331.09}{x^{0.8115}}$	$\log y = 3.6365967 - 0.8115 \log x$	$y = \frac{4,197.94}{x^{0.8115}}$	$\log y = 3.6230396 - 0.8115 \log x$
134. Paris contract price, Aug.-July, 1899-1900 to 1913-14.....	$y = \frac{21.67}{x^{0.3218}}$	$\log y = 1.3358251 + 0.3218 \log x$	$y = \frac{22.72}{x^{0.3218}}$	$\log y = 1.3563290 + 0.3218 \log x$
135. Minnesota farm price, Dec. 1, 1899-1913.....	$y = \frac{684,413.75}{x^{1.8931}}$	$\log y = 5.8353187 - 1.8931 \log x$	$y = \frac{611,313.80}{x^{1.8931}}$	$\log y = 5.782642 - 1.8931 \log x$
136. Kansas farm price, Dec. 1, 1899-1913.....	$y = \frac{73,377.46}{x^{1.4139}}$	$\log y = 4.8655628 - 1.4139 \log x$	$y = \frac{67,273.03}{x^{1.4139}}$	$\log y = 4.8278410 - 1.4139 \log x$
Wheat, southern-hemisphere production 1899-1900 to 1913-14 related to:				
137. Liverpool spot price of red wheat, April-May, 1900-1914.....	$y = \frac{103.51}{x^{0.0122}}$	$\log y = 2.0149638 - 0.0122 \log x$	$y = \frac{105.75}{x^{0.0122}}$	$\log y = 2.0248000 - 0.0122 \log x$
Wheat, east-European production, 1899-1900 to 1913-14 related to:				
138. Liverpool spot price of red wheat, Aug.-July, 1899-1900 to 1913-14.....	$y = \frac{251.24}{x^{0.1998}}$	$\log y = 2.4000871 - 0.1998 \log x$	$y = \frac{250.91}{x^{0.1998}}$	$\log y = 2.3995120 - 0.1997563 \log x$
139. Liverpool spot price of red wheat, Sept.-Oct., 1899-1913.....	$y = \frac{278.10}{x^{0.2233}}$	$\log y = 2.4442081 - 0.2233 \log x$	$y = \frac{279.80}{x^{0.2233}}$	$\log y = 2.4465334 - 0.2232267 \log x$
140. Liverpool spot price of red wheat, Jan.-Feb., 1900-1914.....	$y = \frac{311.39}{x^{0.2491}}$	$\log y = 2.4933040 - 0.2491 \log x$	$y = \frac{314.91}{x^{0.2491}}$	$\log y = 2.4981924 - 0.2490932 \log x$
141. Liverpool spot price of red wheat, April-May, 1900-1914.....	$y = \frac{444.24}{x^{0.3222}}$	$\log y = 2.6476158 - 0.3222 \log x$	$y = \frac{441.04}{x^{0.3222}}$	$\log y = 2.6444898 - 0.3222404 \log x$
Wheat, west-European production 1899-1900 to 1913-14 related to:				
142. Liverpool spot price of red wheat, Aug.-July, 1899-1900 to 1913-14.....	$y = \frac{627.85}{x^{0.4001}}$	$\log y = 2.7978630 - 0.4001 \log x$	$y = \frac{631.34}{x^{0.4001}}$	$\log y = 2.8002620 - 0.4001310 \log x$
143. Liverpool spot price of red wheat, Sept.-Oct., 1899-1913.....	$y = \frac{454.10}{x^{0.3314}}$	$\log y = 2.6571566 - 0.3314 \log x$	$y = \frac{460.09}{x^{0.3314}}$	$\log y = 2.6628408 - 0.3314204 \log x$
144. Liverpool spot price of red wheat, Jan.-Feb., 1900-1914.....	$y = \frac{484.63}{x^{0.3472}}$	$\log y = 2.6885412 - 0.3472 \log x$	$y = \frac{494.77}{x^{0.3472}}$	$\log y = 2.6944046 - 0.3472023 \log x$
145. Liverpool spot price of red wheat, April-May, 1900-1914.....	$y = \frac{531.45}{x^{0.3654}}$	$\log y = 2.7254687 - 0.3654 \log x$	$y = \frac{538.08}{x^{0.3654}}$	$\log y = 2.7308448 - 0.3654224 \log x$
Wheat, North American production 1899-1913 related to:				
146. Liverpool spot price of red wheat, Aug.-July, 1899-1900 to 1913-14.....	$y = \frac{863.31}{x^{0.4667}}$	$\log y = 2.9361658 - 0.4667 \log x$	$y = \frac{857.85}{x^{0.4667}}$	$\log y = 2.9334126 - 0.4667063 \log x$
147. Liverpool spot price of red wheat, Sept.-Oct., 1899-1913.....	$y = \frac{1,833.50}{x^{0.6283}}$	$\log y = 3.2632817 - 0.6283 \log x$	$y = \frac{1,805.61}{x^{0.6283}}$	$\log y = 3.2566246 - 0.6283123 \log x$

TABLE 132 (continued)

	Original equations	Revised so that $y = 100$ when $x = 100$
<i>Wheat</i> , North American production 1899-1913 related to: (continued)		
148. Liverpool spot price of red wheat, Jan.-Feb., 1900-1914.....	$y = \frac{1,101.90}{x^{0.5210}}$	$\log y = 3.0421424 - 0.5210 \log x$
149. Liverpool spot price of red wheat, April-May, 1900-1914.....	$y = \frac{1,218.85}{x^{0.5420}}$	$\log y = 3.0859511 - 0.5420 \log x$
150. Minneapolis wholesale price of No. 1 northern spring wheat, Aug.-July, 1899-1900 to 1913-14.....	$y = \frac{37,408.78}{x^{1.2781}}$	$\log y = 4.5729735 - 1.2781 \log x$
<i>Wheat</i> , total United States production 1899-1913 related to:		
151. Minneapolis wholesale price of No. 1 northern spring wheat, Aug.-July, 1899-1900 to 1913-14.....	$y = \frac{47,557.03}{x^{1.3397}}$	$\log y = 4.6772148 - 1.3397 \log x$
152. Kansas City wholesale price of No. 2 best yellow hard wheat, July-June, 1899-1900 to 1913-14.....	$y = \frac{12,866.41}{x^{1.0551}}$	$\log y = 4.1094573 - 1.0551 \log x$
153. Minnesota farm price, Dec. 1, 1899-1913.....	$y = \frac{68,968.89}{x^{1.4180}}$	$\log y = 4.8386532 - 1.4180 \log x$
154. Kansas farm price, Dec. 1, 1899-1913.....	$y = \frac{41,563.29}{x^{1.3069}}$	$\log y = 4.6187099 - 1.3069 \log x$
155. Chicago May future price in Sept., 1899-1913.....	$y = \frac{15,445.94}{x^{1.0927}}$	$\log y = 4.1898144 - 1.0927 \log x$
156. Chicago May future price in Dec., 1899-1913.....	$y = \frac{8,411.57}{x^{0.9654}}$	$\log y = 3.9248772 - 0.9654 \log x$
157. Chicago No. 2 red, cash, May, 1900-1914.....	$y = \frac{29,686.92}{x^{1.2351}}$	$\log y = 4.4576839 - 1.2351 \log x$
158. Chicago No. 2 red, cash, Dec., 1899-1913.....	$y = \frac{4,542.06}{x^{0.8284}}$	$\log y = 3.6572530 - 0.8284 \log x$
159. Chicago No. 2 red, cash, Sept., 1899-1913.....	$y = \frac{5,817.54}{x^{0.8825}}$	$\log y = 3.7647395 - 0.8825 \log x$



Wheat, United States spring-wheat production 1899-1913 related to:			
160. Minneapolis wholesale price of No. 1 northern spring wheat, Aug.-July, 1899-1900 to 1913-14.....	$y = \frac{1,094.41}{x^{0.5241}}$	$\log y = 3.0391784 - 0.5241 \log x$	$\log y = 3.0481848 - 0.5240924 \log x$
161. Minnesota farm price, Dec. 1, 1899-1913.....	$y = \frac{1,519.54}{x^{0.5931}}$	$\log y = 3.1817717 - 0.5931 \log x$	$\log y = 3.1861004 - 0.5930502 \log x$
Wheat, production of hard winter wheat in five States 1899-1913 related to:			
162. Kansas City wholesale price of No. 2 best yellow hard wheat, July-June, 1899-1900 to 1913-14.....	$y = \frac{382.29}{x^{0.2887}}$	$\log y = 2.5823886 - 0.2887 \log x$	$\log y = 2.5774404 - 0.2887202 \log x$
163. Kansas farm price, Dec. 1, 1899-1913.....	$y = \frac{809.82}{x^{0.4462}}$	$\log y = 2.9083883 - 0.4462 \log x$	$\log y = 2.8923658 - 0.4461829 \log x$
Wheat, British India production 1899-1900 to 1913-14 related to:			
164. Liverpool spot price of red wheat, April-May, 1900-1914.....	$y = \frac{279.79}{x^{0.2248}}$	$\log y = 2.4468380 - 0.2248 \log x$	$\log y = 2.4495556 - 0.2247778 \log x$
Wheat, Russian production 1899-1913 related to:			
165. Saratov price, Aug.-July, 1899-1900 to 1913-14.....	$y = \frac{2,306.05}{x^{0.6860}}$	$\log y = 3.3638691 - 0.6860 \log x$	$\log y = 3.3319024 - 0.68659512 \log x$
Wheat, German production 1899-1913 related to:			
166. Berlin contract price, Aug.-July, 1899-1900 to 1913-14.....	$y = \frac{501.78}{x^{0.3509}}$	$\log y = 2.7005123 - 0.3509 \log x$	$\log y = 2.7017820 - 0.3508910 \log x$
Wheat, French production 1899-1914 related to:			
167. Paris contract price, Aug.-July, 1899-1900 to 1913-14.....	$y = \frac{955.09}{x^{0.4962}}$	$\log y = 2.9800454 - 0.4962 \log x$	$\log y = 2.9924086 - 0.4962033 \log x$
Straw crops, United States production per capita related to:			
168. United States farm price per pound, Dec. 1, 1871-1914.....	$y = \frac{1,227.84}{x^{0.5482}}$	$\log y = 3.0891429 - 0.5482 \log x$	$\log y = 3.0964178 - 0.5482089 \log x$
Cotton, United States production related to:			
169. United States farm price, Dec. 1, 1892-1913.....	$y = \frac{1,026.29}{x^{0.4967}}$	$\log y = 3.0112684 - 0.4967 \log x$	$\log y = 2.9934050 - 0.4967025 \log x$

TABLE 132 (continued)

	Original equations	Revised so that $y = 100$ when $x = 100$
<b>Hogs, total weight packed in the West</b> Nov.-Feb., 1877-78 to 1913-14, related to:		
170. Western winter hog pack price, Nov.-Feb., 1877-78 to 1913- 14	$y = \frac{5,169.24}{x^{0.8498}}$ $\log y = 3.7134266 - 0.8498 \log x$	$y = \frac{4,939.53}{x^{0.8468}}$ $\log y = 3.6936852 - 0.8468425 \log x$
171. Chicago price of heavy hogs, Nov.-Feb., 1877-78 to 1913- 14	$y = \frac{6,113.96}{x^{0.8828}}$ $\log y = 3.7863229 - 0.8828 \log x$	$y = \frac{5,878.41}{x^{0.8823}}$ $\log y = 3.7655504 - 0.8827752 \log x$
172. United States farm price, Jan. 1, 1878-1914	$y = \frac{1,465.73}{x^{0.5687}}$ $\log y = 3.1660545 - 0.5687 \log x$	$y = \frac{1,371.83}{x^{0.5687}}$ $\log y = 3.1373014 - 0.5686507 \log x$
173. Iowa farm price, Jan. 1, 1878- 1914	$y = \frac{3,238.08}{x^{0.7390}}$ $\log y = 3.5102877 - 0.7390 \log x$	$y = \frac{3,095.60}{x^{0.7390}}$ $\log y = 3.4779316 - 0.7389658 \log x$
174. Rhode Island farm price, Jan. 1, 1878-1914	$y = \frac{597.47}{x^{0.3865}}$ $\log y = 2.7763181 - 0.3865 \log x$	$y = \frac{592.93}{x^{0.3865}}$ $\log y = 2.7730052 - 0.3865036 \log x$
<b>Hops, total weight packed in the West</b> Nov.-Feb., 1877-78 to 1915-16, related to:		
175. Chicago price of heavy hogs, 1877-1915	$y = \frac{1,986.21}{x^{0.6386}}$ $\log y = 3.2960247 - 0.6386 \log x$	$y = \frac{1,892.79}{x^{0.6386}}$ $\log y = 3.2771080 - 0.6385515 \log x$
<b>Hops, total weight packed in the West</b> Nov.-Feb., 1889-90 to 1913-14, related to:		
176. Western winter hog pack price, Nov.-Feb., 1889-90 to 1913- 14	$y = \frac{5,704.43}{x^{0.8637}}$ $\log y = 3.5254777 - 0.7455 \log x$	$y = \frac{5,338.15}{x^{0.8637}}$ $\log y = 3.7273906 - 0.8636953 \log x$
177. Iowa farm price, Jan. 1, 1890- 1914	$y = \frac{3,363.34}{x^{0.7455}}$ $\log y = 3.097.11 - 0.7455 \log x$	$y = \frac{3,097.11}{x^{0.7455}}$ $\log y = 3.4909562 - 0.7454781 \log x$
178. United States retail price of bacon, 1890-1914	$y = \frac{597.29}{x^{0.5203}} + 53$ $\log (y-53) = 2.7761848 - 0.5203 \log x$	$y = \frac{586.19}{x^{0.5203}} + 49.4$ $\log (y-49.4) = 2.7452210 - 0.5203899 \log x$
179. United States retail price of ham, 1890-1914	$y = \frac{580.21}{x^{0.5155}} + 52$ $\log (y-52) = 2.7483516 - 0.5155 \log x$	$y = \frac{537.84}{x^{0.5155}} + 49.9$ $\log (y-49.9) = 2.7306506 - 0.5154920 \log x$
180. United States retail price of pork chops, 1890-1914	$y = \frac{289.37}{x^{0.3701}} + 53$ $\log (y-53) = 2.4614497 - 0.3701 \log x$	$y = \frac{273.97}{x^{0.3701}} + 50.18$ $\log (y-50.18) = 2.4377035 - 0.3701442 \log x$
181. United States retail price of lard, 1890-1914	$y = \frac{1,206.85}{x^{0.6815}} + 51$ $\log (y-51) = 3.0816544 - 0.6815 \log x$	$y = \frac{1,168.19}{x^{0.6815}} + 49.4$ $\log (y-49.4) = 3.0675120 - 0.6815233 \log x$
182. United States weighted average retail price of lard, pork chops, bacon, and ham, 1890-1913	$y = \frac{568.50}{x^{0.5144}} + 52$ $\log (y-52) = 2.7547309 - 0.5144 \log x$	$y = \frac{540.40}{x^{0.5144}} + 49.4$ $\log (y-49.4) = 2.7327182 - 0.5144242 \log x$

*Hogs, total weight packed in the West*  
 Nov.-Feb., 1890-91 to 1912-13, related to:  
 183. United States farm price, Jan. 1, 1891-1913.....  
 184. United States weighted average retail price of lard, pork chops, ham, and bacon, 1891-1913.....  
*Cattle, receipts at Chicago 1890-1912 related to:*  
 185. United States farm price, Jan. 1, 1891-1913.....  
 186. United States retail price of round steak, 1890-1912.....  
*Cattle, receipts at Chicago 1890-1914 related to:*  
 187. United States farm price, Jan. 1, 1891-1915.....  
 188. Nebraska farm price, Jan. 1, 1891-1915.....  
 189. Chicago price of 1200-1500-pound steers, Jan. 1, 1891-1915.....  
 190. Chicago top price of native beef cattle, 1890-1914.....  
 191. United States retail price of round steak, 1890-1914.....  
 192. United States retail price of round steak, 1890-1914.....  
 193. Sale price of Shorthorn cows at public auction, 1893-1917.....  
 194. Sale price of roan Shorthorn bulls at public auction, 1893-1917.....  
 195. Low price of canner and cutter cows at Chicago, 1890-1914.....  
 196. Low price of fat cows and heifers, 1890-1914.....  
*Cattle, receipts at Chicago 1892-1914 related to:*  
 197. Chicago wholesale price of packer hides, heavy native steers, 1892-1914.....

$$y = \frac{1,555.53}{x^{0.5798}} + 152$$

$$y = \frac{511.98}{x^{0.4903}} + 152$$

$$y = \frac{59,319.05}{x^{1.3864}}$$

$$y = \frac{1605.84}{x^{0.4038}}$$

$$y = \frac{88,925.47}{x^{1.4804}}$$

$$y = \frac{400,761.51}{x^{1.8104}}$$

$$y = \frac{2,638.37}{x^{0.7163}}$$

$$y = \frac{1,733.24}{x^{0.6275}}$$

$$y = \frac{1,770.30}{x^{0.6339}}$$

$$y = \frac{9,050.10}{x^{1.1236}} + 44$$

$$y = \frac{214,161.49}{x^{1.6878}}$$

$$y = \frac{120,211.19}{x^{1.5676}}$$

$$y = \frac{12,003,624.31}{x^{2.5748}}$$

$$y = \frac{102,541.18}{x^{1.5093}}$$

$$y = \frac{1,896.74}{x^{0.6451}}$$

$$\log y = 3.1913201 - 0.5788 \log x$$

$$\log (y-52) = 2.7092189 - 0.4903 \log x$$

$$\log y = 4.752990 - 1.3864 \log x$$

$$\log y = 2.7822614 - 0.4038 \log x$$

$$\log y = 4.9492022 - 1.4804 \log x$$

$$\log y = 5.6028856 - 1.8104 \log x$$

$$\log y = 3.4213383 - 0.7163 \log x$$

$$\log y = 3.2388588 - 0.6275 \log x$$

$$\log y = 3.2480465 - 0.6339 \log x$$

$$\log (y-44) = 3.9566532 - 1.1236 \log x$$

$$\log y = 5.3307414 - 1.6878 \log x$$

$$\log y = 5.0806533 - 1.5676 \log x$$

$$\log y = 7.0793134 - 2.5748 \log x$$

$$\log y = 5.0108683 - 1.5093 \log x$$

$$\log y = 3.2568947 - 0.6451 \log x$$

$$y = \frac{1,444.38}{x^{0.5798}}$$

$$\log (y-49.3) = 2.8857998 - 0.4902799 \log x$$

$$y = \frac{485.06}{x^{0.4003}} + 49.3$$

$$y = \frac{59,264.27}{x^{1.3864}}$$

$$y = \frac{642.24}{x^{0.4038}}$$

$$y = \frac{91,385.96}{x^{1.4804}}$$

$$y = \frac{417,705.48}{x^{1.8104}}$$

$$y = \frac{2,707.58}{x^{0.7163}}$$

$$y = \frac{1,799.02}{x^{0.6275}}$$

$$y = \frac{1,852.56}{x^{0.6339}}$$

$$y = \frac{9,504.41}{x^{1.1236}} + 46.2$$

$$y = \frac{237,412.51}{x^{1.6878}}$$

$$y = \frac{136,533.87}{x^{1.5676}}$$

$$y = \frac{14,112,716.61}{x^{2.5748}}$$

$$y = \frac{104,392.14}{x^{1.5093}}$$

$$y = \frac{1,950.97}{x^{0.6451}}$$

$$\log y = 3.1596816 - 0.5788408 \log x$$

$$\log y = 4.7727930 - 1.3863965 \log x$$

$$\log y = 2.8076956 - 0.4038478 \log x$$

$$\log y = 4.9607844 - 1.4803922 \log x$$

$$\log y = 5.6208702 - 1.8104361 \log x$$

$$\log y = 3.4325812 - 0.7162906 \log x$$

$$\log y = 3.2550382 - 0.6275181 \log x$$

$$\log y = 3.2677948 - 0.6338974 \log x$$

$$\log (y-46.2) = 3.9779250 - 1.1236234 \log x$$

$$\log y = 5.3755036 - 1.6877518 \log x$$

$$\log y = 5.1352404 - 1.5678202 \log x$$

$$\log y = 7.1496106 - 2.5748063 \log x$$

$$\log y = 5.0186678 - 1.5093339 \log x$$

$$\log y = 3.2902510 - 0.6451256 \log x$$

TABLE 132 (continued)

	Original equations	Revised so that $y = 100$ when $x = 100$
<i>Cattle</i> , receipts at Chicago 1892-1914 related to: (concluded)		
198. Chicago wholesale price of country hides, heavy steers, 1892-1914.....	$y = \frac{2,473.88}{x^0.7079}$	$y = \frac{2,605.58}{x^0.7079}$
<i>Cattle</i> , receipts at Chicago 1893-1914 related to:		
199. Utah farm price of cattle under one year, Jan. 1, 1894-1915....	$y = \frac{55,641.68}{x^1.3943}$	$y = \frac{61,450.10}{x^1.3943}$
200. Utah farm price of cattle one year and under two years, Jan. 1, 1894-1915.....	$y = \frac{47,037.41}{x^1.3565}$	$y = \frac{51,648.60}{x^1.3565}$
201. Utah farm price of cattle two years and over, Jan. 1, 1894-1915.....	$y = \frac{24,303.87}{x^1.2062}$	$y = \frac{25,849.46}{x^1.2062}$
<i>Cattle</i> , receipts at Chicago 1890-1922 related to:		
202. United States farm price, Jan. 1, 1891-1923.....	$y = \frac{28,121.16}{x^1.2313}$	$y = \frac{29,008.97}{x^1.2313}$
203. Nebraska farm price, Jan. 1, 1891-1923.....	$y = \frac{100,237.64}{x^1.5099}$	$y = \frac{104,651.45}{x^1.5099}$
204. Chicago price of 1200-1500-pound steers, Jan. 1891-1923.....	$y = \frac{829.12}{x^0.4621}$	$y = \frac{839.98}{x^0.4621}$
205. United States retail price of round steak, 1890-1922.....	$y = \frac{1,115.98}{x^0.5264}$	$y = \frac{1,129.05}{x^0.5264}$
<i>Beef and pork</i> , production 1890-1912 related to:		
206. United States farm price, Jan. 1, 1891-1913.....	$y = \frac{3,913.53}{x^0.7867}$	$y = \frac{3,744.46}{x^0.7867}$
207. United States retail price, calendar year, 1890-1912.....	$y = \frac{342.34}{x^0.2666}$	$y = \frac{341.40}{x^0.2666}$
<i>Wheat, corn, and potatoes</i> , United States production 1890-1912 related to:		
208. United States farm price, Dec. 1, 1890-1912.....	$y = \frac{1,398.66}{x^0.5642}$	$y = \frac{1,343.95}{x^0.5642}$
	$\log y = 3.3683790 - 0.7079 \log x$	$\log y = 3.4158924 - 0.7079462 \log x$
	$\log y = 4.7454002 - 1.3943 \log x$	$\log y = 4.7885862 - 1.3912931 \log x$
	$\log y = 4.6724434 - 1.3565 \log x$	$\log y = 4.7130540 - 1.3565270 \log x$
	$\log y = 4.3856754 - 1.2062 \log x$	$\log y = 4.4124514 - 1.2062257 \log x$
	$\log y = 4.4490333 - 1.2313 \log x$	$\log y = 4.4625354 - 1.2312962 \log x$
	$\log y = 5.0012474 - 1.5099 \log x$	$\log y = 5.0197452 - 1.5098726 \log x$
	$\log y = 2.9186185 - 0.4621 \log x$	$\log y = 2.9249195 - 0.4621098 \log x$
	$\log y = 3.0476579 - 0.5264 \log x$	$\log y = 3.0527142 - 0.5263571 \log x$
	$\log y = 3.5925685 - 0.7867 \log x$	$\log y = 3.5733886 - 0.7866948 \log x$
	$\log y = 2.5344617 - 0.2666 \log x$	$\log y = 2.5332630 - 0.2666315 \log x$
	$\log y = 3.1457114 - 0.5642 \log x$	$\log y = 3.1283818 - 0.5641903 \log x$

<b>Meat and crops, production 1890-1912</b> related to:			
206. United States farm price, 1890-1912.....	$y = \frac{258.49}{x^{0.1998}}$	$\log y = 2.4124392 - 0.1998 \log x$	$\log y = 2.3995370 - 0.1997688 \log x$
<b>Horses, Chicago and East St. Louis receipts 1880-1913</b> related to:			
210. United States farm price, Jan. 1, 1881-1914.....	$y = \frac{652.26}{x^{0.4059}}$	$\log y = 2.8144193 - 0.4059 \log x$	$\log y = 2.8117276 - 0.4058638 \log x$
211. Vermont farm price, Jan. 1, 1881-1914.....	$y = \frac{565.56}{x^{0.3822}}$	$\log y = 2.7749264 - 0.3822 \log x$	$\log y = 2.7643432 - 0.3821716 \log x$
212. Nebraska farm price, Jan. 1, 1881-1914.....	$y = \frac{832.50}{x^{0.4496}}$	$\log y = 2.9203828 - 0.4496 \log x$	$\log y = 2.8991466 - 0.4495733 \log x$
<b>Horses, Chicago and East St. Louis receipts 1884-1913</b> related to:			
213. Number of horses imported, July-June, 1884-85 to 1913-14.....	$y = \frac{4,028,171.30}{x^{2.3270}}$	$\log y = 6.6051079 - 2.3270 \log x$	$\log y = 6.5540840 - 2.3270420 \log x$
<b>Lead, United States production</b> related to:			
214. New York City wholesale price of pig lead, 1875-1915.....	$y = 0.0650x + 90.42$	$y = 0.0671x + 93.29$	
<b>Salt, United States production</b> related to:			
215. Chicago wholesale price of American medium salt, 1895-1915.....	$y = 0.1362x + 84.84$	$y = 0.1383x + 86.17$	
<b>Rock phosphate, Florida production</b> related to:			
216. Wholesale price of rock phosphate f. o. b. mines, Florida, 1902-1913.....	$y = 0.4422x + 36.14$	$y = 0.5503x + 44.98$	
<b>Pig iron, United States production</b> related to:			
217. Wholesale price of No. 1 foundry pig iron, 1875-1913.....	$y = 0.4875x + 35.64$	$y = 0.5777x + 42.23$	
<b>Zinc, United States production</b> related to:			
218. Factory price of sheet zinc, 1887-1914.....	$y = 0.36109x + 56.44$	$y = 0.39017x + 60.98$	

TABLE 132 (concluded)

	Original equations	Revised so that $y = 100$ when $x = 100$
<i>Manufactures</i> , United States index of physical volume of manufactures related to:		
219. Wholesale price of 27 raw commodities, 1904-1915.....	$y = 0.1671x + 90.55$	$y = 0.1558x + 84.43$
220. Wholesale price of 70 manufactured commodities, 1904-1915.....	$y = 0.0375x + 101.12$	$y = 0.0358x + 96.43$
<i>Mining</i> , United States index of physical volume of mining 1895-1915 related to:		
221. Wholesale price of metal and of metal products, 1895-1915....	$y = 0.7864x + 23.72$	$y = 0.7683x + 23.18$

## SUMMARY

Nearly all readily available and extended series of prices are wholesale prices. Economists have fallen into the serious error of using these as measures of consumers' and producers' prices.

The price that the producer receives is the only price that affects production.

The price that the consumer pays is the only price that affects his consumption.

Consumption of that part of the supply which is used on the farm is affected by farm prices, which fluctuate violently. Consumption of that part of the supply which sells at retail is affected by retail prices, which fluctuate little. Consumption of that part of the supply which sells in tin cans is affected by prices of canned goods, which fluctuate still less. Consumption of that part of the supply which is consumed in hotels is affected by prices on the bill of fare, which are practically indifferent to supply.

The statement is constantly reiterated that supply and demand govern prices. The assumption is made that all prices are thus explained. If this were true, low prices would be explained either by high supply or by low demand. Consumers' prices are governed by supply and demand. Prices paid to farmers are consumers' prices less the cost of distribution. They may be low because supply or demand has made consumers' prices low, or they may be low in spite of high consumers' prices if distributing charges have risen.

In May, 1927, food sold by American farmers was retailing in American cities for 72 per cent above pre-war prices, but farmers were receiving only 46 per cent above pre-war prices for it.

Distributing charges for farm products in 1927 averaged 91 per cent above pre-war charges. This makes farm prices low. If farmers received their pre-war share of retail prices, there would now be no agricultural depression.

The agricultural depression is primarily due to high handling charges which have resulted from deflation. Prices and handling charges will in time come into adjustment. Before this occurs, forces will be set in motion which will result in a shortage of food and high retail prices. Retail prices of food in the United States do not indicate that there is an oversupply or an under-demand.

The producer pays the freight and all other distributing costs until such a time as he is able to reduce production and so pass on a part of these charges to the consumer. If retail prices were raised because handling charges were raised, the consumer would not take all the product and prices would have to be lowered. For most farm products a number of years are required in order to reduce production and pass on part of the distributing charges.

For most industrial products, a year of high supply is a year of high prices. For farm products, high supply means low prices.

Consumers pay more for a large crop than for a small crop. Farmers receive less total dollars for a large crop than for a small one. The extra amount paid by consumers remains in the cities.

When there is a large crop, the farm price is reduced more cents per bushel than is the retail price. It costs more cents per bushel to get the cheap crop to the consumer than to get the high-priced crop to him.

There is no "world market" to which other markets have a constant relationship. Farm prices are frequently as much affected by the location of the supply as by the total supply.

The violence with which farm prices fluctuate was becoming an important national problem even before the war. Eating in restaurants, stabilized retail prices, increased use of package goods, commercialized agriculture, specialized farming, and living in large cities rather than in small villages, all tend to make farm prices fluctuate violently.

Since urban growth is dependent on farm efficiency, the more efficient farmers become, the more violently do farm prices fluctuate.

Any change that makes distributing charges high relative to retail prices causes violent fluctuation in farm prices. Deflation left distributing charges high and made farm prices fluctuate violently. Before the war, a 20-per-cent shortage in the United States potato crop increased farm prices at Batavia, New York, 54 per cent, but it now increases them 177 per cent. Apparently fluctuations in the total food supply affect prices less than do fluctuations in the supply of a single commodity.

Farmers respond to prices as vigorously as does industry, but they are dealing with biological facts. When prices of pig iron were 20 per cent above normal, production was increased 12 per cent in the same year. When round steak sold for 20 per cent above the normal price, the receipts of steers in Chicago were increased 32 per cent eight years later.





