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THE WORLD DAIRY MARKET
-- POLICIES, TRADE PATTERNS, AND PROSPECTS --

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The welfare gains referred to on the bottom of page 40 are for the "Industrial Market Economies" only which consists of:

Australia, Canada, EC-10, EFTA-5, Japan, New Zealand, Spain, Portugal, and the United States.

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THE WORLD DAIRY MARKET
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M. C. Hallberg and Woong-Je Cho*

INTRODUCTION

The world market for dairy products is so distorted by the protectionist policies of most of the major milk producing countries of the world that producer prices for milk are now being determined almost exclusively by governments rather than by the forces of supply and demand. In almost all such countries, governments maintain domestic prices well above competitive levels as they have endeavored to protect local dairy farmers and the local dairy industry. These high price levels must be protected with high import barriers. But high price levels inevitably lead to overproduction which in turn leads to high government costs associated with absorbing the surplus and disposing of it at distressed or subsidized prices (either locally or in foreign markets), or to strong production control measures, or both. All this means distorted trade patterns, greatly reduced world price levels, tremendous budgetary drains on the protectionist countries' treasuries, and social losses associated with a misallocation of resources not only in the protectionist countries but also in those countries whose dairy producers suffer lost markets as a result of the protectionist policies of others.

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In contrast, the prevailing dairy policies in most of Latin America, Africa, and Southeast Asia have historically been aimed at providing milk to local consumers at low prices. Here too, though, in the past two decades a growing number of countries in Asia, North Africa, and to a lesser extent Latin America and Sub-Saharan Africa have given greater impetus to the development of a viable and indigenous dairy industry. Governments in Eastern Europe and the USSR have maintained stable milk prices for long periods of time, though in recent years there has been a recognition of the need to permit consumer prices to adjust more in line with the costs of production and marketing.

The purpose of this report is to document, in so far as is possible, the nature and severity of the problem and speculate as to whether and by what means the problem might be resolved in the future. Specifically we will first review the dairy policies of the major milk producing countries of the world in order to get a qualitative assessment of protectionism in the world dairy market. Second, we will examine the existing data in an effort to get a quantitative assessment of the level of protection in this market. Third, we examine in some detail the potential for trade liberalization in dairy around the world paying particular attention to those countries now employing protectionist policies. Finally, we discuss some potential mechanisms designed to lead toward trade liberalization in dairy.

DAIRY POLICIES OF SELECTED COUNTRIES

European Community

The agricultural policy of the 12-member States of the European Community (EC) is dictated by the Common Agricultural Policy (CAP) formulated and administered by the Community Council of Agricultural Ministers^{1/} The basic dairy policy of the EC was established in 1964 although not fully implemented until 1968. The principal objective of this policy was and is to ensure a "fair standard of living" for Community dairy farmers. This policy has been implemented through an elaborate system that ensures high prices for milk, export subsidies and absolute protection from foreign competition. The principal instruments of EC dairy policy include:

Domestic market intervention - A target price for milk is established as a goal to be sought. Intervention prices for butter, nonfat dry milk, and (for Italy) certain cheeses are also established at which intervention agencies are obliged to purchase all quantities of the respective products offered for sale. The intervention prices are set with a view toward achieving the target price goal.

Threshold price and import levies - To protect the domestic dairy industry from lower priced imports, threshold prices are established for dairy

^{1/}The 12 States are Belgium, Denmark, France, The Federal Republic of Germany, Italy, Ireland, Luxembourg, The Netherlands, United Kingdom, Greece, Spain, and Portugal. The United Kingdom, Denmark, and Ireland joined in 1973. Greece joined in 1981. Spain and Portugal joined in 1986.

products which represent the minimum prices at which duty-free imports could compete with domestically produced products^{2/}

An import levy sufficient to raise the minimum offer price of imports up to the threshold price is imposed. When EC supplies of these products are short, imports are allowed to enter at the threshold price duty-free so as to stabilize EC prices at the threshold level. During periods of surpluses, import duties are imposed to discourage imports of these products. The threshold price is reviewed every two weeks.

Domestic surplus disposal - A variety of aids and subsidies are used to promote increased use of dairy products when surplus stocks accumulate. There is a school milk program jointly financed by EC funds, a coresponsibility levy on Community milk producers, and by the national governments. A variety of schemes have been devised to dispose of surplus butter ranging from holiday distress sales to subsidies to manufacturers of products using butter as an input. Subsidies are also used to encourage the use of nonfat dry milk and liquid skim milk for animal feed and for manufacture into casein and caseinates.

Export subsidies - Export subsidies are provided to EC exporters to enable them to sell EC dairy products to non-EC countries at competitive (i.e., world market) prices.

Supply control - The high prices afforded EC milk producers by the EC dairy policy has resulted in large surpluses and a tremendous drain

^{2/}Threshold prices include processing margins thus protecting the domestic processing industry as well as dairy farmers.

on the EC budget in recent years. A variety of schemes have been attempted to discourage milk production since the late 1960s. First a slaughter premium was introduced in 1969 to encourage reductions in the national herd and in milk output. In 1974 a "beef conversion" scheme was introduced in an effort to simultaneously reduce milk production and increase beef production. In 1977 the EC introduced a so-called "prudent price" policy to reduce increases in target prices below increases in the general price level, and a coresponsibility levy whereby producers were assessed a fee the revenues from which were to be used to expand markets for dairy products. Finally in 1984, the Council of Ministers approved a production quota program. Under this program, member States have the option of applying a mandatory quota directly on the individual producer or on the dairy processing plant. A tax (a super-levy) is assessed on over-quota milk at from 75-100 percent of the target price. Individual farm quotas are transferable with the sale or lease of the farm. Quotas by themselves, however, cannot be traded.

Austria

In Austria producer prices for milk are fixed by the Government at well above world price levels and maintained uniform throughout the country. Individual producer quotas were established in 1977. Producer levies are assessed (in the form of price reductions) on deliveries in excess of quota. In 1977 the price reduction on over-quota milk was as high as 40%. These levies are used to partially finance the cost of surplus disposal at home and abroad.

Export subsidies are used on exports of surplus production. Import licenses are required and equalization levies are used to insure that importers do not undercut the local price structure.

Switzerland

The aim of dairy price policy (and for general agricultural policy as well) in Switzerland is that prices must cover costs of production and agricultural wages should be the same as those for skilled non-farm workers. Thus a "basic" price is established by the Federal Council which must be paid all producers. Again this price is well above world market levels.

An individual producer quota scheme was introduced in 1977 in an effort to curtail surpluses of milk. In 1979 the quota system was revised and applied to dairy cooperatives instead of to individual producers. Prices are reduced on over-quota deliveries --- as much as 76% --- in order to discourage surplus production.

Export subsidies are used on exports of surplus production. Imports are relatively free but the exporting country is required to respect the minimum Swiss prices so as to preserve the local price structure.

Finland

The dairy sector generates over 40 percent of agricultural income in Finland. Consequently this sector has received a great deal of attention by Finnish authorities. Target prices based on costs of production and "reasonable" or "fair" returns are met via tight import controls, export subsidies, as well as through incentives to control supply. Target prices

for milk are a very important policy instrument. Further, dairy policy has been used to serve rural regional and social policy goals for Finnish agriculture.

As in many other countries, milk surpluses became a heavy burden by the early 1980s. A "voluntary" quota scheme was introduced in 1981 under which a farmer who reduced deliveries by at least 25 percent was entitled to a special payment sufficiently high to make him slightly better off with the reduced production. In 1985 Finland adopted a quota program with a two-tiered price scheme under which farmers receive the target price on quota milk, but on overquota deliveries they receive the lower world market price.

Finland, like other Scandinavian countries, utilizes tight import quotas on all dairy products produced locally to protect its dairy industry from foreign competition. She does permit the importation of various specialty cheeses.

Export licenses are issued for each export contract. A minimum return is fixed on export sales so as to encourage local consumption. The difference between the export sale and the guaranteed minimum return is paid exporters in the form of an export subsidy. Some of this subsidy is assessed farmers in the form of a "marketing fee".

Norway

The Norwegian dairy sector also generates over 40 percent of the value of agricultural production, hence it too has received a great deal of attention. As in the other Scandinavian countries, dairy policy is part and parcel of Norwegian rural social and regional development policy. A variety of producer subsidies are provided.

Milk prices are set at levels designed to enable producers to achieve the average income of industrial workers. Import quotas are used to protect the domestic industry from foreign competition although some specialty cheeses are imported. Norway does not use export subsidies. Rather she has attempted to control surpluses with domestic policies. This has been much more difficult in recent years.

A voluntary "bonus" scheme was introduced in 1977 to help control the supply of milk. Under this arrangement, producers who reduced their deliveries from previous levels received a higher price for milk (a "bonus") than did producers who delivered the same or an increased amount. This plan was financed by a deduction in the National Basic Price. This scheme worked well under moderate surpluses, but by 1983 increasing cow numbers and output per cow led to problems requiring more drastic solutions. A quota system was introduced whereby producers were paid the guaranteed price on quota milk and the lower world market price on overquota deliveries.

Sweden

As in the other Scandinavian countries, dairy is a very important part of Sweden's agriculture so it receives a large portion of the agricultural authority's attention. Sweden's agricultural policy in general is aimed at (1) preserving the family farm and (2) ensuring that the income of farmers is on a par with that of industrial workers.

Sweden has a variable import levy program similar to that of the Common Market designed to protect farmers' incomes from foreign competition. Sweden's agricultural policy discourages the subsidization of exports, but like many other countries she does have a foreign food aid program under which some subsidized exports occur.

The farm programs of the early 1980s called for a special "pension" scheme to encourage older milk producers to retire early. But by 1985 milk surpluses became such a problem that a voluntary quota program was introduced. If a producer opts for the quota plan, quota deliveries are paid the full support price while overquota deliveries receive the world price. Farmers not opting the quota plan get a "blend" or weighted average of fluid and manufacturing milk prices.

United States

United States dairy legislation in force today, as is the case for most all farm legislation, evolved out of policy formulated in the 1930's. This legislation is aimed at stabilizing the domestic dairy industry and of ensuring United States dairy farmers an "adequate" income. The policy is implemented via price supports, classified pricing and pooling through Federal Milk Marketing Orders, and very tight import controls. The major policy instruments utilized are:

Price supports - A support price for producer milk is established by the Secretary of Agriculture based on guidelines provided by the extant agricultural legislation. As in the case of the EC, this is a goal to be sought by subsequent policy instruments, not a guarantee.

Purchase prices for butter, nonfat dry milk, and cheddar cheese are also established by the Secretary with a view toward maintaining the support price. If processors cannot find commercial buyers for all the butter, nonfat dry milk, or cheddar cheese they produce for at least the announced purchase price, the Commodity Credit Corporation (CCC) is obligated to purchase these products at the purchase price. When the market price is above the announced purchase price and thus,

at least theoretically, the handler buying price for producer milk is above the announced support price, the CCC is authorized to sell on the open market any butter, nonfat dry milk, and/or cheese stored in government warehouses.

Milk Marketing Order program - Nearly 80 percent of the fluid grade milk^{3/} in the United States is regulated by one of 49 Milk Marketing Orders. These Orders establish minimum prices to be paid by handlers for (1) milk used for fluid purposes and (2) for fluid grade milk diverted to manufacturing uses. These minimum prices are established on the basis of a formula which is specified by the Market Administrator based on testimony taken at public hearings. In all cases the minimum prices are based directly or indirectly on the basis of a competitive pay price for manufacturing grade milk (the average price paid farmers by processing plants in Minnesota and Wisconsin) which in turn is heavily influenced by the support price for producer milk. Orders also establish a pooling procedure so that the actual price farmers receive is a weighted average of the two minimum prices.

Import quotas - Imports of dairy products are restricted by quotas authorized under Section 22 of the Agricultural Adjustment Act of 1949. Currently positive quotas exist for 12 categories of cheese, chocolate, buttermilk, skimmed and whole milk, dried cream, evaporated milk, and dry milk. In recent years imports of dairy products have amounted to the equivalent of about 2 percent of total

^{3/}Milk that meets the sanitary requirements established by the USPH Agency for drinking milk. All other milk is termed Grade B or manufacturing grade milk.

United States milk production. Hence United States import quotas serve to effectively insulate the United States dairy industry (both farming and processing) from foreign competition.

Surplus disposal - Surplus products accumulated by the CCC are distributed to low-income families under Section 416 of P.L. 81-439, Section 210 of P.L. 84-540, Sections 202 and 407 of P.L. 81-439, and under various other authorizations. Export subsidies per se are not used to dispose of surplus dairy products. However, under P.L. 480 (the Food For Peace Program) the CCC has subsidized exports at the level of about 0.5 percent of production per year in recent years.

Supply Control - Until recent times the United States had no need for supply control measures on a national scale. A combination of factors has, however, led to quite burdensome surpluses at present: sustained high support prices since the early 1970s, low feed prices, and failure of the 1983/84 dairy assessment program to reduce supplies. (The dairy assessment program resulted in a reduction of the effective support price by \$1.50 over the period in which it was in force.) To further deal with the problem, the United States Congress enacted in 1983 the so-called Dairy Diversion Program under which contracts were offered to producers who agreed to reduce their marketings by 5 to 30 percent in return for a payment of \$10/cwt reduction. Any further assessments under the previous program were to be credited toward the diversion payment. Finally in 1986 the Dairy Herd Buyout Program was put into operation by which dairy producers were offered the opportunity to submit a bid to sell to the government their right to produce milk for the next 5 years. More recently there has been considerable discussion concerning milk production quotas.

Canada

The dairy sector is of considerable importance to Canada's agricultural sector contributing over 20 percent to total farm income. The sector is subject to a rather high degree of protection via tight supply management, rigid import controls, and domestic price supports. The Provincial governments have jurisdiction over the marketing of milk within their territories while the Federal government has jurisdiction over interprovincial and international trade. The major instruments of Canadian dairy policy are:

Production quotas - Canada has liquid (fluid) milk quotas as well as industrial (manufacturing) milk quotas. The latter are referred to as "market share quotas" or MSQs. In addition there are Provincial as well as National milk quotas. Every producer who holds a liquid milk quota also holds an MSQ. Any milk produced over the liquid milk quota automatically becomes part of that production counted towards the MSQ and is thus paid the industrial milk price rather than the higher liquid milk price. The MSQ is set at a level necessary to meet domestic requirements plus a small amount for reserve and for limited exports. Producers can sell their MSQ to other producers in the same Province only. From time to time there is a reallocation of quotas between Provinces:

Overquota levy - A levy (of about 50 percent of the target price) is assessed producers who produce over their MSQ. If, however, total deliveries in the Province do not exceed the Provincial quota, these producer levies are returned. Similarly overquota levies are refunded if national deliveries do not exceed the national quota.

Since the penalty for overproduction is stiff, overquota levies are rarely necessary in Canada.

Coresponsibility levy - For the purpose of purchasing dairy products and thereby maintaining the support price structure, the Canadian Dairy Commission (CDC) borrows funds from the Federal Treasury to purchase cheddar cheese, butter, and nonfat dry milk at support prices. If the revenue from the disposition of these products is insufficient to repay the loan, the difference is made up with a coresponsibility levy assessed producers on their industrial milk production.

Support prices - A "target return" on industrial milk is established based on a formula that takes into account changes in consumer prices, input costs in milk production, and a judgement factor on what constitutes "reasonable" capital costs. A subsidy is paid producers on their MSQ sufficient to bring the market price up to the "target return". To help stabilize the market for dairy products and hence the return to industrial milk producers, the CDC offers to purchase dairy products at a specified price. By varying these purchase prices the CDC controls the amount of the subsidy to be paid producers.

Import quotas - Canada, like the United States, uses import quotas to protect the domestic industry from foreign competition. She does permit some specialty cheese imports --- about 10 percent of domestic cheese consumption.

Export subsidies - Canada has large surpluses of nonfat dry milk which she combines with domestically produced surplus or imported butterfat and exports the resulting product as condensed milk at a considerable loss.

Japan

Japan's milk production has increased rapidly in the last 20 years under government subsidies and domestic protection policies. Japanese producers receive direct subsidies in the form of deficiency payments. Import quotas are imposed on all dairy products except natural cheese.

Japan operates a support buying scheme with the dual objective of supporting and stabilizing prices. The Livestock Industry Promotion Council purchases "designated products" (butter, nonfat dry milk, and condensed milk) when their prices fall to 90 percent or less of the support price (the "stabilization indicative price") for these products. Stocks are released when market prices reach 104 percent or more of the support price. If no stocks are available, purchases are made on the world market.

A subsidy is paid producers supplying milk for the manufacture of specific products so as to raise the effective producer pay price up to a guaranteed price for manufacturing milk. To keep production in line with demand, however, the subsidy is paid only on a specified quantity of milk which has remained constant since 1979.

There is no quota system as such in Japan despite rising milk production and accumulating stocks. Allotments are made to each producer, however, in the form of planned production targets and each producer is expected to exercise voluntary self-restraint in achieving their targeted allotment. To encourage producers to do so, inducements are made for the slaughter of low producing cows, and for the use of whole milk for calf and pig feeding.

Japan does not export dairy products and thus does not use export subsidies. She does import significant quantities of natural cheese, despite having surplus production of milk.

New Zealand

The dairy sector is a very significant part of New Zealand's agricultural economy accounting for over 20 percent of the value of agricultural production. About 10 percent of the milk produced is consumed domestically as fresh milk, the remainder being diverted into processed products of which about 90 percent is exported. Due to a favorable climate which permits a long pasture grazing period thus greatly reducing feed concentrate needs, New Zealand has one of the lowest, if not the lowest, milk production cost of any country in the world. Hence New Zealand dairy products can be expected to be price competitive on the world market.

New Zealand's milk policy is implemented via the New Zealand Milk Board. The Board establishes the producer price for milk consumed locally in fluid form known as "town milk". In return, cooperative producer companies allot production quotas for "town milk" to individual member producers and contract to sell "town milk" to the Board.

The New Zealand Milk Board also has the authority to purchase and sell all dairy products manufactured for export and to fix export purchase prices based on values established by the independent Dairy Products Prices Authority for butterfat and solids-not-fat. The Board also regulates the marketing of butter and cheese within the country so as to keep domestic prices in line with export prices. Following the Board's export sales, the cooperative companies which had supplied the products share the proceeds on the basis of how much was supplied.

Although New Zealand milk prices are not determined solely by free market forces, of the countries considered here she comes the closest to doing so. This is the case primarily by virtue of the fact that she is the low cost producer and she relies so heavily on the export market. As various observers have noted, she is likely to move to complete deregulation of "town milk" production in the near future.

New Zealand thus relies almost exclusively on market forces to establish dairy product prices. She need not protect the industry from foreign competition because no foreign country can undercut her prices (at least not for long). Similarly she has (ordinarily) nothing to gain from subsidizing exports since she is the lowest cost producer on the market.

New Zealand's system of smoothing payment to producers works by holding back receipts in seasons when prices are high and making supplemental payments from these reserves when market prices are low. Prices on the domestic market are kept in line with those on the export market. "Town milk" is priced higher than manufacturing milk in an effort to take advantage of demand elasticity differences and thus to capture some consumer surplus for producers.

Australia

Australia's dairy industry, never as important a component of agriculture as New Zealand's, has been on the decline since its principal outlet for surplus products --- the United Kingdom --- joined the Common Market in 1973. Nevertheless she still remains a substantial exporter of dairy products, finding new markets primarily in Asia.

The market (fluid) milk sector in Australia is controlled by the individual States. The price of market milk has been maintained

significantly higher than that for manufacturing milk so that for most States, individual producer quotas have been necessary to limit market milk production.

Exports of dairy products in Australia are under the control of the Australian Dairy Corporation. Australia, like New Zealand, does not use export subsidies. Australia does, however, set domestic prices of manufactured dairy products at a higher level than export prices, and pools the two returns to determine producer pay prices. If the pooled return falls below a predetermined level, the Commonwealth pays farmers a deficiency payment to bridge the gap. This is known locally as "underwriting". For 1985-86, the Commonwealth has for each of the major dairy products, "underwritten" an export return of no lower than 90 percent of the average export return over the most recent 3-year period. In previous years the Commonwealth "underwrote" the combined return on domestic and export sales.

A levy collection and disbursement scheme has been in effect since 1977 with which to equalize returns to producers from domestic and export sales. A levy is imposed on domestic sales equal to the difference between the domestic wholesale price and the (lower) average export price. The levy thus makes domestic sales as remunerative as export sales. Funds raised by the levy are distributed across all production of the product concerned so that manufacturing milk producers receive a payment for milk based on an equalized return for the products produced regardless of source of sale.

PRODUCTION, CONSUMPTION, AND TRADE PATTERNS

The world dairy market has been persistently and increasingly distorted by protectionist policies of the major milk producing countries. Production, consumption, and trade have been widely misdirected and prices in the international market have coordinated supply and demand only on a limited basis.

Production

During the last two decades world milk production has grown at an average annual rate of 1.33 percent.^{4/} Production grew rapidly in the 1960s until large surplus stocks were built up and prices trended downward through this period. During 1968-70 supply management actions taken by developed countries coupled with consecutive years of bad weather halted production expansion, liquidated surplus stocks, and boosted dairy prices. Production began to rise in 1972 in the EC, the centrally planned countries, and prospective EC member countries. Following 1975 and the so-called food crisis, production expanded rapidly stimulated by favorable feed prices and accelerating imports from developing countries. Production outpaced demand, and growing surpluses persistently put downward pressures on world dairy prices in the late 1970s. Nevertheless, production continued to increase in the major producing countries. In

^{4/}For the purposes of this discussion, unless otherwise noted, the world includes the United States, Canada, Australia, New Zealand, the EC-12, other Western European countries (Austria, Switzerland, Sweden, Norway, and Finland), the Soviet Union, other Eastern European countries (Czechoslovakia, East Germany, Hungary, Poland, and Yugoslavia), Japan, South America, and India.

1984, expansion of world milk production slowed considerably because of the supply control measures instituted in the United States and the EC.

Growth in milk production has varied considerably among countries. In the developed economies, where about 60 percent of the world's milk was produced in 1966, production increased at an average annual rate of 0.97 percent over the last two decades. In the developing and centrally planned economies, on the other hand, production has increased at an annual rate of 1.84 percent. Countries with high growth rates include Japan, the EC, New Zealand in the developed area, India and Argentina in the developing area, and most countries in the centrally planned area.

The EC alone accounted for about 60 percent of the increase in the developed area's milk production. The annual growth rate in the EC (about 1.2 percent) is far below that of Japan (4.2 percent) and of India (5.2 percent) but still highest among exporting countries in the developed area. After a sharp increase during 1965-68, EC milk production dropped the next three years following the establishment of a unified EC dairy price policy in 1968 and three years of constant prices. In 1972, the trend reversed and milk production began climbing at a steady pace. Technological improvement and structural change, induced by high domestic prices relative to world prices, contributed to a large extent to the development of the EC's dairy industry by reducing production costs and increasing production.

The United States, accounting for another 20 percent of the increase in the developed area's milk production, expanded its milk industry from the mid-seventies. United States milk production, in contrast with that of the EC, fluctuated considerably in response to the world market situation. Before 1976 milk production in the United States had been

stagnant at a level near or below that of 1966, sharply increased in 1976-78, and stagnated again through 1980 at slightly less than the 1965 level. In non-EC Western European countries, where the dairy industry is heavily protected, milk production has grown at about the same pace as in the EC. Post-1980 surpluses that developed in the United States and Western Europe adversely affected production of the other developed countries through the world market of dairy products. New Zealand experienced modest production growth until 1983 but recorded a sharp increase in 1984 in response to the retraction in milk production of the EC and the United States. Production in Canada and Australia fell despite a positive growth in output per cow.

Production in the developing countries and in Japan has expanded at a quite steady pace, while that in the centrally planned countries showed large variability. In the Soviet Union --- the second largest milk producer in the world --- production rose from 7.60 MT in 1966 to 9.79 MT in 1984, for an average annual increase of 1.2 percent. Due to the large influence of weather, USSR milk production is characterized by pronounced variability from year to year that acts as a major source of world market price instability.

Expansion in world milk production over the last two decades is attributable almost entirely to an increase in milk production per cow. With the exception of the first half of the 1970s, when feed prices rose sharply everywhere, yields per cow increased steadily from about 3500 kg/cow to 4600 kg/cow for an annual rate of increase of 1.4 percent. The number of cows declined over this same period from 53.9 million head

to 48.7 million head^{5/} This growth in milk production per cow was due primarily to genetic improvements in the animal spurred on by favorable feed prices and the persistence of price supports.

One observes considerable variation in per cow productivity and in its growth rate across countries, however. The annual growth rate in milk production per cow has exceeded 2 percent in Japan, the United States, Canada, Sweden, Norway, Finland, Denmark, France, and Italy during the past two decades (Figure 1). In Australia and New Zealand where dairying relies mainly on pasture for a source of feed, yield per cow has grown at more modest rates. Japan has so far recorded the highest in milk yield per cow --- 6483 kg/cow in 1984. The United States shows the second highest with a yield of 5666 kg/cow in 1984 followed by Canada and Western Europe. Milk yield per cow in New Zealand and Australia is relatively low --- 3664 kg/cow and 3392 kg/cow in 1984, respectively.

Production of dairy products has grown faster than has production of raw milk because of the sluggish demand for fluid products. Over the past two decades butter production has increased by 63 percent and cheese and dry milk production has nearly doubled (Tables 1-3). In most developed countries milk for industrial use shifted from butter and dry milk to cheese production, reflecting the change in demand for these products. Thus production of butter and dry milk has stagnated in the developed countries with the exception of the EC and Japan.

^{5/} Cow numbers and production per cow are for the developed countries only since the reliability of data available for the developing and centrally planned countries is difficult to assess.

FIGURE 1. TREND IN MILK PRODUCTION PER COW IN MAJOR PRODUCING REGIONS.

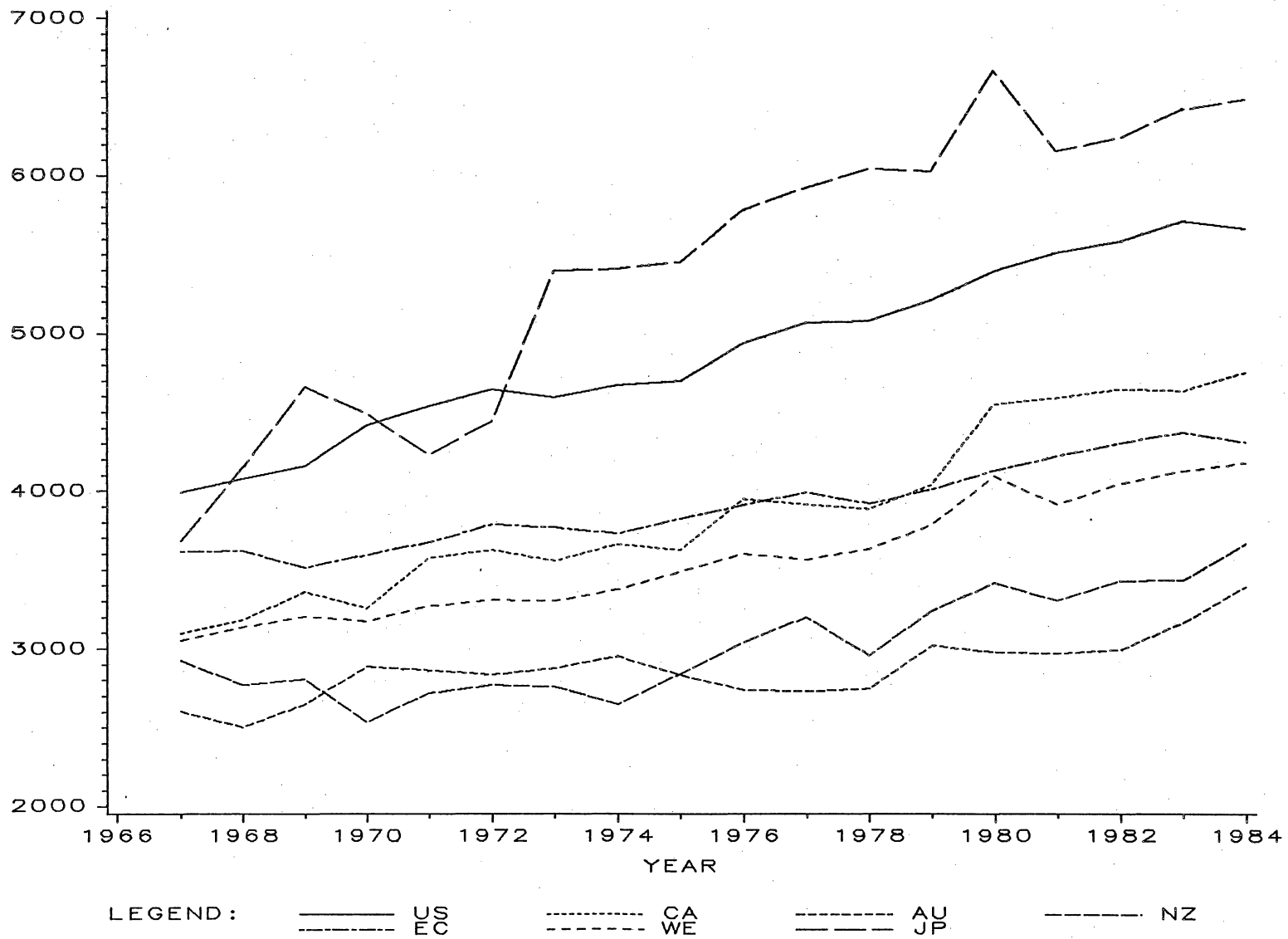


Table 1. World Butter Production, Consumption and Trade.

Country	1966-70 average	1971-75 average	1976-80 average	1981	1982	1983	1984
PRODUCTION							
	-----thousand tons-----						
USA	527	464	471	557	570	589	500
Canada	155	123	109	125	134	104	108
Australia	210	184	113	79	76	88	111
New Zealand	255	235	251	247	248	252	287
EC-10	1593	1667	1900	1918	2055	2268	2106
Other West European	271	245	259	261	260	284	281
Eastern Europe	460	604	731	707	716	788	830
USSR	1013	1167	1438	1318	1403	1562	1588
Japan	35	43	58	64	64	74	78
South America	83	104	115	92	107	102	98
India	440	440	465	485	650	670	690
Other Developing ^{a/}	313	338	387	432	358	367	370
Total	5355	5611	6297	6285	6641	7148	7047
CONSUMPTION							
USA	513	463	444	447	486	541	542
Canada	155	136	112	120	117	113	103
Australia	120	116	75	66	65	62	59
New Zealand	51	51	46	42	41	41	41
EC-10	1789	1693	1713	1768	1606	1554	1627
Other West European	250	234	249	244	247	247	243
Eastern Europe	488	616	740	752	685	780	782
USSR	947	1200	1528	1520	1539	1748	1769
Japan	39	56	57	70	69	74	74
South America	78	99	114	90	97	98	101
India	442	448	476	496	667	671	711
Other Developing ^{a/}	327	375	498	615	482	535	542
Total	5198	5487	6051	6230	6101	6411	6594
TRADE (NET EXPORTS)							
USA	8	10	0	53	67	33	50
Canada	-1	-12	1	0	0	4	0
Australia	89	65	43	11	7	17	44
New Zealand	201	177	204	205	228	234	201
EC-10	-201	-35	173	251	234	179	269
Other West European	21	9	10	10	4	39	32
Eastern Europe	-28	-16	-5	-54	-3	15	21
USSR	66	-33	-92	-202	-136	-186	-181
Japan	-5	-11	-6	-2	-5	-2	-2
South America	4	4	2	0	10	7	1
India	-2	-8	-11	-11	-17	-1	-21
Other Developing ^{a/}	-13	-37	-111	-183	-124	-168	-172
Total	389	265	433	530	550	521	618

^{a/}Other Developing countries include Egypt, Nigeria, Mexico, Chile, Iran, Saudi Arabia, China, Indonesia, and Republic of Korea.

SOURCE: USDA. "World Dairy Situation & Outlook." Foreign Agricultural Circular, FAO. "Production Yearbook", and FAO. "Trade Yearbook".

Table 2. World Cheese Production, Consumption and Trade.

Country	1966-70 average	1971-75 average	1976-80 average	1981	1982	1983	1984
PRODUCTION							
	-----thousand tons-----						
USA	898	1217	1624	1940	2060	2186	2120
Canada	92	138	148	177	170	185	193
Australia	70	89	124	137	155	158	161
New Zealand	107	98	93	84	112	114	110
EC-10	2307	2861	3284	3424	3559	3619	3782
Other West European	304	444	569	620	638	653	630
Eastern Europe	552	668	716	594	626	647	673
USSR	452	608	669	656	699	744	782
Japan	8	9	9	10	17	20	19
South America	294	359	451	453	449	409	410
India	0	0	1	1	1	1	1
Other Developing ^{a/}	660	660	764	796	709	720	730
Total	5745	7153	8452	8892	9195	9456	9611
CONSUMPTION							
USA	956	1293	1685	1916	2124	2208	2334
Canada	87	149	164	193	192	191	208
Australia	44	62	83	103	106	110	115
New Zealand	10	13	23	27	26	25	25
EC-10	2346	2801	3107	3124	3268	3338	3433
Other West European	244	363	477	521	523	563	527
Eastern Europe	547	662	666	490	579	599	630
USSR	407	528	670	669	650	677	710
Japan	34	49	75	85	91	93	98
South America	289	353	449	456	443	406	411
India	0	0	1	1	1	1	1
Other Developing ^{a/}	667	677	851	932	847	898	948
Total	5632	6949	8251	8517	8935	9109	9440
TRADE (NET EXPORTS)							
USA	-59	-80	-91	-106	-104	-113	-122
Canada	5	-12	-19	-16	-15	-15	-14
Australia	26	28	37	36	40	34	32
New Zealand	96	81	72	80	81	75	96
EC-10	-46	36	152	274	260	276	350
Other West European	60	69	89	103	103	97	99
Eastern Europe	5	4	51	102	36	58	55
USSR	-4	-7	0	-13	-7	-9	-11
Japan	-26	-40	-68	-71	-74	-72	-79
South America	4	5	3	-4	7	5	2
India	0	0	0	0	0	0	0
Other Developing ^{a/}	-7	-17	-87	-136	-138	-178	-218
Total	196	223	404	595	527	545	634

^{a/}Other Developing countries include Egypt, Nigeria, Mexico, Chile, Iran, Saudi Arabia, China, Indonesia, and Republic of Korea.

SOURCE: USDA. "World Dairy Situation & Outlook." Foreign Agricultural Circular, FAO. "Production Yearbook", and FAO. "Trade Yearbook".

Table 3. World Dry Milk Production, Consumption, and Trade.

Country	1966-70 average	1971-75 average	1976-80 average	1981	1982	1983	1984
PRODUCTION							
	-----thousand tons-----						
USA	703	506	455	596	635	680	527
Canada	154	157	134	137	163	123	129
Australia	93	135	91	61	82	98	124
New Zealand	124	190	190	181	200	189	248
EC-10	1258	1664	2030	2010	2163	2485	2089
Other West European	150	205	215	229	218	243	231
Eastern Europe	24	68	219	253	159	200	223
USSR	172	273	357	352	386	400	440
Japan	48	69	113	127	131	154	155
South America	103	154	209	191	61	63	59
India	6	13	26	34	41	47	54
Other Developing ^{a/}	51	67	112	147	117	114	117
Total	2886	3501	4152	4318	4356	4796	4396
CONSUMPTION							
USA	521	432	351	304	315	340	304
Canada	74	58	53	49	62	43	63
Australia	51	63	47	43	61	54	57
New Zealand	7	9	15	10	10	2	5
EC-10	1077	1240	1779	1446	1579	1976	2066
Other West European	146	194	241	216	185	214	190
Eastern Europe	31	64	190	265	160	165	166
USSR	186	297	398	429	476	447	462
Japan	116	132	215	240	235	245	253
South America	126	159	212	197	61	76	89
India	44	47	52	73	105	55	123
Other Developing ^{a/}	136	250	437	541	493	513	546
Total	2514	2943	3990	3813	3742	4130	4324
TRADE (NET EXPORTS)							
USA	184	43	94	154	143	288	297
Canada	74	77	108	62	119	82	70
Australia	41	63	54	12	29	37	61
New Zealand	122	160	186	163	135	223	235
EC-10	156	219	449	483	324	198	329
Other West European	3	6	-25	33	13	46	42
Eastern Europe	-7	3	28	-20	-5	21	34
USSR	-14	-23	-41	-77	-90	-47	-57
Japan	-74	-58	-114	-83	-93	-92	-90
South America	-21	-8	-24	-5	-3	-18	-30
India	-38	-33	-26	-39	-64	-8	-69
Other Developing ^{a/}	-85	-183	-325	-394	-377	-399	-428
Total	580	571	919	907	763	895	1068

^{a/}Other Developing countries include Egypt, Nigeria, Mexico, Chile, Iran, Saudi Arabia, China, Indonesia, and Republic of Korea.

SOURCE: USDA. "World Dairy Situation & Outlook." Foreign Agricultural Circular, FAO. "Production Yearbook", and FAO. "Trade Yearbook".

The EC's butter production increased from 1512 thousand tons in 1965 to 2106 thousand tons in 1984. With a relatively limited world market for cheese and high intervention prices for butter and dry milk, the surplus milk of the EC is being converted into butter. Production of dry milk, a by-product of butter production, also increased from 933 thousand tons to 2089 thousand tons during the same period. Japan's exceptional growth in butter and dry milk production is also a consequence of its national policy which has aimed at increasing the level of self-sufficiency for these products.

Consumption

The demand side of the world dairy market over the last two decades can be characterized by (1) structural change in consumption, and (2) slow-paced growth (Tables 1-3). The demand for butter and dry milk has remained stagnant due to a strong downtrend in the developed countries even though the trend in the developing and centrally planned countries has been up. Sizable subsidies in the EC and other Western European countries for butter and dry milk consumption helped to maintain a moderately positive growth in world consumption of these products. World cheese consumption has increased significantly due to the positive effects of income and population growth as well as consumption subsidies in Western Europe.

World butter consumption increased from 5.18 MT in 1966 to 6.59 MT in 1984. About 80 percent of this increase was realized in the centrally planned area. On the other hand, butter consumption in the developed area dropped from 2.90 MT to 2.69 MT over the same period. Per capita world butter consumption declined from 1.96 kg in 1966 to 1.82 kg in 1984. The

latter figure is about one kg less than per capita availability. The major consuming countries --- the centrally planned countries, Western European countries, India, and the United States --- accounted for 38.6 percent, 28.4 percent, 10.8 percent, and 8.2 percent of 1984 world butter consumption respectively.

Because of the increasing concern about saturated fats in the diet, butter consumption has declined significantly in the developed world since 1970. In 1984 and on a per capita basis, Australians, Canadians, and New Zealanders consumed only 40-60 percent of the butter they consumed in 1966. A modest decline has been observed in the other developed countries due no doubt to diet tradition, lagged information about the effect of saturated fats on health, and consumption subsidies. In contrast, consumption in the centrally planned countries, the developing countries, and Japan has grown rapidly whether measured in the aggregate or on a per capita basis. Hence, the proportion of consumption in the developed countries to world consumption dropped sharply from 56.7 percent in 1966-70 to 40.8 percent in 1984.

The EC had been the leading butter consumer until recently when the Soviet Union took its place. Total butter consumption in the EC declined by 143 thousand tons in 1966-84, which amounted to 68 percent of the total reduction in the developed countries. Among the EC members the United Kingdom experienced the most drastic change in butter consumption. Since the United Kingdom's butter prices were aligned upward to EC prices, its butter consumption has declined at an average annual rate of 7.0 percent, for a total decrease of 233 thousand tons.

For the purpose of disposing of surpluses, the EC has implemented a subsidy program for butter consumption. In 1984 the EC subsidized 375

thousand tons of butter consumption out of 1627 thousand tons of total EC consumption. In addition, 125 thousand tons were sold at significantly reduced prices and 233 thousand tons were disposed of domestically through special measures. Thus, in 1984 virtually 45 percent of total butter consumed in the EC was subsidized. Recently, in recognition of the fact that subsidizing butter consumption has effectively increased consumption but has been cost-inefficient in disposing of surpluses, the EC has reduced its consumption subsidies and lowered intervention prices. The remaining Western European countries have also operated extensive consumption subsidy programs.

World cheese consumption has increased at a steady pace from 5.63 MT in 1966 to 9.44 MT in 1984. About 80 percent of this increase is attributable to increased consumption in the developed world. Major consuming countries are the United States, the EC and other Western European countries, and the centrally planned countries which collectively accounted for about 85 percent of world cheese consumption in 1984.

Per capita consumption of cheese in the EC stood at 12.58 kg/year in 1984, which was 2.72 kg/year more than that of the United States, and nearly twice that of the other Western European countries. Japanese cheese consumption has increased quite rapidly since 1966, but is still only about 10 percent of the level of that in the EC. In the developing and centrally planned countries, per capita cheese consumption has been stagnant at the level of 2.5-3.5 kg/year through this period.

The EC is the world's largest cheese consumer, accounting for 36 percent of world consumption in 1984. The growth of cheese consumption has been relatively slow-paced, averaging 2.6 percent per year in 1966-84 compared with an average of 5.5 percent in the other developed countries.

While high internal prices depressed cheese consumption in the EC, the positive effect of income and population growth has resulted in an increase in total consumption. The uptrend of EC cheese consumption was largely paced by France and Italy, who traditionally consume cheese at rates above the EC average and comprise 50 percent of total EC cheese consumption. Even though per capita consumption in these countries did not improve much, both had population increases high enough to enhance the EC's cheese consumption.

Until 1976, world dry milk consumption increased at the rate of 2.4 percent per year but has since moderately increased because feed use became uneconomic and human consumption in developed countries trended down. The major dry milk consuming countries are the EC, the centrally planned countries, the United States, and Japan accounting for 47.8 percent, 14.5 percent, 7.0 percent, and 5.9 percent of world consumption in 1984 respectively. Per capita dry milk consumption of the world rose from 0.82 kg/year in 1966 to 1.18 kg/year in 1984.

These statistics do not, however, reflect the trend in effective demand for dry milk. Disposal schemes that have been used in Western Europe and the United States for not only domestic but also international markets largely affected dry milk consumption in the past. Like butter, dry milk has been sold to consumers at heavily subsidized prices in Western Europe since the late 1970s. The volume disposed of under the EC's subsidy program for feed utilization, for example, accounted for 90 percent of the EC's consumption and 43 percent of the world's consumption in 1984. The amount under food aid programs, which is in effect subsidized by foreign countries and largely determined by the donator, was also sizable.

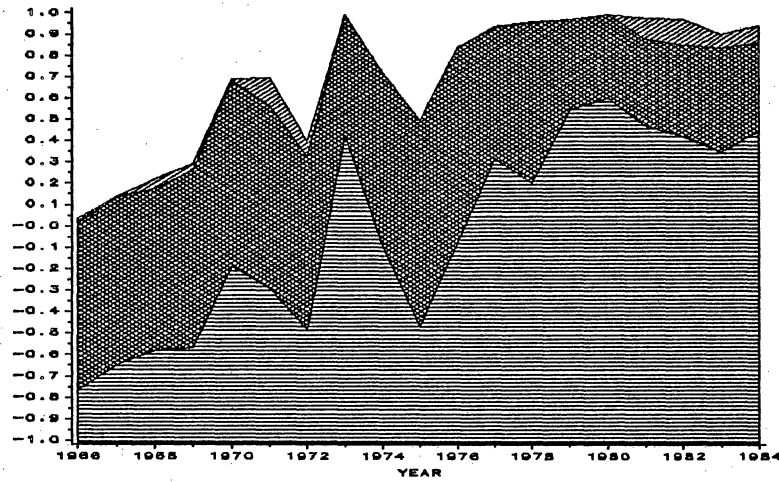
Dry milk consumption in the centrally planned countries has grown markedly since 1966, averaging 6.9 percent per year, but has remained relatively insignificant in international trade. Large butter production and small dry milk consumption made these countries net exporters. The important role of the developing countries in consumption and international trade is emerging. Dry milk consumption of the developing countries increased from 301 thousand tons in 1966 to 758 thousand tons in 1984. These figures are underestimated because the consumption of missing developing countries is large, probably more than 500 thousand tons. However, even though the number of countries surveyed here is too small to represent the entire developing area, data collected for those countries is believed to adequately describe the growth patterns of this group.

Trade

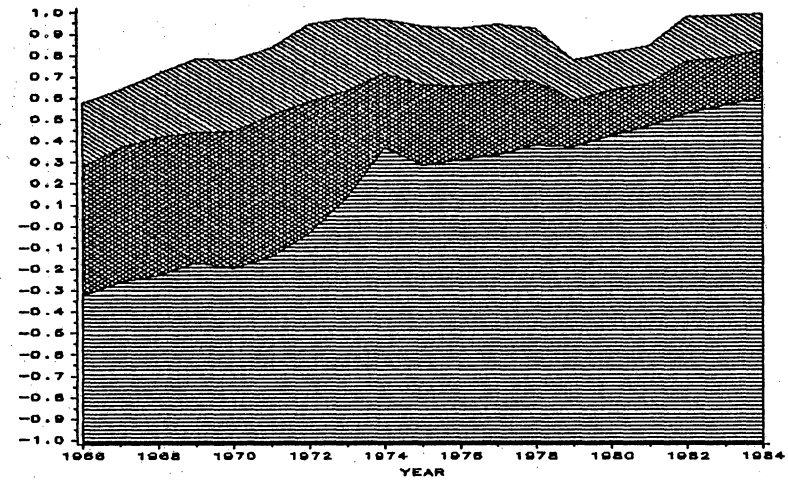
Trade in dairy products has characteristically been not only small relative to production or consumption but also concentrated in a small number of countries. Hence, small changes in exportable surpluses result in disproportionately large impacts on world prices. In fact, the world market has been extremely volatile because of changes in production or consumption that in large part were created by the protectionist policies of the major producing countries. Thus depressed world prices of dairy products caused by the resulting surpluses disrupted production of low-cost producing countries and changed competitive trade flows (see Figure 2 and Tables 1-3).

Figure 2. Market Shares in Dairy Products of the Major Producing Countries, 1966-84.

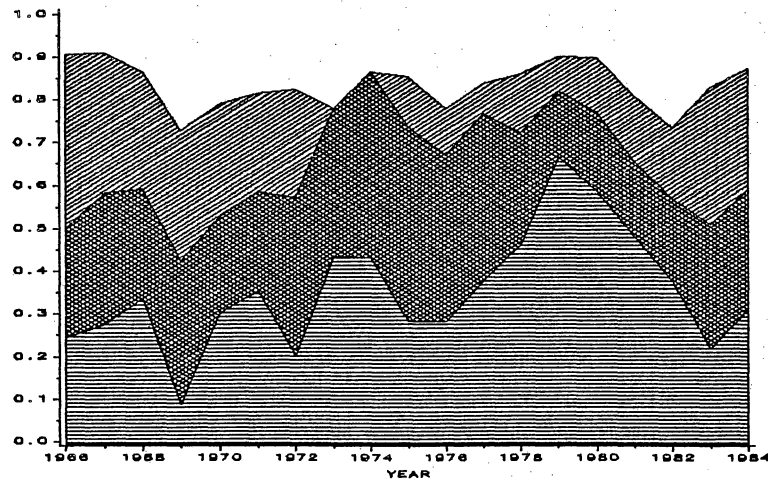
SHARES OF THE INTERNATIONAL BUTTER MARKET, 1966-1984.







SHARES OF THE INTERNATIONAL CHEESE MARKET, 1966-1984.



SHARES OF THE INTERNATIONAL DRYMILK MARKET, 1966-1984.



LEGEND

-  EC-10 Countries
-  Oceania
-  The United States
-  Other Western Europe

Due to the divergent trends in consumption and production among countries, not only the volume but also the direction of trade in dairy has changed considerably over the past two decades. Until the 1960s, international trade in dairy products occurred mostly among the developed countries, with Australia and New Zealand as the major exporters and Western Europe and Japan the major importers. Due to the protectionist policies of the EC and Western Europe and to a declining demand, milk production there outpaced demand so that the EC moved from being the largest importer of dairy products in the 1960s to the largest exporter of dairy products today. The other Western European countries and the United States also became net exporters in the 1980s.

Trade policy of the EC has been more effective in promoting export sales than has that of the United States. Due to high costs of production and high price support levels, neither EC nor United States dairy products are price competitive on the world market. In order to export their products special measures are required. Export subsidies are the basic tool used in the EC, while foreign aid is the major tool used in the United States. This implies that the United States tends to dump its surpluses into low effective demand countries whereas the EC tends to dump its surpluses into the commercial market. The EC strategy, then, definitely affects exports from other countries.

As the growth of surpluses in the developed world accelerated in the 1980s, imports by the developing countries also increased substantially due to increases in income, increases in population, and greatly depressed dairy product prices on the world market. Nevertheless, strong domestic demand led these countries to expand output also so that imports have of late been dampened. Facing limited commercial outlets, the developed

countries, particularly the EC and the United States, have resorted to subsidizing their exports. The combined effect of all these developments has been a shrinking of exports of dairy products from the low-cost producing countries of Oceania.

World butter trade increased from 393 thousand tons in 1966 to 618 thousand tons in 1984 --- from 7.4 percent of world production in 1966 to 9 percent in 1984. In the 1960s, over 70 percent of butter traded was imported by the EC-10 and supplied from Oceania. In the 1980s, the EC and Oceania shared equally 85 percent of world butter exports. The United States, who was almost self-sufficient in butter in the 1960s, accounted for 10 percent of world butter exports in the 1980s. The major buyers of butter are the developing countries (65 percent) and the centrally planned countries (35 percent). Japan remains self-sufficient in butter.

World cheese trade has increased from 198 thousand tons in 1966 to 634 thousand tons in 1984, but still accounts for only 6 percent of world production. In the 1960s, Oceania and the non-EC Western European countries accounted for 90 percent of cheese exports, while the EC, the United States, and Japan accounted for 75 percent of cheese imports. In the 1980s, the EC with the largest cheese exports accounted for 54 percent of the total. Oceania accounted for only 22 percent of cheese exports in 1984 and the non-EC Western European countries for 19 percent.

The developing countries are the major importers of cheese (60 percent) followed by the United States (21 percent) and Japan (14 percent). Among the developing countries, the Middle East is the largest buyer. As the EC successfully substituted cow milk cheese for sheep and goat milk cheese, sales to this region, and particularly to Iran, have increased rapidly.

Trade in dry milk has more than doubled over the period 1966 to 1984. Almost one-quarter of the world's production is now traded in the international market. Until the 1960s, the United States was the largest exporter accounting for 40 percent of the total. Oceania and the EC shared equally in an additional 50 percent. In the 1980s, however, the EC accounted for 35 percent of dry milk exports while the United States and Oceania shared equally an additional 23 percent. The developing countries account for about 90 percent of dry milk imports.

Stocks

The growth in stocks of dairy products, particularly of butter and dry milk products, in the last several years has been the legacy of surplus milk production spurred on by high levels of protection and price supports in the developed world (Table 4). Most of the increase in stocks has occurred in the United States, Western Europe, and New Zealand. The United States has also recorded significant increases in stocks of cheese during the 1980s.

RATES OF PROTECTION IN THE WORLD DAIRY MARKET

The obvious effect of protectionist policies is to raise domestic prices or, at least, to keep them higher than would be justified in a perfectly competitive, free trade world. This, in turn, leads to overproduction in the protectionist countries and possibly to reduced world trade and/or subsidized exports. Estimates of "nominal protection" coefficients in dairy for several countries of the world are shown in Table 5. "Nominal protection" coefficients are estimated as the ratio of domestic price to world market price at the respective country's border. In the case of dairy, the border price is the New Zealand price plus cost of transportation from New Zealand to the country of concern. The New Zealand price is used here since the cost of producing milk in New Zealand is estimated to be the lowest of any country in the world (Austin).

These estimates of the level of protection need to be treated with a good deal of caution. There are various reasons why these estimates may not reflect the "true" rate of protection. First, if world prices vary while domestic prices are stable (as would be expected for administered prices), "nominal protection" coefficients can vary widely over time. Second, domestic prices can be measured at different levels in the marketing chain: farmgate, the intervention board, or the wholesale level. Since different countries report prices at different levels, country comparisons can be somewhat misleading.

Furthermore "nominal protection" coefficients by themselves are simply measures of the degree of protection in individual countries: they provide little information about the international consequences of the level of protection so measured. It is clear that agricultural policies

Table 4. Stocks of major dairy products for the specified countries.

Country	1966-70 average	1971-75 average	1976-80 average	1981	1982	1983	1984
-----thousand tons-----							
BUTTER							
USA	51	33	84	195	212	227	135
Canada	29	19	23	20	37	24	29
Australia	14	14	14	11	15	24	32
New Zealand	44	50	75	61	94	71	116
EC-10	318	289	440	250	454	989	1197
Other West European	14	9	12	22	31	29	35
Japan	6	6	23	36	10	12	18
Total	476	420	670	595	853	1376	1562
CHEESE							
USA	238	238	266	445	483	574	482
Canada	44	44	48	61	47	56	55
Australia	37	33	40	47	57	71	85
New Zealand	20	34	32	9	14	28	17
EC-10	688	712	632	534	591	596	595
Other West European	85	111	6	144	119	113	117
Japan	1	2	6	5	5	4	4
Total	1113	1175	1167	1245	1316	1442	1355
DRY MILK							
USA	92	88	256	404	581	633	559
Canada	59	71	55	43	28	26	22
Australia	11	19	20	15	10	17	23
New Zealand	26	55	90	71	126	90	98
EC-10	317	575	769	384	624	935	629
Other West European	37	44	47	31	58	41	40
Japan	12	22	46	39	28	29	21
Total	554	874	1284	987	1455	1771	1392

SOURCE: USDA. "World Dairy Situation & Outlook." Foreign Agricultural Circular, FAO. "Production Yearbook", and FAO. "Trade Yearbook".

Table 5-Self-Sufficiency Ratios in Dairy, Dairy's Share of Total GLS^{a/} Production, Dairy's Share of Total GLS Consumption, and Nominal Protection Coefficients in Dairy for Selected Countries.

Country	1980-82 Self- Sufficiency Ratios ^{b/}	1985 Share in Total GLS Production	1985 Share in Total GLS Consumption	1980-82 Nominal Protection Coefficients ^{c/}
	(%)	(%)	(%)	
<u>Industrial Market Economies</u>				
Australia	124	11.4	18.6	1.30
Canada	111	17.9	23.8	1.95
EC-10	113	29.1	27.8	1.75
EFTA-5 ^{d/}	111	41.2	37.5	2.40
Japan	84	11.5	10.7	2.90
New Zealand	219	32.4	31.7	1.00
Spain and Portugal	95	21.3	18.8	1.80
United States	103	22.0	23.8	2.00
<u>Centrally Planned Economies</u>				
USSR	98	42.4	31.0	2.60
Other East European	101	33.1	25.8	2.60
<u>Selected Developing Economies</u>				
Egypt	75	27.0	23.9	2.50
Nigeria	32	4.1	8.5	3.00
South Africa	98	22.2	23.6	2.30
China	95	5.3	6.3	2.80
India	99	27.2	28.3	1.80
Korea	98	4.4	4.1	3.00
Taiwan	93	1.1	1.2	3.00
Thailand	6	0.1	2.0	1.80
Argentina	100	9.6	12.9	1.00
Brazil	99	18.5	19.5	1.60
Mexico	90	35.3	35.6	2.80

^{a/}Grain, Livestock, and Sugar. ^{b/}Ratio of local production to local consumption times 100. ^{c/}Estimated as the ratio of local producer price to border price. ^{d/}European Free Trade Association including Austria, Iceland, Norway, Sweden, and Switzerland.

SOURCE: Tyers and Anderson.

do affect world prices and trade. A good deal more information is needed to assess what would happen to world milk prices if protectionist policies were abandoned, however. The relative importance of the different countries as well as their internal policies must be considered.

Switzerland, for example, has the highest rate of nominal protection in dairy of any country in the world. Yet Switzerland has such a small percentage of the world's milk production and engages in such a small percentage of world trade in dairy products that this high level of protection is of little consequence to the international dairy market. A large exporting country, on the other hand, with a high rate of nominal protection may also have little impact on the international market if the remainder of its internal policies act to remove the surplus production that would otherwise occur --- policies such as production quotas (or acreage set-asides in the case of grains), domestic food distribution programs, stock accumulation programs, or price distortions in competing or complementary commodities.

Despite these limitations, some general conclusions are apparent. It seems rather clear, for example, from the estimates available that in most all countries with a milk self-sufficiency ratio of 110 or less, dairy farmers receive generous support from their government. Japanese, Common Market, United States and Scandinavian dairy farmers are more highly protected than are farmers in those countries that normally rely on the export market to market their dairy produce. Some of the developing countries also protect their local dairy industry apparently in an effort to develop a viable industry and to reduce their dependence on other countries for a source of dairy products.

CONSEQUENCES OF WORLD TRADE LIBERALIZATION
IN DAIRY

In a recent study commissioned by the World Bank, Tyers and Anderson used a multi-commodity (grain-livestock-sugar) simulation model of world agriculture to project expected 1985 consequences of free trade in dairy on 30 countries and country groups. The first projection assumed 1980-82 domestic-to-border price ratios would remain unchanged to 1985. This projection thus assumed a continuation of 1980-82 protectionist dairy policies everywhere and was used as the basis of comparison for subsequent simulations. The second projection assumed removal of all forms of dairy market intervention --- domestically as well as across borders --- and thus that everywhere free market prices in dairy would prevail. In the latter projection, 1980-82 domestic-to-border price ratios in all non-dairy markets were assumed to prevail through 1985.

In both of these simulations it was also assumed that the border price for milk in every country is the New Zealand producer price for milk plus an allowance for processing milk into exportable form as well as an allowance for transportation and reconstitution at the destination. All milk product quantities were converted into fluid milk equivalents so all dairy products could be treated, for analytical purposes, as a single commodity.

The essential results of this analysis are shown in Table 6. The study found that under removal of all protectionist policies for dairy, world prices for milk as well as exports of dairy products would nearly double! This finding is consistent with the somewhat less sophisticated empirical work of Lattimore and Weedle, Vermeer, et al, and Warley.

Because of the world price being so high under trade liberalization of the world dairy market, milk prices in Canada, the United States, and several of the developing countries would change very little. Milk prices in Australia and South America would increase significantly but not by as much as in the low-cost countries of New Zealand and Argentina. In the EC, milk prices would also increase slightly in spite of their current high level of protection. Milk prices in Scandinavia (actually in EFTA-5) would drop by 18 percent, and in Japan by over 30 percent. Significant price decreases would also occur in the centrally planned economies, in Egypt and Nigeria, in China, in Korea and Taiwan, and in Mexico. In general, global liberalization in dairy would raise the price to producers in the major dairy countries with relatively low rates of protection currently, while for several with relatively high rates of protection it would have little price impact. The major exceptions to the latter would be Japan and EFTA-5.

Under liberalization of the world dairy industry, trade would increase by a projected 27 million tons of milk equivalent. Exports to EFTA, Japan, the USSR, China, and Mexico would increase substantially. Exports from New Zealand, Argentina, Brazil, the EC, United States, and India would also increase substantially. The changes in self-sufficiency ratios noted in Table 6 in general reflect these changes in net exports.

GAINERS AND LOSERS FROM TRADE LIBERALIZATION IN DAIRY

The overall welfare gains from removal of dairy intervention policies everywhere were estimated by Tyers and Anderson to be \$5.6 billion ---

Table 6-Impact of Liberalization of the World Dairy Industry.

Country	Change in	Change in	Self-Sufficiency Ratios	
	Domestic Producer Price		Net Imports	Reference Scenario
	(%)	(000 tonnes)	(%)	(%)
<u>Industrial Market Economies</u>				
Australia	51	-759	118	137
Canada	1	-31	111	112
EC-10	12	-10893	114	125
EFTA-5 ^b	-18	2388	125	108
Japan	-32	5199	83	45
New Zealand	96	-3743	218	374
Spain and Portugal	9	-778	95	105
United States	-2	-5342	103	102
<u>Centrally Planned Economies</u>				
USSR	-25	6482	99	92
Other East European	-25	1241	104	101
<u>Selected Developing Economies</u>				
Egypt	-22	1031	68	46
Nigeria	-35	704	32	17
South Africa	-15	710	95	74
China	-30	13849	79	29
India	9	-3683	96	107
Korea	-35	606	100	45
Taiwan	-51	104	81	26
Thailand	9	-16	5	6
Argentina	96	-4225	100	244
Brazil	23	-3300	95	125
Mexico	-30	4468	89	56

^a/Grain, Livestock, and Sugar. ^b/European Free Trade Association including Austria, Iceland, Norway, Sweden, and Switzerland.

SOURCE: Tyers and Anderson.

about \$7 per capita. As in every such case there would be some gainers and some losers. By and large all the major dairy producing countries in North America, Europe, Australia-New Zealand, and South America would be net gainers. Many countries in the developing world would be losers. New

Zealand stands to gain the most from trade liberalization in dairy --- an estimated \$195 per capita --- as both the world price and her exports increase. The next largest gainer would be EFTA-5 (\$25 per capita). Australia and Argentina also stand to gain significantly. Strangely enough the remaining countries with relatively high rates of protection --- EC-10, United States, and Canada --- would also gain primarily from increased exports. In the United States, for example, the increase in world price causes exports to increase because of the now relatively lower United States domestic price. Thus while consumers in the United States would be slightly worse off as a result of the higher world market prices, United States producers would be better off and in total the United States gainers more than offset the United States losers. The big losers would be the Caribbean and African countries, and to a somewhat less degree, Southeast Asia.

It is inevitable that, compared to the status quo, there are both gainers and losers from free trade. The distribution of gains and losses from free trade in dairy depicted here would appear to most people to be rather inequitable --- the low income countries tend to be the big losers while most of the high income countries end up being gainers.

It must be borne in mind, however, that the analysis on which these results are based tells only part of the story. That is, prices, production, consumption, and trade in all non-dairy markets were assumed to remain unchanged at their 1980-82 levels. Clearly these variables would not likely remain unchanged if free trade were to occur in dairy. In particular it is to be expected that in those countries where milk production is projected to increase, resources would be bid away from the production of other agricultural products some of which are produced in

the countries identified above as losers. Hence the losses sustained in a given country as a result of free trade in dairy can be expected to be compensated for (and indeed more than compensated for) by the gains from non-dairy enterprises. The World Bank report further elaborates on this point.

CONCLUSIONS

If current trends continue, the prospects are for continued surpluses of milk and dairy products in the world. The ability of many countries less well endowed with pasture to feed high levels of concentrates per dairy animal enables them to expand milk production under the price shelter of protectionist policies. In the developing and centrally planned countries and in Japan, milk production can be expected to continue to expand in line with the growth in demand for milk and dairy products. In the major producing regions of the developed world --- i.e., in the United States and Western Europe --- production expansion and budgetary stress promised by continuing protectionist measures will likely result in a reinforcement of current production control measures. Technological progress and low feed prices, though, may well result in little change in total output.

The comparative advantage in the world dairy market may change in the future as the stock of technology and capital change, and if an abundant supply of low-priced animal feed is maintained. If this is the case the comparative advantage traditionally held by Oceania may diminish and trade flows could be significantly altered from those depicted here. A more significant factor, however, is likely to be whether or not protectionist policies around the world are maintained.

Currently there is a great deal of concern among the major developed countries about the mounting costs of protecting the local dairy industries. Expenditures on dairy price supports alone in the EC amounted to 5442 million ECU (49.5 ECU per ton of milk produced) in 1984 and in the United States \$1598 million (\$26.0 per ton of milk produced). Expenditures associated with supporting the dairy industry in Austria, Finland, Norway, Sweden, and Switzerland have also been exceedingly high. There is no indication that this situation will be improved until these countries take action to curb the production growth of recent years.

Why Protection?

The fact that in the 1930s or even before many countries initiated dairy policy of a highly protectionist nature is for the most part quite understandable. Milk and dairy products are highly perishable commodities and, given the technology of those days, could neither be stored for long periods of time nor transported long distances. Furthermore the production technology available did not permit farmers to milk large herds nor specialize solely in milk production. Thus, in order to supply consumers' demand for not only processed dairy products but also fresh milk, many farmers throughout the rural landscape were involved in dairying. Most policy-makers deemed it crucial to develop whatever policies were necessary to ensure the continued survival of these dairy farmers so that a steady and uninterrupted supply of fresh milk was available to consumers.

The fact that these protectionist policies have persisted through the 1980s is less easily explained. Production, marketing, and transportation technology is vastly different today than it was 50 years ago. Milk can

now be transported great distances without deteriorating in quality sufficient to prevent its use as drinking milk at the destination^{6/} Further the technology exists to produce other forms of drinking milk (e.g., sterilized milk or a product that can be reconstituted into drinking milk at the destination) that can be transported longer distances, even across international borders. Most of the more essential manufactured products can now be shipped satisfactorily anywhere in the world.

Today's production technology in conjunction with new marketing and transportation technology has permitted specialization in dairy production which, in turn, has meant fewer farmers producing milk. Herds with 1000 or more cows are not uncommon in the United States today.

The study cited in this report suggests that world welfare could be increased substantially by dismantling the protectionist policies in dairy and moving closer toward a free trade position. Caution should be used in interpreting these results because the estimates are questionable on both theoretical and empirical grounds. Nevertheless, some firm conclusions stand out. The principle gainers would be the major milk producing countries. Within these countries, though, consumers would be adversely affected as world prices rise. In general, protectionism in dairy as in other commodities leads to an uneconomic (i.e., inefficient) allocation of resources because (1) it encourages production in excess of what the market requires and/or (2) it prevents the use of committed resources in the production of alternative products.

^{6/}In the United States fluid grade milk regularly moves from the Upper Midwest to Florida destined for the drinking milk market. Technically we see no reason why it could not move from any two points in the United States, although legal restrictions or local sanitary regulations may

Why then do protectionist policies persist? Anderson and Hayami (pps. 37-38) offer the following explanation:

Much of the explanation is to be found on the supply side of the political market for rural assistance policies. Direct price- or income-support schemes are simply much more costly politically per dollar of assistance to farmers. For a start they are more overt because they involve direct treasury payments, which are open to periodic budget scrutiny. Import controls, by contrast, do not involve government payouts, and may even add to treasury revenue through tariffs on imports; domestic consumers pay the subsidy in the form of high domestic prices for food. And ... consumers have an ever-decreasing incentive to oppose such price distortions as their incomes grow.

Another major reason why agricultural protection policies are less costly politically than more direct assistance policies is that the former can be argued to be necessary for reasons of food security. However, although protection is certainly the first-best policy instrument for boosting food self-sufficiency, food self-sufficiency is not synonymous with food security, especially when the raw materials for the crucial inputs (fertilizer, animal feedmixes) must be imported ...

A final reason why first-best adjustment assistance policies have not been adopted is the divergence between the real interests of the farm population and those of farm organizations. The cooperative organizations, for example, benefit from the sale of farm inputs, especially to small farms, and the marketing of their produce. (Large farms can often obtain better deals through private traders.) Cooperatives thus have an interest in ensuring that the agricultural output of small farms does not shrink. If the government were to adopt policies that assisted farm households to earn larger incomes off the farm, or strengthened the incentive for farms to increase in size, it is possible that the political and economic power of cooperatives would diminish. Cooperatives therefore do not lobby for better rural education (which would encourage more part-time and full-time off-farm employment) or more research (which might generate greater economies of scale and increase the incentives for small farms to amalgamate), even though such policies would benefit farm people more than do protectionist policies.

currently present an obstacle.

Prospects for Reduced Levels of Protection

For many the strongest hope for reduced levels of protection is that society will cease to be willing to pay the high cost required to support this protection. Yet, as we have seen, most societies appear willing to bear the cost. Maintenance of protectionist policies is currently being justified on the rather fragile argument of many politicians that if it is dismantled unilaterally, the country that first takes the initiative places its dairy farmers at a disadvantage vis-à-vis dairy farmers in other countries. Consequently no country is willing to take the lead. At the recent Venice Economic Summit, for example, it is largely for this reason that no agreement could be reached among the world economic powers on a future date by which protectionist policies in agriculture were to be phased out.

A more rational argument for maintaining these policies is what we might call the "Western European" argument (although this argument is not necessarily confined to Western Europe). Here society seems driven by the desire (1) to maintain the existing agricultural structure consisting of relatively small, family-sized units, and (2) to keep agricultural incomes on a par with those of non-farm families. These lofty aims are not consistent with the aims of countries that have long had a love affair with the "efficiency" results of the free market solution. Nonetheless these aims are quite legitimate and must be reckoned with.

The best hope for the future, then, would appear to us to be some type of middle-ground compromise. We suggest the following for consideration and implementation: (1) phased reduction of levels of protection and removal of trade barriers on a multilateral (but not

global) basis where mutual benefits are deemed possible, (2) international sanctions against export subsidies and dumping in whatever form, and (3) multilateral agreements designed to create economic hardships on countries or country groups that engage in export dumping. The first of these would of necessity result from individual country negotiations but could be given international sanction via, for example, GATT or the UN. It recognizes the near futility of attempts to achieve global free trade and the more likely prospect of multicountry cooperation. The Canadian/United States discussions aimed at freeing up trade between these two countries might serve as an example of this type of cooperation. The second is essentially already in place via GATT. Ways should be sought for strengthening GATT's teeth in this area. The third could also be strengthened via legitimization through GATT or the UN or both.

Prospects for Increased U.S. Exports of Dairy Products

Many individuals appear to look hopefully to the foreign market as a means of increasing sales of United States dairy products. In fact, in March of this year the USDA introduced a Dairy Export Incentive Program designed to promote exports of United States dairy products via in-kind subsidies from CCC stocks for export sales of targeted products from commercial sources. The targeted products include butter, butteroil, anhydrous milkfat, nonfat dry milk, whole milk powder, and cheddar and bulk American cheese for processing.

The Dairy Export Incentive Program will certainly enable United States processors of dairy products to compete in the international market. It is not, however, a long-term solution to the basic problem of overproduction in the United States. Over the long-term the United States

simply cannot compete on the international market with the low-cost producing nations like New Zealand and Argentina without subsidizing exports. This is true regardless of whether the present levels of protection in the United States and elsewhere continue or if all countries remove their protectionist and trade barrier policies. Further, to continue to subsidize these exports would mean not only social losses in the United States (through the continued employment of resources in milk production in the absence of a market for this milk) but also losses imposed on countries that have a greater comparative advantage for milk production than does the United States.

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