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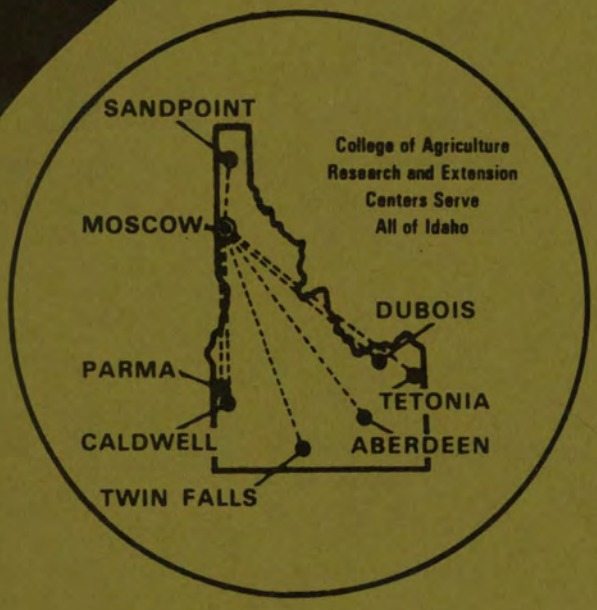

Economic Investment in the Food And Kindred Products Manufacturing Industries of Idaho, 1958-1971

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Conclusions

Results of this research indicate the following:

In 1969 the food and kindred products industry employed 34.4 percent of all employees in manufacturing in Idaho.

Primary sectors in Idaho's manufacturing economy include:

Food and Kindred Products

Lumber and Wood Products

Printing and Publishing

Chemicals and Allied Products

Fabricated Metals

Machinery

Primary Food and Kindred Products subsectors include:

Meat Products

Dairy Products

Canned, Cured and Frozen Foods

Grain Mills

Bakery Products

Sugar Products

Beverages

Increases in manufacturing employment from 1958 to 1971

All Manufacturing - 158.3 percent

Food and Kindred Products - 185.2

Increases in value added by manufacture 1958 to 1971

All Manufacturing - 261.5 percent

Food and Kindred Products - 293.7 percent

Increases in real productivity per employee from 1958 to 1971

All Manufacturing - 18 percent

Food and Kindred Products - 14 percent

Multiplier analysis implies

All Manufacturing: $5.45 of income per dollar of investment

Food and Kindred Products: $6.56 of income per dollar of investment

All manufacturing value added as a function of capital expenditures in food and kindred products:

$23.30 of income from all manufacturing as a result of $1.00 investment in food and kindred products.

ECONOMIC INVESTMENT IN THE FOOD AND KINDRED PRODUCTS MANUFACTURING INDUSTRIES OF IDAHO 1958-1971

by Roger B. Long and Janet A. Sylvester

Manufacturing Industries of Idaho - 1969

Idaho is an agricultural state with a large but unknown portion of its income originating from farming, the processing of farm products, and the distribution of these products within the State. The results presented in this report are part of a detailed study of Idaho's agriculturally-based economy. The focus of this research is the manufacturing industries of Idaho that process agricultural products. The analysis is concerned with the relationships between income earned and investments made in the food and kindred products industries.

All Manufacturing

The Census of Manufactures, Bureau of the Census, periodically publishes detailed information on manufacturing industries by state. The last Census was completed in 1967 and is in published form. These Census data provide information indicating what the structure of Idaho's manufacturing industry is like.

The Annual Survey of Manufactures updates some of the Census data each year. For example, in 1967 there were 1,131 firms in Idaho that employed 37,100 persons, earned $503.4 million in value added (income), purchased materials worth $713.4 million, had a value of production worth $1,224.5 million and capital expenditures of $57.7 million. By 1969, the structure of Idaho's manufacturing economy had grown to 39,200 employees with statistics as shown in Table 1.

Table 1. Statistics for the State of Idaho by industry groups and industries, 1969.

S.I.C. Code	Sector	All Employees	Value Added by Manufacture ($ Million)	Cost of Materials ($ Million)	Value of Shipments ($ Million)	Capital Expenditure ($ Million)
20	Food and Kindred Products	13,500	168.6	392.4	558.3	19.5
24	Lumber and Wood Products	12,000	150.0	211.7	351.6	13.7
27	Printing and Publishing	2,100	22.6	7.7	30.3	2.5
28	Chemicals and Allied Products	3,400	108.0	66.0	174.8	3.9
34	Fabricated Metals	800	11.1	19.7	30.8	0.7
35	Machinery	1,000	8.1	7.6	17.2	0.4
39	Misc. Manufacture	300	2.8	1.5	4.1	0
	Unaccounted	6,100	106.0	158.9	264.8	11.2
	Total Idaho	39,200	577.2	865.5	1,431.9	51.9

Source: Annual Survey of Manufactures.

Of the 39,200 persons employed in manufacturing in Idaho in 1969, 13,500--34.4 percent--were employed in food and kindred products industries; of the $577.2 million of income generated (value added), $168.6 million were generated by the food and kindred products industries in Idaho. Food and kindred products was the leading sector in terms of both employment and total income in the State.

Food and Kindred Products Manufacturing

1967 Census of Manufactures

The food and kindred products sector of manufacturing is comprised of various subsectors important to Idaho. Data are available for these subsectors for 1967 and have been projected to 1969 through Census reports. Table 2 presents actual Census data for food and kindred products in Idaho. In 1967 these sectors consisted of 215 firms, employing 12,200 persons, and earning $143.4 million in income.

The single most important industry in food and kindred products was canned, cured and frozen foods which included 41 firms, employed 6,900 persons, and earned $70.6 million in value added or income. These firms alone earned 49.2 percent of the income from agricultural manufacturing. The meat, dairy, and sugar industries were also important parts of the industrial combination for food and kindred products.

Table 2 shows the canned, cured, and frozen food industry employed 18.6 percent of all persons in all manufacturing and earned 14.0 percent of all income from manufacturing. These firms preserve the potatoes, vegetables, and fruits grown on Idaho farms. This same information was projected for 1969 using the 1967 proportions, and is presented in Table 3.

Table 2. Food and kindred products statistics, Idaho, 1967.

S.I.C. Code	Sub-Sector	Total Establishments (Number)	Total Employees (Number)	Value Added by Manufacture ($ Million)	Cost of Materials ($ Million)	Value of Production ($ Million)	Capital Expenditures ($ Million)
2010	Meat Products	40	1,000	13.8	73.1	86.9	0.4
2020	Dairy Products	54	1,700	18.9	87.4	106.3	1.1
2030	Canned, Cured, and Frozen Foods	41	6,900	70.6	89.9	160.5	7.2
2040	Grain Mills	27	600	6.3	19.9	26.2	0.6
2050	Bakery Products	15	400	4.3	3.2	7.5	0.1
2060	Sugar Products	4	700	20.7	34.5	55.2	1.4
2080	Beverages	18	600	4.3	3.8	8.1	0.7
2090	Misc. Foods	16	300	4.5	4.3	8.8	0.3
20	Food and Kindred Products	215	12,200	143.4	316.1	459.5	11.8
Total Idaho	All Manufacturing	1,131	37,100	503.4	713.4	1,224.5	57.7

Source: Census of Manufactures.

Table 3. Projected food and kindred products statistics, Idaho, 1969.

S.I.C. Code	Sub-Sector	Total Establishments (Number)	Total Employees (Number)	Value Added by Manufacture ($ Million)	Cost of Materials ($ Million)	Value of Production ($ Million)	Capital Expenditures ($ Million)
2010	Meat Products	44	1,107	16.2	90.6	106.8	0.7
2020	Dairy Products	59	1,876	22.3	108.4	130.7	1.8
2030	Canned, Cured, and Frozen Foods	45	7,041	83.0	111.8	194.8	11.9
2040	Grain Mills	30	661	7.4	24.7	32.1	1.0
2050	Bakery Products	17	445	5.1	3.9	9.0	0.2
2060	Sugar Products	5	770	24.3	42.8	67.1	2.3
2080	Beverages	20	662	5.1	4.7	9.8	1.2
2090	Misc. Foods	18	338	5.2	5.5	10.7	0.4
20	Food and Kindred Products	238	13,500	168.6	392.4	561.0	19.5
Total Idaho	All Manufacturing	1,195	39,500	577.2	865.5	1,431.9	51.9

Source: Annual Survey of Manufactures.

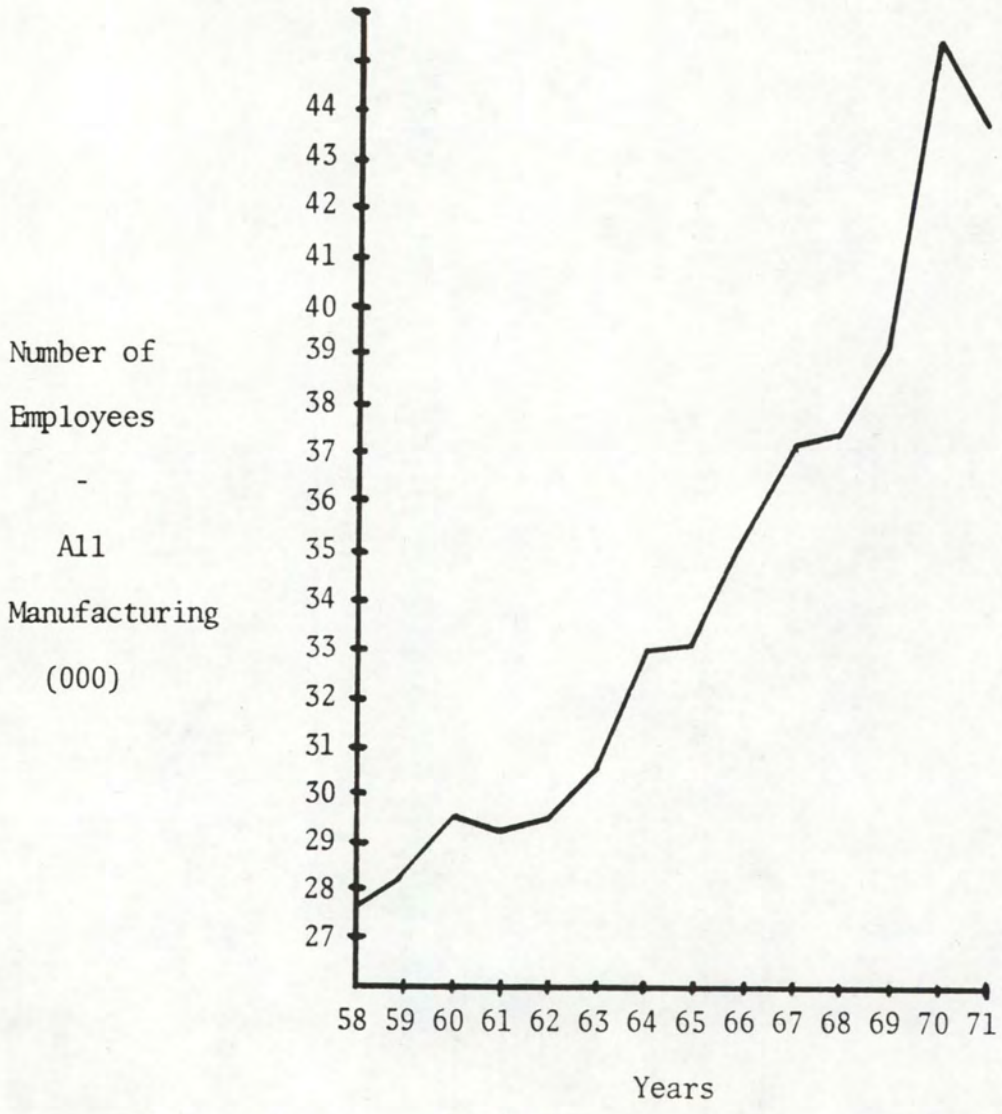

Figure 1. All employees engaged in manufacturing, Idaho, 1958-1971. Annual survey of Manufactures, 1970-1971.

Trends in Manufacturing Employment

All Manufacturing

Idaho has only begun to develop concerning manufacturing. In 1958, Idaho employed 27,600 persons in the manufacturing sectors of its economy. By 1971, manufacturing employment had grown to 43,700--58.3 percent increase in 13 years. However, this increase is not particularly large, averaging about 4.5 percent per year.

In 1958, total employment in Idaho was 145,000 of which 17.2 percent was classified as working in some type of manufacturing. By 1971, total employment increased to 214,000 with 19.1 percent engaged in manufacturing. Employment in manufacturing had grown at a rate greater than total employment for the period.

Fig. 1 shows the employment data for all manufacturing in Idaho from 1958 to 1971. The figure indicates an increasing number of persons employed in all manufacturing with a significant drop in numbers only in 1971. This decline is reflected in both total manufacturing and food and kindred products. If past trends continue, Idaho will probably have a larger proportion of people employed in manufacturing, compared to other occupations, than it has had in previous years.

Food and Kindred Products

Since 1958 employment in food and kindred products industries has also expanded. In 1958, 28.6 percent of manufacturing employment was in food and kindred products; by 1971 the percentage had grown to 33.4 percent. Fig. 2 summarizes the growth in food and kindred products employment from 1958 to 1971. In 1958, total employment here was 7,885 and by 1971 it had grown to 14,600--increase of 85.2 percent in 13 years or 6.6 percent per year.

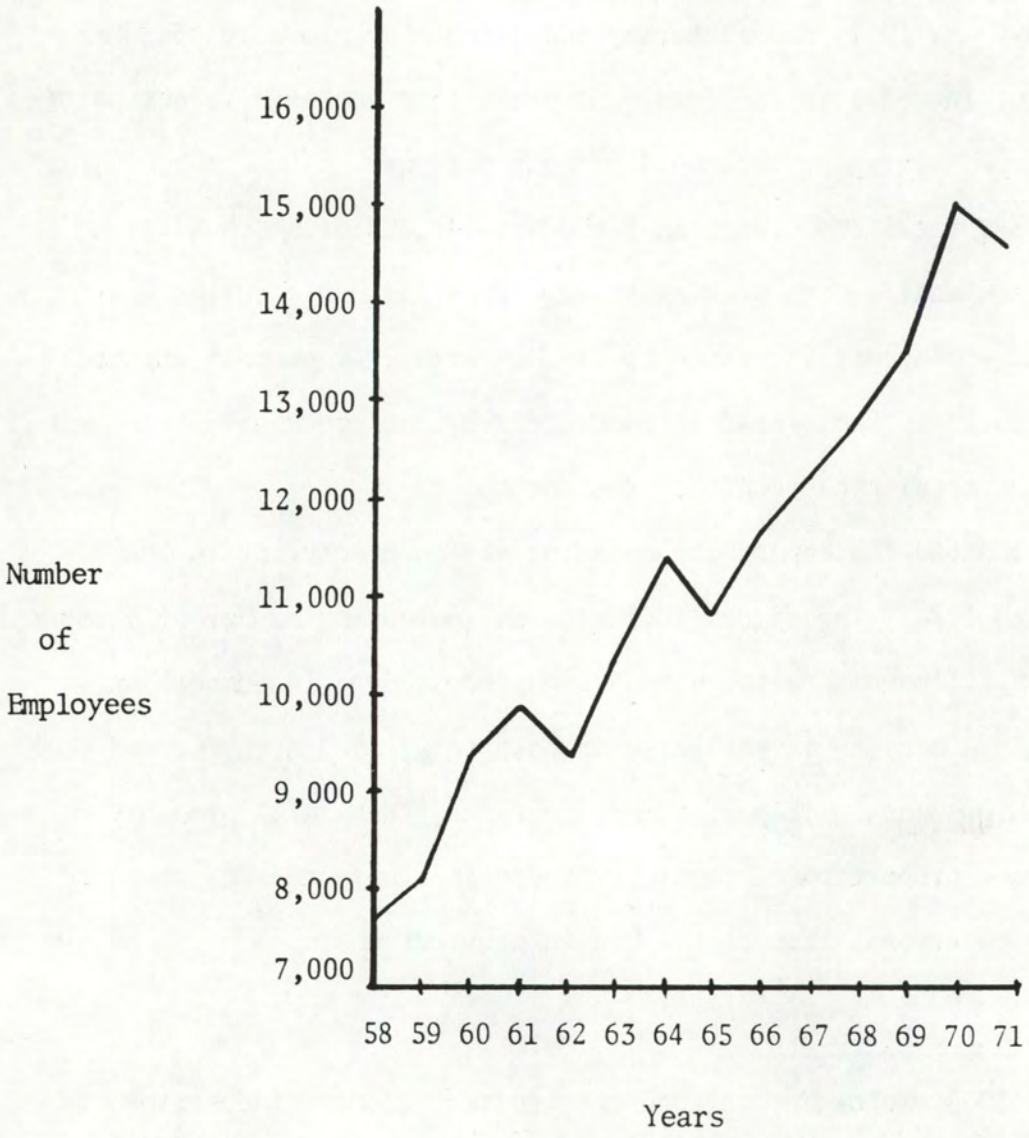

Figure 2. Number of employees, food and kindred products sectors, Idaho, 1958-1971.

Food and kindred products have improved and maintained their relative importance from 1958 to 1971 when compared to employment in all manufacturing. Table 4 compares employment in all manufacturing and in food and kindred products. The percentage of persons employed in food and kindred products has remained at about 33 1/3 percent of the total employment in all manufacturing in Idaho since 1961. Food and kindred products has progressed with all manufacturing and has contributed 42 percent--6,715 of 16,100--of the increase in employees from 1958 to 1971.

New plants currently being built in the food and kindred products sector of Idaho's economy indicate that similar relationships will continue into the future.

Income From Manufacturing Employment

All Manufacturing

Income or value added from manufacturing, like employment, has increased for manufacturing industries in Idaho. For example, in 1958 all manufacturing industries produced $255.8 million in value added. By 1971 this had increased to $669 million. In percentage terms this is a 161.5 percent increase, or a 12.4 percent increase in income per year.

Total value added by manufacture shows a steady, nearly linear, increase over time (Fig. 3). Between 1961 and 1971 the value added by manufacture in Idaho increased at a rate of nearly $40 million per year.

Food and Kindred Products

Total value added by manufacture for food and kindred products increased in a manner similar--but slightly steeper in recent years--to that of all manufacturing (Fig. 4). Between 1958 and 1971, value

Table 4. Number of employees, all manufacturing and food and kindred products, Idaho, 1958-1971.

Year	Number of Employees All Manufacturing	Number of Employees Food and Kindred Products	Food and Kindred Products as a Percentage of All Manufacturing
1971	43,700	14,600	33.4%
1970	45,300	15,000	34.5
1969	39,200	13,500	34.4
1968	37,300	12,800	34.3
1967	37,100	12,200	32.9
1966	35,300	11,681	33.1
1965	33,100	10,876	32.9
1964	32,900	11,495	34.9
1963	30,500	10,486	34.4
1962	29,400	9,477	32.2
1961	29,200	9,980	34.2
1960	29,400	9,507	32.3
1959	28,300	8,211	29.0
1958	27,600	7,885	28.6

Source: Annual Survey of Manufactures.

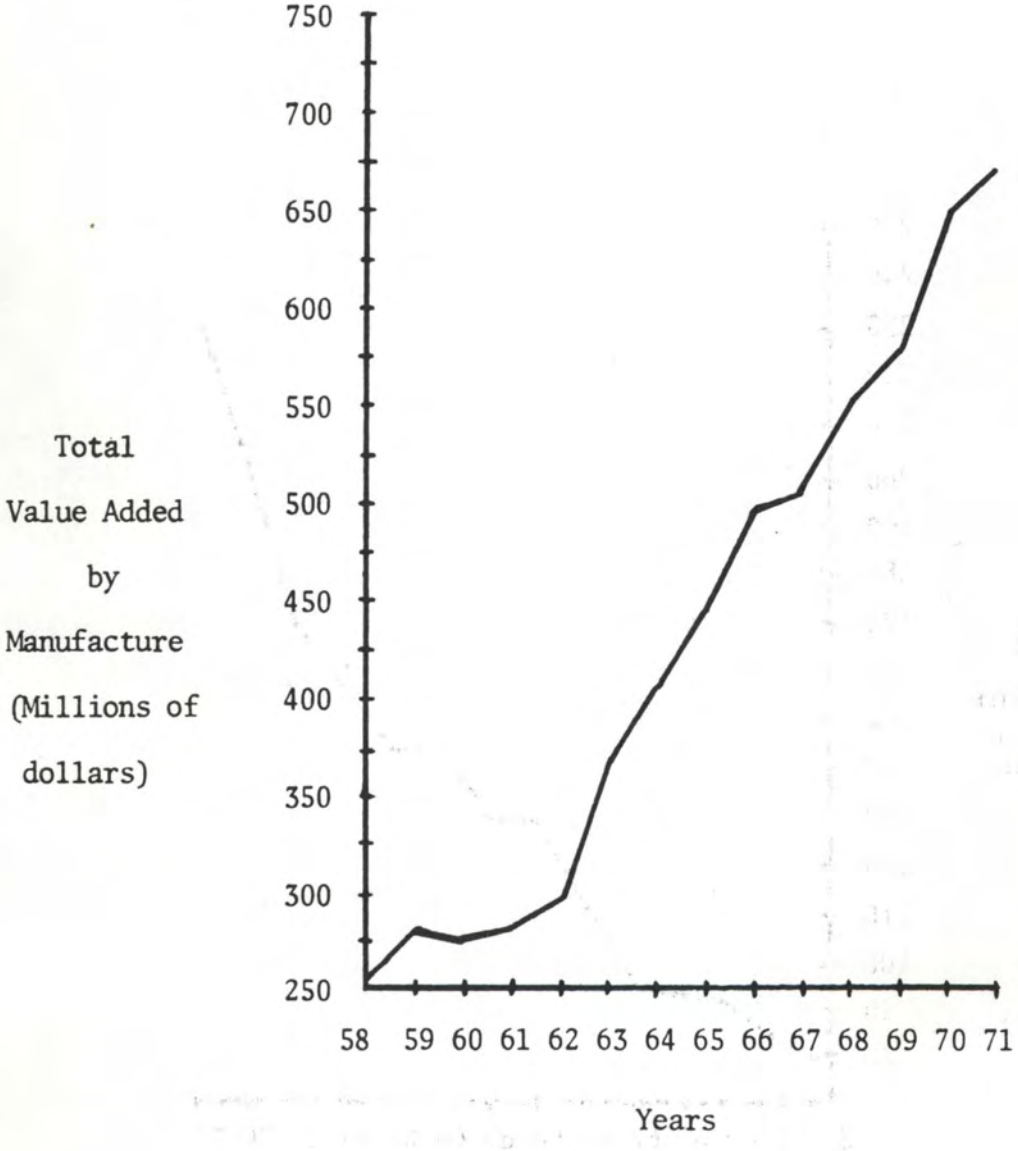

Figure 3. Total value added by manufacture, Idaho, 1958-1971. (Annual survey of manufactures, 1970-1971).

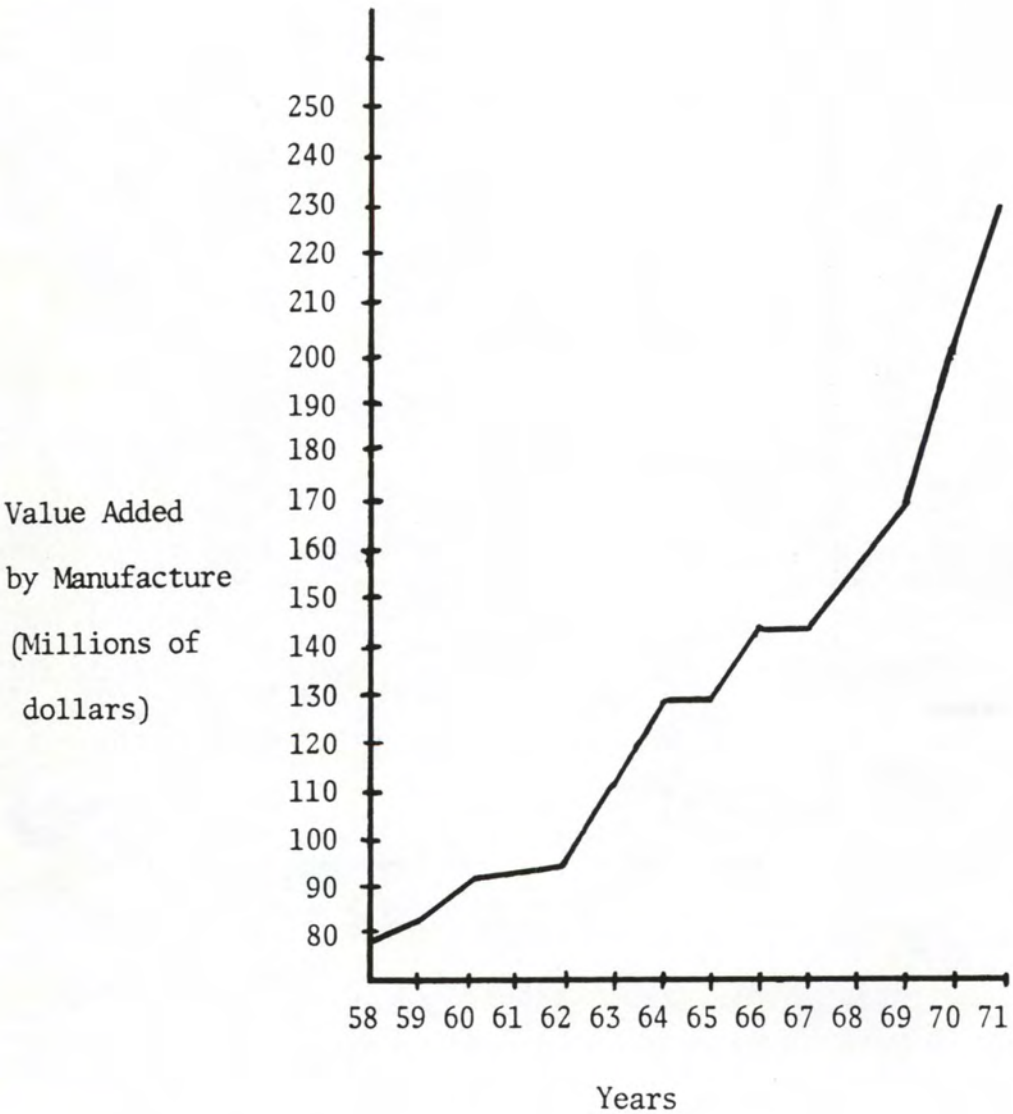

Figure 4. Total value added by manufacture, food and kindred products, Idaho, 1958-1971.

added by manufacture for food and kindred products increased 194 percent from $77.6 million to $227.9 million, or nearly $11.6 million per year. Table 5 compares increases in value added by manufacture for all manufacturing and for food and kindred products from 1958 to 1971. Again, food and kindred products manufacturing was about one-third of all manufacturing on a value added basis. The actual percentage varied from a low of 28.4 percent in 1968 to a high of 34.1 percent in 1971. Obviously food and kindred products manufacturing is an integral part of total manufacturing in Idaho. Since value added is essentially income, increases are of importance to all residents of the State.

Productivity in Manufacturing

All Manufacturing

Productivity of an enterprise may be evaluated in terms of the output per unit of input. In manufacturing, a useful measure of productivity is the income earned per worker (or value added per worker). If income or value added per worker increases over time, one would presume that productivity was increasing also. First examination of the data indicates that productivity per worker increased from $9,268 in 1958 to $15,309 in 1971, an increase of over $6,000 per worker. The data in Table 6 shows a steady increase in income earned per worker over the period 1958 to 1971. This increase, however, is complicated by changing value of the dollar, which will be discussed later.

Table 6 and Fig. 5 indicate that all manufacturing increased total employment by 58.3 percent in 13 years and increased apparent productivity per worker 65.2 percent. While the increase in number of employees is remarkable, the increase in productivity is questionable because of price inflation.

Table 5. Total value added by manufacture, all manufacturing and food and kindred products, Idaho, 1958-1971.

Year	Value Added by Manufacture-All Manufacturing ($ Million)	Value Added by Manufacture-Food and Kindred Products ($ Million)	Food and Kindred Products as a Percent of All Manufacturing (Percent)
1971	669.0	227.9	34.1%
1970	649.7	201.0	30.9
1969	577.2	168.6	29.2
1968	552.3	156.7	28.4
1967	503.4	143.4	28.5
1966	494.2	144.2	29.2
1965	443.8	129.4	29.2
1964	406.4	128.8	31.7
1963	366.4	111.1	30.3
1962	297.3	94.3	31.7
1961	280.1	92.3	33.0
1960	276.2	91.1	33.0
1959	280.4	83.4	29.7
1958	255.8	77.6	30.3

Source: Annual Survey of Manufactures.

Table 6. Value added by manufacture per employee, Idaho, 1958-1971.*

Year	Number of Employees	Value Added ($ Million)	Value Added Per Employee ($/Person)
1971	43,700	669.0	15,309
1970	45,300	649.7	14,342
1969	39,200	577.2	14,724
1968	37,300	552.3	14,806
1967	37,100	503.4	13,568
1966	35,300	494.2	14,000
1965	33,100	443.8	13,407
1964	32,900	406.4	12,352
1963	30,500	366.4	12,013
1962	29,400	297.3	10,112
1961	29,200	280.1	9,592
1960	29,400	276.2	9,394
1959	28,300	280.4	9,908
1958	27,600	255.8	9,268

*Source: Annual Survey of Manufactures, Bureau of the Census.

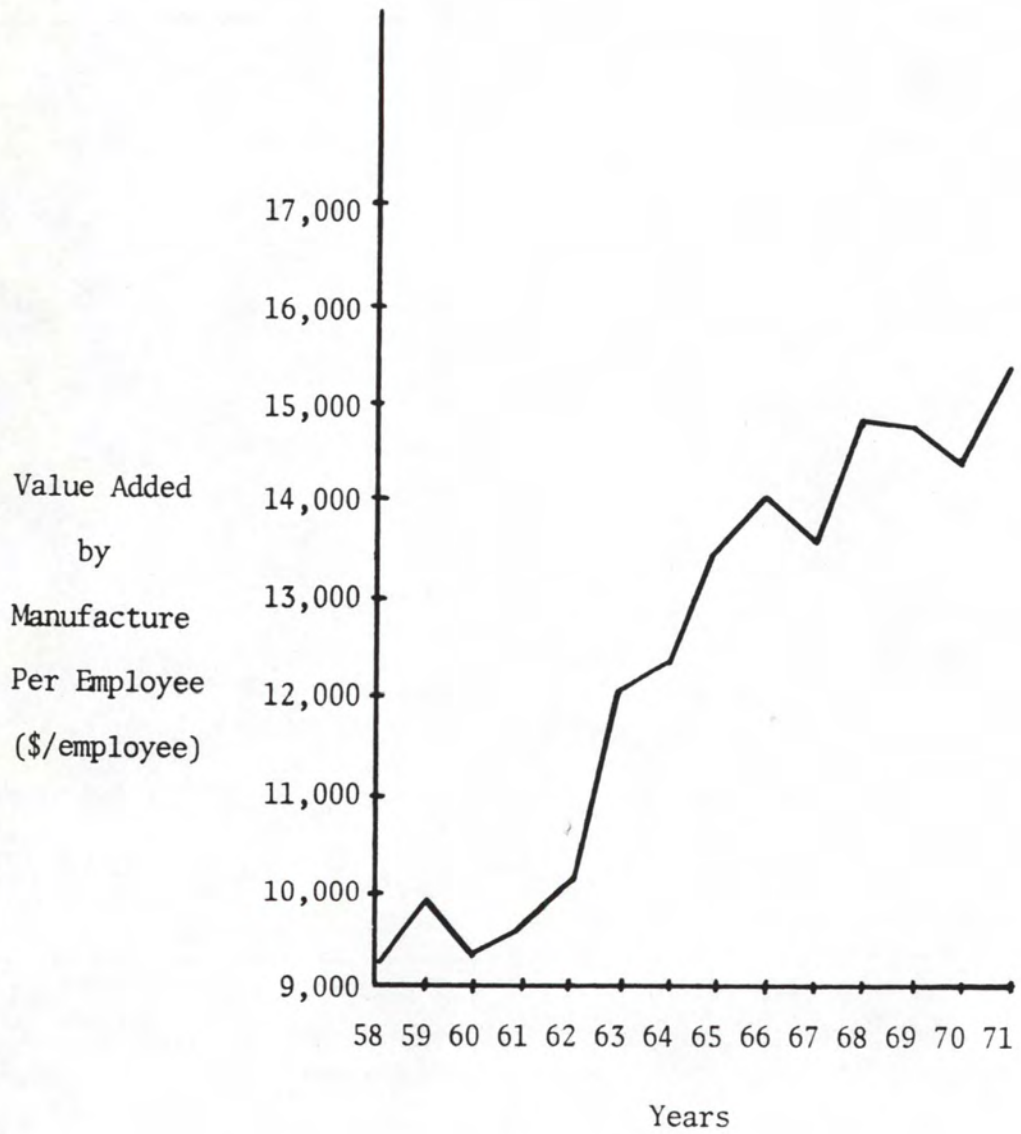

Figure 5. Value added by manufacture per employee, Idaho, 1958-1971, (Annual survey of manufactures.

Food and Kindred Products

Data similar to the above are presented in Table 7 and Fig. 6. Employment in food and kindred products increased from 7,885 to 14,600 between 1958 and 1971, while value added per employee increased from $9,841 to $15,609 for the same period. These increases are similar to those for all manufacturing and have the same problem with respect to real productivity per worker because of price increases. Doubling employment is real enough; however, the income earned per person must be adjusted to account for increased prices.

Real Productivity in All Manufacturing and Food and Kindred Products

The Consumer Price Index--base year 1967--was used to evaluate productivity per employee in all manufacturing and food and kindred products for the years 1958 to 1971. First, the Consumer Price Index for 1967 was adjusted to 1958. Secondly, the actual value added per employee was adjusted to this index. Finally, an index of productivity was developed using the 1958 adjusted value added per employee as the base.

The productivity index for all manufacturing varied from 100 in 1958 to 118 in 1971, indicating an 18 percent increase in employee productivity from the first to the last year. The productivity index, however, rose to a high of 134 in 1966, indicating a 34 percent productivity increase in 8 years.

The productivity index for food and kindred products increased from 100 in 1958 to 114 in 1971, indicating a 14 percent increase in real productivity in 13 years. The 114 productivity index was the highest for the whole period. While productivity of food and kindred products did not rise as high as that for all manufacturing, the two were almost at the same levels after 13 years.

Table 7. Value added by manufacture per employee, food and kindred products, Idaho, 1958-1971.

Year	Number of Employees	Value Added ($ Million)	Value Added Per Employee ($/person)
1971	14,600	227.9	15,609
1970	15,000	201.0	13,400
1969	13,500	168.6	12,488
1968	12,800	156.7	12,242
1967	12,200	143.4	11,754
1966	11,681	144.2	12,344
1965	10,876	129.4	11,897
1964	11,495	128.8	11,204
1963	10,486	111.1	10,642
1962	9,477	94.3	9,950
1961	9,980	92.3	9,248
1960	9,507	91.1	9,582
1959	8,211	83.4	10,157
1958	7,885	77.6	9,841

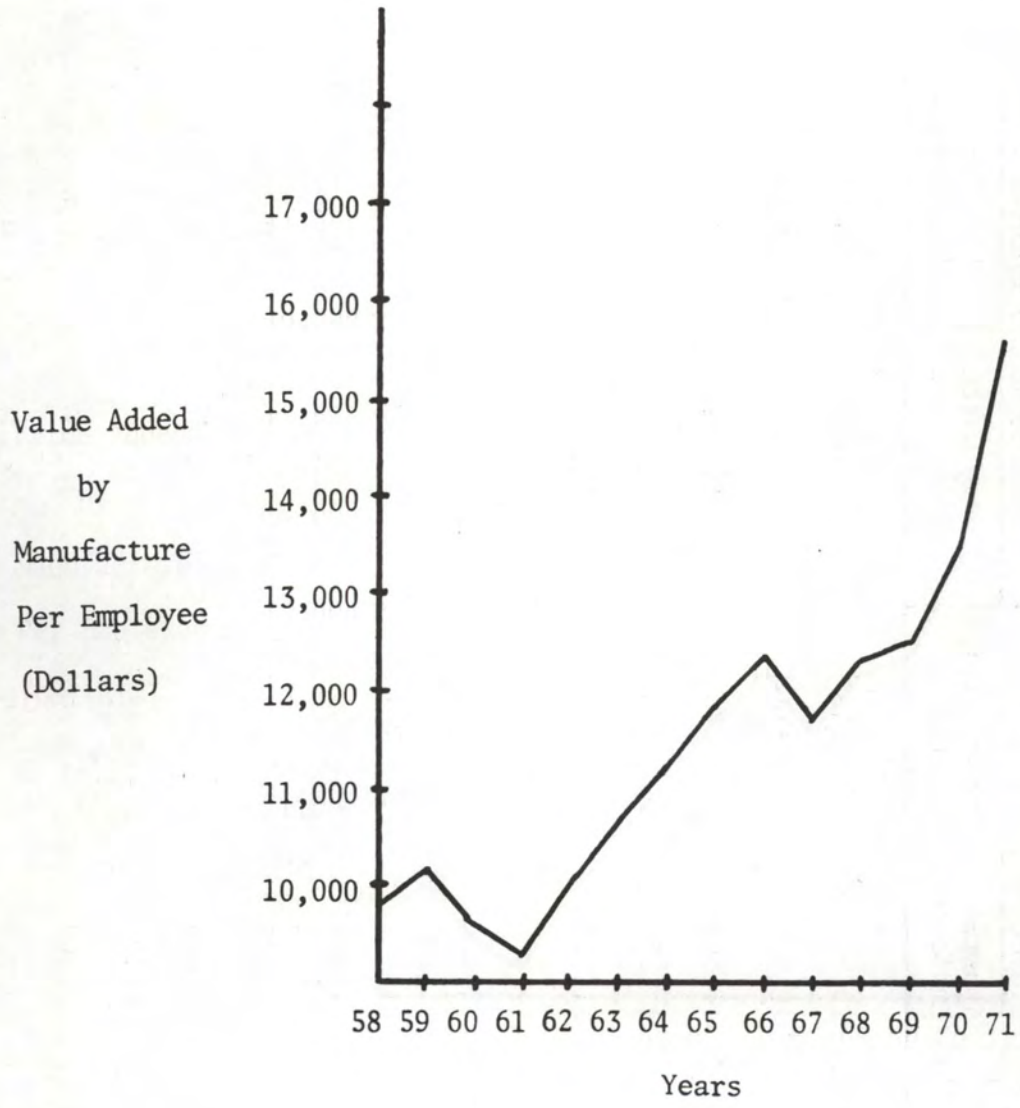

Figure 6. Value added by manufacture per employee, food and kindred products, Idaho, 1958-1971.

Table 8. Consumer price index, actual and real value added per employee for all manufacturing and food and kindred products, Idaho, 1958-1971.

Year	Consumer Price Index		All Manufacturing			Food and Kindred Products		
			Value Added/Employee			Value Added/Employee		
	1967 Base	1958 Base	Unadjusted ($/Employee)	Adjusted ($/Employee)	Productivity Index	Unadjusted ($/Employee)	Adusted ($/Employee)	Productivity Index
1971	121.3	140	15,309	10,935	118	15,609	10,814	114
1970	116.3	134	14,342	10,702	116	13,400	10,000	102
1969	109.8	127	14,724	11,593	125	12,488	9,833	100
1968	104.2	120	14,806	12,338	133	12,242	10,201	103
1967	100.0	115	13,568	11,798	127	11,754	10,220	104
1966	97.2	112	14,000	12,500	134	12,344	11,021	112
1965	94.5	109	13,407	12,300	133	11,897	10,914	111
1964	92.9	107	12,352	11,543	124	11,204	10,471	106
1963	91.7	106	12,013	11,333	123	10,642	10,039	102
1962	90.6	105	10,112	9,630	104	9,950	9,476	96
1961	89.6	104	9,592	9,223	100	9,248	8,892	90
1960	88.7	102	9,394	9,209	99	9,582	9,394	95
1959	87.3	101	9,908	9,809	106	10,157	10,056	102
1958	86.6	100	9,268	9,268	100	9,841	9,841	100

These productivity indexes are not conceptually perfect, but are probably better indicators of productivity than data based on unadjusted value added per employee. The reader should also note that price indexes do not reflect the changes in quality of a product. Consequently, real productivity is probably higher than indicated by the indexes shown in Table 8. One can conclude, without hesitation, that Idaho's manufacturing industries are increasing in productivity, not only in dollar value, but also in real dollar value per employee.

Income Multipliers from Investment

All Manufacturing

Income multipliers provide another method of evaluating the value of an industry to a state. An income multiplier is defined as the amount of income induced as the result of one dollar of investment or the change in income divided by the change in investment. In this report, income will be measured in terms of value added and investment in terms of capital expenditures. Table 9 shows the amounts of capital expenditures in Idaho for all manufacturing and food and kindred products between 1958 and 1971. These data, coupled with the previously presented value added data, are used to estimate income multipliers for all manufacturing and food and kindred products.

Figure 7 presents value added by manufacture as a function of capital expenditures in the previous year. The results of regression analysis indicate a statistically significant relationship exists between the two variables. This relationship implies that $5.45 of value added was created for every dollar of capital expenditures for all manufacturing. In other words, $5.45 of income was associated with each dollar of investment in the previous year or an income multiplier of about 5:1.

Table 9. Capital expenditures in all manufacturing and food and kindred products, Idaho, 1958-1971.

Year	Capital Expenditures All Manufacturing ($ Million)	Capital Expenditures Food and Kindred Products ($ Million)	Food and Kindred Products as a Percent of All Manufacturing (Percent)
1971	54.2	11.6	21.4%
1970	53.2	11.3	21.2
1969	51.9	19.5	37.6
1968	42.6	15.2	35.7
1967	57.7	11.8	20.5
1966	57.6	12.8	22.2
1965	81.3	15.4	18.9
1964	45.4	14.8	32.6
1963	28.4	7.9	27.8
1962	26.2	6.7	25.6
1961	26.0	9.2	35.4
1960	37.4	13.4	35.8
1959	23.5	7.1	30.2
1958	19.2	7.2	37.5

Source: Annual Survey of Manufactures.

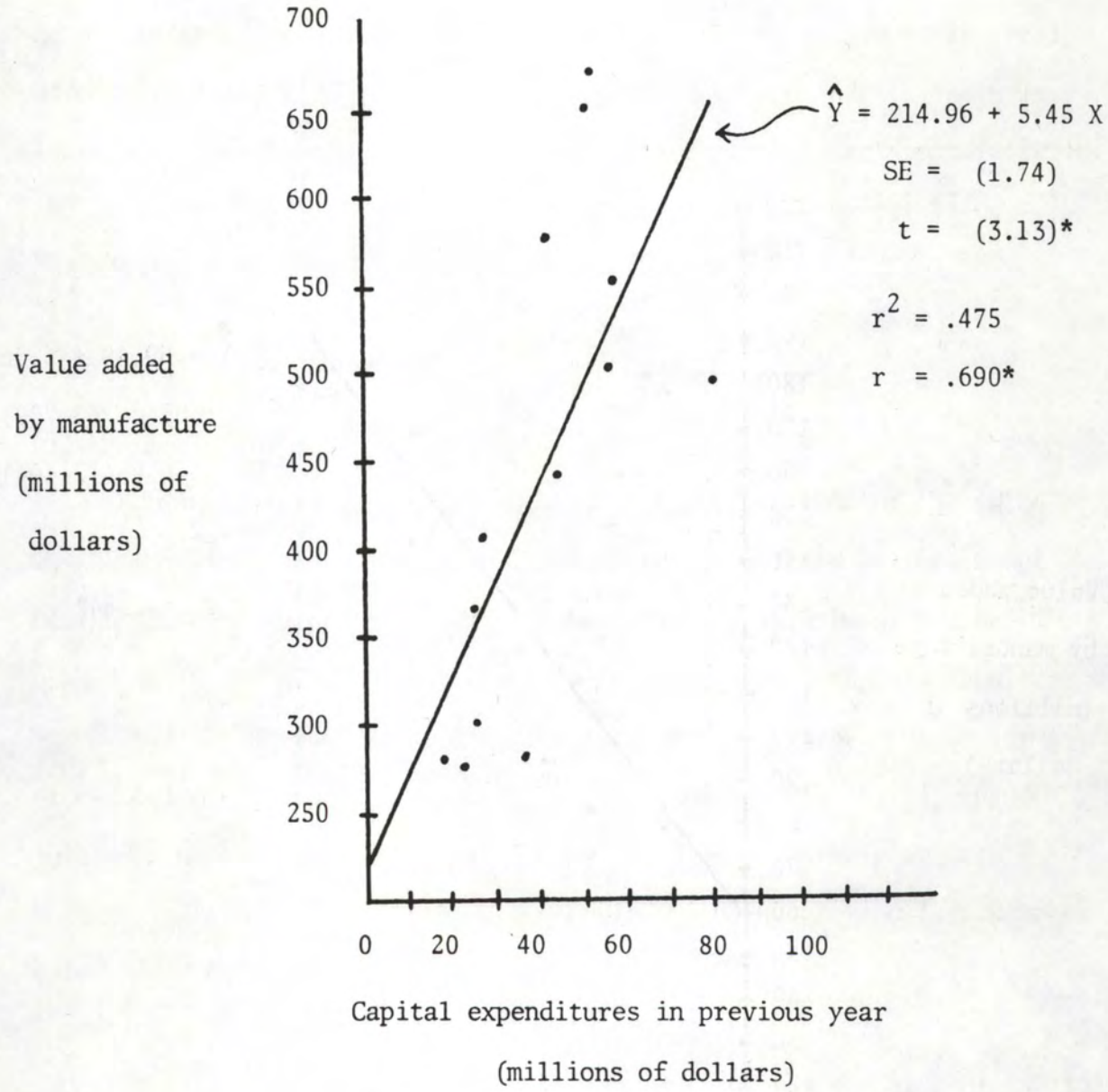

Figure 7 Value added by manufacture, all manufacturing, as a function of capital expenditures in previous year, 1959-1971.
*Significant at the 1% level.

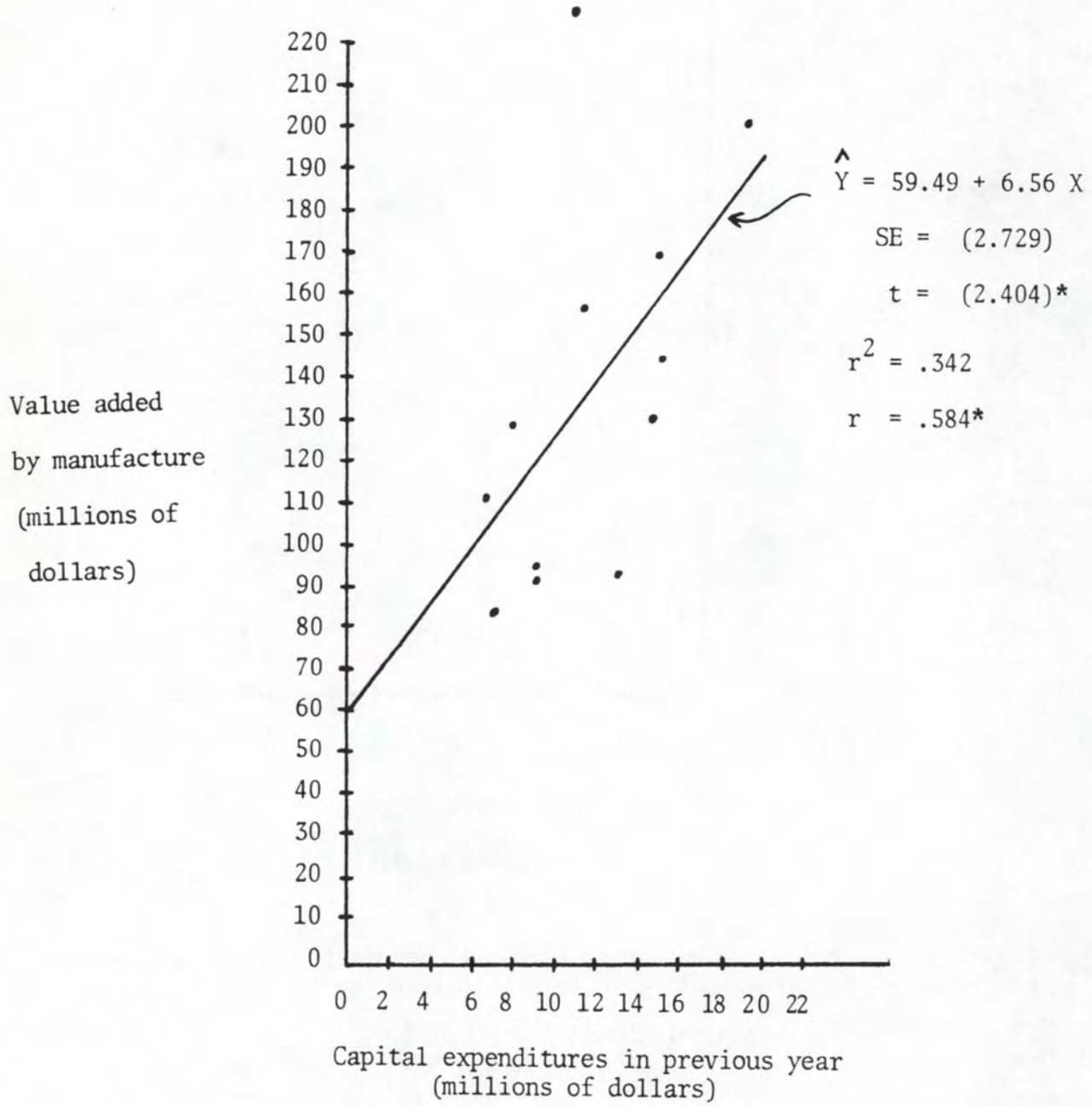

Figure 8 Value added by manufacture by food and kindred products as a function of capital expenditure in previous year, 1959-1971.
*Significant at the 5% level.

This is quite a large multiplier considering it includes only manufacturing income over a period of 13 years. If this relationship holds, expanding manufacturing industries in the State would increase per capita income considerably. Since food and kindred products are a large part of all manufacturing, one would expect a similar relationship to exist in that sector.

Food and Kindred Products

Capital expenditure data are also available for food and kindred products manufacturers. These data are plotted against value added by manufacture in Figure 8. Simple linear regression analysis was used to test the relationship of these two variables. The statistical t-test indicated a significant linear relationship did exist at the 5 percent level. Capital expenditures were found to be associated with 34.2 percent of the variation in value added by manufacture.

This relationship between the two variables indicated that $6.56 worth of value added was associated with each dollar of capital expenditure. In multiplier terms, $6.56 worth of income was created for each dollar of investment in the previous year in the food and kindred products industry. This multiplier ($6.56) is somewhat larger than the multiplier for all manufacturing ($5.45) although the results are not quite as strong in the statistical sense.

A multiplier of $6.56 of income per dollar of investment indicates that the food and kindred products industry has had a meaningful impact on income levels for Idaho citizens. If this relationship continues to hold in the future, and investors are willing to commit their resources, the food and kindred products industry in Idaho should continue to develop. Certainly, in a purely economic sense, it is in the interest of Idaho

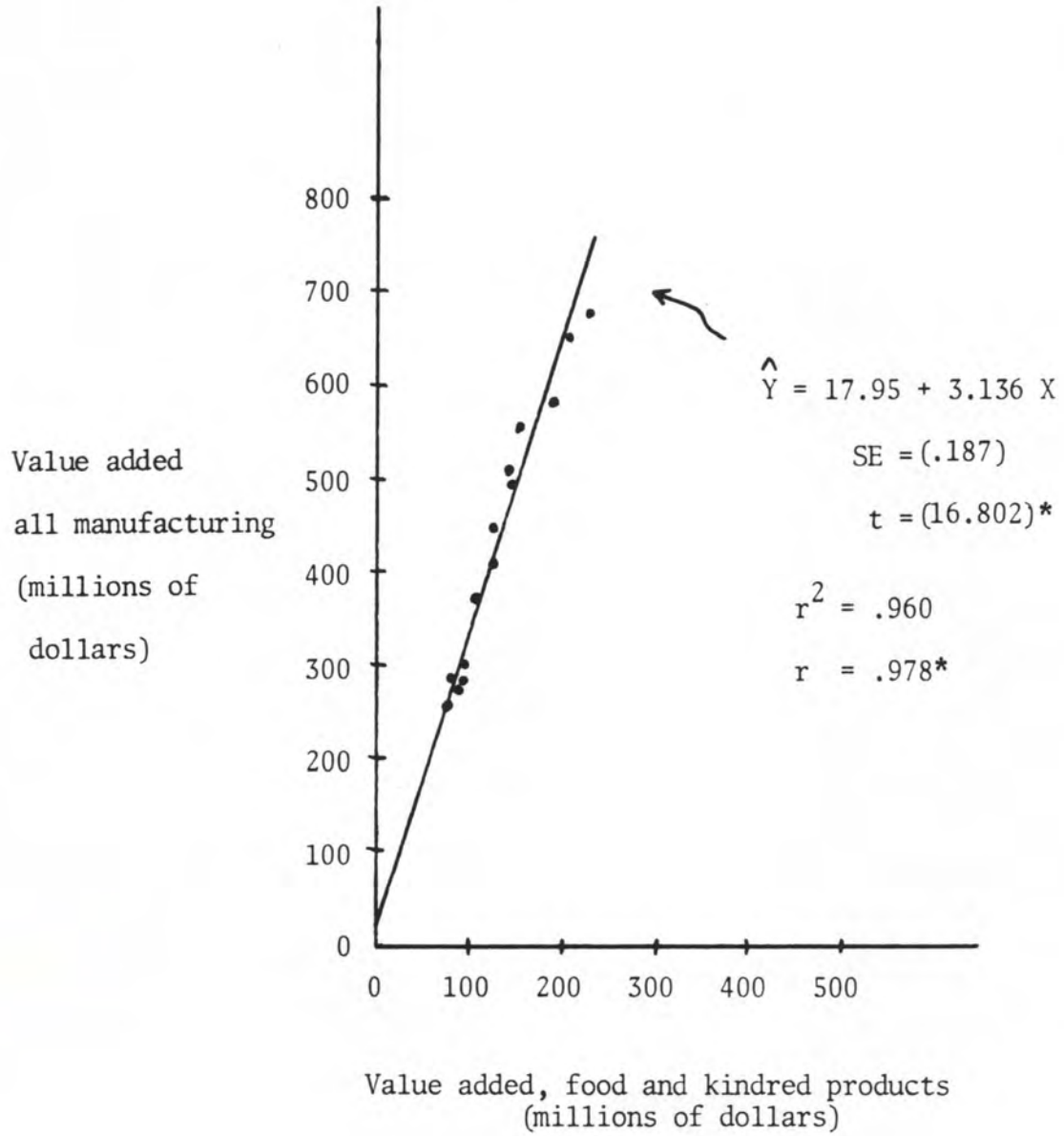

Figure 9 Value added, all manufacturing as a function of value added, food and kindred products, Idaho 1958-1971.
*Significant at the 1% level.

citizens for such development to take place.

Future development of this sector also requires that the same opportunities exist in the future as in the past in terms of the availability of input resources and markets for products. The analysis performed here cannot determine if these conditions still exist without additional information, but the results will have an important impact on Idaho's future.

All Manufacturing and Food and Kindred Products Related

We have seen in previous tables that the food and kindred products industry over the past 13 years has accounted for about one-third of all manufacturing in terms of employment and value added. One might expect that value added for all manufacturing would be closely related to value added by food and kindred products. Regression analysis was used to evaluate the impact of food and kindred products manufacturing industries on all manufacturing industries. The results are presented in Fig. 9.

The regression analysis of Fig. 9 shows that value added in all manufacturing is closely related to value added from food and kindred products. Results indicate that $3.14 of value added in all manufacturing is associated with each dollar of value added earned in food and kindred products. The closeness of the results--which account for 96 percent of the variation in income in all manufacturing--implies that the food and kindred products industries are closely related to all manufacturing and probably purchase large amounts of input and sell their products to these manufacturers. The extent to which such relationships actually exist in Idaho would have to be confirmed by further research. It is not unreasonable to assume, however, that food and kindred products industries

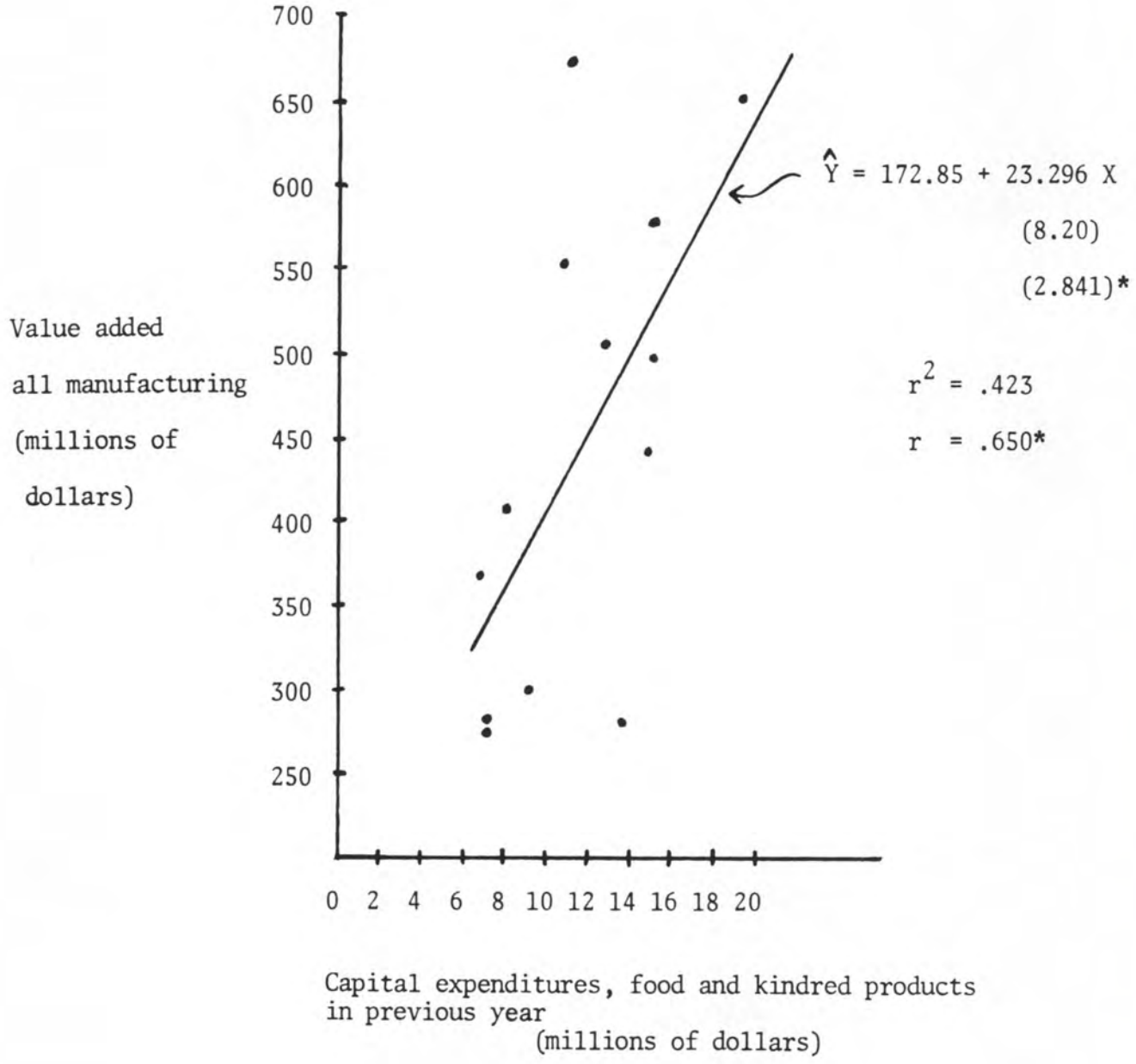

Figure 10 Value added, all manufacturing, as a function of capital expenditures in food and kindred products in previous years, 1958-1971.

*Significant at the 1% level.

indirectly stimulate the production of fertilizer for use in agriculture or directly stimulate the purchase of paper products for packaging.

If all manufacturing and food and kindred products manufacturing are so closely related, one might ask: What are the impacts of dollars invested in food and kindred products manufacturing on the income earned from all manufacturing? The results of this analysis are shown in the following section.

Income From All Manufacturing Related to Investment in Food and Kindred Products

Since the food and kindred products sector is closely related to all manufacturing in Idaho, it is of interest to analyze the impact of investment in food and kindred products in terms of income from all manufacturing. Fig. 10 presents value added data from all manufacturing as a function of capital expenditures in food and kindred products. The results of the regression analysis are significant in the statistical sense and imply that for each $1 invested in the food and kindred products industry, $23.96 of income is generated in Idaho. A multiplier of this magnitude is unusual and probably cannot be expected to hold indefinitely. Assuming this relationship represents reality in terms of investment opportunities in Idaho, one could conclude that Idaho has provided considerable advantage for the food and kindred products industry in the past. If this advantage continues, the food and kindred products industry should expand in the future.

Further research is necessary to confirm if $1 of investment in food and kindred products does give rise to $23 of income for all manufacturing in Idaho or if this association is simply coincidence. For example, in the food processing industry, where are the inputs purchased--in Idaho or from an outside source? Where are food and kindred products sold?

To other manufacturers in Idaho? To consumers?

Regarding the input of food processing, we need to determine if the basic manufacturing inputs are purchased from within Idaho. Is Idaho sugar used? Are the packaging products from Idaho? Are the processing oils from Idaho? Are the wood pallets used in handling manufactured locally?

On the product side we need to determine if manufactured products are sold for remanufacture within Idaho, sold directly to consumers within Idaho, or sold to out-of-state markets.

Once the sources of inputs and use of outputs from Idaho's manufacturing industries have been accounted for, in terms of their relationships to each other, we can confirm more positively the impact of a dollar of investment in food and kindred products on income from all manufacturing and the State as a whole.