RESOURCE USE AND RETURNS FOR GRADE A DAIRY FARMS, 1968-69

Based on Studies in Southeastern Wisconsin and Central New York

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ABSTRACT

Incomes in 1969 on two synthesized, representative 40-cow dairy farms were about $15,100 in central New York and $19,600 in southeastern Wisconsin, both record-highs and about 10 percent above 1968 levels. Farm expenses advanced 4 to 5 percent on farms in both areas, but gross income increased about 7.5 percent—largely because milk prices continued to rise. The income position of these milk producers has improved considerably since 1965, as significant increases in milk prices have kept ahead of steadily rising prices paid for production items. Partitioning farm returns to resources according to resource functions of investment, ownership, labor, and management revealed that rates of return competitive with use in alternative employment were earned on dairy farms in both areas in 1968 and 1969.

Keywords: Dairy farms, expenses, input prices, land values, marketing areas, milk prices, production, net income, resource returns.

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SUMMARY

An efficient, well-managed dairy farm with 40 cows was a sound economic unit in the late 1960's, based on characteristics of two synthesized, representative 40-cow dairy farms. One was drawn up for grade A milk producers with 30-49 milk cows in central New York, the other for this stratum in southeastern Wisconsin. These areas are under two very significant milk marketing orders—New York-New Jersey and Chicago Regional. At each level discussed in the report—area, State, region, and Nation—milk producers with 30-49 milk cows are the most important stratum in dairying.

Income on these representative farms improved considerably in the latter half of the 1960's and in 1969 was record-high: in central New York, $15,100 and in southeastern Wisconsin, $19,600. Production costs rose steadily during 1965-69, about 4 to 5 percent, but were more than offset by sharp increases in milk and cattle prices.

Resources used on these dairy farms were earning market rates of return competitive with those in alternative employment. The levels of farm income generated on both farms in 1968 and 1969 were adequate to meet farm debt obligations and family living expenses.

The sharp declines in milk production and cow numbers that occurred nationally and in both States in the mid-1960's had eased near the end of the decade. Contributing factors were rising milk prices; heavy concentrate feeding in response to a favorable milk-feed price ratio; and a tightening of the labor market, which probably reduced off-farm employment opportunities for dairy farmers and hired labor and slowed the rate of herd disposal.

RESOURCE USE AND RETURNS FOR GRADE A DAIRY FARMS, 1968-69 . . . BASED ON STUDIES IN SOUTHEASTERN WISCONSIN AND CENTRAL NEW YORK

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This study analyzes the 1968 and 1969 economic position of two synthesized, representative 40-cow grade A dairy farms in southeastern Wisconsin and central New York. Preceding this analysis is a brief review of U.S. dairying in 1969 and of dairying in the 1960's in New York and Wisconsin, farm production regions, the Nation, and the world. The second section examines two very important dairy belt milk marketing areas–Chicago Regional and New York-New Jersey. The most important stratum of milk producers at each level–area, State, region, and Nation–are those with 30-49 milk cows, examined in the third section of the report. These three sections provide the perspective required to adequately analyze the two 40-cow dairy farms drawn up to represent the 30-49 milk cow group of producers–one farm representing a 13-county area in southeastern Wisconsin; the other, a nine-county area in central New York.

DAIRYING HIGHLIGHTS OF 1969 AND A CAPSULAR LOOK AT THE 1960's

New York and Wisconsin

Milk Production

Following a brief upturn in 1968 from sharp declines in 1965 and 1966, milk production in Wisconsin dropped 1 percent in 1969. A smaller-than-average increase in output per cow in 1969–1 percent–was more than offset by a 2-percent decline in number of milk cows. In 1969, milk production was 6 percent, or 1.2 billion pounds, below the record 1964 level. Output has been declining since 1964, despite rapidly rising milk prices. However, economic forces that deter increases in milk production have also been operating during this period. Most important probably are a strong demand for beef; record-high cattle prices; and attractive employment opportunities outside agriculture, particularly in southern and eastern Wisconsin.

New York milk production turned upward in 1969, following annual declines during 1966-68. Nonetheless, output in 1969 was 6.5 percent, or 0.75 billion pounds, below the 1965 record level of over 11 billion pounds. Output per cow continued its longtime upward trend, topping 10,000 pounds in 1969.

Dairy Herd

Numbers of Wisconsin and New York dairy herds continued to decline in 1969, but at slower rates than in 1968 and at considerably slower rates than in the mid-1960's. Dairy farmers in both States are culling less severely, probably in response both to favorable and rising milk prices and to a less attractive off-farm employment situation.

Milk cows and heifers 2 years old and over in Wisconsin numbered 2,062,000 on January 1, 1970, down 1.5 percent from a year earlier and 13 percent from the level of January 1, 1965. New York's dairy herd numbered 1,127,000 on January 1, 1970, 0.5 percent fewer than in 1969 and 14 percent fewer than on January 1, 1965.

Prices and Income

Fluid milk prices received by Wisconsin dairy farmers in 1969 averaged $5.10 per 100 pounds, 4 percent above the 1968 price and nearly 44 percent higher than the decade low of $3.55 recorded in 1963. Market milk prices continued to advance in 1970, with prices in the first half of the year averaging over 5 percent more than a year earlier.

Fluid milk prices received by the New York farmers averaged $5.80 per 100 pounds in 1969, 4.7 percent above 1968 prices, and 35 percent higher than the 1963 low of $4.29. Market milk prices in the first half of 1970 advanced 3.3 percent from their level a year earlier, and were considerably less than the gain of 7.5 percent for the first half of 1968 and 1969.

Cash receipts by Wisconsin dairy farmers from the combined marketings of milk and cream were a record $846.7 million in 1969, 5 percent above the amount a year earlier. Cash receipts rose 44 percent over the decade and 31 percent from 1965 to 1969. Average returns were $4.86 per 100 pounds in 1969, compared with $4.59 in 1968 and $3.42 in 1962 and 1963.

Cash receipts by New York dairy farmers from the combined marketings of milk and cream were a record $587.7 million in 1969, 6 percent higher than in 1968 and nearly $110 million more than in 1965. Most of the increase in cash receipts over the decade occurred during 1965-69, a period of substantial price gain. Average returns of $5.83 per 100 pounds in 1969 were up nearly 5 percent from a year earlier and 35 percent above the 1962-63 low of $4.32.

Crop Production

Production of the principal crops raised in Wisconsin—corn, oats, and hay—was abundant in 1969, except for corn. Production of corn for grain dropped over 14 percent from the 1968 level; yields averaged 11 percent lower. More acreage than normal was cut for silage in 1969, but production fell as yields averaged 7 percent less. Acreage of oats harvested continued its gradual downtrend in 1969, but yield and quality were good. All hay production and yields were record-high in 1969, 1.5 and over 2 percent, respectively, above year-earlier levels.

New York dairy farmers also realized a good crop year in 1969. Of the three major field crops raised—corn silage, oats, and hay—only oat yields and production were lower than in 1968. Acreage harvested and production of oats were record lows. Corn silage yields averaged 14 tons per acre, up 12 percent from the year-earlier level and second only to the 1967 record high of 15.5 tons. Acreage harvested and production of corn for silage were record-high in 1969. All hay yields averaged a record 2.13 tons per acre in 1969, 2 percent above 1968's yields and slightly above 1967's.

National and Regional

Milk Production

U.S. milk production continued to drop in 1969 to 116.2 billion pounds, the lowest level since 1952. However, the decline of about 1 percent from 1968 was the lowest annual drop since 1964. The most rapid declines were in the Northern Plains (4.7 percent), Corn Belt (2.4 percent), and Lake States (2.0 percent). The largest reduction (648 million pounds) occurred in the Lake States, the most important dairying region (28 percent of U.S. total milk production in 1969).

Milk production rose in five regions, led in rate by the Southeast (1.6 percent) and quantity by the Northeast (253 million pounds). The Northeast was second in output and accounted for 21 percent of the U.S. total in 1969. In general, regions with production increases had substantially smaller declines than the decline occurring nationally in number of milk cows, and larger increases in output per cow. Regions with sharp drops in production also showed sharp declines in milk cow numbers and smaller-than-average increases in output per cow.

Production per cow increased less than 2 percent to a U.S. average of 9,158 pounds in 1969, the smallest annual gain since the early 1950's. Gains ranged from less than 1 percent for the Lake States to about 5 percent for the Delta States. Milk per cow varies widely among regions and in 1969 ranged from about 6,000 pounds in the Delta States to over 11,000 pounds in the Pacific region.

Conditions encouraging heavy concentrate feeding continued in 1969, as the milk-feed price ratio reached a record 1.74, over 2 percent above the 1968 level. Higher milk prices in 1969 more than offset an increase of nearly 6 percent in dairy ration cost. This situation was preceded by a 9-percent increase from 1967 to 1968 in the milk-feed price ratio, because of a substantial rise in milk prices coupled with a slightly lower feed cost. Roughage supplies have been adequate for the past several years and continue to be.

Dairy Herd

The national dairy herd on January 1, 1970, numbered 13.9 million cows and heifers 2 years old

and over, a 2-percent decline from a year earlier. The average number of milk cows on farms totaled 12.7 million head in 1969, 2.7 percent fewer than in 1968. Both these declines were the smallest annually since 1962. The largest declines occurred in the Northern Plains and Corn Belt, and the smallest in the Southeast, Mountain, and Pacific regions.

The national culling rate was the lowest since the mid-1950's. Continued milk price increases and favorable milk-feed price ratios in 1969 offset higher prices for cull cows. A tightening of the labor market in 1969 probably reduced off-farm employment opportunities for dairy farmers and hired labor and might have slowed the rate of herd disposal.

Prices and Income

Prices received by U.S. farmers for all milk and cream marketed averaged a record-high $5.52 per 100 pounds in 1969, over 4 percent above the 1968 level. Cash receipts totaled a record $6.2 billion, up nearly 4 percent. Milk prices and cash receipts in 1969 were 32 and 30 percent higher, respectively, than at the beginning of the decade, largely because of substantial price gains since 1965.

During 1969, prices for manufacturing milk remained above the support level of $4.28 per 100 pounds. In the face of a continued decline in national milk production, the support price for manufacturing milk was raised from $4 to $4.28 per 100 pounds for the 1968-69 marketing year beginning April 1, 1968. This support price was maintained for the 1969-70 marketing year. Milk prices are expected to continue improving in 1970 because the support price level was increased to $4.66 for the 1970-71 marketing year. National dairy pricing policy continues to emphasize pricing the nonfat component versus the fat component of milk for two basic reasons: (1) to enable plants that process milk into butter and nonfat dry milk to increase their paying prices correspondingly—to be more competitive with plants manufacturing cheese; and (2) to avoid enhancing the competitive position of the various milk substitute products, particularly "filled milk."

World

Exports of U.S. dairy products dropped sharply—25 percent—in 1969, while imports, especially of certain cheeses, rose about 12 percent. Exports have been declining because of large surpluses in Western Europe and are expected to continue declining in 1970.

Net imports in 1969—316 million pounds on a whole-milk equivalent basis—were up nearly 85 percent from a relatively low level in 1968, but were substantially below the 1.3 to 1.4 billion pounds imported during 1966-67.

World milk production rose only slightly in 1969, following a decade of annual increases averaging 2 percent. Output leveled off in the European Community, fell in other Western European countries and North America, and increased in Eastern Europe, Oceania, and South America.

DAIRY BELT MILK MARKETING AREAS

Chicago Regional

Considerable quantities of milk for fluid consumption produced by Wisconsin dairymen are marketed under the auspices of the Chicago Regional Federal Milk Marketing Order. The area under this order, as defined December 31, 1969, includes northern Illinois and much of Wisconsin except chiefly the northwest corner. According to the 1960 census, over 10 million people live in the area, with more than 50 percent of them in Metropolitan Chicago and its suburbs. More than 80 percent of the milk needed to supply Metropolitan Chicago is received through a system of country supply plants, most of them in Wisconsin. In 1969, an average of 16,639 producers delivered over 7 million pounds of milk to handlers regulated under this order.

Wisconsin dairymen are becoming increasingly important in producing for the Chicago market. In December 1969, 90 percent of the milk received by order handlers was supplied by Wisconsin dairymen, who accounted for 89 percent of the order producers.

Despite growing urbanization pressures in southeastern Wisconsin—the 13-county area selected for studying grade A dairying—producers there continue to contribute importantly to the Chicago market. In December 1969, this area accounted for 36 percent of both total order receipts and producers, compared with 40 and 39 percent, respectively, a year earlier. Dairying in Wisconsin north and west of this 13-

Table 1.—Total pool receipts, proportion delivered bulk, average number of producers, and proportion with bulk tanks, area under the New York-New Jersey Marketing Orders, by State, 1969

Item	Unit	States regulated under New York-New Jersey Marketing Orders			
		New York	Penn-sylvania	Other five States[1]	Total
Total pool receipts	Mil. lb.	7,397	2,388	552	10,337
Proportion delivered bulk	Pct.	74.0	55.2	86.5	70.3
Average number of producers	No.	18,245	8,009	1,049	27,303
Proportion with bulk tanks	Pct.	59.2	40.6	79.1	54.5

[1] Delaware, Maryland, New Jersey, Vermont, and West Virginia.

Source: The Market Administrator's Bulletin, New York-New Jersey Milk Marketing Area, Quar. Stat. Issue (B), Vol. 30, No. 8, 1969.

county area is expanding. The average number of order producers and milk receipts was 13 and 19 percent higher, respectively, in December 1969 than a year earlier, and 47 and 71 percent higher than in December 1965. Clearly, the Chicago milkshed is expanding northward.

New York-New Jersey

Most milk produced in New York is marketed under the New York-New Jersey Federal Milk Marketing Orders. The area under these orders, as defined December 31, 1969, includes southeast, south-central, and central New York, and northern New Jersey. The 1960 census showed over 18.5 million people residing there. In 1969, an average of 28,554 producers delivered over 10.3 billion pounds of milk to handlers regulated under these orders.

The relevant milkshed encompasses nearly all of New York, the eastern two-thirds of Pennsylvania, and portions of five other States.[1] A substantial and rising proportion of the milk received at plants and bulk-tank units under the Federal orders comes from producers in New York nearly 72 percent in 1969 (table 1).

Two important order trends are that the average number of producers delivering to plants and bulk-tank units is declining steadily, and producers shipping milk bulk are rapidly becoming the more important of the two groups (table 2). Commensurate with these trends is a substantial increase in volume received per producer.

Table 2.—Number of producers delivering to plants and bulk-tank units in area under the New York-New Jersey Marketing Orders, annual average, 1965-69

Year	Total	Producers delivering to—		
		Plants	Bulk-tank units	
	Number			*As percentage of total*
1965	39,614	28,775	10,839	27.4
1966	36,405	24,235	12,170	33.4
1967	33,304	19,956	13,348	40.1
1968	30,040	16,064	13,976	46.5
1969	28,554	13,194	15,360	53.8

Source: The Market Administrator's Bulletin, New York-New Jersey Milk Marketing Area, Annual Reports, 1965-69.

Most of the milk produced by order dairymen in central New York the nine-county area selected for this study is shipped to New York City. Some is diverted to supply local cities. In 1969, these nine counties collectively accounted for 35 percent of the pool receipts of all order producers in New York and one-fourth of total order receipts. Also, three of the nine counties were among the top 10 in milk production in the State and in the area under the marketing orders.

[1] Delaware, Maryland, New Jersey, Vermont, and West Virginia.

DAIRY BELT FARMS WITH 30-49 MILK COWS

The most important milk producers in Wisconsin and New York are those with 30-49 milk cows. Census of agriculture data for 1964 show clearly the significant contribution of these dairymen (table 3 and fig. 1). These essentially one-man operations are the type of dairy farm encountered most frequently today in both areas.

Most of the milk produced in Wisconsin and virtually all of it in New York is eligible for fluid consumption. In Wisconsin, milk from 70 percent of the producers with 30-49 cows and from 96 percent of those with larger herds was eligible in 1969. The highest concentration of grade A producers in Wisconsin is in the 13-county study area in the southeast (fig. 2). In New York, it is in the nine-county study area in the central part. Contributions made by dairymen in each respective area to dairying in the State are shown in table 4.

In both study areas, milk producers reporting 30-49 milk cows represent a sizable proportion of area producers and an even higher proportion of cow numbers and production. In southeastern Wisconsin, the proportion of producers reporting 30-49 cows in

Table 3.—Farms, cow numbers, and whole milk sold, for producers with 30-49 cows, New York and Wisconsin, 1964

Item	Unit	New York	Wisconsin
Milk producers:			
Number	No.	11,577	22,641
Percent of State	Pct.	29.3	26.5
Cow inventory:			
Number	No.	435,115	818,139
Percent of State	Pct.	38.4	39.3
Whole milk sold:			
Million pounds	Mil. lb	3,915.1	7,188.9
Percent of State	Pct.	39.5	41.6

Source: 1964 Census of Agriculture.

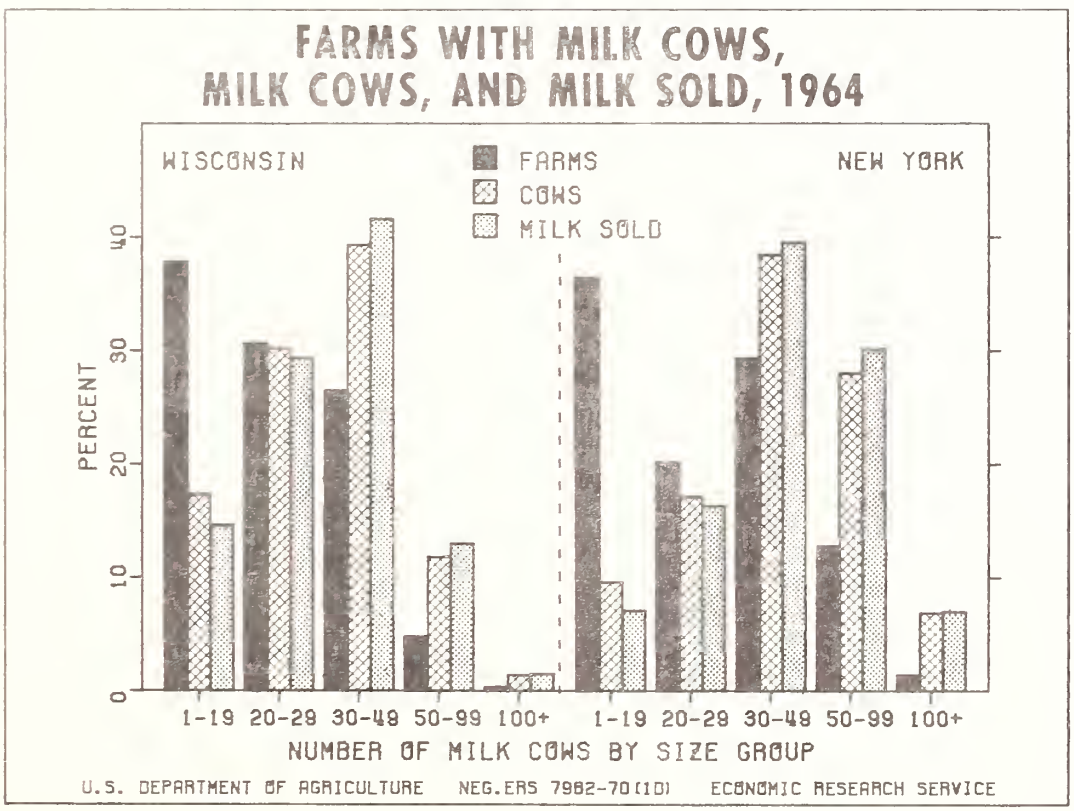

Figure 1

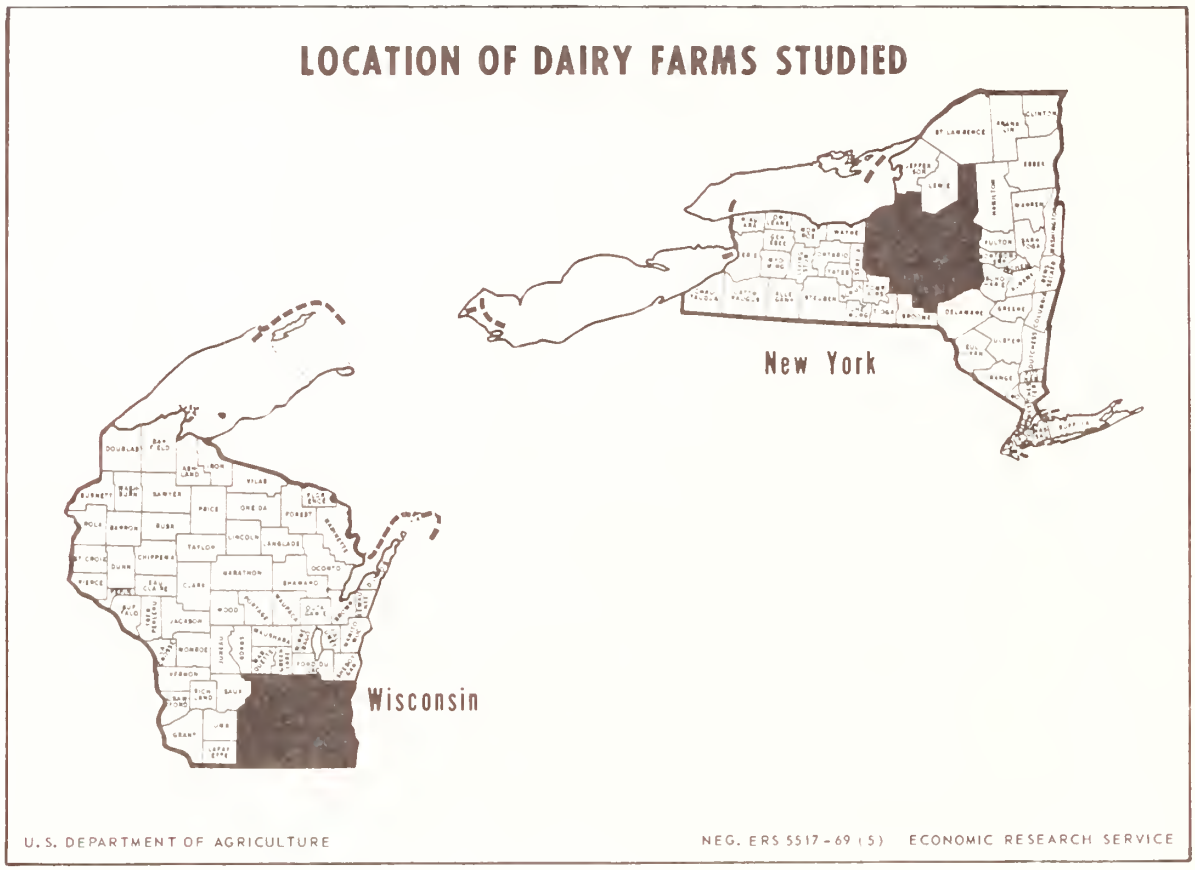

Figure 2

Table 4.—Milk producers, cow numbers, and whole milk sold, central New York and southeastern Wisconsin, 1959 and 1964

Item	Unit	Central New York		Southeastern Wisconsin	
		1959	1964	1959	1964
Milk producers:					
Number	No.	12,225	9,618	18,662	14,820
As proportion of State	Pct.	23.2	24.3	18.1	17.4
Proportion with 30-49 cows	Do.	25.7	32.3	25.3	35.2
Cow inventory:					
Head	No.	305,728	293,607	446,825	428,384
As proportion of State	Pct.	26.1	25.9	21.3	20.6
Whole milk sold:					
Amount	Mil. lb.	2,320.5	2,639.4	3,772.5	3,939.0
As proportion of State	Pct.	24.9	26.6	23.2	22.8

Source: 1959 and 1964 Censuses of Agriculture.

Table 5.—Percentage of dairy farm income supplied by off-farm employment and dairy enterprise, for selected cow herd sizes, Wisconsin, 1969

Source of income	Cow herd size				
	1-9 cows	10-29 cows	30-49 cows	50 or more cows	All herds
	Percent				
Off-farm employment:					
Dairymen reporting	50	32	25	15	28
As proportion of household income	25	7	2	1	5
Dairy enterprise as proportion of household income[1]	61	82	87	87	84

[1] Income from sales of milk and dairy stock.

Source: Wisconsin Stat. Rpt. Serv., Milk Prices Bulletin, Mar. 5, 1970.

1968 was slightly higher than the 35 percent reporting this number in 1964. Strictly comparable data for central New York are not available for 1968. However, 1968 State data reveal that 44 percent of the milk producers in New York had 30-49 cows. There are indications that the proportion of 30- to 49-cow herds is increasing more rapidly in the New York study area than in the Wisconsin study area. Partly explaining this might be the general absence of resource use competition and the lower opportunity costs in central New York; such a situation favors enterprise specialization and farm growth. Dairying in southeastern Wisconsin is being affected significantly by alternative uses for area resources- most importantly, land and labor in the nonfarm sector.

Many milk producers in both areas- relatively more in southeastern Wisconsin—are employing too few resources to compete economically and to realize an adequate level of farm income. The attrition rate of farms with smaller herds, particularly those with fewer than 20 milk cows, is rapid. Aggregate farm household income on many of these smaller farms, however, is adequate because of additional income from nonfarm sources. Typically, the principal source of nonfarm income is off-farm labor earnings. Off-farm employment income in 1969 was important on smaller dairy farms in Wisconsin and its relative importance was related inversely to herd size (table 5).

Many dairy farmers are expanding their operations to sizes that generate adequate farm income and afford scale economies. This is suggested by the rising significance of the essentially one-man dairy farms with 30-49 milk cows and the rapid growth rate of larger dairy farms. Wisconsin's dairy herds of 50 or more cows, and particularly those of 100 or more cows, are increasing at a rapid rate. Their relative numbers, however, continue to represent only a small proportion of all herds in the State. According to the State farm census, only four of every 1,000 dairy farms in 1969 had 100 or more milk cows and only 70 per 1,000 had 50 or more cows. Comparable 1968 figures for New York herds of these sizes were larger—28 and 210 per 1,000, respectively.

THE TWO SYNTHESIZED, REPRESENTATIVE FARMS

A competitive 40-cow dairy farm was drawn up for each of the two study areas to represent grade A milk producers having 30-49 milk cows. Major objectives of the drawing up of these two farms include: (1) portraying realistically the typical or most common organization of resources used by an important stratum of dairymen in producing milk for fluid consumption; (2) representing the types of short run adjustments commonly made annually by area farm operators, as in feeding rates and practices; and (3) reflecting annual changes beyond the control of the producer; such as changes in weather effects on crop

yields and subsequently on milk yields, and changes in land values and prices paid and received. But most important, this study and ensuing studies reveal the net annual and longrun effects of these factors on farm income.

In the study, herd and farm size were held constant. This was done to avoid the effects of major adjustments that occur on only a few farms. Most dairy farms do not undergo annual changes in farm size, and annual fluctuations in herd size are typically insignificant. Longrun adjustments in farm and herd size commonly result in shifts between, rather than within, selected size groups. These shifts are reflected in the increasing number of milk producers reporting 30-49 milk cows.

The land base for a 40-cow dairy farm is considerably larger in central New York than in southeastern Wisconsin, but a substantially higher proportion of the Wisconsin farmland is cropped (table 6). Other major differences are use of cropland, feed expenditures, land values, and degree of enterprise specialization.

Over 40 percent of the cropped acreage on the Wisconsin representative farm is corn for grain and silage. For the New York farm, the comparable proportion is about one-fifth, with all corn cut for silage. A substantially smaller proportion of the harvested acres on the New York farm are grains. This means that more feed must be purchased than in Wisconsin, and at higher prices. Consequently, feed

Table 6.—Organization and production characteristics of the two synthesized, representative 40-cow dairy farms, central New York and southeastern Wisconsin, 1968 and 1969[1]

Item	Unit	Central New York		Southeastern Wisconsin	
		1968	1969[2]	1968	1969[2]
Land in farm	Acre	250	250	184	184
Cropland harvested	do.	94	94	145	145
Crops harvested:					
Corn for grain	do.	---	---	38.0	37.8
Corn for silage	do.	20.5	21.2	21.0	21.6
Oats	do.	14.7	14.6	27.0	26.6
Hay	do.	58.8	58.2	59.0	59.0
Crop yields per harvested acre:					
Corn for grain	Bushel	---	---	105	96
Corn for silage	Ton	15.6	17.6	15.2	14.0
Oats	Bushel	65.0	64.2	78.0	70.0
Hay	Ton	3.2	3.2	3.5	3.5
Cattle on farm, Jan. 1:					
Total	Number	61	61	65	65
Milk cows	do.	40	40	40	40
Milk production per cow	Pound	12,220	12,370	13,000	13,100
Total farm capital, Jan. 1	Dollar	77,720	81,740	102,800	113,330
Land and buildings	do.	36,500	38,750	59,430	67,160
Machinery and equipment	do.	16,740	17,550	17,680	18,500
Livestock	do.	18,420	19,260	16,860	18,400
Crops	do.	6,060	6,180	8,830	9,270
Total labor used	Hour	3,950	3,980	4,160	4,140
Operator labor[3]	do.	3,120	3,120	3,120	3,120

[1] Both grade A operations are owner operated and farmed essentially by 1 man in his early 40's and by his family. All farm characteristics are based on farms having 30-49 milk cows.

[2] Preliminary.

[3] Assumes an average of 60 hours per week for the year.

expenditures on central New York dairy farms average over 3-1/2 times more than on southeastern Wisconsin farms. In contrast to the grain deficit in central New York, a surplus of corn often exists in southeastern Wisconsin. Dairy farmers in the latter area often grow more than enough corn to meet their needs and market this surplus. Farm-produced hay and roughage normally are adequate in both areas.

Dairying is more highly specialized in central New York than in southeastern Wisconsin. Census data for 1964 revealed that $71 of every $100 of total farm product sales in central New York was from milk sales, compared with $48 in southeastern Wisconsin. Dairy farms in the latter area are becoming more specialized, although many also raise hogs and beef cattle, and grow cash grains and vegetables. These enterprises typically are small and do not represent a significant departure from the specialization concept that was assumed for the farms with 30-49 cows.

Crop yields and milk production per cow reflect the above-average level of managerial ability assumed for both representative 40-cow farms. Producers in both areas milk their cows in stanchion barns equipped with gutter cleaners and ship milk in bulk. Labor for milking the 40 cows is furnished largely by the farm operator; other family members are available when needed. Hired farm labor, if needed, is used only at harvesttime.

Capital investment at current market prices is considerably greater in southeastern Wisconsin than in central New York. Despite the smaller land base for the 40-cow farm in Wisconsin, the current value of the investment in land and buildings is about double that for the New York farm because land values are significantly higher.

1968 and 1969 Returns

Net returns generated to all resources in 1969 irrespective of ownership and excluding debt obligations averaged about 10 percent higher than in 1968 on the 40-cow representative farm in southeastern Wisconsin and central New York (table 7). Farm expenses advanced 4 to 5 percent, but gross income increased about 7.5 percent in both areas, largely because milk prices continued to rise. Higher prices received for milk in 1969 accounted for 52 percent of the increase in cash receipts in Wisconsin and 71 percent in New York.

Income on the southeastern Wisconsin dairy farm is typically higher on the average than on the central New York farm, despite the considerably higher milk prices received by New York dairymen. Cash expenditures are greater on the New York dairy farm because of substantial quantities of feed bought and lower milk production per cow.

In recent years, the income position of milk producers in both areas has improved considerably because of significant increase in milk prices (fig. 3). Receipts from milk sales in 1969 averaged 37-40 percent higher than the amount 4 years earlier, whereas total farm expenditures advanced 17 percent. Milk prices have risen unusually rapidly since 1965, while input prices have pursued their longer term steady increase. Machinery prices and real estate taxes have substantially increased. Feed and fertilizer prices, on the other hand, have been relatively steady over the past 6 years, and recently, have declined. Price changes continue to be the main determinant of the annual increases in cash expenditures on these dairy farms. Price increases in 1969 accounted for nearly two-thirds of the increase in cash outlays on both representative farms.

Farmowners in both areas are also benefiting from the continued rapid appreciation of land values. From 1964 to 1969, the market value of capital investment in land and buildings rose 50 percent in central New York and 46 percent in southeastern Wisconsin.

Partitioning Returns

Description of Method

As computed using a traditional accounting framework, net farm income is an aggregate return to a specific bundle of resources (table 6). Subsequently, this return is allocated to operator labor and management, unpaid family labor, and total farm capital. Net farm income can also be "partitioned" (allocated) with a greater degree of refinement than in the traditional method.[2] The objective is to show more meaningfully the earnings of resources related to the functions they perform commensurate with their expected earnings in competitive markets.

Five distinct functions of resources are recognized for this analysis—investment, ownership, labor, management, and entrepreneurship. Theoretically, a market value exists for each, but the markets for management and entrepreneurship frequently are not well enough established to be measured. Generally, markets for the other three functions are well established and their rates of return can be determined.

In evaluating returns, it is constructive to isolate two sets of resources, physical and human. The set of

[2] Bostwick, Don, Returns to Farm Resources, Amer. Jour. of Agr. Econ. Vol. 51, No. 5, Dec. 1969.

Table 7.–Resource returns and production expenses on the two synthesized, representative 40-cow dairy farms, central New York and southeastern Wisconsin, 1968 and 1969[1]

Item	Central New York		Southeastern Wisconsin	
	1968	1969[2]	1968	1969[2]
	Dollars			
Total cash receipts	27,951	29,658	28,470	30,717
Milk sales[3]	26,112	27,644	25,338	26,724
Cattle and calves	1,799	1,974	2,362	2,655
Other, including Government payment	40	40	770	1,338
Value of perquisites	1,034	1,102	1,200	1,267
Inventory change	967	1,494	1,989	2,010
Gross farm income	29,952	32,254	31,659	33,994
Total cash expenses	13,024	13,604	10,442	10,775
Dairy feed	6,414	6,663	1,742	1,771
Veterinarian and medicine	364	388	270	284
Other livestock expense	1,033	1,085	767	807
Machinery repairs	978	1,025	1,005	1,050
Auto expense (farm share)	270	279	300	310
Gas and oil	401	427	555	570
Contract hauling and custom hire	188	197	1,063	1,129
Fertilizer and lime	1,075	1,069	1,152	1,112
Farm chemicals	281	286	283	275
Seed and other crop expense	410	416	631	624
Building and fence repair	188	200	286	315
Farm taxes	678	800	1,536	1,647
Farm insurance	345	370	324	359
Utilities (farm share)	399	399	528	522
Total capital expenses	3,293	3,540	3,456	3,642
New machinery	3,576	3,705	3,702	3,819
New buildings	520	640	572	630
Inventory adjustment	– 803	– 805	– 818	– 807
Total farm expenses	16,317	17,144	13,898	14,417
Net farm income	13,635	15,110	17,761	19,577

[1] Both grade A operations are owner operated and farmed essentially by 1 man in his early 40's and by his family. All farm characteristics are based on farms having 30-49 milk cows. Returns and expenses shown, however, are irrespective of resource ownership and do not reflect farm debt.

[2] Preliminary.

[3] Receipts from milk sales are net of transportation charges for the New York farm but not for the Wisconsin farm.

physical resources–land, machinery, livestock, and so on–embodies the functions of investment and ownership, for which separate returns can be computed.

The investment return to each resource is determined by the amount of capital invested and by either a rate of return specified by contractual agreement or an appropriate opportunity-cost rate prevailing at the time the resource was acquired. The return to a capital investment made using the farm operator's capital is assumed to be the same as the rate that he would have paid had he borrowed the capital.

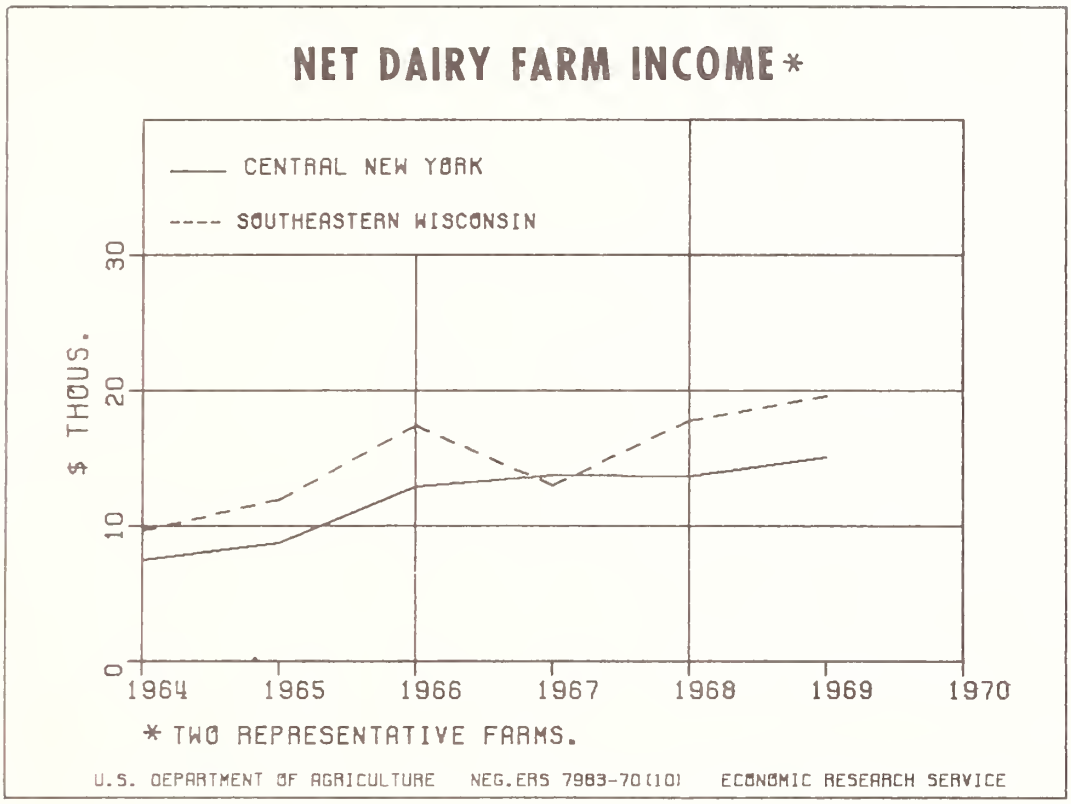

Figure 3

The ownership function is a legal condition whereby holding title to a resource enables the owner to risk reaping benefits or bearing losses. Ownership returns (or losses) are stipulated by the market rate at which use rights can be rented from the owner. The ownership return is determined by the gross rent as defined in the rental market, minus all ownership costs—such as taxes, insurance, and maintenance—plus an adjustment for changes in the book value of the resources used. Depreciable resources commonly show a negative change in book value. A good example of a positive change is land value appreciation.

The set of human resources includes labor, management skills, and the entrepreneural skills required to organize all the resources and services used in production. A straightforward procedure is available for computing the labor return, given the market values associated with the kind and quality of labor. The return to hired labor is specified at a rate set by contractual agreement; this rate can also be applied to farm operator labor. Returns to labor supplied by family members are estimated by use of a relevant market rate that depends primarily on age and sex.

Without further defining and discussing management and entrepreneural returns, let it suffice to state that well-established markets for each do not exist for dairy farmers in the two dairy belts. Thus, these returns are treated here as an aggregate residual return.

A subset of financial resources can be isolated from the physical resources set. Included are various types of liquid assets, such as the value of crops held in inventory and the operating capital used to meet the production expenses of feed, seed, fertilizer, fuel, and so on. The form of this operating capital might be money, stocks and bonds, or savings deposits, for example. The return—typically only an investment return—to financial resources is determined by applying an appropriate shortterm market rate of interest to the respective amounts of these resources.

Application of Method

Partitioning net farm returns to the operator on the two synthesized representative farms in south-

eastern Wisconsin and central New York explicitly accounts for returns to three functions–investment, ownership, and labor. As mentioned, managerial and entrepreneural returns–all accruing to the farm operator–are considered as an aggregate residual return. All external returns computed make up an aggregate return to the investment function performed by the lenders of capital used by the operator. The partitioning of operator and external returns for 1968 and 1969 is preceded by a discussion of the financial status of the dairy farmers represented, focusing on farm debt and on appreciation in the value of land resources.

Most resources controlled by operators of 30-to-49-cow dairy farms in both areas are typically operator owned. Land resources are frequently encumbered by mortgages. It also is common for farmers in southeastern Wisconsin to have relatively small amounts of chattel debt, usually on machinery and sometimes on livestock. The incidence of operating loans is low in both areas because of the monthly income received from milk sales.

A comprehensive 1969 survey of 30-to-49-cow dairy farms in southeastern Wisconsin revealed that half the operators were paying on mortgages and about two-thirds on chattel debt. Thus, both types of debt are represented by the study farms. In view of the wide range in the amounts that were reported as outstanding, the median level of debt was selected to represent each type of debt.

Comparisons of farm debt data for 1964 indicate that mortgage debt on 30-to-49-cow dairy farms studied in both areas was similar. Thus, current debt on dairy farms in central New York was assumed to be similar to that on the southeastern Wisconsin farms. Chattel debt occurred less frequently on farms in central New York than in southeastern Wisconsin and was not represented here.

Land resources were assumed to have been acquired in the early 1960's with 1962 as the first full operating year. Survey data for the Wisconsin area show that many of the land tracts with outstanding mortgages were acquired in the early 1960's. The typical mortgage loan obtained at that time was for 20 years and carried a loan rate of 5 to 5-1/4 percent. The loan was assumed payable over the 20-year period according to a standard schedule requiring annual repayment of principal and interest. Actual adherence to such a schedule was verified by 1968 survey data for southeastern Wisconsin. The initial loan amounts were larger in the Wisconsin area than in the New York area, but represented about 61-64

Table 8.–Farm financial statement for two synthesized, representative 40-cow dairy farms, central New York and southeastern Wisconsin, 1969[1]

Item	Central New York		Southeastern Wisconsin	
	Jan. 1, 1969	Dec. 31, 1969	Jan. 1, 1969	Dec. 31, 1969
	Dollars			
Total farm assets, current value	84,111	86,436	115,382	125,607
Land and buildings	38,750	38,750	67,160	74,520
Machinery and equipment	17,547	18,352	18,500	19,307
Livestock	19,264	19,867	18,400	20,855
Crop inventories and operating capital	8,550	9,467	11,322	10,925
Total financial liabilities	12,136	11,462	27,759	26,525
Land and buildings	12,136	11,462	21,859	20,625
Machinery and equipment	---	---	5,900	5,900
Net worth	71,975	74,974	87,623	99,082
Dollar assets controlled per dollar of investment	1.41	1.38	1.76	1.80
Operator equity (ratio)	.86	.87	.76	.79

[1] Both grade A operations are owner operated and farmed essentially by 1 man in his early 40's and by his family.

percent of the market value of the land and buildings in both areas.

Changes in the market value of land resources–potential capital gains (losses)–are important to many dairymen in southeastern Wisconsin and central New York, and were considered in the partitioning of farm returns. When dairymen buy or retain land resources, particularly in southeastern Wisconsin, they are probably motivated by the potential capital gains, as well as by the annual income-generating capacity of these resources in dairying.

Land value appreciation and potential capital gains

Table 9.–Partitioning net farm returns on two synthesized, representative 40-cow dairy farms, central New York and southeastern Wisconsin, 1968 and 1969[1]

Item	Central New York		Southeastern Wisconsin	
	1968	1969	1968	1969
	Dollars			
Income and expenses:				
Cash farm income[2]	27,951	29,658	28,470	30,717
Noncash farm income[3]	4,251	2,596	10,917	10,637
Gross farm returns	32,202	32,254	39,387	41,354
Cash operating expenses[4]	13,695	14,241	12,010	12,310
Net farm returns	18,507	18,013	27,377	29,044
Operator returns	17,648	17,179	24,746	26,380
Exogenous returns[5]	859	834	2,631	2,664
Partitioning net farm returns:				
Investment returns to operator	3,918	4,315	4,078	4,563
Ownership returns to operator	4,875	2,024	10,326	10,891
Labor returns to operator and other family	6,088	6,565	6,339	6,882
Management and entrepreneural returns to operator	2,767	4,275	4,003	4,044
	Percent			
Ratios and rates of return:				
Investment return per dollar of operator's investment	6.6	6.9	6.2	6.6
Ownership return per dollar of operator's investment	8.2	3.2	15.8	15.6
Management and other returns per dollar of assets controlled	3.3	4.9	3.5	3.2
	Dollar			
Dollar net farm returns per dollar of assets controlled	0.22	0.21	0.24	0.23
Dollar net farm return per dollar of operator's investment	0.30	0.27	0.38	0.38

[1] Both grade A operations are owner operated and farmed essentially by 1 man in his early 40's and by his family.

[2] Includes income from all farm product sales and Government payments.

[3] Includes value of perquisites, changes in value of livestock and crop inventories, and change in value of land.

[4] Excludes machinery and buildings investment expenses. Includes interest paid by operator for use of external capital.

[5] Earnings of external capital used by farm operator accruing to the lenders.

Table 10.—Cash operating statement for two synthesized, representative 40-cow dairy farms, central New York and southeastern Wisconsin, 1968 and 1969[1]

Item	Central New York		Southeastern Wisconsin	
	1968	1969	1968	1969
	Dollars			
Total operating income[2]	27,951	29,658	28,470	30,717
Total operating expense[3]	13,695	14,241	12,010	12,310
Net operating income	14,256	15,417	16,460	18,407
Capital item purchases[4]	4,096	4,345	4,274	4,449
Net cash income[5]	10,160	11,072	12,186	13,958
Principal payment	640	674	1,997	2,049
Family living expenses[6]	7,211	7,556	6,583	6,898

[1] Both grade A operations are owner operated and farmed essentially by 1 man in his early 40's and by his family.

[2] Total cash receipts from table 7.

[3] Total cash expenses from table 7, plus interest paid.

[4] Unadjusted capital expenses from table 7.

[5] Available for principal repayment and farm family's living expenses.

[6] Estimates based on 1965 data reported in Agr. Econ. Res. 207 and Agr. Econ. Ext. 358 Cornell University; and Minnesota Dept. Agr., Econ. Rpt. No. 285, 1966. All data were adjusted for location and for price changes by using U.S. index of farm family living items.

since 1962 have been substantial in both areas. Between January 1, 1962, and January 1, 1970, average land values in southeastern Wisconsin rose more than 65 percent, to over $400 per acre, an increase of about $150 in 8 years. Land values did not rise as rapidly in central New York during this period—about 50 percent, or $50 per acre. Prospects for capital gains in southeastern Wisconsin are brighter than in central New York, largely because of alternative uses for land resources in the nonfarm sector.

The current financial situation of both representative farms is sound. Net worth as of December 31, 1969, was 79 percent in southeastern Wisconsin and 87 percent in central New York (table 8). Net equity is large on these dairy farms, because of the rapid advances in the market value of their real estate.

Aggregate operator returns in 1968 and 1969 on the representative farm in southeastern Wisconsin averaged about $25,600, compared with about $17,410 in central New York (table 9). Most of the difference between the two areas in the aggregate operator return was accounted for by potential capital gains. During 1968-69, land value appreciation alone accounted for 19 percent of gross returns on the Wisconsin area farm, compared with less than 5 percent on the New York area farm. This is reflected by the substantially larger ownership returns accruing to operators of southeastern Wisconsin dairy farms.

Investment returns to all resources used by dairymen in both areas reveal that investing in dairy farms of this size in the early 1960's was a sound practice.

Operators of the representative 40-cow dairy farms are also realizing substantial returns to their labor, management, and entrepreneurship. The farm operator was considered to average a 60-hour workweek for the year, for a total of 3,120 hours. The balance of the labor required on these farms was furnished by other family members. Typically, hired labor is not needed. Occasionally some labor is hired at hay harvesttime; but the wage bill usually is small. Since costs for operator and other family labor are figured at a hired labor wage rate, any hired labor expenditure would correspondingly reduce returns to operator and other family labor. It was also assumed that the farm operator and the other family members

could have been employed as hired hands on another farm for the equivalent number of hours they worked on their own farm. Admittedly, the reality of the last assumption is debatable. For example, a farm operator who averaged a 60-hour workweek on his own farm could probably not average a 60-hour workweek as a hired hand on another farm. If the assumption that a fewer number of hours worked on another farm is a preferable one, the consequence is that the return to operator and other family labor is reduced and the return to operator management and entrepreneurship enhanced correspondingly.

The above-average level of operator managerial ability assumed for these representative farms is reflected by its return on both farms. Managerial (and entrepreneural) returns as a percentage of gross farm returns averaged 10-11 percent for 1968-69.

The sound management existing on both farms is also reflected by their strong cash position. Net cash income in both 1968 and 1969 was adequate for principal payment and for meeting estimated family living expenses (table 10). The cash position of both farms has improved considerably since 1965, largely because of rising milk prices. Coupling this positive price effect with rapid land value appreciation reveals a substantial improvement since the mid-1960's in the economic position of these dairymen.