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Rates of Assistance on U.S. Casein Imports from New Zealand and Australia

Tanya Roberts

RATES OF ASSISTANCE ON U.S. CASEIN IMPORTS FROM NEW ZEALAND AND AUSTRALIA. By Tanya Roberts, Commodity Economics Divison, Economic Research Service, U.S. Department of Agriculture. Staff Report No. 870610.

ABSTRACT

Casein imports have been criticized for displacing U.S. milk production. This report examines the policies of New Zealand and Australia for signs of economic subsidies and calculates three measures of assistance. In New Zealand, interest concessions are the largest sources of assistance. Pooling revenues earned in the high-priced drinking market with those in the low-priced manufactured products are Australia's largest source of casein subsidies. The rates of assistance on casein as a percentage of casein revenue were estimated at less than 14 percent for New Zealand and about 17 percent for Australia during 1977/78-1981/82. Recent abolition of the interest subsidy to the New Zealand Dairy Board dramatically lowers today's subsidy in New Zealand.

Keywords: Casein, subsidy, assistance, New Zealand, Australia, dairy imports, General Agreement on Tariffs and Trade, Oceania.

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SUMMARY

Subsidies paid by New Zealand and Australia on their casein exports are estimated in this report. Casein, the principal protein in milk, is a major component in U.S. fabricated foods, such as substitute cheeses and coffee whiteners. Casein is not produced domestically in the United States, and casein imports are not restricted by quotas or tariffs. The U.S. dairy cooperatives have proposed curbs on casein imports to increase use of domestic milk supplies. A large portion of U.S. casein is imported from New Zealand and Australia.

Economic policies of New Zealand and Australia are examined to determine whether their casein exports are subsidized and by what means: (1) direct subsidies on casein exports or casein production; (2) direct subsidies to the dairy industry as a whole; (3) indirect subsidies to the dairy industry, such as subsidized input prices; or (4) pooling arrangements that blend money earned by domestic and foreign sales, blend receipts from sales of other dairy products with casein, or at the farm level blend manufacturing and drinking milk receipts.

Three measures of assistance are calculated. The first measure is the subsidy on casein as a percentage of casein revenue, which is similar to the producer subsidy equivalent popularized by Josling and used in the Economic Research Service trade liberalization study. Measure I_{TR} was estimated at less than 14 percent for New Zealand and at about 17 percent for Australia during 1977/78-1981/82. The other two measures of assistance are similar to ones developed by the Australian Industries Assistance Commission: the casein subsidy as a percentage of unsubsidized casein revenue, and the casein subsidy as a percentage of valued added by the casein industry. The value-added base, while theoretically the more correct, is more difficult to estimate.

New Zealand's primary source of assistance is below-market interest rates to the New Zealand Dairy Board and to individual farmers. In 1987, the New Zealand Government converted an overdraft loan of the dairy board to a lump sum payment which amounted to a NZ$600 million subsidy. In exchange, the dairy board will no longer be able to borrow at less than commercial rates. Consequently, the rate of assistance to casein exports now will be markedly lower than the rate calculated in this report.

The dominant source of Australia's subsidy is the state pooling of farm receipts for the high-priced drinking milk with the low-priced manufacturing milk products. The Australian Government has been trying to minimize producer assistance that distorts market signals for 15 years, but state policies are unlikely to change much.

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INTRODUCTION

Casein, the principal milk protein, is used in substitute cheeses, diet supplements, and other products. U.S. casein production peaked in the late thirties and fell steadily thereafter until 1968 when production essentially stopped.

Casein is produced commerically by adding an acid to skim milk. The casein precipitates and is usually washed and dried. It is sold as raw casein, which enters the United States duty free. If the casein is dissolved in an alkaline solution and sold as caseinate, it is charged a duty of 0.2 cent a pound when it enters the United States. Some versions of the pending 1987 trade bill contain restrictions on casein imports, such as 50-percent quotas [62]. 1/

U.S. casein imports have been scrutinized in recent years, and their effect on dairy policy has been analyzed [38, 58, 59, 63]. The U.S. International Trade Commission (ITC) concluded "...that casein, mixtures in chief value of casein, and lactalbumin...are not being, and are not practically certain to be, imported into the United States under such conditions and in such quantities as to render or tend to render ineffective, or materially interfere with, the price-support program for milk undertaken by the Department of Agriculture, or to reduce substantially the amount of any product processed in the United States from domestic milk" [60, p. 1]. Consequently, the United States did not take any further action.

New Zealand and Australia are two of the most important casein suppliers to the United States (table 1). This report examines whether and by how much these countries have subsidized their casein production and exports.

METHODOLOGY

The General Agreement on Tariffs and Trade (GATT) is the only ongoing multilateral instrument that sets agreed rules for international trade. Its basic aim is to foster and liberalize world trade, partly by acting as a forum for countries to arrive at mutually agreed upon rules for trade and partly by encouraging consultations among countries to solve trade disputes. In the Tokoyo round of negotiations, 1973-79, member nations formulated two relevant codes of conduct, one on subsidies and the other on countervailing duties and antidumping. These codes were sent to 92 member countries for discussion and formal approval. About a third of the GATT members (including Australia and New Zealand) approved them. The United States approved the Subsidies Code in the Trade Agreements Act of 1979.

1/ Underscored numbers in brackets refer to items in the Bibliography at the end of this report.

Table 1--U.S. casein imports and mixtures of casein

Country of origin	1970	1977	1978	1979	1980	1981	1982	1983	1984	1985
	Million pounds									
New Zealand	63.0	96.3	84.3	92.1	76.8	76.8	85.2	68.4	94.7	102.0
Australia	34.3	23.1	22.9	21.7	17.9	18.4	16.5	18.8	15.3	12.1
Ireland	1/	4.3	9.2	14.8	24.0	19.9	40.2	35.9	39.2	64.9
France	11.2	1/	1/	2.0	8.9	5.8	14.9	12.0	13.9	10.7
West Germany	.4	.4	.2	.2	.6	1.2	1.2	2.6	1.5	1.9
Netherlands	.2	.6	1.5	2.5	2.5	1.8	4.6	6.0	7.9	7.7
Other	26.2	19.5	19.0	17.5	21.5	3.9	14.2	15.8	19.8	32.1
Total	135.3	144.1	137.1	150.8	152.2	127.8	176.8	159.5	192.3	231.4

1/ Less than 100,000 pounds.
Source: [38, p. 5].

Export subsidies under the GATT Subsidies Code are prohibited on industrial products and minerals. The GATT list of export subsidies under the code is shown in table 2. The subsidies range from government payments to a firm contingent upon export performance to special terms on transportation and freight charges for exported goods. GATT, however, permits export subsidies on primary agricultural products so long as the country paying the export subsidy does not gain more than an equitable share of world export trade for the product.

Domestic subsidies are permitted by the GATT Subsidies Code because they are used by governments to promote important objectives of national policy [19, p. 5]. GATT acknowledges that even domestic subsidies may have harmful effects on trade and production [19, p. 5]. If the trade of a country is harmed by another country's subsidies, then a remedy can be pursued by GATT, ranging from consultation to formal investigation. Each complaint is to be examined on its unique merits in light of world trade, production (for example, price and capacity utilization), and supply of the product concerned [19, p. 20].

Because GATT allows export subsidies on agricultural products and because domestic subsidies are treated individually, I do not rely on GATT's definitions. I use general economic principles in this report. According to economic theory, a government subsidy is any government intervention that distorts the commodity price so that it no longer equals the marginal cost of production. Subsidies can take the form of direct government payments to the industry or indirect effects such as subsidized inputs or regulatory programs that reduce competition or reallocate wealth.

Four economic categories for evaluating casein subsidies are examined:

- o Direct payments to the casein industry, such as government payments for overseas sales or for domestic production.
- o Direct payments to the dairy industry, such as a price support program guaranteeing a minimum price for fresh milk and government purchases whenever that price is approached.

Table 2--List of export subsidies under GATT

(a) The provision by government of direct subsidies to a firm or an industry contingent upon export performance.

(b) Currency retention schemes or any similar practices that involve a bonus on exports.

(c) Internal transport and freight charges on export shipments, provided or mandated by governments, on terms more favorable than for domestic shipments.

(d) The delivery by governments or their agencies of imported or domestic products or services for use in the production of exported goods, on terms or conditions more favorable than for delivery of like or directly competitive products or services for use in the production of goods for domestic consumption, if (in the case of products) such terms or conditions are more favorable than those commercially available on world markets to their exporters.

(e) The full or partial exemption, remission, or deferral specifically related to exports of direct taxes or social welfare charges paid or payable by industrial or commercial enterprises.

(f) The allowance of special deductions directly related to exports or export performance, over and above those granted in respect to production for domestic consumption, in the calculation of the base on which direct taxes are charged.

(g) The exemption or remission in respect of the production and distribution of exported products, of indirect taxes in excess of those levied in respect to the production and distribution of like products when sold for domestic consumption.

(h) The exemption, remission, or deferral of prior stage cumulative indirect taxes on goods or services used in the production of exported products in excess of the exemption, remission, or deferral of like prior stage cumulative indirect taxes on goods or services used in the production of like products when sold for domestic consumption; provided, however, that prior stage cumulative indirect taxes may be exempted, remitted, or deferred on like products when sold for domestic consumption, if the prior stage cumulative indirect taxes are levied in goods that are physically incorporated (making normal allowance for waste) in the exported product.

(i) The remission or drawback of import charges in excess of those levied on imported goods that are physically incorported (making normal allowance for waste) in the exported product; provided, however, that in particular cases a firm may use a quantity of home market goods equal to, and having the same quality and characteristics as, the imported goods as a substitute for them in order to benefit from this provision if the import and the corresponding export operations both occur within a reasonable time period, normally not to exceed 2 years.

(j) The provisions by governments (or special institutions controlled by governments) of export credit guarantee or insurance programs, of insurance or guarantee programs against increases in the costs of exported products.

...Continued

Table 2--List of export subsidies under GATT (Continued)

(k) The grant by governments (or special institutions controlled by or acting under the authority of governments) of export credits at rates below those that they actually have to pay for the funds so employed (or would have to pay if they borrowed on international capital markets in order to obtain funds of the same maturity and denominated in the same currency as the export credit), or the payment by them of all or part of the costs incurred by exporters or financial institutions in obtaining credits, in so far as they are used to secure a material advantage in the field of export credit terms.

Provided, however, that if a signatory is a party to an international undertaking on official export credits to which at least 12 signatories to this agreement are parties as of January 1, 1979 (or a successor undertaking which has been adopted by those original signatories), or if in practice a signatory applies the interest rate provisions of the relevant undertaking, an export credit practice that is in conformity with those provisions shall not be considered an export subsidy prohibited by this agreement.

(l) Any other charge on the public account constituting an export subsidy in the sense of Article XVI of the General Agreement.

Source: [19]

- Indirect subsidies to the dairy industry, such as electricity sold by the government at a price below the cost of producing that power.

- Regulatory mechanisms that raise prices or profits, such as pooling arrangements that alter the distribution of revenue among domestic and foreign sales and, thereby, alter the profitability of selling in one market rather than another market.

Once the subsidies in the four economic categories are identified and quantified, some overall measures of assistance need to be calculated for cross-country comparisons. The most common comparison is the subsidy as a percentage of industry total revenue (TR), which is the primary measure. It is conceptually comparable to the producer subsidy equivalent popularized by Josling [15] and used by USDA's Economic Research Service (ERS) in its trade liberalization study [57], or

$$\text{Measure } I_{TR} = \frac{\$ \text{ subsidy to the casein industry}}{\$ \text{ casein total revenue}}$$

Two other measures are also calculated; both are related to concepts developed by the Australian Industries Assistance Commission (IAC). One is the subsidy to the casein industry divided by unsubsidized total revenue (UTR) to the industry. The only difference between this and measure I_{TR} is that the denominator is reduced by the amount of the casein subsidy, or

$$\text{Measure } II_{UTR} = \frac{\$ \text{ subsidy to the casein industry}}{\$ \text{ casein total revenue} - \$ \text{ subsidy to the casein industry}}$$

Economic theory indicates that if the industry purchased inputs from other sectors of the economy, then both measures I_{TR} and II_{UTR} understate the true rate of assistance. The more accurate measure of assistance is the dollar subsidy to the casein industry divided by casein value added. Industry value added (VA) is defined as industry total revenue minus purchased inputs. The difficult part of

the casein industry divided by casein value added. Industry value added (VA) is defined as industry total revenue minus purchased inputs. The difficult part of the value-added concept is defining where one industry ends and another begins. Are we looking just at casein manufacturing or are we looking at casein manufacturing plus farm milk production? I have chosen the latter definition because farm subsidies also affect the export price of casein. Subsidies are examined at the farm level and at the casein manufacturing level. Value added is a hard concept to measure, and the rate of assistance calculated, while theoretically more correct, is more subject to estimation error than one based on total revenue. The formula for assistance based on value added is:

$$\text{Measure III}_{VA} = \frac{\$ \text{ subsidy to casein industry}}{\text{unsubsidized casein industry value added}}$$

$$= \frac{\$ \text{ subsidy to casein industry}}{\$ \text{ casein total revenue} - \$ \text{ subsidy} - \$ \text{ purchased inputs}}$$

Measure III_{VA} will be higher than either measures I_{TR} or II_{UTR}. The numerators are the same, but the denominator becomes progressively smaller as you go from measure I_{TR} to II_{UTR} to III_{VA} (fig. 1).

Figure 1 Components of Industry Total Revenue 1/

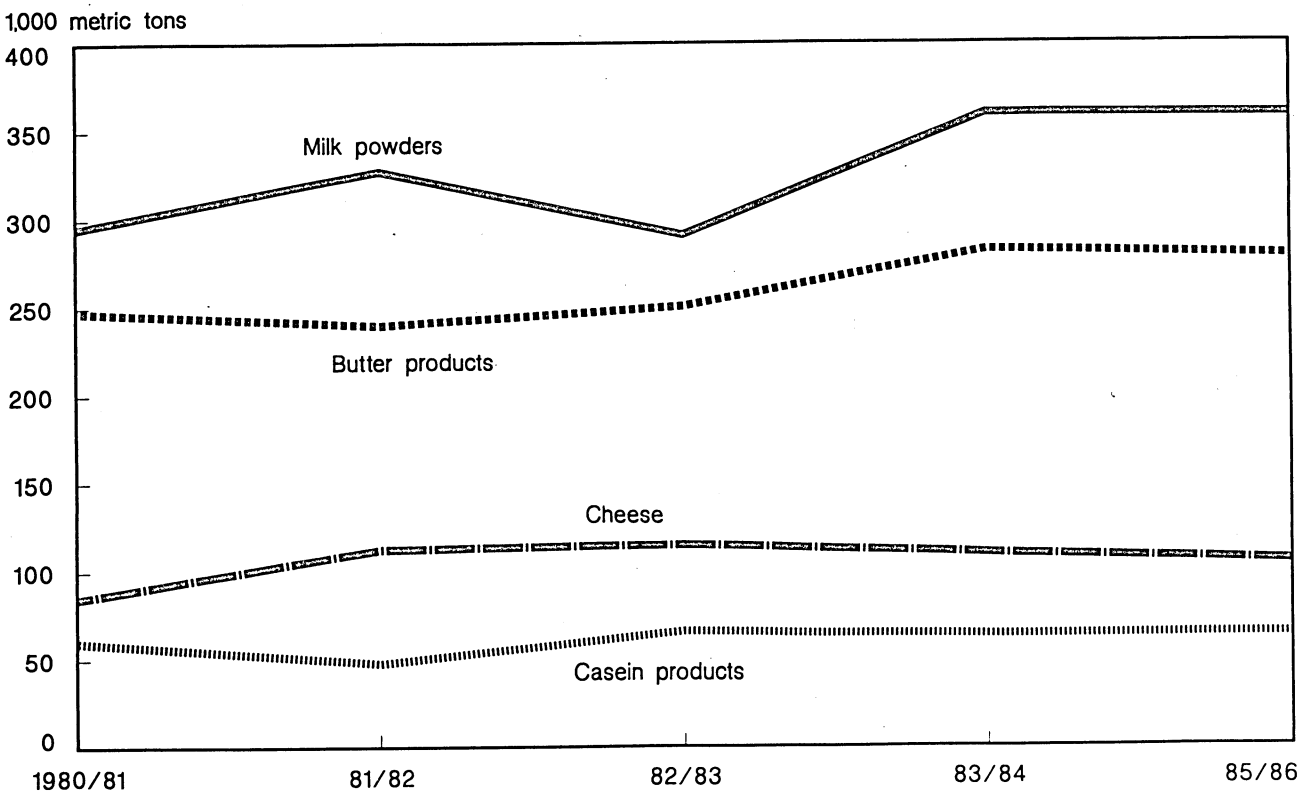
Subsidized total revenue	=	Purchases from other industries	Unsubsidized value added	Final product subsidy
Unsubsidized total revenue	=	Purchases from other industries	Unsubsidized value added	
Subsidized value added	=		Unsubsidized value added	Final product subsidy
Unsubsidized value added	=		Unsubsidized value added	

1/ It is assumed that input purchases from other industries are not subsidized or taxed.

NEW ZEALAND

New Zealand is the world's largest exporter of dairy products, including casein (fig. 2). Almost 80 percent of New Zealand's annual dairy production was exported during 1982/83. The exported products earned the equivalent of NZ$1.5 billion during that year. Powdered skim milk for export has been the biggest growth item in the New Zealand dairy industry from 1962/63-1982/83 [45]. Casein has been the commodity with the second largest export growth rate (nearly 40 percent) over those 20 years. The primary destinations for New Zealand's casein are the United States and Japan. Cheese production has shown very little change whereas butter production has increased slightly with the bulk of it being shipped to the United Kingdom from 1962/63-1982/83. Whether this will continue depends on European Community policies, which have been gradually reducing New Zealand butter sales in England.

Figure 2
New Zealand Production of Dairy Products



Source: (45).

The New Zealand dairy industry sells about 10 percent of its total production in the domestic fresh drinking milk market, called the "town milk" sector. The remainder of its production is used in manufactured products, the bulk of which is exported. Both sectors are dominated by dairy cooperatives in which most farmers are members. The New Zealand Milk Board contracts with 40 dairy cooperatives located near urban markets to supply drinking milk to exclusive geographical marketing areas.

Milk production for manufactured dairy products is concentrated in the northern part of the North Island. Large multiproduct cooperatives process most of the manufactured dairy products. For example, 6 of the 58 manufacturing cooperatives produced the full range of products (butter, cheese, milk powders, and casein) and used 53 percent of the total milkfat processed in New Zealand during 1977/78 [44, p. 25]. These products were purchased by the New Zealand Dairy Board and later sold by them in over 100 markets overseas. The net proceeds were returned to the manufacturer. The butter regulations were implemented during World War II and are still used to keep manufacturers' returns for domestic butter sales at the same rate of return as export sales [44, p. 19-20]. Manufacturers receive the projected export price minus the estimated packaging and transportation costs for bulk butter sold to the dairy board. Additional compensation for packaging, transportation, and sales are included for butter sold locally.

The New Zealand retail price for drinking milk was artificially low until April 1, 1985, because of subsidies paid out of general tax revenues to milk suppliers. The subsidy increased consumption of drinking milk in New Zealand

(fig. 3). This increase in consumption diverted milk away from manufacturing uses, which lowered casein output, making less casein available for export. Thus, this policy did not subsidize casein exports, but only subsidized and increased New Zealand consumption of milk.2/

Output Assistance

There are two potential sources of payments for the New Zealand dairy industry: the Government and the New Zealand Dairy Board. Neither body has programs to subsidize casein production or exports. Both have operated stabilization programs for milk. These programs were examined to determine whether each contains an element of income support for the dairy industry.

The New Zealand Government voted to establish a supplementary minimum price (a floor price) for all milk at the farm gate in 1978. That year, the Government paid NZ$15.6 million to ensure that dairy farmers received the guaranteed price. There have been no payments since then. For a low-subsidy estimate, NZ$15.6 million is omittted. For the high-subsidy estimate, it is averaged over 1977/78-1981/82 to become a subsidy of $3.1 million annually, or 0.4 percent of dairy farm income.3/ This supplementary minimum price program was terminated March 31, 1984.

2/ New Zealand dairy farmers either supply the town milk (drinking) sector or the manufacturing sector. There is no pooling of returns across drinking and manufacturing milk sectors [8, p. 104].

3/ The value of dairy farm gross agricultural production averaged NZ$691 million: 1978, NZ$513 million; 1979, NZ$350 million 1980, NZ$668 million; 1981, NZ$834; and 1982, NZ$888 million. Gross agricultural production value for 1982 is estimated by the Agricultural Review Committee. I assume that the dairy section proportion would be the same as in 1981 [43], p. 33].

Figure 3
Impact of the Domestic Packaged Milk Subsidy on the Consumption of Drinking Milk

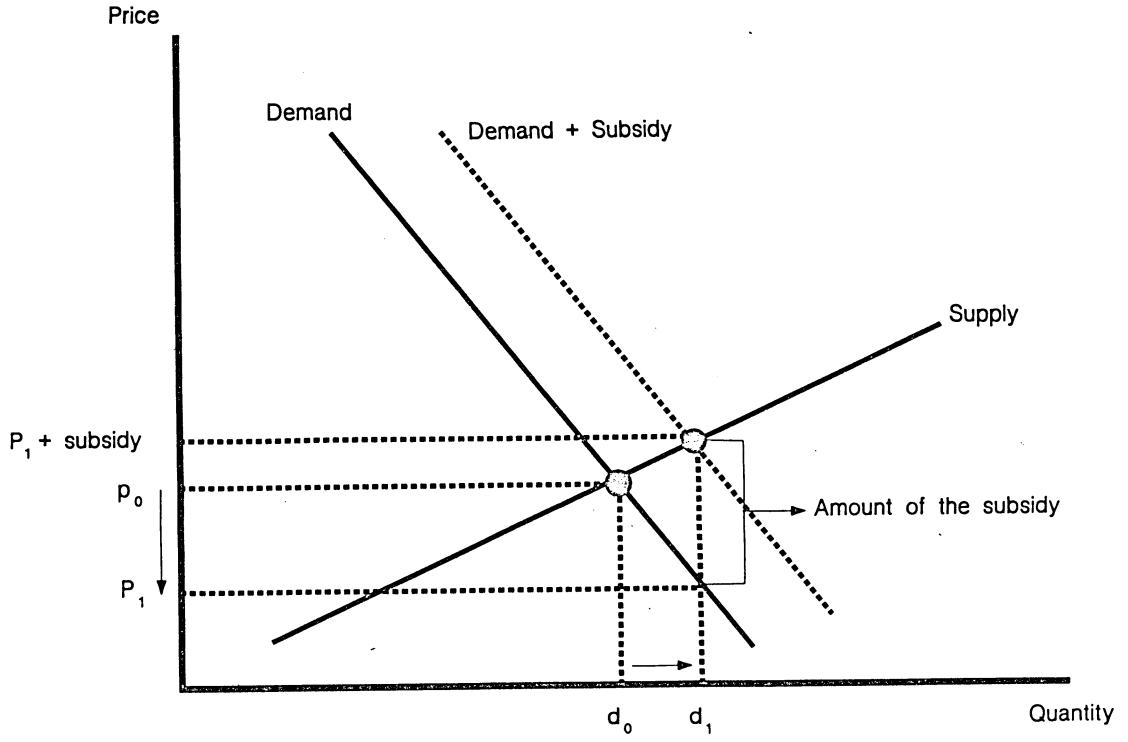


Table 3--Reserve account balances and transfers for New Zealand dairy products

Year	Reserve account balance	Transfers into reserve account
	Million NZ dollars	
1969/70	-20.1	-4.1
1970/71	-20.1	0
1971/72	13.8	33.9
1972/73	18.4	4.6
1973/74	11.8	-6.6
1974/75	17.8	6.0
1975/76	-26.0	-43.8
1976/77	-2.9	23.1
1977/78	-2.1	.8
1978/79	-27.2	-25.1
1979/80	34.1	61.3
1980/81 1/	101.1	97.0
1981/82 1/	174.0	137.8

1/ Tranfers from the reserve account to the capital account were NZ$30 million in 1980/81 and NZ$65 million in 1981/82. These actions reduced the funds available to be paid to producers.

Source: [45, p. 21].

The New Zealand Dairy Board has a reserve account to reduce the effects of fluctuations in overseas dairy product prices. A potential source of subsidization would be payments to dairy farmers greater than the dairy export earnings paid into the fund. Annual dairy export earnings have generally exceeded the payments to New Zealand dairy farmers (table 3).

Interest Assistance

New Zealand farmers, like those in the United States, have access to below-market interest rate loans for a variety of purposes (table 4). The difference between the average loan rate charged to farmers by the New Zealand Rural Banking and Finance Corporation and the market rate of interest for new mortgages is the estimate of interest rate subsidy shown in table 5. The interest rate subsidy ranged from a low of 3.2 percentage points in 1977/78 to a high of 6.4 percentage points in 1981/82. The 6.4-percent estimate overstates the subsidy because interest rates were rising during the period. The farm loan rate is for all loans outstanding, but the market rate is for new mortgages (which is higher than the average for all loans outstanding when interest rates are rising).4/

There is no commodity breakdown for disaggregating the loans. However, a breakdown for the second largest subset, settlement loans, reveals that dairy farmers received 42 percent of new settlement loans in 1981/82 and 45 percent a year earlier [46, 1982, p. 8]. Assuming dairy farmers receive between 42 and 45 percent of the annual value of all Rural Banking and Finance Corporation loans, then the annual interest subsidy would range from NZ$21-22.5 million. This is equivalent to 2.5-3.6 percent of dairy farm revenue during 1977/78-1981/82.

4/ If data were available, it would be better to compare just the new loans or to compare all loans outstanding at the market rate versus the actual interest rate.

Table 4--New authorizations of the Rural Banking and Finance Corporation of New Zealand, year ended March 31, 1982

Program	Loans	Total value
	Number	Million NZ dollars
Standard settlement	836	88.82
Special settlement	100	24.13
Workers holding	333	16.62
Additional land	256	14.75
Sharemilkers suspensory	147	.45
Development	6,287	140.35
Stock and plant loans	1,223	30.14
Advances to RIC association	75	1.31
Refinance	304	7.38
Climatic relief	312	3.99
Estate duty	46	1.99
Dept. of lands and survey settlement	10	.77
Livestock incentive scheme	1,620	16.75
Land development encouragement	1,483	42.76
Development consolidation	1,717	30.03
Fishing industry	178	13.38
Rural industrial lending	613	32.58
Total	15,540	466.20

Source: [46, 1982, p. 6].

Table 5--New Zealand farm loan subsidy

Year	Interest rates, weighted average: New mortgages	Interest rates, weighted average: Rural Banking and Finance Corporation farm loans	Subsidy = difference in interest rates	Rural Banking and Finance Corporation loans outstanding	Annual interest subsidy to farmers
	Percent			Million NZ dollars	
1977/78	10.3	7.1	3.2	694	22.2
1978/79	10.9	7.5	3.4	859	29.2
1979/80	11.4	7.5	3.9	1,043	40.7
1980/81	12.9	7.8	5.1	1,242	63.4
1981/82	14.3	7.9	6.4	1,510	96.6
			Total farm subddidy = NZ$252.1 million		
			Annual averge farm subsidy = NZ$50 million		
			Dairy share of subsidy = NZ$21-NZ$22.5 million 1/		

1/ Assuming the dairy industry received 42-45 percent of the value of farm loans, which was dairy's share of the new settlement loans.

Source: [14, 1983, p. 956; 46].

Table 6--New Zealand Dairy Board loan subsidy

Year	Interest rates, weighted average: New mortgages	Interest rates, weighted average: Rural Banking and Finance Corporation farm loans	Subsidy = difference in interest rates	Dairy board balance 1/	Annual interest subsidy to New Zealand Dairy Board on overdraft account
	--------Percent---------			---Million NZ dollars---	
1977/78	10.3	1	9.3	357	33.2
1978/79	10.9	1	9.9	384	38.0
1979/80	11.4	1	10.4	498	51.8
1980/81	12.9	1	11.9	679	50.8
1981/82	14.3	1	13.3	603	80.2
				Total subsidy = NZ$284 million	
				Annual average subsidy = NZ$56.8 million	

1/ Balance as of May 31 in the earlier year.

Sources: [33; 46].

The New Zealand Dairy Board also received interest rate concessions during this period. Only 1-percent interest was charged on its overdraft account. With the account balance ranging between NZ$357-NZ$679 million, the annual average subsidy was NZ$56.8 million during 1977/78-1981/82 (table 6). The interest concession (which is equivalent to 8.2 percent of dairy farm income) to the dairy board is the dominant source of subsidization to casein exports.

The New Zealand Government in 1987 eliminated the dairy board interest subsidy by selling the NZ$750 million overdraft loan balance to the dairy board for NZ$150 million and by stipulating that future loans would be available only at commercial interest rates [33].5/ Loss of the interest concession significantly lowers future rates of subsidization on New Zealand casein exports.

Other Assistance

Other subsidies have been small and input oriented. Fertilizer, for example, accounted for three-fourths of the total (table 7).6/ These other subsidies that were paid to the dairy industry during 1977/78-1981-82 were reported in the New Zealand Official Yearbook at NZ$15.5 million annually, less than 2.2 percent of all dairy revenue.

5/ In 1984 the overdraft loan was converted to a subordinated loan of NZ$750 million to be repaid in 40 annual payments of NZ$18.75 million each, indicating a zero interest rate. In 1987, the stream of payments was purchased by the dairy board for a lump sum of NZ$150 million [33]. The net subsidy by the Government was NZ$600 million (the difference between the balance in 1984 and the purchase price in 1987).

6/ While general support to an industry is a subsidy, the intent of the fertilizer subsidy is to maintain longrun soil quality and may reflect the longer run time horizon of society versus individual farmers. Consequently, some economists would argue against including this subsidy in the estimate.

Table 7--Other direct subsidies to the dairy industry, New Zealand, annual average 1977/78-1981/82

Type of subsidy	Annual dairy share
	NZ$1,000
General agricultural subsidies prorated to the dairy sector: 1/	
Flood and draught relief	295
Fertilizer	11,196
Plant and pest control	834
Joint beef-dairy programs 2/	2,574
Education 3/	225
Subtotal	15,124
Dairy subsidies:	
Dairy transportation	152
Product Development Centre	262
Subtotal	414
Total	15,538

1/ The dairy share according to Professor Frampton is 15 percent of the fertilizer subsidy and no more than 5 percent of the plant and pest control subsidies [18]. The other categories are prorated at dairy's percentage of the value of total agricultural output, which is approximately 20 percent.

2/ Includes Artificial Breeding Incentive, Veterinary Services Council, Herd Improvement Council, Dairy-Beef Diversion Scheme, which are divided between the dairy and beef sectors on a 50-50 basis because the gross output is about equal.

3/ Includes Agricultural Engineering Institute and Agricultural Training Council.

Source: [14, p. 380].

There is the possibility that inputs to dairy farming or casein manufacturing could have been either subsidized or taxed by other New Zealand regulatory programs. Data does not exist to evaluate this possibility and, in all likelihood, the effect on costs of producing casein would be quite small.

Overview

Interest concessions to the New Zealand Dairy Board and directly to New Zealand farmers were the most important sources of assistance during 1977/78-1981/82. The dairy board interest concessions were 8.2 percent of dairy revenue, and interest concessions on farm mortgages were overestimated at 3.1-3.2 percent (table 8).

New Zealand Government payments program was to maintain a floor under the milk price and was to be a one-shot occurance (ignored for the low estimate and aver-

Table 8--New Zealand assistance for casein exports, 1977/78-1981/82

	Percentage of total revenue
Output assistance:	
Guaranteed price	0-0.4
Other assistance:	
Farm interest concession	3.1-3.2 overestimate
New Zealand Dairy Board interest concession	8.2
Other	2.2
Percentage of revenue	13.5-14.0 overestimate
Estimate of measure $I_{total\ revenue}$	less than 14 percent

aged over the period for the high estimate). Another 2.2 percent can be added for input subsidies, primarily for the use of fertilizers.

Dairy related subsidies total 13.5-14.0 percent of New Zealand dairy farm revenues, which averaged NZ$691 during 1977/78-1981/82. Assuming all dairy products share equally in this subsidy, the rate of assistance for casein would be comparable, or measure I_{TR} would average 13.5-14 percent of casein revenues. Today subsidies are substantially lower because the New Zealand Government only loans funds to the New Zealand Dairy Board at commercial interest rates.

AUSTRALIA

Seventy-five percent of Australian milk production is consumed at home and 25 percent is exported. Prices in the domestic market are kept high by tariffs and antidumping duties to discourage imports. There also is a voluntary agreement that limits imports of products from New Zealand [3, p. 12]. Cheese is the only dairy product imported in significant amounts. Cheese imports account for 20 percent of total cheese consumption. Both Australian milk production and dairy exports declined as the result of policies implemented during the seventies. They appear to be somewhat stabilized in the early eighties. With the loss of the English butter market in 1973, Japan has been Australia's most important foreign customer.

Output Assistance

Australia radically changed its dairy support policies in the midseventies. Bounty payments (cash payments to processors) on butter and cheese production peaked in 1970/71. In 1973, the Minister for Agriculture stated that:

> ...."bounty payments had not contributed to solving the industry's major problem, namely the adjustments of farm production levels to realistic local and overseas market demands. As a welfare measure, the bounty had been an ineffective device as the bulk of it had gone to the wealthier and larger producers who needed it least. The bounty had become built in to the price of land and other dairy inputs and added to productive costs" [42].

Table 9--Budgetary cost of underwriting prescribed dairy products, Australia

Product	Common-wealth	State	Commonwealth				
	1977/78		1978/79	1979/80	1980/81	1981/82	1983/84 1/
				A$1,000			
Butter	11,509	NA	12,927	0	0	0	0
Cheese	0	NA	0	0	0	0	0
Skim milk powder	0	0	0	0	0	0	0
Casein	722	361	0	0	0	0	0
Whole milk	404	NA	2,314	4,714	0	0	0
Total	12,635	361	2/15,241	4,714	0	0	0

NA=Not applicable.

1/ Preliminary.
2/ Includes A$7 million from the Victoria Government.

Source: [29, p. 93].

The Australian Government decided to phase out the bounty and replace it with programs that would accelerate the growth of dairy farms to more efficient sizes or speed their exit from dairying. Bounty payments between 1970-76 amounted to A$143.6 million of which payments for butter accounted for over 80 percent [23].

The Dairy Industry Stabilization Act was passed in 1977. The act set floor prices, called the underwritten prices, for the major dairy products. The underwritten prices are product specific--butter, cheese, skim milk powder, casein, and whole milk powder--and are set by the Minister for Primary Industry. If the product-specific minimum prices are not obtained on the gross equalized pool returns of a particular manufactured product sold domestically and internationally, then the Government makes up the difference [3, 79/80, pp. 6, 7, 10]. Underwriting payments during 1977/78-1981/82 totaled only A$33 million of which butter received about 74 percent (table 9).

Neither of these price-support payments was important sources of direct subsidies for casein.7/ Underwriting payments for casein totaled A$1.1 million, 1.1 percent of total casein receipts during the 5-year period.

7/ The joint nature of the milk production function means that a subsidy to one milk component (fat or solids) has a price effect on the other milk component and all their derived products (Appendix A). The complementariness between the production of butterfat and the production of skim milk used in casein implies cross-subsidization of casein through the bounty and underwriting payments for butter.

Pooling Across Milk Markets: The Theory

Australia has two independent types of pools. One type equalizes returns across manufactured products (exports sold at the lower price versus products consumed within Australia sold at the higher price). The other type operates within each state in Australia and averages prices for drinking milk uses with manufacturing uses.

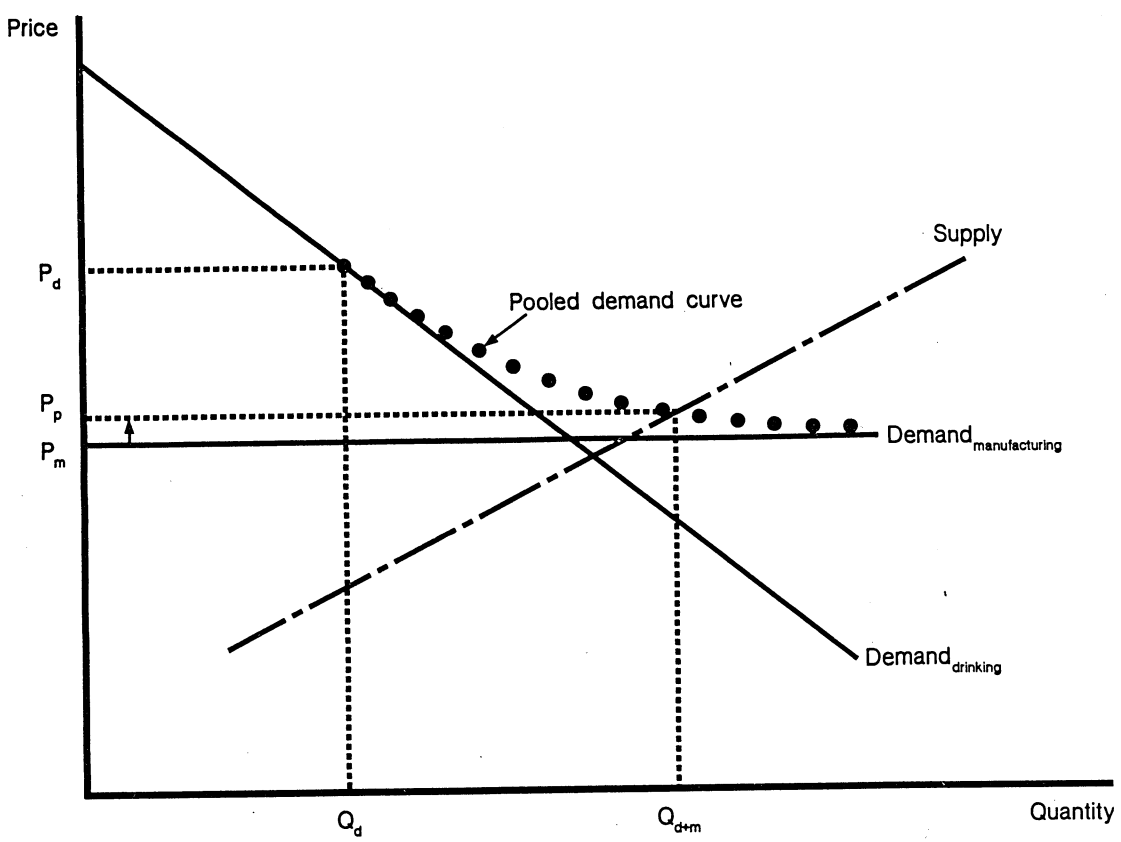
Pooling is a price discrimination practice where prices above the marginal cost of producing milk are charged for uses in products with a relatively inelastic demand [4, 25, 30, 32, 49, 52, 53]. The drinking milk market has the most inelastic demand and pays the highest price for raw milk.

Milk going into manufactured products that compete in international markets (and consequently have a very elastic demand) receives a lower price. The effect of price pooling is shown in figure 4 where P_d is the drinking milk price, P_m is the manfactured products price, and P_p is the pooled price. The pooled price is the quantity weighted average, or

$$P_p = P_d \frac{Qd}{Qd + Qm} + P_m \left(1 - \frac{Qd}{Qd + Qm} \right)$$

The difference between P_p and P_m is the subsidy to manufactured milk products, including casein. A necessary condition for P_d to remain higher than P_m is that monopoly power exists or Government regulation enforces this market segmentation. Otherwise, resale of manufacturing milk in the drinking market would soon eliminate any price differential.

Figure 4
Price and Quantity Effects of Price Discrimination and Pooling



National Pooling

Australia has a mandatory program pooling returns for dairy products sold in the high-price domestic market with the low-price export market. Separate pools are operated for butter, cheddar and gouda cheeses, milk powder, and casein [3, 1979/80, p. 10]. Butter exports received the highest rate of subsidization during the seventies or around 40 percent of its revenue (table 10).8/ Exported cheese had the second highest subsidy rate at around 30 percent; however, this rate has declined in the last few years. Casein and skim milk powder exports were not subsidized until the midseventies.

The average transfer of domestic receipts to casein exporters was around 6 percent of total casein receipts. If administrative costs of operating the pool are deducted, the net payment to casein exporters is reduced to 1 percent of casein receipts [28, p. 27]. This 1 percent is used because it is the amount exporters actually receive, that is, the subsidy that would affect world trade and casein exports to the United States.9/

8/ During the 1978/79 season, "The Victorian Government independently supplemented the Commonwealth commitment with its own underwriting scheme to raise returns to Victorian milk producers" [5, p. 33]. The amount of this 1-year subsidy was A$7 million.

9/ For a social-welfare cost analysis, 6 percent should be used because the resources were used by the program.

Table 10--Subsidization out of the equalization accounts for Australian exports 1/

Year	Casein	Butter	Cheese	Skim milk powder	Whole milk powder
			Percent		
1970	0	42	31	0	0
1971	0	48	44	0	0
1972	0	38	28	0	0
1973	0	46	45	0	0
1974	0	45	29	0	0
1975	5	42	17	2	0
1976	3	47	37	6	0
1977	7	44	28	13	0
1978	6	50	11	14	0
1979	4	65	10	30	13
1980	9	43	13	7	19
1981	0	22	6	0	16
1982	10	3	6	4	6

1/ Subsidy is defined as the stabilization payments divided by the export price that is the same as measure I_{TR} or the producer subsidy equivalent. The deduction for administrative expenses of 5 percent is not included.

Sources: [3; 16].

State Pooling

Within each state in Australia, another pool averages prices for drinking milk uses with all other uses. Each state has different rules and regulations. The State of Victoria dominates Australian casein production (91 percent of the total in 1980/81). Consequently, Victoria's program is the most representative. Most Victorian dairy farmers are paid an equalized price for all milk supplied, regardless of end use [28, p. 97]. The farm milk price subsidy for manufacturing milk (including casein) is 13 percent of revenue (average price) in Victoria (table 11). Pooling is the most important subsidy source for casein in Australia. Even without the pooling arrangement, the wide participation by farmers in both drinking and manufacturing markets (table 12) results in revenue pooling as discussed in Appendix A.

Other Dairy Programs

Other types of assistance are available to all dairy farmers (table 13). The data are reported by the Australian Industries Assistance Commission for the dairy industry's share of these types of programs. Casein is assumed to receive the same percentage subsidy as other dairy products.

Two other types of output assistance programs, devaluation compensation and export incentives, contributed only A$0.7 million to the Australian dairy industry during 1976/77-1980/81. The input assistance programs were also small: the phosphatic and nitrogenous fertilizer subsidy was A$6.2 million and the brucellosis and tuberculosis eradication programs were A$1.3 million.

The assistance to value adding factors was larger, totaling A$111.3 for the period 1976/77-1980/81. The largest were income tax concessions available only to

Table 11--Farm prices for milk according to use, Australian states, 1978/79

State	Farm milk prices according to use: Drinking milk	Manufactured products 1/	Average farm price	Difference between manufactured products and average farm prices	
	Australian dollars per kilogram milk fat				Percent
Tasmania	4.05	1.88	2.13	.25	12
Victoria	3.83	1.85	2.13	.28	13
South Australia	4.60	1.80	2.65	.85	32
Queensland	4.90	1.80	3.20	1.40	44
Western Australia	4.68	1.75	3.31	1.56	47
New South Wales	4.60	1.74	3.36	1.62	48

1/ Manufactured products are the five prescribed products: butter, skim milk powder, casein, cheddar and gouda cheese, and whole milk powder. Price data were not available for just casein and, thus, the actual subsidy on casein may be higher or lower than the average calculated here for the bundle of manufactured dairy products.

Source: [3, 1978/79, pp. 11-13].

Table 12--Distribution of dairy farms by access to the market milk sector by Australian states, 1979-80

Proportion of drinking milk in total milk production	New South Wales	Victoria	Queensland	South Australia	Western Australia	Tasmania	Total
			Percent				
Less than 10%	0	15.8	10.4	31.9	5.5	94.5	17.9
Less than 20%	0	85.6	10.4	31.9	5.5	94.5	56.8
Less than 30%	3.7	90.5	12.6	31.9	12.0	94.5	60.6
Less than 40%	26.3	95.9	42.2	34.1	12.0	94.5	71.2
Less than 50%	35.9	97.2	72.7	96.0	31.7	94.5	82.3
Less than 60%	47.7	98.8	84.2	100.0	41.6	94.5	87.1
Less than 70%	65.1	98.8	88.6	0	61.4	94.5	91.0
Less than 80%	87.1	100.0	90.8	0	80.1	94.5	95.9
Less than 90%	98.5	0	91.8	0	96.1	94.5	98.3
Less than 100%	100.0	0	100.0	0	100.0	100.0	100.0
Ratio of drinking milk to total milk production	58.9	15.4	43.3	29.7	60.6	5.2	27.6
			Number				
Farms	3,269	11,425	2,624	1,479	547	1,153	20,498

Source: [8, p. 28].

farmers: (1) depreciation allowances or accelerated rates of depreciation for certain capital items, (2) income deference to later tax years, and (3) income averaging [29, p. 24-25]. During 1976/77-1980/81, these income tax concessions to the dairy industry amounted to A$47.9 million.

Adjustment reconstruction programs were the second most important type of assistance to value adding factors. A Marginal Dairy Farms Reconstruction Scheme was introduced in 1970 to enable dairy farmers to increase their farm size. This was replaced in 1974 by the Dairy Adjustment Scheme that provided assistance for: (1) dairy farms and factories to convert to refrigerated milk supply, (2) farm diversification and development, (3) farmers to relocate or cease dairy farming, and (4) short- to medium-term loans for financing farm operating cost [28, p. 159]. In 1976, the separate farm sector assistance programs were consolidated into one rural adjustment scheme, and additional assistance was granted to encourage farmers to leave farming.10/ Together they totaled A$25.6 for 1976/77-1980/81.

Next in importance is agricultural research contributions of A$20.3 million for the 5-year period 1976/77-1980/81. The primary source of funds is through the

10/ Loans are convertible to grants for those leaving farming. Also household support, comparable with unemployment benefits of other sectors of the economy, allows farmers breathing space in which to assess their long-term options [29, p. 144]. While all these programs are not subsidies to the dairy industry, a separate breakdown is not available and all are included in the estimates.

Table 13--Other assistance to Australian dairying 1/

Item	1976/77	1977/78	1978/79	1979/80	1980/81	5-Year total
	Million Australian dollars					
Dairy revenue	480.6	506.9	568.4	606.8	830.2	2,992.9
Assistance to output:						
Export incentives	.2	.2	.1	.1	.1	.7
Assistance to inputs:						
Fertilizer subsidies	1.1	1.2	1.3	1.6	1.0	6.2
Bovine brucellosis and tuberculosis eradication	.1	.2	.2	.3	.5	1.3
Assistance to value-adding factors:						
Income taxation concessions	3.1	5.4	11.7	10.7	17.0	47.9
Adjustment/ reconstruction	5.6	5.4	5.4	4.0	5.2	25.6
Research	3.7	4.2	3.2	3.7	5.5	20.3
Concessional credit 1/	1.5	1.3	2.3	4.5	4.8	14.4
Natural disaster relief	.7	1.0	1.4	1.3	8.3	12.7
Agricultural extension services	.9	.9	.6	.3	.4	3.1
Minus tariffs on inputs:						
Materials	6.5	6.9	7.7	8.2	11.3	40.6
Depreciation (plant and machinery)	7.4	7.8	7.0	7.6	10.3	40.1

1/ Excludes producer transfers, the largest source of subsidy, and bounties.
2/ Assistance to agricultural producers through credit concessions available through loans administered solely through state agencies have not been included in this analysis [29, p. 24].
Source: [29, p. 53].

Commonwealth Scientific and Industrial Research Organization (CSIRO). Much smaller amounts were matching contributions to the dairy industry levy for research and special research grants to states.

Concessional credit has been available to farmers through the major trading banks and the IAC roughly estimated that the subsidy was A$14.4 million to the dairy industry for 1976/77-1980/81.11/ One of the special institutions heavily

11/ This estimate does not look at the net cost to farmers of deregulating the entire financial system, but rather the extent to which farmers financing costs have been reduced through access to certain special financial institutions within a regulated financial system.

Table 14--Sources of assistance for casein exports from Australia, 1977/78-1981/82

	Percent of gross revenue
Output assistance:	
Underwriting payments	1.1
Export pooling for casein	1.0
State pooling 1/	13.0
Other Assistance 2/	1.7
Total percent of revenue	16.8
Estimate of measure $I_{\text{total revenue}}$	about 17 percent

1/ Data available for only 1978/79, which is assumed to be representative of the 5-year period.
2/ Data for 1976/77-1980/81.

used by the dairy industry has been the Rural Credits Department of the Reserve Bank (similar role to the U.S. Farm Credit System). This department provides short-term seasonal finance to major marketing bodies to assist in the marketing and processing of primary produce.

The total for these miscellaneous subsidies geared to the whole dairy industry amounted to A$132.2 million from 1976/77-1980/81 (table 13). The dairy industry, however, is penalized by protection of input industries that raised the costs of these inputs. The tariffs on materials and equipment used in the dairy industry were A$80.7 million for 1976/77-1980/81. Consequently, the net subsidy falls to A$51.5 million ($132.2 - $80.7 = $51.5). The revenue earned by the dairy industry during this period was A$2,993 million and, thus, the net general subsidies were 1.7 percent of revenue.

Overview

The dominant source for Australian casein exports subsidy is the pooling of farm receipts from drinking milk and manufacturing milk at the state level (tables 11 and 14). Other sources are small: the export pool for casein uses up most of its resources in administrative expenses, the underwriting payments have been focused on butter, and available data on assistance such as interest subsidies indicate low subsidies. Measure I_{TR}, the casein subsidy as a percentage of casein revenue, is estimated at about 17 percent for 1977/78-1981/82 (table 14). Events since this period are not likely to have altered casein subsidies: the Australian Government has been trying to move the dairy industry toward a freer market for 15 years, but the dominant subsidies reported here are state subsidies that are unlikely to be affected.

MEASURES OF ASSISTANCE

The estimates presented have been the subsidy as a percentage of subsidized casein receipts, or the first measure discussed in the methodology section:

$$\text{Measure } I_{TR} = \frac{\$ \text{ subsidy to the casein industry}}{\$ \text{ casein total revenue}}$$

This rate of assistance to casein exports is less than 14 percent for New Zealand and is about 17 percent for Australia. The estimates have been calculated as a rate because some applied only to casein and others applied to the whole dairy industry (casein is assumed to share proportionally in this dairy subsidy).

Measure II_{UTR} is the casein subsidy divided by unsubsidized casein total revenue:

$$\text{Measure } II_{UTR} = \frac{\$ \text{ casein subsidy}}{\text{unsubsidized casein revenue}} = \frac{\$ \text{ casein subsidy}}{\text{casein revenue} - \$ \text{ casein subsidy}}$$

Since \$ casein subsidy = % casein subsidy(casein revenue), Measure II_{UTR} can be rewritten as:

$$\text{Measure } II_{UTR} = \frac{\%\text{ casein subsidy(casein revenue)}}{\text{casein revenue} - \%\text{ casein subsidy(casein revenue)}}$$

$$= \frac{\%\text{ casein subsidy}}{1 - \%\text{ casein subsidy}} \times \frac{\text{casein revenue}}{\text{casein revenue}}$$

$$= \frac{\%\text{ casein subsidy}}{1 - \%\text{ casein subsidy}}$$

For New Zealand (see table 8), measure $II_{UTR} = \frac{\text{less than } 14\%}{86\%} = \text{about } 16\%$

For Australia (see table 14), measure $II_{UTR} = \frac{17\%}{1\text{-}17\ \%} = \frac{17\%}{83\%} = 20\%$

The theoretically soundest concept (see methodology section) is based on the casein subsidy as a percentage of value added by the casein industry. Measure III_{VA} is more difficult to estimate because value added is difficult to estimate. David Gargett, Australian Bureau of Agricultural Economics, estimated the value added for casein. Using his data, I complied the value-added estimates for casein manufacturing and for the raw milk used to produce casein (table 15). I included the value-added numbers into the following equation,

$$\text{Measure } II_{VA} = \frac{\$ \text{ casein subsidy}}{\$ \text{ value added}}$$

$$= \frac{(\%\text{ subsidy})\ (\text{casein revenue})}{(\%\text{ value added})(\text{casein revenue})} = \frac{\%\text{ subsddidy}}{\%\text{ value added}}$$

$$\text{Australian estimate} = \frac{17\%}{43\%} = \text{around } 40\%$$

$$\text{New Zealand estimate} = \frac{\text{less than } 14\%}{43\%} = \text{over } 30\%$$

The three measures of subsidization calculated in this report are shown in table 16. For each measure the numerator is identical, namely the dollar subsidy to the casein industry. However, the denominator gets progressively smaller with measure I_{TR} based on total casein revenue, measure II_{UTR} based on unsubsidized casein revenue, and measure III_{VA} based on casein value added. For both countries, the rates of subsidization are low relative to the rest of the world as shown in a recent ERS report [57].

Table 15--Casein value added and export receipts, Australia

Sector value added	1977/78	1978/79	1979/80	1980/81	1981/82	1982/83	1983/84
	Australian dollars per metric ton						
Farm level	132	276	228	392	474	568	497
Casein manufacturing	320	335	371	388	476	528	577
Total casein value added	452	611	599	780	950	1,096	1,074
Casein export receipts	996	1,149	1,511	2,226	2,370	2,360	2,201
	Percent						
Casein value added / Casein export revenue 1/	45.4	53.2	39.6	35.0	40.1	46.4	48.8

1/Average for 1977/78-1981/82 is 43 percent.

Source: [17].

CONCLUSIONS

In New Zealand, the largest source of assistance to casein exports was concessional credit to individual farmers and the New Zealand Dairy Board. Input subsidies, dominated by fertilizer, were next in importance, and the smallest source was the price support payment. The subsidy as a percentage of total casein revenue was estimated at less than 14 percent for the period 1977/78-1981/82.

The dominant source of assistance in Australia was state pooling across the drinking milk and manufacturing markets. The export-domestic pool for casein also made a small contribution as did a price-support payment. The remaining sources were generally available to the whole farm sector and included concessional credit, fertilizer subsidies, and tax advantages. The subsidy as a percentage of total casein revenue was estimated at 17 percent during 1977/78-1981/82 (table 16).

The international dairy industry in 1984 fell on hard times and world prices of many dairy products dropped to General Agreement on Tariffs and Trade minimum levels. In the fall of 1986, New Zealand milk prices were US$2.20 per hundredweight, (cwt), compared with the U.S. price of $12 per hundredweight [9]. Part of the lower price is due to currency devaluation in New Zealand during the eighties. The value of New Zealand dollar was equal with the U.S. dollar in 1980 but fell to half the value in 1986. Changes in the international dairy industry suggest recent events may have altered the subsidy picture painted here. However, more recent data on subsidies are spotty.

The current situation in New Zealand is markedly lower subsidies to the dairy industry because the New Zealand Dairy Board can no longer borrow at below market interest rates. Other subsidies reported in the 1985 New Zealand Official Yearbook show little net change [14]. Fertilizer subsidies have fallen with payments restricted to air-spread application, but the farm interest subsidy rose somewhat for land development loans and the livestock incentive scheme.

The Australian Industries Assistance Commission's estimated rates of assistance for the dairy industry have bounced around recently. The 1982/83 and the 1983/84 assistance rates for manufactured milk are 48 and 57 percent, respectively. These percentages are comparable with the 1979/80 level but above the 16-percent levels of 1980/81 and 1981/82. Australia continues to move toward a market based production system as shown by their 1986 legislation. Australia's basic objective is a "more efficient and profitable dairy industry," which contains two diverse goals: efficiency (which can be reached by lowering costs) and profitability (which can be reached by lowering costs or raising prices). Most importantly, the dominant sources of casein subsidies are state pooling programs, which have not changed, further suggesting the estimates here are still applicable.

Table 16--Australian and New Zealand rates of assistance for casein exports, 1977/78-1981/82

Type of subsidy	New Zealand	Australia
	Percent of revenue	
Output assistance:		
Support prices	0-0.4	1.1
Export pooling	-0-	1.0
State pooling	-0-	13.0
Other assistance:		1.7
New Zealand Dairy Board interest concession	8.2	
Farm interest concessions	1/3.1-3.2	
Other	2.2	
Total	1/13.5 -14.0	16.8
Measure $I_{total\ revenue}$	less than 14	about 17
Measure $II_{unsubsidized}$ total revenue	around 16	around 20
Measure $III_{value\ added}$	over 30	around 40

1/Overestimate.

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APPENDIX A: FARM POOLING OF RECEIPTS FOR MILK

Prior to 1977, separate and distinct programs for the drinking and manufacturing markets existed in Australia, leading some observers to conclude that cross-subsidization cannot exist. However, subsidization can occur either directly on the farm because milk is sold in both markets and the farm then pools revenue earned in both markets, or cooperatives can pool milk receipts and pay one average price to their members. (In Australia, most farms sell milk in both markets, see table 12.)

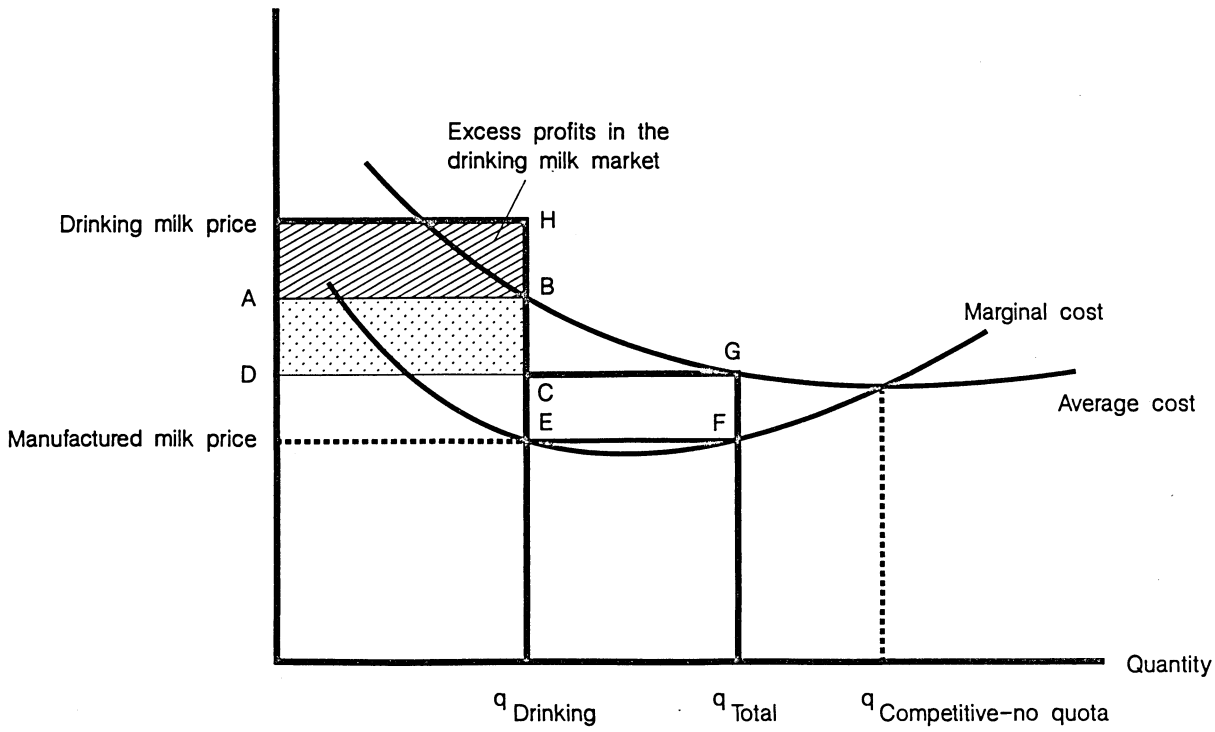
First, consider a dairy farm that would go out of business producing exclusively for the manufactured products markets. (See the farm's cost curves in appendix figure 1 that is taken from a publication by the Australian Bureau of Agricultural Economics.) At the equilibrium level of output where marginal cost = marginal revenue = manufactured milk price, the farm is losing GF amount of money on each unit of milk produced because G is the level of average cost and F is the price received (app. fig. 1). The farm, however, will stay in business if it can obtain a quota to sell in the more lucrative drinking milk market at the higher price, H. The farmer (with the given stock of capital shown in the

diagram) will sell in both the fluid and manufacturing markets as long as the reduction in costs due to a larger scale of operation from selling in both markets (area ABCD) more than covers the loss in the manufacturing market (area CGFE) where milk is sold below cost. Thus, even when the drinking milk quota system operates separately from the manufactured products pooling arrangement, there are still linked at the farm level because farmers supplying the drinking market generally sell in the manufactured market as well [48, p. 1].

Second, dairy cooperatives can link the drinking milk and manufactured products markets. An early and essential component of cooperatives in the United States was price averaging so that members would not compete among themselves for the more profitable drinking milk market. Australian dairy cooperatives could function similarly and pool all milk receipts and pay members one average price for their milk regardless of its use.

Apendix Figure 1

Farm Level Pooling of Manufacturing and Drinking Milk Receipts



Source: (48, p. 46).