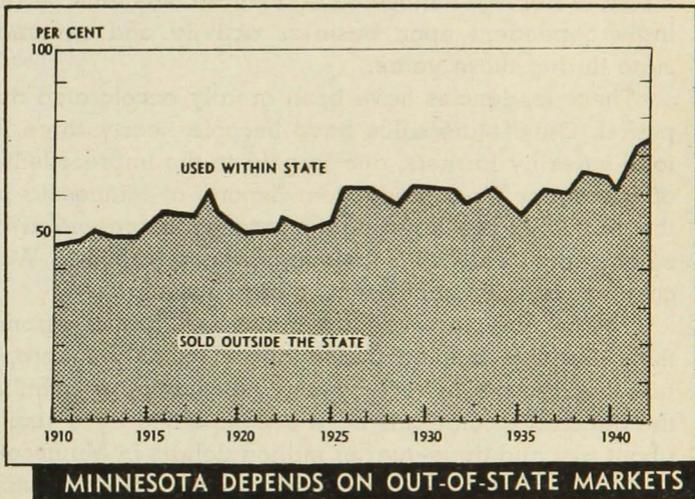
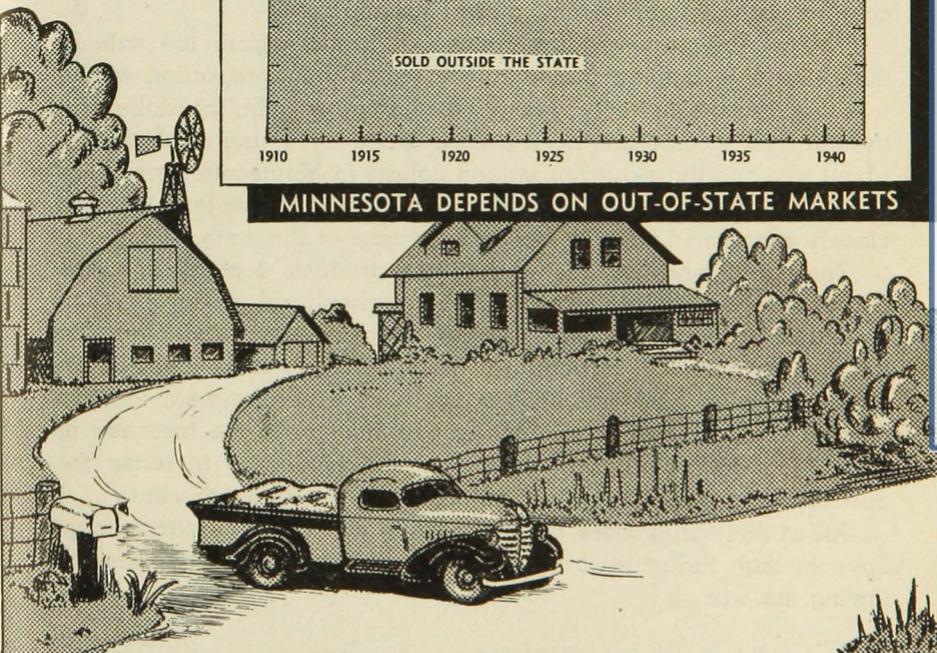


Sales OF MINNESOTA AGRICULTURAL PRODUCTS

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Conclusions

At the prices prevailing in 1935 to 1939, the state provided an outlet for about one hundred million dollars of Minnesota agricultural products at farm values. Products valued at twice this amount found markets outside the state. Between 1910 and 1939 the quantity of products reaching the nonfarm population of the state increased 40 per cent, while the quantities moving to markets outside the state trebled. Minnesota agriculture was thus becoming increasingly dependent upon business activity and demand outside the state during these years.

These tendencies have been greatly accelerated during the war period. Out-of-state sales have become nearly three fourths of the total sales by farmers, due largely to the unprecedented expansion of our agricultural production. Exports of Minnesota products from the United States have again reached a proportion of out-of-state sales comparable with their importance in World War I, after becoming virtually nonexistent during the thirties.

The income received by Minnesota farmers from the sale of their products has fluctuated almost exactly in proportion to the national income in recent years. A change of a billion dollars in the national income has been accompanied by a similar change of about five and three-quarter million dollars in Minnesota farm sales. The value of sales to the nonfarm population of the state is likewise closely associated with the nonfarm income of the state.

The purchasing power of agricultural products depends upon the output of industrial products as well as agricultural products. When industrial production is high relative to agricultural production, the purchasing power of agricultural products tends to be high. In the period between 1920 and 1939, agricultural exports appear to have exerted a considerable influence upon this ratio. An increase of 85 million dollars in agricultural exports tended to increase the purchasing power of agricultural products by one per cent.

All of this emphasizes the great stake which Minnesota farmers have in high industrial activity and large agricultural exports following the war.

Sales of Minnesota Agricultural Products In State and Out of State

Warren C. Waite

SATISFACTORY postwar markets for their products will shortly be a problem of first concern to Minnesota farmers. One important indication of where these markets may be found is the relative extent of in-state and out-of-state sales of the major commodities in recent years. Existing data do not permit precise determination of these destinations, but reasonably good estimates can be made of sales within the state and of sales outside. Estimates have been made for the 19 principal agricultural products sold by farmers for the years 1910 to 1943 inclusive. The products included are: wheat, corn, oats, barley, rye, flaxseed, potatoes, hogs, cattle, calves, sheep and lambs, chickens, eggs, milk, butterfat, farm butter, turkeys, and wool. They represent about 90 per cent of the total cash sales.

In general, the procedure has been to calculate the amount of the product consumed within the state from estimated per capita consumption rates and the number of people comprising the consuming population. The difference between these quantities and the total sales from the farms is assumed to represent the quantities which are sold outside the state. There are obvious errors in addition to inaccuracies of the data in such a procedure. Some of the pork, for example, consumed within Minnesota may come from North Dakota hogs, while Minnesota hogs are shipped out. Actual sales within the state would then be smaller than our estimates and sales outside would be larger. For appraising the importance of the local as compared with the out-of-state market, however, this is not thought to be of great importance.

Feedstuffs have been differently estimated in that shipments outside the state have first been estimated and the difference between these quantities and the total sales assigned to sales within the state.

Total Quantity of Cash Sales by Farmers

The total quantities of products which farmers have sold in previous years are shown by means of index numbers in table 1. The index in 1938 was double that of 1910. It will be observed that this was the result of a prolonged rise between 1910 and 1924 and that between 1924 and 1938 there was no decided change in level. There has been a very considerable increase during the war, with the index in 1943 nearly three times that of 1910.

Division of Sales within and outside the State

Between 1910 and 1940 total population in the state increased by more than one third and the nonfarm population by one half. The war has caused some decline. The increasing population provided a constantly larger local market for agricultural products for many years. Total agricultural production and sales, however, increased even more rapidly than the nonfarm population of the state with the result that a constantly larger portion of the agricultural products moved outside the state to find their market. The general trend in the proportion of the total dollar value of sales absorbed by the two outlets is shown in figure 1. In 1910, the state appears to have provided an outlet for about half the products sold by the farmers. Between 1925 and 1939, the proportion sold within the state varied between 35 and 40 per cent. The large increase in output during the

war decreased the proportion to about one fourth. The agriculture of the state has thus become increasingly dependent upon employment and industrial activity elsewhere for a satisfactory market for its products.

The change is further illustrated in figure 2. This shows indexes of the quantity of products estimated as consumed by the nonfarm population of the state and the quantity sold outside the state. The base is 1935-39, as with the index in table 1. The quantity of sales to the nonfarm population of the state appears to have increased by about 40 per cent between 1910 and 1940, while the sales outside the state were trebling. The index of sales to the nonfarm population fluctuates less than the index for sales outside the state, indicating a somewhat more stable market in terms of quantities for the within-state sales.

The relative proportion of the sales of the various products absorbed by the state market varies greatly. Estimates are shown in table 2 by five-

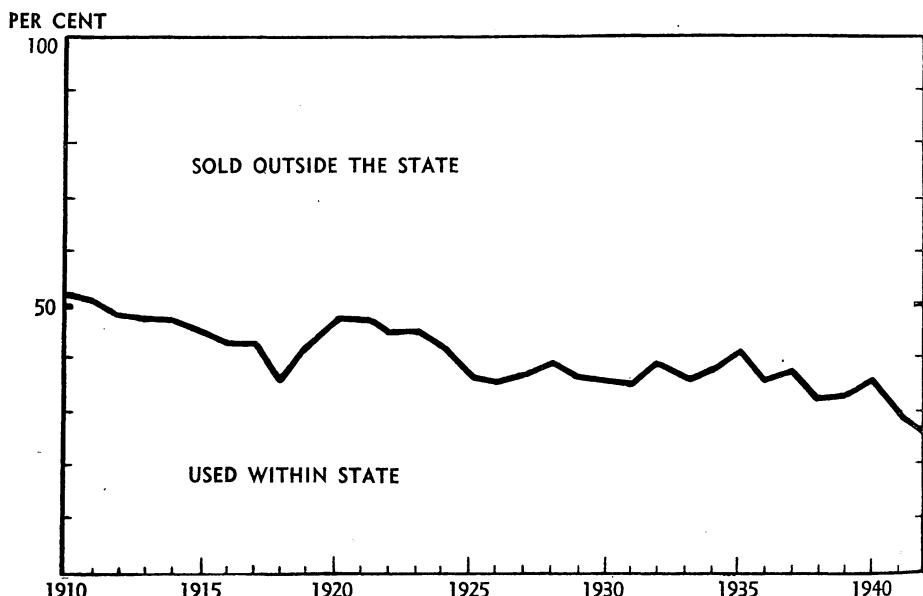


FIG. 1. Proportion of Minnesota farm sales within and outside the state, by years, 1910-1942

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Table 1. Index of Quantities of Cash Sales of 19 Principal Minnesota Agricultural Products, 1910 to 1943
(1935-1939=100)

Year	Index	Year	Index	Year	Index
1910	54	1921	75	1932	94
1911	58	1922	81	1933	102
1912	66	1923	88	1934	93
1913	66	1924	101	1935	82
1914	67	1925	100	1936	97
1915	71	1926	99	1937	96
1916	66	1927	96	1938	108
1917	63	1928	95	1939	116
1918	78	1929	97	1940	130
1919	72	1930	97	1941	133
1920	68	1931	100	1942	147
				1943	155

year periods for the individual commodities. Since the remaining product is sold outside the state, the percentages for this proportion may be readily calculated by subtracting the percentages in the table from 100. In the 1935-

39 period, the estimates for sales within the state vary from 12 per cent for flaxseed to 100 per cent for hay. The state itself in this period provided less than a quarter of the market for flaxseed, turkeys, lambs, sheep, wool, hogs,

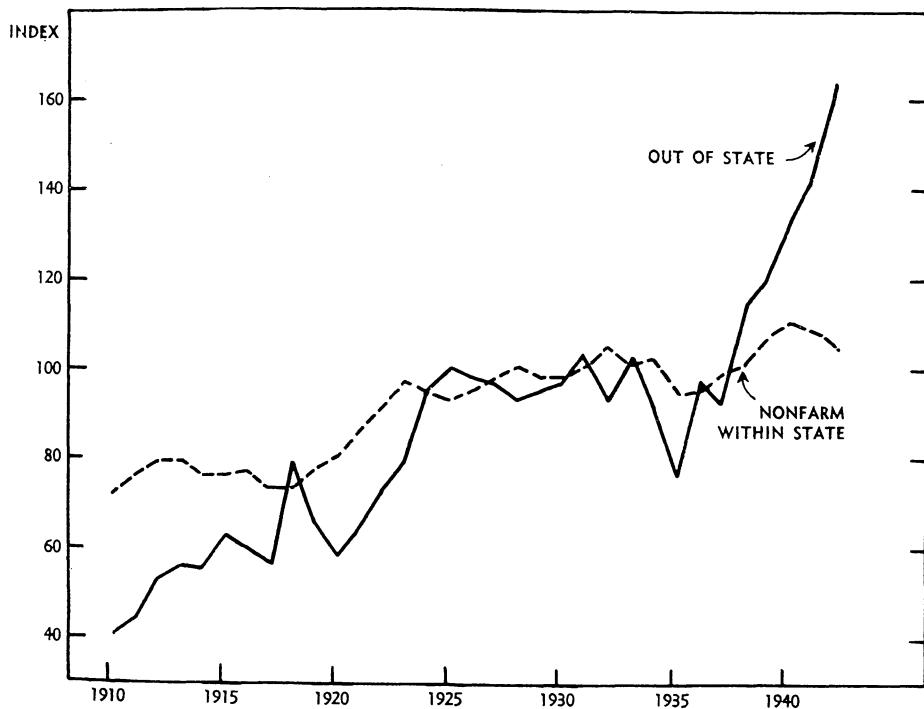


FIG. 2. Indexes of sales outside the state and nonfarm consumption within the state
(1935-39=100)

Table 2. Proportion of Minnesota Farm Sales Consumed within the State

	1910-14	1915-19	1920-24	1925-29	1930-34	1935-39
	Per cent					
Wheat	24	25	47	52	80	56
Corn	74	68	78	70	60	55
Oats	61	38	66	51	53	43
Barley	40	22	43	55	37	22
Rye	67	71	70	79	58	63
Flax	20	20	17	12	9	12
Potatoes	22	22	20	21	32	40
Hay	100	100	100	100	100	100
Hogs	40	30	23	19	19	22
Cattle, calves	51	34	35	29	29	31
Lambs, sheep	74	68	50	35	21	17
Butterfat	70	58	46	37	36	35
Milk and farm butter	72	94	98	88	80	75
Chickens	61	55	52	48	40	42
Eggs	80	66	54	48	48	44
Turkeys	17	16
Wool	42	61	54	34	18	22
All products	49	41	45	37	37	36

and barley; between a quarter and half the market for cattle and calves, butterfat, potatoes, chickens, eggs, and oats; and more than half the market for corn, wheat, rye, milk, and hay. The trends in these percentages are in large part due to the shift in the character of agricultural production in the state. The increasing importance of the out-of-state market for livestock and livestock products has been due to the very large expansion in the production of these products, while the increasing importance of the local market for potatoes and wheat has been due to the declining output of these commodities. Expansion of livestock enterprises has led to a greater utilization within the state of an enlarged output of feed-stuffs with a consequent decline in the relative importance of outside sales.

There is a rough correspondence between the ranking of importance of products in the total sales, sales outside the state, and sales within the state. There are, however, some significant differences. Hogs, which are first in importance in total sales and sales outside the state, are fourth in importance for sales within the state. Milk, which is fourth in importance in total sales

and third in importance in local sales, ranks tenth in importance in outside sales (table 3).

Sales within the State

The products included in the sales within the state are in part made up of products used by the nonfarm population, in part sales to other farmers, and a small part of products later repurchased by the farmers themselves after processing. This latter includes such things as linseed meal produced from crushing of the flax sold, and flour produced from wheat. These products constitute part of the farmer's cash sales even though he may later buy the processed commodities into which they have been converted. They have been separated here to show as far as possible the ultimate destination of the within-state sales. The division of the within-state sales according to these categories is shown in table 4.

The largest portion of the sales within the state ultimately reaches the nonfarm population. This category roughly accounted for five sixths of the within-state sales during the period 1935 to 1939. At the price levels prevailing in

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Table 3. Total Sales and Division of Sales by Commodities—Within-state and Out-of-state Annual Averages, 1935-39

Total sales		Sales outside the state		Sales within the state	
Commodity	Million dollars	Commodity	Million dollars	Commodity	Million dollars
Hogs	65.5	Hogs	51.1	Butterfat	22.5
Butterfat	64.5	Butterfat	42.0	Cattle	16.4
Cattle	52.9	Cattle	36.5	Milk	16.3
Milk	21.6	Eggs	10.3	Hogs	14.4
Eggs	18.5	Flax	8.0	Wheat	9.1
Wheat	16.4	Barley	7.7	Eggs	8.2
Corn	11.1	Wheat	7.3	Corn	6.1
Chickens	10.6	Chickens	6.2	Chickens	4.4
Barley	9.9	Sheep	6.2	Oats	2.6
Flax	9.1	Milk	5.3	Potatoes	2.3
Sheep	7.4	Corn	5.0	Barley	2.2
Oats	6.1	Turkeys	4.3	Hay	2.0
Potatoes	5.7	Oats	3.5	Rye	1.7
Turkeys	5.1	Potatoes	3.4	Sheep	1.2
Rye	2.7	Wool	1.4	Flax	1.1
Hay	2.0	Rye	1.0	Turkeys	0.8
Wool	1.8	Hay	0.0	Wool	0.4

Table 4. Destination of Agricultural Products Sold within the State, by Five-year Periods, 1910 to 1939

Period	Total in-state sales	Sales to nonfarm population	Sales to other farmers	Sales later repurchased by farmers as processed products
1910-14	\$ 89.1	\$ 65.2	\$19.8	\$4.1
1915-19	136.3	106.7	22.4	7.2
1920-24	141.3	103.3	32.2	5.8
1925-29	151.1	120.3	25.6	5.2
1930-34	85.6	72.9	10.0	2.7
1935-39	111.8	93.8	14.0	4.0

this period, nonfarm consumers within the state provided a market for nearly one hundred million dollars of Minnesota farm products at farm values. This would be about \$50 per capita for those in the nonfarm group. The quantities absorbed by this group do not change greatly from year to year as has already been indicated by the index in figure 2. The value of these quantities, of course, fluctuates considerably, depending upon the level of prices in the individual years.

The value of the sales within the state is closely associated with the non-

farm income of the state as is shown in figure 3. The nonfarm state income has been estimated by subtracting the total value of the sales of the 19 principal agricultural products of the state from the U. S. Department of Commerce estimates of the total state income. An increase in the nonfarm income of the state of 100 million dollars appears to have been accompanied by an increase of about 16 million dollars in sales to the nonfarm population of the state during the period from 1929 to 1942.¹

Sales to other farmers consist prin-

¹ The correlation is + .89. The regression equation is: Farm sales within the state = 41.38 million dollars plus .15614 times state nonfarm income.

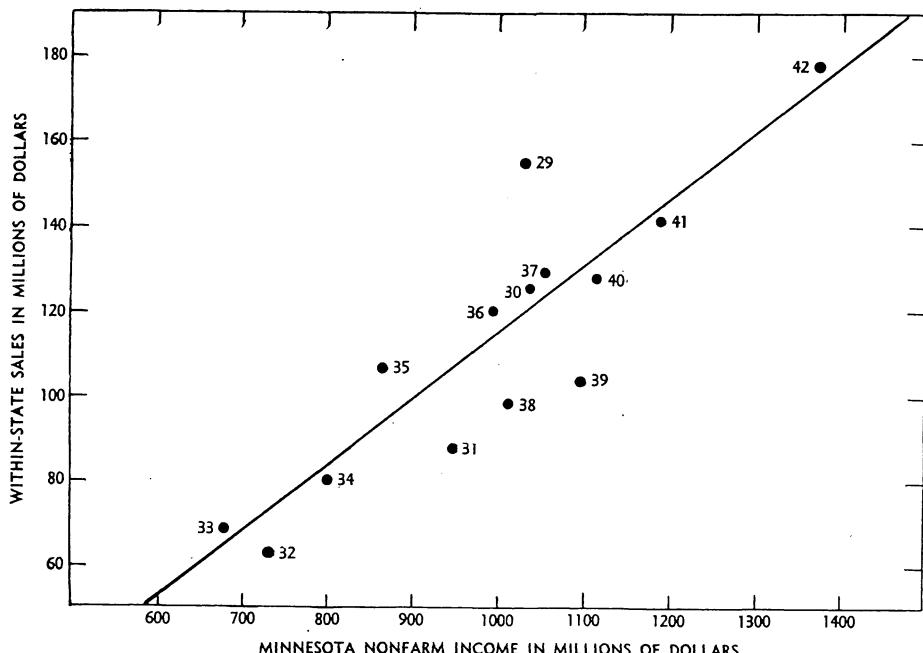


FIG. 3. Relationship between sales to nonfarm population in Minnesota and nonfarm income

cipally of feed grains for animals, although there are some sales of seed and a small quantity of food. Most of the feed fed on Minnesota farms is grown on the farm where fed. When the sales of feed grains in 1935 to 1939 are compared with the production in the years 1934 to 1938, it appears that only about 15 per cent of the corn produced in the state is sold, 20 per cent of the oats, 7 per cent of the hay, 50 per cent of the barley, and 72 per cent of the rye. The unsold portion is used for feed and seed on the farm where grown. Sales to other farmers have declined relative to the sales to non-farmers over a period of years.

Sales outside the State

The products sold outside the state are intermingled with a flow of commerce from other places, making it impossible to designate their final ori-

gin. Market receipt data are available for some of the principal markets of arrivals by states of origin for dairy and poultry products and for fruits and vegetables. There are no data for livestock and crops. Data are available on the export of the various agricultural products from the United States, and these permit a rough estimate of the probable place of these exports as an outlet for Minnesota agricultural products.

Assuming that the same proportion of a Minnesota commodity reaches the export market as for the United States as a whole, the probable position of exports in the sales of Minnesota products outside the state is shown in figure 4. These computations cannot be exact, but on the assumption that if the Minnesota product is not exported it replaces in the domestic market a product exported from some other locality, it has significance. The peak of exports appears to have been reached in 1918.

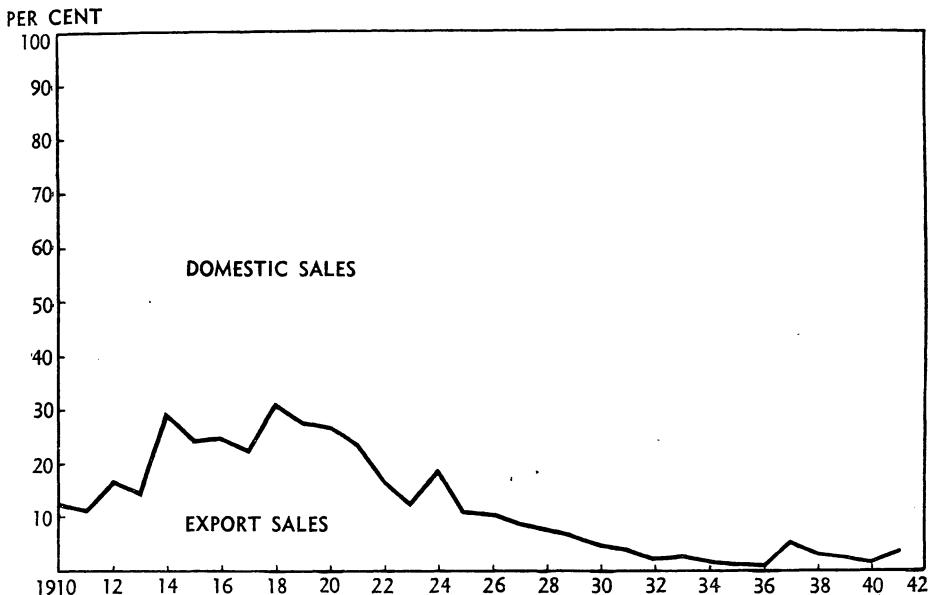


FIG. 4. Proportion of out-of-state sales exported from the United States, by years, 1910-1941

when close to 30 per cent of the products sold outside the state may be assigned to this outlet. Following that year, there was a great decline until in the 1930's only 2 per cent or less of the sales could be assigned as exports.

Under the stimulus of lend-lease, exports from the state have apparently reached about the same relative level as in World War I as a proportion of sales outside the state.

The value of the out-of-state sales has been closely related to the income of the nonagricultural population of the United States.² This relationship is shown for the period 1929 to 1942 in figure 5, in which total nonagricultural income as estimated by the U. S. Department of Commerce is compared with the total value of out-of-state sales of the principal agricultural products. Each change of a billion dollars

in national nonagricultural income appears to have been accompanied by a corresponding change of 6 million dollars in out-of-state farm sales.

Because of the current discussions of the necessity of a large postwar national income, a comparison has also been made between the national income in recent years and the total value of Minnesota farm sales regardless of destination. Here again the relationship is very close.³ As shown in figure 6, an increase or decrease in the national income of a billion dollars has been accompanied by a corresponding increase or decrease in Minnesota cash farm sales of about five and three-quarter million dollars. On the basis of these past relationships, it might be expected that if the national income could be maintained at a level of around 140 billion dollars, that Minne-

² The correlation coefficient is +.982. The regression equation is: Out-of-state sales in million dollars equals 5.9649 times United States nonagricultural income in billion dollars minus 166.55 million dollars.

³ The correlation is +.99. The regression equation is: Total farm sales in million dollars = 5.78 times national income in billion dollars minus 68.37 million dollars.

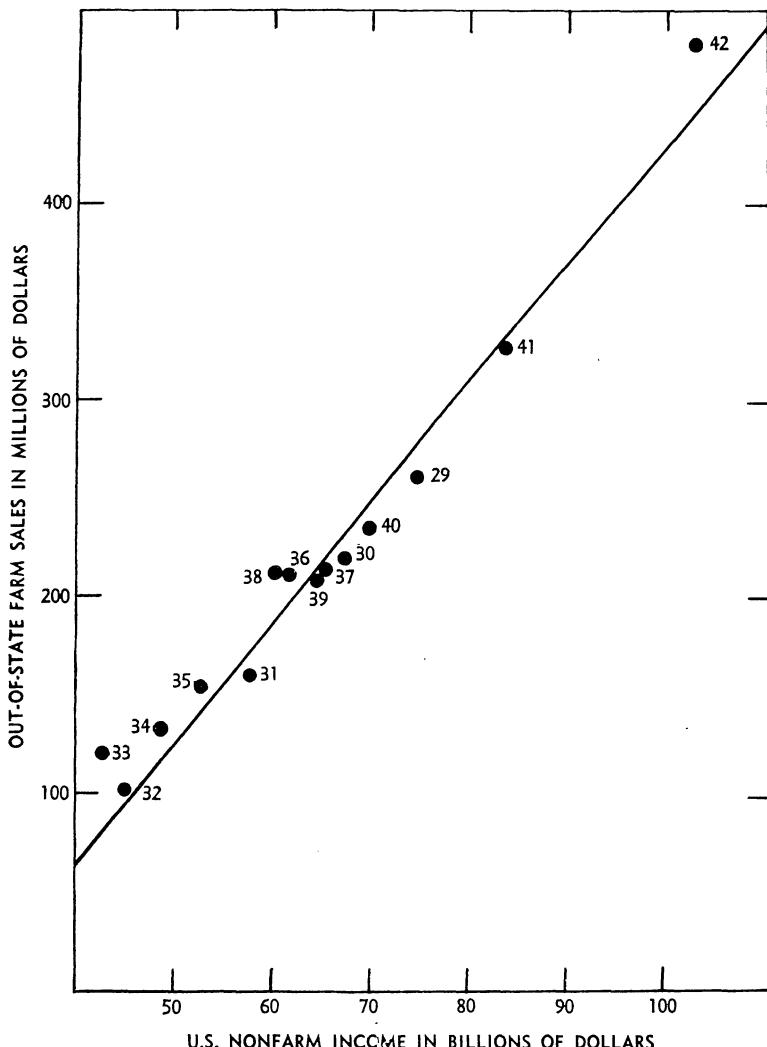


FIG. 5. Relation of out-of-state sales and nonagricultural income in the United States

sota agriculture could expect sales of around 740 million dollars in years of ordinary production. A national income of 120 billion dollars would be expected to result in an income of around 625 million dollars and one of 100 billion dollars in an income of about 510 million dollars.

The situation of the farmer depends

not only upon the prices which he receives for his products, but also in part upon the prices which he must pay for the products which he buys. The relationship between these sets of prices is commonly expressed by the parity ratio computed by the U. S. Department of Agriculture. This ratio is derived by dividing the index of prices received by

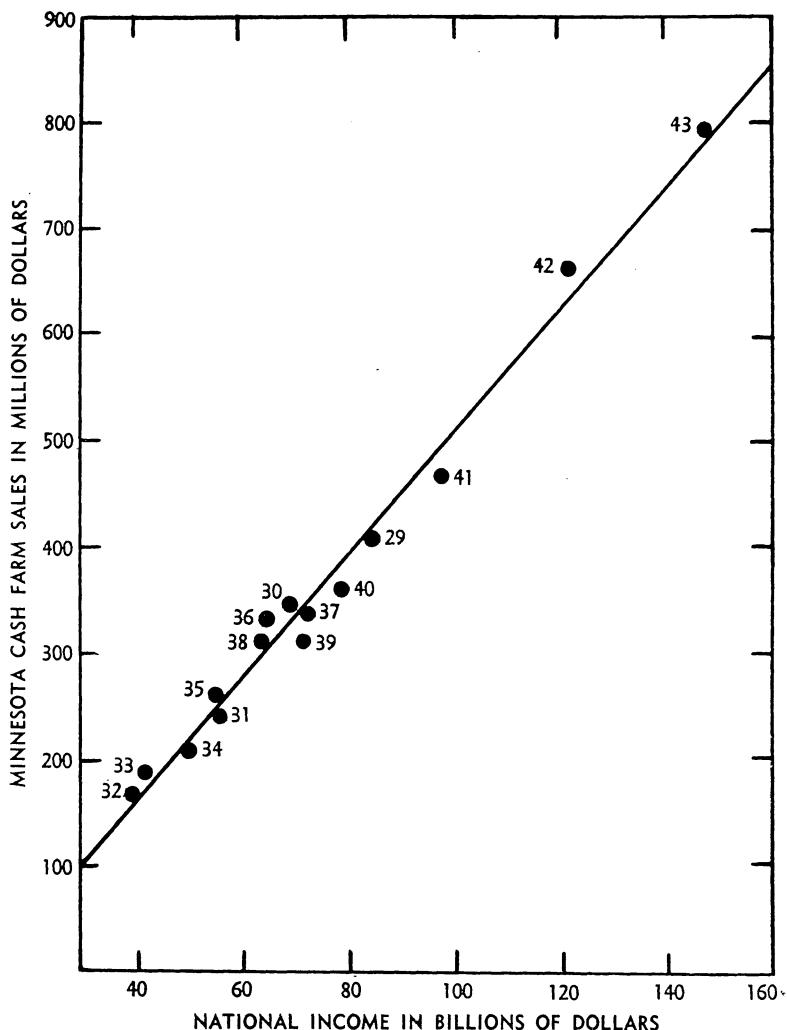


FIG. 6. Relation of Minnesota cash farm sales and the national income

farmers by the index of prices paid by them for commodities bought, including interest and taxes. When the ratio is high, prices received are high relative to prices paid.

The ratio of prices received by farmers to prices paid by farmers for goods bought by them depends in part upon the comparative volume of industrial and agricultural production. When in-

dustrial production is large, there is a strong demand for agricultural products both for food and as raw materials for industry. Large industrial production also means a large supply of things bought by farmers with a more favorable relationship between agricultural prices and prices paid by farmers. The changes in agricultural output relative to industrial output

have been measured by dividing the index of industrial production of the Federal Reserve Board by the index of agricultural production computed by the U. S. Department of Agriculture. During the period from 1920 to 1939, an increase in the ratio of industrial production to agricultural production of one per cent was accompanied by an increase in the ratio of prices received by farmers to prices paid of one-half of one per cent. Even more

striking, however, has been the apparent influence of agricultural exports upon this price ratio. When an index of dollar value of agricultural exports is included in the analysis, the total fluctuation in the price ratio is nearly completely explained in this period.⁴ Roughly an increase in agricultural exports of 85 million dollars was associated with an increase of one per cent in the ratio of prices received to prices paid by farmers.



⁴The simple correlation between the ratio of prices received to prices paid and the ratio of industrial to agricultural production is +.67. The multiple correlation with the ratio of prices received to prices paid as the dependent variable and with the ratio of industrial to agricultural production and the index of dollar value of agricultural exports as independent variables is .94.