

CHAPTER VII
DANISH DAIRY CO-OPERATIVE SYSTEM
(Continued)

7.1 Producing

Having already presented the economic characteristics of the Danish co-operative dairy, we now turn to its essential economic functions, which are buying, producing, and marketing of dairy products¹⁾ for its members. To give a clearer picture of these economic functions, their fundamental concepts will simultaneously be presented.

One of the auxiliary functions of this co-operative-type firm is the procurement of resources to be used in processing operations. Processing operations cannot take place until and unless resources have been bought, received, inspected, and delivered in the right quantities and at the right time to the plant where the goods are produced. The firm's managerial organ must make the final decisions concerning these aspects.

Specifically, the firm, as a buyer, buys the raw materials and other goods, or inputs, for contributing to the production of dairy products, or outputs, *et cetera*. In all cases the most important input the firm buys daily is the raw milk produced on its own farms. The basis for payment for the raw milk by the firm is the weight of raw milk, the quality or grade of raw milk as determined by the methylene-blue test, the flavour, odour, and appearance of this commodity, and the fat content of the milk as determined by the Gerber test.²⁾ But it has often been debated whether these methods of payment are fair when the milk contains a low or high percentage of fat. And lately it has been agreed

¹⁾ Sinar O. Petersen, Danish Dairying, (Copenhagen: Technical Dairy Publishing House, 1963), pp. 63-79.

²⁾ Ibid., p. 66.

that a fair method of payment is based on (1) the value of the fat in the milk delivered; (2) the total value of the skim milk delivered by the producer; (3) the cost of plant operation per unit of milk delivered; and (4) yearly distribution of the reserve fund in accordance with the method used in the district.¹⁾ To calculate the price per kilogram of milk, its fat content is considered and determined by the dairyman, and at the same time the value of the milk for butter manufacture and the skim milk value must be calculated by him. "The butter value can be calculated by multiplying the fat percentage (with the unit price of fat determined by dividing the price of butter per kilogram) by 85, which is the number units of fat for one kilogram butter." Then the skim milk value, which is based on the weight of the milk, is added to the butter value; and an amount representing the operating cost and an amount to be retained for the reserve fund of dairy are deducted. Thus calculated, the price paid for one kg. milk with fat percentage of 3.80 is about 33.40 shillings. The prices paid vary according to the fat percentage in the milk. In addition, a deduction is made if the milk is of the third or fourth grade; and instructions are given to the producer to rectify the defect and to pay a premium for the best quality milk to its producer as an additional payment. This payment is regarded as an important incentive.

The buying function covers the hauling of the milk from farms to co-operative dairy plants, which transport is generally contracted for by the co-operatives. The milk is usually delivered in metal cans to the plants by trucks, lorries, or horse-drawn wagons. However, the horse-drawn wagons are small in number at present. The emptied cans are immediately filled with skimmed milk, buttermilk, or whey, and are then returned to the farms at low cost. If the delivery of milk is not consistent with the by-laws, the supplier concerned is punished by the firm.

¹⁾ Ibid., p.67.

89.00 per cent of the total milk production in Denmark is delivered to co-operative dairies. The amounts of milk received by the firms, in April 1970-March 1971 for example, were 3,595 mill.kg.¹⁾ (The amount of milk produced by farmers in West Jutland was larger than that in any other part of the country.) The milk as such is bought by the firms in quantities depending on their sizes. If 290 co-operative dairies (about 75%) are classified according to volume of milk received in 1970, we have six categories of dairies. The biggest, consisting of 143 dairies (49%), handled over 5 mill.kg. of milk, while the smallest one, consisting of 2 dairies (0.67%), handled under 1 mill.kg. of milk in 1970.²⁾

If the dairies classified according to the dairy products produced in 1969-1970, we have seven categories:³⁾ (1) the dairies processing pasteurized fresh milk; (2) the dairies producing butter and dairies producing butter and wholesaling skimmed milk; (3) the dairies producing butter and retailing skimmed milk; (4) the dairies producing butter and cheese; (5) the dairies utilizing milk in a quantity of more than 15 per cent for cheese production with retail sale and wholesale; (6) the dairies producing several products with utilization of less than 15 per cent of milk for cheese production; and (7) the dairies producing butter with wholesaling of cream and milk. Of these categories, the fifth was the largest and the seventh the next. In 1965-1970 the average quantity of milk received per dairy was about 6 mill.kg. of milk.⁴⁾

One other essential economic function of the firms is the dairy-products production, the transformation of raw milk into dairy products in hygienic plants with modern dairy machines by a series

1) T. Mathiassen, Beretning om Fællesorganisationens og Mejerikon-
torats virksomhed (Århus: De danske Mejeriforeningers Fællesorga-
nisation, 1970-71). p. 12.

2) T. Mathiassen, Danmarks Mejeri-Statistik 1971 (Århus: De danske
Mejeriforeningers Fællesorganisation, 1971), p. 27.

3) Op. Cit., p. 59.


4) Ibid., p. 59.

of • applications, each of which may effect well-defined changes in the physical and chemical characteristics of the raw material. The most important resources utilized in such production are the four factors of production, i.e. (1) capital, (2) labour, (3) land, and (4) ~~Services~~ **Services** of labour, land, management, and fixed capital form **part of** the inputs utilized in the production process; but unfixed Capital such as fuel is used up as an input in the production process. Of these factors, management is the most significant because the success or failure of the co-operative dairy enterprise depends ultimately on management. In addition, some aspects of the factors of production appear in the production, e.g., form-losing, depreciation, and appreciation. For example, the raw milk is transformed into dairy products of high quality. In doing so, certain important elements of form utility are created for the products; e.g., the need-satisfying properties--favour, colour, texture, shape, size, arrangement and good taste--are created scientifically in Danish butter. The product can thus command a better price.

Now we leave the properties of form to examine the products' kinds and characteristics. If we take economic importance as the basis for classification of the products, they can be at present grouped into (1) chief dairy products--market milk, butter, cheese, and condensed and dried milk, and (2) the by-products--cream, ice cream, skim milk, buttermilk, whey, casein, and others. Classified as such, only the chief dairy products will be considered further.

Three types of butter produced¹⁾ are 1) type 1, cultured cream butter with 1 percent salt, characterized by its salty and aromatic flavour for home consumption and for • export trade; 2) type 2, culture cream butter with no salt, which keeps its quality better than than salted butter and lasts longer; it is produced chiefly for export; 3) type 3, sweet cream butter with 1.5-J percent salt, which can be kept for a long time in shipping over long distances to tropical countries. These three types of butter are now being

¹⁾ Op. Cit., p.72.

produced by the dairies  reported under the Lur Brand, a national trade mark.

There are four types of cheese produced at present¹⁾ ;

1) non-tirrod cheeses--Samsø, Danbo, Fylbo, and Elbo--all firm, with at least 45 percent moisture in the dry matter and a maximum of 46 percent moisture in the cheeses, they are characterized by mild flavour and firm texture, and are exported under the Lur Brand;

2) stirred and dipped cheeses--Maribo, Havarti, and Esrom--are all produced with 45 per cent moisture in the dry matter; they are quite different in weight and shape, but only slightly different in flavour; all the cheeses of this group are allowed to bear the Lur Brand for export;

3) special cheeses--Danablu, Mycella, and others--are all produced of cylindrical shape, but different in weight and percentage of moisture in the dry matter;²⁾ and 4) processed cheeses, consisting of (1) sliced processed cheese (2) prepackaged processed cheese, and (3) the processed cheese variety--a combination of cheese varieties with various added ingredients. The last three kinds of cheese can be produced in six types: type 1, with a minimum 45 percent fat in dry matter, maximum 50 percent moisture; type 2, with a minimum 40 percent fat in dry matter, maximum 52 percent moisture; type 3, with a minimum 30 percent fat in dry matter, maximum 54 percent moisture; type 4, with a minimum 20 percent in dry matter, maximum 57 percent moisture; type 5, with a minimum 10 percent in dry matter, maximum 50 percent moisture; and type 6, whole milk cheese, maximum 60 percent moisture.³⁾ The characteristics of cheeses are dependent on the skill of the Danish cheese-maker, the breed of cow, the nature of the land providing food for the cow, and the climate. The first indispensable resource creates scientifically the characteristics of cheese from the healthy cow's hygienic milk supported by a good diet and the geographical nature of Denmark.

¹⁾ pp. 83-96.

²⁾ R. Holmes et al., "The Danish Cheese Guide." Pamphlet, Aarhus; the FDDA, p. 11.

³⁾ Bjarne O. Petersen, Danish Dairying (Copenhagen: Technical Dairy Publishing House, 1963), p. 96.

The market milk (milk delivered and processed for sale in liquid form, either as fresh milk, cream, skim milk, or butter milk) is the product of high quality under strict control. Of these types of liquid milk, fresh milk is the most important from the economic point of view. Thus, only fresh milk will be considered in examining liquid milk characteristics. The processing of fresh milk for consumption, as well as the production of whole milk, is under state milk regulations. Consequently, the Danish fresh milk meets the following requirements: 1) the milk comes from tuberculosis-free herds; 2) it is clarified; 3) it is pasteurized; 4) the standardized milk has a fat content of at least 3.8%, a high nutritive value, and pleasing flavour and appearance, and 5) the milk is kept in brown bottles, capped and sealed to protect the milk from sunlight. Characteristically, the milk thus has good consumer appeal.

Condensed and dried milk is produced from only good quality milk mainly for export. The most important products produced are condensed milk, unsweetened condensed milk, spray-dried milk, and roller-dried milk. The composition of the different products depends on the standards in effect in countries to which they are to be exported, and on Danish standard requirements.¹⁾ The plants producing these products have been licensed by the government. This means that such plants meet certain requirements as to equipment and arrangement, and that they comply strictly with definite standards for production. "Further, all heat-treated milk must be high-temperature pasteurized to not less than 80°C."²⁾ The product normally contains 8.9 percent butterfat and 10-31 percent total milk solids, and meets standard requirements of storage quality, reconstitutability, appearance, odour, and taste. Characteristically, the dried milk is a light yellow pure and fresh product, providing an important food in convenient and easy-to-use form.

Having presented types and characteristics of the dairy products, we now turn for the completion of the present study to

1) Op. Cit., p.116.

2) Cit. ., p.117.

the analysis of trends in dairy production in Denmark. As a base for the analysis, should begin with milk production on farms and then with utilization of the milk. According to Danish dairy statistics in the "Statistical Yearbook", volumes 57-76, the trend of dairy cows raised in Denmark has been slightly downward since 1954. In 1954 about 1,505,000 cows and heifers calved while only 1,105,411 cows and heifers calved in 1971. Also, the milk production trend slipped slightly during the same 19-year period. Numerically, in 1954 the total milk production stood at about 5,394 mill.kgs.; but it stood at 4,559 mill. kgs. in 1971.¹⁾ A reason for the decrease may be due partly to an agricultural phenomenon which occurred. However, if we refer to the Danish dairy statistics of 1881 up to the present year, cow and milk production trends have been upward.²⁾ Moreover, Danish milk production per cow has gone up at a record-breaking pace, increasing from 3,428 kgs. in 1950 to 4,049 kgs. in 1971.³⁾ This has been due mainly to intensification of and progress in selective cattle breeding, which have been encouraged by livestock shows, contests, herd books, bull associations, and advisory services rendered partly by the firms. In 1950 the average fat content in milk delivered to dairies increased from 3.91 percent in 1950 to 4.25 percent in 1971. This increase was due partly to the effective work by the milk-butterfat recording society, founded in 1895 in Denmark, and its followers (see Appendix I).

With respect to the utilization of milk, according to Danish dairy statistics in the yearbooks, Beretning om Fællesorganisationens og Miljøkontorets virksomhed, volumes 1964-65 - 1970-71, the percentage of total milk production that went into Butter decreased from 86.7 in 1938-39 to 59.1 in 1970-71, as there was an increased interest in the production of cheese and condensed milk

¹⁾ Danmarks Statistik, Statistisk Årbog 1972 (København: Det Statistiske Departement, 1972), p.83.

²⁾ The Federation of Danish Dairy Associations. Facts About the Danish Dairy Industry (Aarhus: the Federation, 1968), p.4.

³⁾ Op. Cit., p.83.

products. However, the percentage of milk used for butter production is still larger than that of milk used for the production of other dairy products. Thus, the butter production was the most important branch of Danish dairy industry. And "butter has been and continues to be Denmark's most important product."¹⁾ The cheese production is the second important branch, and the processing of pasteurized fresh milk is the next branch in order (see Appendix 3).

The co-operative butter production decreased from 196,340 tons in 1954-55 to 112,734 tons in 1970-71. During the same period the percentage of milk used for the cheese production increased slightly. The co-operative dairies' cheese production increased from 70,555 tons in 1954-55 to 91,835 tons in 1970-71. The percentage of milk used for condensed and dried milk production increased slightly because of the growing foreign demand for them. The production of condensed and dried milk by dairies increased from 41.1 mill. kg. in 1954 to 81.7 mill. kg. in 1970.²⁾ Simultaneously, the percentage of milk used for fluid milk products increased slightly during the 1954-1967 period and afterwards its trend was rather level although it slackened somewhat. In 1970 the production of fluid milk products of dairies was 371 mill. kg. (see Table 15).

Now we turn our attention to the analysis of trends in butter production. First, to do this successfully, the Danish butter production data must be presented and the method of least squares simultaneously applied, as shown in Table 13. In the table the equation of an arithmetic straight line trend is $Y_c = a + bX$, where Y_c is the computed or trend value of the time series Y in the year numbered X . The letter a is called the Y intercept, while b indicates the slope of the trend line. The values of a and b are constant and unknown, requiring solution. To do this we proceed to the method of least squares, the two "normal equations" may be used under:

¹⁾ Einar O. Petersen, Danish Dairying (Copenhagen: Technical Dairy Publishing House, 1963), p. 71.

²⁾ T. Mathiasen, Berdtning om Fællesorganisationen og Mejerikøberens virksomhed (Århus: De danske Mejeriforeningers Fællesorganisation), 1971, pp. 15-18.

$$\Sigma Y = Na + b\Sigma X \text{ -----(1)}$$

$$\Sigma XY = 0 \cdot X1 + b\Sigma X^2 \text{ -----(2)}$$

where N is the number of items in the series. Since ΣX in column (3) of Table 13 = 0, $a\Sigma X$ in the equation (2) = 0 and $b\Sigma X$ in the equa-

Table 13
Computation of Trend-Least Squares Straight Line Short Method
—Even number of Years
Butter Production of Danish Co-operative Dairies
April, 1954-55-April, 1970-72

(1) Year	(2) Butter production (ton) Y	(3) X	(4) XY	(5) X ²	(6) Y _c = a + bX
1954-55	184,340	-17	-3,133,780	289	169,114.08
1955-56	154,676	-15	-2,320,140	225	166,327.02
1956-57	156,943	-13	-2,040,259	169	163,541.76
1957-58	162,183	-11	-1,784,013	121	160,755.60
1958-59	144,543	-9	-1,300,887	81	157,969.44
1959-60	156,872	-7	-1,098,104	49	155,183.28
1960-61	150,243	-5	- 751,215	25	152,397.12
1961-62	155,909	-3	- 467,727	9	149,610.96
1962-63	150,774	-1	- 150,774	1	146,824.80
1963-64	134,873	1	134,873	1	144,038.64
1964-65	142,876	3	428,628	9	141,252.48
1965-66	150,087	5	750,435	25	138,466.32
1966-67	142,326	7	996,282	49	135,680.16
1967-68	139,465	9	1,255,185	81	132,894.00
1968-69	141,274	11	1,554,014	121	130,107.84
1969-70	125,853	13	1,636,089	169	127,321.68
1970-71	112,734	15	1,691,010	225	124,535.52
1971-72	111,800	17	1,900,600	289	121,749.36
	$\Sigma Y = 2,617,771$	$\Sigma X = 0$	$\Sigma XY = -2,699,783$	$\Sigma X^2 = 1,938$	

Source: T. Mathiassen, Beretning om Fællesorganisationens og Mejerikontorets virksomhed (vol. 1955-56-vol. 1971-72).

tion (1) = 0, thus the normal equations are simplified to:

$$\begin{aligned} \Sigma Y &= Na \\ \Sigma XY &= b\Sigma X^2 \end{aligned}$$

Solving these equations for a and b, we have

$$a = \frac{\Sigma Y}{N} \text{ ----- (1)}$$

$$b = \frac{\Sigma XY}{\Sigma X^2} \text{ ----- (2)}$$

Substituting the values obtained from columns (2), (4), and (5) of Table 13 in the two normal equations, we get

$$a = \frac{2,617,771}{18} = 145,431.72$$

$$b = \frac{-2,699,783}{1,938} = -1,393.08$$

Having substituted these values for a and b in the equation $Y_c = a + bX$, we get the resulting equations:

Trend of Annual Butter Production of Danish
Co-operative Dairies, 1954-1966-67
 $Y_c = 145,431.72 - 1,393.08X$

Having substituted each-year value of X obtained from column (3) of Table 13, we get each-year trend value mentioned in column (6). Then we produce Figure 14 showing straight trend line.

Now we can interpret the downward trend of annual butter production indicated by least-squares straight line; It is simply downward between 1954 and 1971 because of, e.g., the declining demand for Danish butter, as mentioned above. However, this change "has not been permanent, as it has been difficult to satisfy the demand for Danish butter."

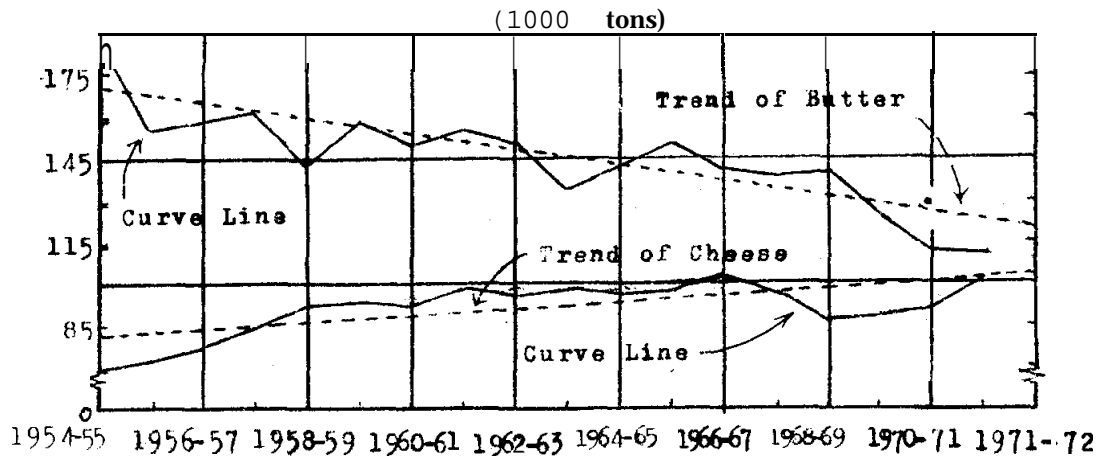


Figure 14

**Butter and Cheese Production of Danish Co-operative
Dairies, 1954-55 - 1971-72
Trend Indicated by Least-Squares Straight Lines**

Source: Table 13

With respect to the trend of annual cheese production by the said dairies, we present the corresponding data in Table 14 by which the method of least squares can be again applied to measure and visualize the trend. And the equation $Y_c = a + bX$ in Table 14 is solved for each-year values of a and b , utilizing the following normal equations:

$$\begin{aligned} Y &= na + b \sum X \\ \sum XY &= a \sum X + b \sum X^2 \end{aligned} \quad \begin{matrix} (1) \\ (2) \end{matrix}$$

Then we solve the equations for a and b by substituting the values obtained from column (2), (4), and (5) of the table in the above

equation. And at last we get the resulting equation :

Trend or Annual Cheese Production of the Danish

Co-operative Dairies, 1954-55-1971-72

$$Y_c = 91,835.17 + 575.22X$$

Origins: 1963-64

Units: tons

Table 14

Computation of Trend-Least Squares Straight Line Short Method
-Even Number of Years

Cheese Production of the Danish Co-operative Dairies
April, 1954-55; - April, 1971-72

(1) Year	(2) Cheese production (ton)	(3) X	(4) XY	(5) X ²	(6) a = a + bX
1954-55	7,555	-17	-1,199,435	289	82,106.43
1955-56	7,623	-15	-1,104,345	225	83,256.87
1956-57	7,146	-13	-1,002,898	169	84,407.31
1957-58	8,967	-11	-945,637	121	85,557.75
1958-59	9,124	-9	-829,116	81	86,708.19
1959-60	9,625	-7	-669,375	49	87,858.63
1960-61	9,124	-5	-470,620	25	89,009.07
1961-62	9,104	-3	-297,312	9	90,159.51
1962-63	9,919	-1	-96,919	1	91,309.95
1963-64	9,442	1	99,442	1	92,460.39
1964-65	9,580	3	292,740	9	93,610.83
1965-66	9,645	5	493,225	25	94,761.27
1966-67	10,936	7	734,552	49	95,911.71
1967-68	9,076	9	882,684	81	97,062.15
1968-69	8,687	11	953,557	121	98,212.59
1969-70	8,891	13	1,168,583	169	99,362.03
1970-71	9,835	15	1,377,525	225	100,513.47
1971-72	10,654	17	1,728,118	289	101,663.91
		$\Sigma X = 0$	$\Sigma XY = 1,114,769$	$\Sigma X^2 = 1,934$	

Source: I. Mathiasen, Årsberetning om Fællesorganisationens og Mejerikontorets virksomhed (vol.1955-56-vol. 1971-72.)

We then substitute each-year value of X in the above equation for its trend value in column (6) of the table. And the trend line is fitted in Figure 14. The approximate trend of cheese production was rather remarkably upward from 1954-55 to 1971-72, due to the great foreign market demand. This is interpreted to mean that production depended upon foreign market requirements.

On the fresh milk trend, the statistics for fresh milk processed and sold for consumption in Denmark are presented in Table 15. To visualize the trend line of the product, the method of least squares is again applied in the table. Thus we get the resulting equation:

Table 15

Computation of Trend-Least Squares Straight Line Short Method
—Even Number of Years
Fresh Milk of the Danish Dairies, 1954-1971

(1) Year	(2) Fresh Milk (mill.kg.) Y	(3) X	(4) XY	(5) X^2	(6) $Y_0 = a + bX$
1954	372	-17	-6,324	289	373.98
1955	356	-15	-5,340	225	374.08
1956	348	-13	-4,524	169	374.18
1957	365	-11	-4,015	121	374.28
1958	392	-9	-3,528	81	374.38
1959	404	-7	-2,828	49	374.48
1960	381	-5	-1,905	25	374.58
1961	371	-3	-1,113	9	373.68
1962	376	-1	-376	1	374.78
1963	387	1	387	1	374.88
1964	386	3	1,158	9	374.98
1965	384	5	1,920	25	375.08
1966	387	7	2,709	49	375.18
1967	368	9	3,312	81	375.28
1968	369	11	4,059	121	375.38
1969	368	13	4,784	169	375.48
1970	371	15	5,569	225	375.58
1971	362	17	6,154	289	375.68
	$\Sigma Y=6,747$	$\Sigma X=0$	$\Sigma XY=99$	$\Sigma X^2=1,931$	

Source: Danmarks Statistik, Statistisk Årbog, København, Det Statistiske Departement, vol. 57-vol.76

Trend of Annual Production of Fresh Milk
of Danish Dairies, 1954-1971

$$Y_0 = 374.83 + 0.05X$$

Origin: 1963

Units: in millions of kg.

Having substituted each-year value X in the equation, we can plot the corresponding points and draw a trend line through them on Figure 15. It is seen that the trend of processed milk moved slightly upward in 1954 although the each-year quantity in the equation moved both upward and downward. This is due to the bigger consumption in Denmark.

We now leave the trend of processed milk for that of condensed and dried milk from the Danish dairies. As mentioned above, in 1938-39 condensed milk was produced only in small quantities by the dairy factories in Denmark due mainly to (1) great quantities of milk used for feeding hogs to meet a high demand for Danish pork and (2) the condensed milk industry's inability to pay a higher price for milk than that for milk for pork production or other dairy products. Thus, there was little interest in the production of condensed milk. At present, the Danish dairy farmers are interested in the production of condensed and dried milk products because of a growing demand in world markets. Thus, the quantities of milk utilized in the production are greater than those of milk utilized in 1938-39.¹⁾ Less than half of the total amount of condensed milk is produced in the co-operative factories. The available production from 1954 to 1970 are shown in Table 16. To fully visualize the trend line of the products, the method of least squares is applied again in the table. The resulting equation is written after the table.

After the substitution of each-year value of X in the equation, we can plot the points whose positions are determined by their respective values in the table and draw a straight trend line in Figure 15.

¹⁾ T. Mathiassen, Beretning om Fællesorganisationens og Mejerikon-torens virksomhed 1966-67 (Århus: De danske Mejeriforeningers Fællesorganisation, 1967), p.13.

Table 16

Computation of Trend-Least Squares Straight Line
 short Method-Odd Number of Years
Condensed and Dried Milk of Ohs Danish Dairies, 1954-1970

(1) Year	(2) Condensed and dried Milk (mill.kg.) Y	(3) X	(4) XY	(5) X ²	(6) Yc=a+bX
1954	41.1	-8	-328.11	64	46.16
1955	45.9	-7	-321.3	49	49.35
1956	47.6	-6	-258.6	36	52.54
1957	60.6	-5	-303.3	25	55.73
1958	62.4	-4	-249.6	16	58.92
1959	62.9	-3	-188.7	9	62.11
1960	60.6	-2	-121.2	4	65.30
1961	73.3	-1	-73.0	1	68.49
1962	77.9	0	0.0	0	71.68
1963	74.4	1	74.0	1	74.87
1964	81.9	2	163.8	4	78.06
1965	77.8	3	233.4	9	81.25
1966	83.4	4	533.6	16	84.44
1967	95.4	5	476.0	25	87.63
1968	99.4	6	566.4	36	90.82
1969	92.2	7	645.4	49	94.01
1970	81.7	8	653.6	64	97.20
	ΣY=1,218.9	X=0	ΣXY=1,301.7	X²=408	

Source: T. Mathiassen, Beretning om Fødeorganisations
 og Mejerikontorets Virksomhed (Aarhus, vol.1954-55.)

Trend of Annual Production of Condensed
 and Dried Milk, 1954-1970
 $Y_c = 71.68 + 3.19x$
 Origin: 1962
 Units: in millions kg.

It is found in Figure 15 that the trend of the condensed and dried milk production during the years from 1954 to 1970 was upward. It is expected that such a trend is still upward mainly due to the increased foreign demand for the said product.

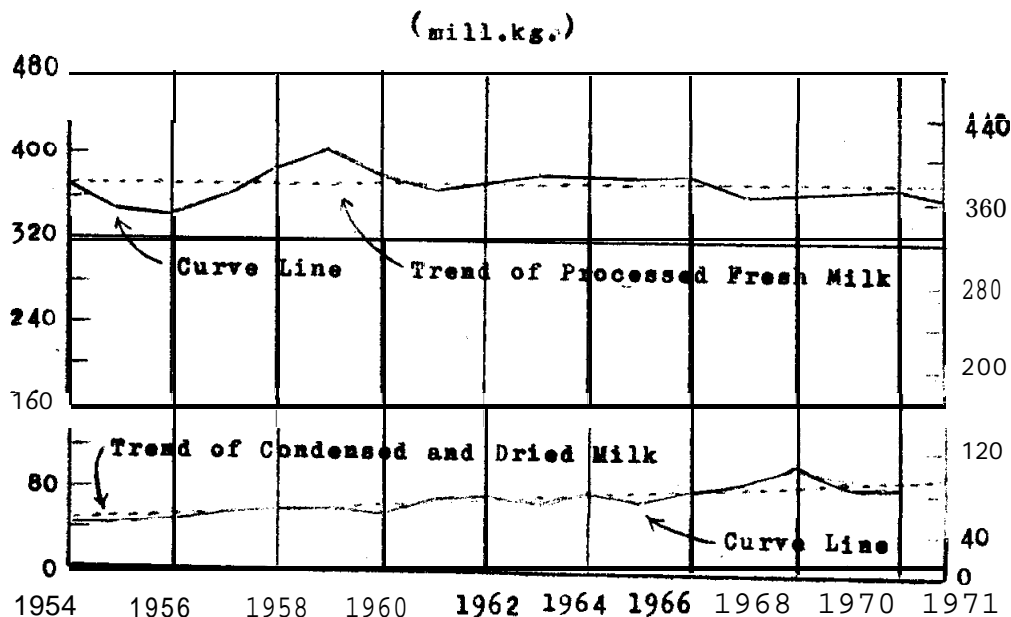


Figure 15

Processed Fresh Milk and Condensed and Dried Milk
of Danish Dairies, 1954-1971
Trends Indicated by Least-Squares Straight Lines

7.2 Marketing and Returns

It is found that one of the main economic functions of the Danish co-operative dairy is "the marketing" of the dairy products on behalf of its member-patrons. It is an economic process by means of which the products and services associated with it are exchanged and their values determined in terms of money by the co-operative dairy seller and buyers.

It is a significant function because it brings products of good quality in the right quantities to buyers in the place needed, at the time agreed upon, and in such a way as to facilitate the maximum satisfaction of the buyers' wants. The production is

dependent upon the marketing, or sale, of the firm's output. A major objective of marketing is the sale of dairy products with want-satisfying properties in anticipation of a profit for the firm's members.

As a result, the marketing of milk-based products by the firm necessitates essential knowledge of the dairy-products marketing functions such as the selection of marketing channels with marketing agencies, operating costs, pricing of the products, and solving marketing problems.

1) The market is composed of at least the co-operative dairy sellers, Danish and foreign buyers, market area, and market demand. Today the market area is world-wide. More than 293,314 tons of dairy products are sold regionally and internationally in a year. They are exported to more than 150 countries all over the world. However, the United Kingdom, West Germany, Italy and the U.S.A. are the main foreign buyers of Danish products.

2) The marketing functions, though marketing operations performed, at least to some degree, by the producer, may be subdivided into minor functions: the exchange functions--buying, selling and pricing; the physical supply functions--transporting and storing; and the facilitating functions--financing, standardizing and grading, risk managing, packaging, securing market information, and researching. Each of these marketing operations affects the cost of marketing, and the benefit enjoyed by a member depends on how effectively and economically these operations are carried out.

1) Buying involves, on the part of the purchaser, the determination of quality, quantity, and value of various goods to be used in the dairy business. For instance, buying the raw milk

1) T. Mathiassen, Beretning om Fællesorganisationens og Mejerikontorets virksomhed (Århus: De danske Mejeriforeninger, 1967), p. 67.

2) Ibid., pp. 67-90.

3) T. Mathiassen, Danmarks Mejeri-Statistik 1968 (Århus: De danske Mejeriforeningers Fællesorganisation, 1968), pp. 32-36.

4) Op. Cit., pp. 73-75.

is a membership agreement; that is, each farmer member has to sell all his milk of good quality used for home consumption to the dairy plant.

2) Selling, the disposal of the product to a buyer for a price, in the catalyst which integrates all phases of the marketing. It is the source of income required to cover costs and yield a profit for the firm. It occurs every time the commodity changes ownership. Practically, the seller takes the initiative in selling the goods by direct contact, correspondence, visits, samples, exhibition, or demonstration; are sales promotion activities.

Sales promotion for the main dairy products is performed at home and abroad by the co-operative dairies' central organization. However, in 1980 there is no competition between brands, comparatively little money is spent on the sales promotion for milk and butter in Denmark.¹⁾

Because of the exhibitions' importance, they deserve further brief discussion. The exhibitions' basic purpose in Denmark is to improve the quality of dairy products and the conditions of the dairy industry itself. The exhibitions undertaken at home are exhibitions of experimentally-manufactured butter and cheese, district dairy shows, and large dairy shows.²⁾ From the marketing point of view, these exhibitions are prime activities not only for promoting quality but also in creating demand for the products; because, according to the Danish motto, "It is the quality that sells the product."

The district dairy shows, the exhibitions of butter in tubs, have primarily been sponsored by dairy plant operators. Each exhibition represents 30 to 70 dairy plants, and is organized six to eight times yearly. At the district level, the supply of butter

¹⁾ This information was collected from Mr. G. Sondergaard, who was a Danish dairy specialist working at the Thai-Danish Dairy Farm and Training Center in Thailand for a long period.

²⁾ Einar O. Petersen, Danish Dairying (Copenhagen: Technical Dairy Publishing House, 1963), pp. 126-128.

from the tubs are exhibited and scored by judges. Dairy plant managers whose products receive the highest scores are awarded prizes. The plants whose products receiving scores not below 10 are awarded diplomas and silver shields.

The exhibition of experimentally-manufactured butter and cheese, a [●] peo5aloaa organized twice yearly by The Associated Cheese Experiments, a private body of the dairy members, ⁵⁸ the one where the ^{o h o 8 8 o} produced by new methods are scored. Producers whose cheeses receive high scores ^{UO} awarded silver shields. A travelling silver cup ⁵⁸ also awarded to the cheese factory receiving the highest total points during the two exhibitions. In [●] tditioa, ⁸ lecture on findings from the experiments ^{1 8 d o l l -} for participants and visitors to tbr exhibitions.

The large dairy shows, the purpose of which is to show the public what the dairy plants can do to produce dairy products of the most excellent quality, include "a dairy show" and ⁸ "National Dairy Show." The first is hold once ⁸ year. About 1,000 casks of butter, about 1,000 cheese samples, dairy plant equipment and supplies, [•] milk ^{bu}, revue, films, cheese dishes, and statistical data of dairy industry are attractively arranged at the "National Dairy Show." At these shows an honour prize and medals are awarded to all the perfect products.¹⁾ Additionally, tho shows wish to present the latest accomplishments, bat simultaneously the concept of quality improvement, which stresses that "inability [•] o8nm ne advancement."

Now ve [●] X8BiD8 the selling results, and find that among the firms ⁸⁰¹¹ their output [●] t home and [●] breed, ⁸ bigger portion of the total dairy output went overseas [●] rd ⁸ smaller one to tbo home market. Apparently, 70-75 percent Of ⁸¹¹ butter, 65-70 percent Of ⁸¹¹ cheesed, almost [●] 11 of the condensed and dried milk,²⁾ and bigger but relatively small portions Of [●] 11 fresh pasteurized

1) Ibid., p. 128.

2) Op. Cit., p. 149

milk¹⁾ ♦ • portsd to foreign countries such as England and West Germany. The export figures of these products and their values mm great (see also Appendix 9). The 1970-1971 figures of these respects us cited in Table 17:

Table 17

Quantities and Values of Danish Export Dairy Products,
1965-69 - 1970-71

Commodity	1968-69		1969-70		1970-71	
	tens	1000 kr.	tens	1000 kr.	tens	1000 kr.
Butter	107,624	624,699	95,908	592,513	81,428	540,805
Cheese	63,953	377,828	62,303	385,794	68,792	445,464
Condensed & dried	78,695	283,824	78,940	288,914	67,449	264,235
Fresh Milk & cream	30,183	39,580	29,488	36,687	25,997	32,945
Casein	735	3,686	953	3,817	1,011	5,718
	281,190	1,329,617	267,592	1,307,725	244,677	1,289,167

Source: T. Mathiassen, Beretning om Fællesorganisationens og Mejerikøterets virksomhed 1970-71, Aarhus, 1971, p.19.

From the table we can visualise that the Danish firms • xpoTtod 244,677 tons et the main dairy outputs with the great return of 1,289,167,000 kroner in 1970-71. From thsso figures we deduce that the Danish dairy industry is based largely on the • xpart trade, and such export figures are of great • oommlo significance to sollas in the said years. However, tho values of exported dairy products have decreased since 1963-64. This is due to changes in quantities and prices of tho products (see Appendix 9).

¹⁾ T. Mathiassen, Beretning om Fællesorganisationens og Mejerikøterets virksomhed 1970-71 (Aarhus: De danske Mejeriforeningers Fællesorganisation, 1971), p.13.

3) Now we turn to • xaxine the pricing of dairy products which is closely associated with the selling function. The pricing by the firms is based on the Danish pricing policy, formulated on the rule that prices of dairy products • hould at least oorreapond to the running costs of the milk production on farms and the operating oorta of dairies. The price-making consists of Danish pricing and pricing on a competitive market, the one covering the products sold regionally and one the other the products intended for export. The oompetitiv price is theoretically • atabliahad by aupply and demand for the product, the major factors in price formation. If the price is out or raised so that quantity of the product the sellers wish to sell is equal to quantity that purchasers wish to purchase, the price is in equilibrium. On the average basis made by the FDDA, the price found for condensed and dried milk was D.Kr. 2.5 per kg. of the product in 1966.¹⁾ The figure changes from time to time due to alterations of supply and demand conditions. The Section of Condeneed Milk Products in the FDDA is in charge of studies on the prices for the Danish sellers.

The pricing for the products sold regionally is at present done by the "Home Market Price System for Milk and Dairy Products,"²⁾ the "voluntary price mechanism in the FDDA," with the purpose of compensating lov export prices by higher home market prices. Such securing in achieved by moans of a home market duty imposed on all butter fat in milk end milk products sold by the dairies. Practic-ally, the System establishes wholesale and retail quotationa of butter, cheese, fresh milk, etc., on the estimated running costs of milk production on farms and of dairies. Tbr quotationa serves as a basis for prices paid to the dairy producers. The price fixed by the System is higher than that for export butter, e.g., it was D.Kr. 9 per kg. of butter in 1965.³⁾ The raising of home market

1) This figure was collected from the FDDA. at Aarhus.

2) The System performs its functions under an authorization of the State Monopoly Control Board in the Ministry of Trade.

3) This figure was collected from the FDDA.

price level above that of export prices represents a price differential. As for cheese, the weekly quotation on cheese for export fixed by the cheese Export Board in the FDD is utilized as a guide for establishing a price paid for cheese sold regionally. The weekly quotation for the exported 45 per cent hard cheese, which should be exemplified, was D. Kr. 3.95 per kg. in 1965. The System also fixes the wholesale quotations for fresh milk sold in Denmark, e.g. about 46 øre per kg. in 1965. But the price for milk sold in Copenhagen and its suburbs is fixed by a milk board of the city, which establishes the price by use of a rather complex formula. The formula values the milk according to the fat content and its solids, and these components are valued in accordance with the "settling price" of butter and the prices of cheese, pork, and barley.¹⁾ The Copenhagen milk quotation at present is about 55 øre per kg.

The pricing of dairy products for export is executed by the Butter Export Board and the Cheese Export Board, the first of which deals with the pricing of butter and whole milk and the second, of cheeses and casein. The first fixes a weekly "settling price" for butter "on the basis of export prices and the existing market prospectus." It is the price the authorized exporters must pay the producers for the butter delivered. If the "settling price" is lower than the actual export price, the Board, vested with the necessary powers, may collect levies on that butter. The proceeds are then paid into the compensation fund managed by the Board. Supplementary payments are made from the fund for butter fetching export prices lower than the "settling price." If it is considered expedient, the Board may fix minimum or uniform prices for butter to particular markets as well. For cheese, the Cheese Export Board fixes a weekly guiding quotation on dairy for cheeses for export. This Board is vested with the same power to fix export duties and minimum prices as is the Butter Export Board. The Cheese Export Board's fund is thus financed by collecting levies demanded under its regulations.

¹⁾ The price of pork and barley, representing the value of skimmed milk in livestock feeding, are added.

4) Now we examine the transport and storage which are required by the firms for creating place and time utilities for the dairy products. The performance of the regional transport function depends on the position of the seller or buyer. If the seller wants to sell his output promptly, the seller nor performs this function. If he is not in such a position, a buyer performs and finances this function. Concerning international trade, transporting from Denmark to a port in a foreign country is organized and paid for by Danish export firms. In so doing, the Danish transportation service is indispensable to the seller for export trade.

To create place and time utilities for dairy products to command high prices, the co-operative dairies manage their own cold storage facilities. Those without cold storage facilities make use of privately-owned cold storage. Those facilities can preserve quality and permit a smooth flow of the good in quantities required along marketing channels to buyers at home and abroad.

5) The next marketing function is financing, which includes the provision and management of money necessary to enable various aspects of marketing to be carried on. Examples are the funds used to meet the transport costs and packaging expenses.¹⁾ Financing may take, e. g., the more subtle form of raising the firm's capital resource. In both instances, it is of utmost significance to the business.

6) The possibility of loss of physical plants and the products by fire or accident may occur. This physical risk can be anticipated and insured against by the dairy; it may purchase insurance policies from firms in Denmark to shift cost of actual loss. Insurance is essential.

7) Standardizing, grading, branding, and controlling functions are scientifically and continuously performed because the co-operative dairies' output must meet standards to satisfy consumers'

¹⁾ T. Mathiassen, Danmarks Mejeri-Statistik 1968 (Århus: De danske Mejeriforeningers Fællesorganisation, 1968), p. 34.

desires. To standardize butter for export, it must be made with "the highest quality" standard and has by law to bear the Lur Brand, a national and quality trade-mark. That is, the butter must 1) be produced from well-cared for milk from tubercle-free herds, be fresh and have a desirable taste, aroma, and good appearance; 2) not contain preservatives other than salt; 3) not be colored with aniline dye 4) be produced from cream already pasteurized at a temperature of at least 170°F.; and 5) contain at least 80 per cent butter fat and not more than 16 per cent moisture, or water content.¹⁾ Butter that does not meet these standards is not allowed to bear the Lur Brand for export, but can be sold only on the home market.



Cheese for export must be made with the "highest quality" standard and has by law to bear the Lur Brand. That is, the cheese must 1) fulfil the regulations applied to butter; 2) contain at least 45 per cent of fat in dry matter; 3) be uniform in appearance, composition, and quality, and 4) be produced by dairies with scientific arrangements and equipment under the most hygienic conditions as prescribed by the regulations.

The standardizing of condensed and dried milk for export requires that the product must be created with "the highest grade" quality and has to bear the Lur Brand. That is, the product must 1) be produced from the first class raw-material only from herds free from bovine tuberculosis and contagious abortion; 2) not be produced from colostrum milk; 3) not contain added preservatives not show coagulation examined by the alcohol test; 4) be produced by a licensed dairy plant, meeting certain requirements as to equipment and arrangement and complying with definite standards for sanitation; and 5) be produced from milk high-temperature pasteurized to not less than 80°C.

Standardized fresh milk must be processed to a "high-grade quality" standard. That is, it must 1) be processed from raw milk from herds free from bovine tuberculosis and contagious abortion under constant veterinary supervision; 2) be processed

¹⁾ Einar O. Petersen, Danish Dairying (Copenhagen: Technical Dairy Publishing House, 1963), pp. 71-72.

from the milk produced and cooled immediately after milking by farms
 □ × ● anity condition; 3) be processed by dairies with modern equip-
 ment ensuring proper treatment, yet ● maximum of security for ● sanitary
 conditions; 4) be either low-temperature pasteurized, standardized, or
 long-time pasteurized; and 5) contain 3.8 per cent fat.

To guarantee that the butter, cheese, and Condensed and
 dried milk have the uniformly high quality standards  ● 
 the Lur Brand¹⁾ has been used by the co-operative dairies as the
 national and quality mark of products intended for export to the
 present day. At first, the Lur was made compulsory by a law of 1906
 as the standard brand, and later it was made, by a law of 1911, the
 quality mark. The present use of this registered trade mark is
 therefore conditional on the fulfillment of the required quality
 standards. No dairy product of a particular type that fails to meet
 the required standards can bear the Lur Brand and without it that
 product cannot be exported.

With respect to grading and controlling, all dairies
 producing Lur Brand dairy products are ● subject to strict state
 control vested in the Government Control, for Dairy Products, Eggs,
 etc.,²⁾ the National Research Institute on Animal Husbandry, and
 the Government Butter and Cheese Grading, each of which is in
 Copenhagen and works with the others. The first body undertakes
 various activities such as inspecting authorized dairy plants and
 collecting ● samples of dairy products for export sales in order to
 determine their quality ● standard, as mentioned.

The second body is vested with the ● authority to make a
 re-test on all ● samples of skim milk, butter milk, and cream for
 butter production and to supervise chiefly the control of pasteurized
 market milk.

The third body supervises the control of the quality of
 butter and cheese; in this office butter and cheese are graded
 weekly, except bi-weekly for Danablu, Mycelle and processed cheese,

1) The Lur is an ● ancient Danish musical instrument" with origins in
 the Bronze Age. It was introduced as an emblem by the dairies ● earlier
 before 1906.

2) ● is ● division of The Ministry of Agriculture and has four control
 district offices: in Copenhagen, Odense, Aarhus, and Vejle.

on a moon in accordance with each of the qualities of butter and cheese. If non-compliance with the regulations or unfulfillment of the required quality is found by any of the three bodies, those concerned lose the right to use the Lur Brand, and the product in question cannot be reported.¹⁾

For fresh milk, thorough quality control from milking to consumption is carried out by veterinarians employed by the Board of Health and large dairy organizations, according to milk regulations. They supervise milk production, inspect milk processing plants, and test samples of milk to ensure that they fulfill, e.g., "high-grade quality" requirements.

In addition to government control, several co-operative dairies have their own control programs. For example, the FDBA has a program of milking-hygiene and milk-hygiene directed to the production of the highest possible quality milk. The dairies also have plans for weekly bacteriological examination of all received milk to determine the total number of bacteria, coliform titer, and content and type of hemolytic bacteria for use as processed milk.

8) As observed, packaging, the process of putting the finished products into convenient wrappers and containers, is scientifically carried out by the firms. It is closely related to standardizing, branding, and labeling and serves as a protective device for the products, as well as the vehicle for carrying the Lur Brand. It makes the product available in proper form and amounts to the customer's attention. Each kind of dairy product is packed according to the requirements of the producers and consumers, as follows:

(1) Most of the bulk of butter for export is packed in kegs of beechwood casks which are stamped with the broad mark, the words "DANISH BUTTER," the production date, and the identification number of the dairy producing it. The Lur Brand control certificate is placed at the bottom and at the top of every beechwood cask. Each

¹⁾ Eina O. Petersen, Danish Dairying (Copenhagen: Technical Dairy Publishing House, 1963), pp. 119-125.

• • • guaranteed net content of 50.8 kg. of butter. The butter, both for home consumption, is also wrapped in a minimum foil on which has been printed the brand mark, the words "DANISH BUTTER" and "LUR9AK," the net weight of the product, and a control number. The minimum foil is coated with real parchment by packing machines. The butter packages are of three sizes: 1 pound, $\frac{1}{2}$ pound, and $\frac{1}{4}$ pound. The packages for export are placed in a paraffined carton.

(2) Boob variety of Danish cheese has its own kind of wrapping. Cheese such as Maribo and Samsø, without rind, are packed in Pliofilm and 91000d in wood or cardboard boxes. Processed cheese is suitable for slicing (is packed in rectangular packages, usually of 1-2 kilograms. Another processed cheese is packed in round cartons of three sizes with square triangular 910000 in a round carton, the net weight of each being 227, 170, or 85 grams. Processed cheese spread is packaged in round cartons of various sizes, and cartons containing 6 pieces with a net weight of 3, 6, and 8 ounces. And novelty processed cheese is packed the same way as the 910000d cheese. Every variety of cheese which has fulfilled the high standards is marked with the Lur Brand for export.

(3) Danish fresh milk is treated hygienically by modern methods in the dairies, in brown-tinted glass bottles of three sizes. Each bottle of milk is capped, and the bottle cap is printed with the name of the dairy that processed it. The week-day of processing is clearly stated on the bottles and their containers.¹⁾ The fresh milk is also treated into "Tetra Pak" of 1/4 litre size to supply local school children. This commodity is also filled into dispensable paper containers of 1 U.S. quart, 1 U.S. pint, 1 U.S. cup, and into 9-litre bags of 6 U.S. gallon size. These containers are placed in nonreturnable fibre carton boxes for export. Each of the containers is printed with the dairy's name and a net weight of the product, etc.

¹⁾ Op. Cit., p. 101.

(4) Finally, the Danish condensed and Mod milk is packed chiefly in labelled or lithographed cans; and the cans are packed in wood or fibre containers for shipping. The sweetened condensed milk for, e.g., candy manufacture, and the roller-dried milk for industrial purposes are packed in lacquered barrels and in paper-lined boxes, or polyethylenelined paper blocks, respectively. The products which fulfill the high standards are marketed with the Lur Brand for export.

(9) The next marketing function performed by the firms is to provide market information and conducting research. Securing and using marketing information at home and abroad is an important part of reducing risk; moreover, it is a mark of good management. This function is performed mainly by the FDDA and its branches in foreign countries, covering not only market information but also the fields of production, consumption, and statistics concerned there. It collects, interprets, and disseminates the information on the mentioned aspects for the Danish dairy industry's success.

Research is scientific dairy research and is conducted in various departments of Danish dairy industry by the dairies and other institutions for more useful information and to explain causes and effects. Undoubtedly it contributes greatly to dairy development. Studies are conducted in many fields, such as (1) milk production, (2) the processing of milk into dairy products, (3) engineering and machines, (4) industrial zoology, and (5) analyses of running markets.¹⁾ A special mention in the first field is bacteriological research on milk samples conducted in the FDDA's Laboratory for Domestic Animal Hygiene, the result of which is to establish means of detecting various forms of infection.

3) As to the next marketing aspect, the Danish milk-based products are marketed along marketing channels, the routes along which the products are moved from the producers to consumers at home and abroad. The channels consist of (1) channels in domestic

¹⁾ Holger Ellert (editor), The Dairy Industry of Denmark (Aarhus; the FDDA, 1962). p. 63.

trade--direct • %d indirect--and(2) channels in foreign trade-- direct and indirect. The producers move a small volume of the products sold regionally • Zory the direct channel in domestic trade directly to ultimate consumers. The producers simultaneously sell • bigger volume of the remaining products along the indirect channel in domestic trade to middlemen, mob as the authorised • rgortm, who in turn may sell their commodities to retailers in the channel of directly to consumers in Denmark. For • xupla, primary co-operatedairies sell most of their butter to • ◆◆□□)(◆◆ exporters, who in turn sell probably about 16 percent of the product to wholesalers, 1) who in turn sell their butter to retailers. In particular, the producers sell buttu and cheeses in small quantities and fresh milk la much bigger quantities • lory the channels of domestic trade.

Simultaneously, the co-operative dairy producers, i.e., the co-operative condensed and dried milk factories, market • lmo8S all their output directly along direct • mort • ketlw channels to buyers in foreign countries such as Thailand and Venezuela. So, many primary co-operatedairies sell their butter in large quantities • loa# indirect export marketing channels to the authorised butter export • wooiationm in Denmark, one 02 which is the co-operative butter export association. The export associations in turn export their product to importers in foreign countries such as England and West Germany, with the bulk going to England. As to the cheese, the dairies sell it in large quantities along indirect channels of foreign trade to • utborised exporters, one of which is a co-operative cheese export • 8oohtioik The exporters export their cheese in large quantities to foreign counties, e.g., West Germany and U.S.A., the first of which has been the main importer. The last product to be • mtiod is fresh milk, sold in very small quantities by the Butter Export Board to West Germany. 2) It is therefore a relatively unimportant export product.

1) R. Esche, Organization and Structure of the Milk Markets in O.E.E.C. Member Countries (Paris: O.E.E.C., 1963), p. 193.

2) This information was obtained from the FDDA at Aarhus.

From the facts presented here, we can see that Danish producers market a much larger part of their dairy output along foreign, rather than domestic, channels. Even the growing part of fresh milk is exported, though in much smaller quantities than other products.

4) The Danish co-operative dairies' performances of all these economic activities to achieve their purposes cost a considerable amount each year. In an economic sense, the total combined costs (or TCC) of any level of dairy output of the firms normally are the total costs defrayed. TCC, which are called here the total operating costs, are the sum total of (1) total fixed costs (or TFC), which remain substantially the same whatever the level of output is, and (2) the total variable costs (or TVC), whose level depends significantly on the rate of output. TFC and TVC are defrayed by the firms for form-utility creation and marketing performance (the marketing costs incurred due to, for example, the movement of dairy products from the dairy plants to the hands of buyers mentioned above). Numerically, the total operating costs of the co-operative dairies, including the items of transportation, wages, packaging salaries, depreciation, fuel and electricity, upkeep, interest, and others, are great. For example, the co-operative dairies' TCC of butter making were about 400 mill. kr. in 1965. The per-unit cost was 7.83 øre per kg. of received milk in the same year.¹⁾ On the per-unit cost basis, we can also formulate a concept of marginal cost for a profit maximization of the firms, etc. It is a change in cost associated with an increase of one unit of the output. As analysed, the per-unit cost of the firms has increased steadily up to the present time due to, e.g., increased costs of living in Denmark. In 1970 the per-unit cost was 11.12 øre per kg. of received milk (see Appendix 8).

5) As regards the firms' return, the co-operative dairies' total return, calculated by multiplying the unit of dairy output by

¹⁾ T. Mathiasen, Op. Cit., p. 34.

its unit price, is high. For example, the total and the average returns of the co-operative dairies in 1965 were about 2,408 mill. kr. and about 55.6 øre per kg. of received milk, respectively.¹⁾ In comparison, the firms' total net return was about 2,008 mill. kr., and the net per-unit return about 47.77 øre per kg. of received milk) but the per-unit cost was 11.12 øre per kg. in 1970. The return per kg. of received milk in 1970 was about 63.88 øre. Thus, the net per-unit return was 52.77 øre.²⁾ The firms might be thus regarded as clearly a uoem8iul dairy • nterpleaee in 1970; i.e., they net with • ucoeea in accomplishing the • oonomic purposes of their members.

6) Even if the firms perform all the • conoia functions successfull, they • noounter the • oonomic problems of (1) increasing costs of operation, e.g., increasing from 6.33 øre in 1961 to 11.12 øre per kg. of received milk in 1970, and (2) difficulties of butter and cheese distributions. Particularly, the rate of increase of operating costs has been bigger than that of net profits (see Appendix 8). The FDDA measures designed to lower increasing costs are, for instance, • tudiae of • tetietioa of dairy working accounts, dairying rationalisation, provision of technical services, and joint purchase and control; but the costs still increase, mainly due to very high wages caused by the increase of Danish wholesale price indexes for all commodities. The cause is an economic condition sector-wide in scope.

The main problems of distribution difficulties are mainly caused by strong competition in the butter and cheese markets. First, Danish butter exported to England competes with the butter from preferential-tariff commonwealth countries. Second, Danish cheese competes with German and Dutch cheeses in the low prices for the Danish products. The above mentioned problems have been overcome to some extent by the Danish co-operative dairies. One significant measure employed by the firms is the merger of uneconomical and small-scale co-operative dairies to gain size and better operational • ooaay, cm mentioned earlier.

¹⁾ This information was obtained from the FDDA at Aarhus.

²⁾ T. Mathiasen, Danmarks Mejeri-Statistik 1971 (Aarhus: De danske Mejeriforeningers Fællesorganisation, 1971), p. 34