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## Quota Rents and Subsidies: The Case of U.S. Cheese Import Quotas

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The Case of U.S. Cheese Import Quotas

by

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ABSTRACT

This paper examines the effects of import quotas and foreign export subsidies on the size of rents from U.S. cheese imports and their division among importers and exporters. Consumers pay a hefty portion of the wholesale price in rents and tariffs; EC's subsidization of cheese exports to the United States has served primarily to maintain rents.

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## Quota Rents and Subsidies: The Case of U.S. Cheese Import Quotas

Agricultural economists have increasingly recognized the importance of international rent creation and distribution in many agricultural policies (McCalla and Josling; Anderson; Carter and Schmitz). In the case of import quotas, it is frequently assumed that quota rights are distributed to importing firms, who capture the entire quota rent by purchasing imports in competitive international markets and reselling in the higher-price domestic market (Corden). As illustrated by the U.S. quota system for cheese, the distribution of quota rents can be more complex. From its introduction in 1951 until its restructuring in 1980, import licenses were allocated to domestic quota holders on a commodity-specific basis by country of origin. Importing firms made purchases, often from monopoly exporters, in an international market dominated by domestic support programs and export subsidies in exporting countries. U.S. cheese imports were also subject to an ad valorem tariff.

This paper develops a conceptual framework for the analysis of rents under the U.S. cheese import quota system. Particular attention is paid to the role of export subsidies. The framework is then used for an empirical analysis of quota rent sizes and distribution.

### The U.S. Cheese Import Quota System

The restriction of dairy imports is an essential complement to the price support program for milk: if imports were not controlled, the government might have to purchase increased quantities of dairy products to maintain support prices. Through section 22 of the Agricultural Adjustment Act of 1938 as amended, the President is empowered to instruct the Secretary of Agriculture to restrict imports whenever imports threaten to interfere with domestic price support programs by displacing domestic production and increasing sales of supported goods to the government. Licenses are issued to importing firms and specify the category of cheese import (numbering 11 in 1980), and its country of origin. As of 1980, licenses for cheeses from the EC specify the "EC", rather than a particular country, as the origin.

### A Model of Rent and Subsidy Determination

Since rents exist because quantitative restrictions drive a wedge between supply and demand prices, rents are affected by quota size, supply and demand elasticities, tariff levels, export subsidies and the characteristics of domestic agricultural programs. Building on earlier work by Sampson and Snape, Hornig has developed a one-commodity, two-country model designed to assess the impact of each of these factors on the size of quota rents. Figure 1a depicts the neoclassical import market for a commodity under quota. The  $P_1$  and  $P_2$  axes measure the component prices of quota rents and export subsidies, respectively.  $D^x$  is the excess wholesale demand in the importing country, less the costs of importing and distributing the good (i.e., normal returns).  $S^x$  is the excess wholesale supply in the foreign country, including normal returns for the exporter.

With no tariff or quota,  $Q^*$  is traded at a price of  $P^*$  (ignoring transportation costs). A quota of  $Q_1 < Q^*$  increases the price in the importing country, from  $P^*$  to  $P_D^x$ . With the import price (f.a.s. or f.o.b.) at  $P_S^f$ , the rent is divided between the exporter,  $X$ , and the importer,  $M$ :  $R = X + M = Q_1 [(P_S^f - P_S^x) + (P_D^x - P_S^f)]$ . A quota of  $Q_2 > Q^*$  is filled only if the government furnishes an export subsidy:  $S = Q_2 (P_S^x - P_D^x)$ . The goods cost the exporter  $P_S^x$  and are sold at  $P_D^x$  ( $P_2$  axis); no quota rents exist.

With an ad valorem tariff " $t$ ",  $S^x(1+t)$ , shows the landed cost of the import if the exporter sells at cost plus normal returns. The export price,  $P_S^f$ , must lie between the minimum possible price,  $P_S^x$ , and the maximum,  $P_D^x/(1+t)$ . For a quota of  $Q_1$ , the rent is:  $R = X + M + T = Q_1(P_S^f - P_S^x) + Q_1[P_D^x - P_S^f(1+t)] + Q_1(tP_S^f)$ . If the quota is set at  $Q_2$ , the tariff affects the subsidy size. On axis  $P_2$ ,  $P_D^x$  measures the highest price at which  $Q_2$  can be sold; thus the good must be sold to the importer at or below  $P_D^x/(1+t)$ . The required subsidy,  $S = Q_2[P_S^x - P_D^x/(1+t)]$ , varies directly with " $t$ ".

The bilateral quota used in cheese trade gives importers and exporters limited monopsony and monopoly power by conferring exclusive rights to trade. This may explain the coexistence of quota rents with export subsidies. Introducing two new curves (figure

1b):  $D^{x'}$  and  $S^{x'}$ , marginal to  $D^x$  and  $S^x$ , respectively;  $P_S^{x'}$  shows the lowest f.a.s. price the exporter will accept, and  $P_D^{x'}$  the highest price the importer will pay. For a quota below  $Q'$ , the market provides sufficient rents to satisfy both exporters and importers. If it is  $Q_1$  (between  $Q'$  and  $Q^*$ ),  $P_D^{x'}$  will exceed  $P_S^{x'}$  but rents are insufficient to generate trade. Quotas are filled only if the government pays a subsidy:  $S = Q_1(P_S^{x'} - P_D^{x'})$ . If the quota exceeds  $Q^*$ , the subsidy is the sum of cost restitution,  $S_C = Q_1(P_S^x - P_D^{x'})$  and monopoly profit  $S_P = Q_1[(P_S^{x'} - P_S^x) + (P_D^x - P_D^{x'})]$ .

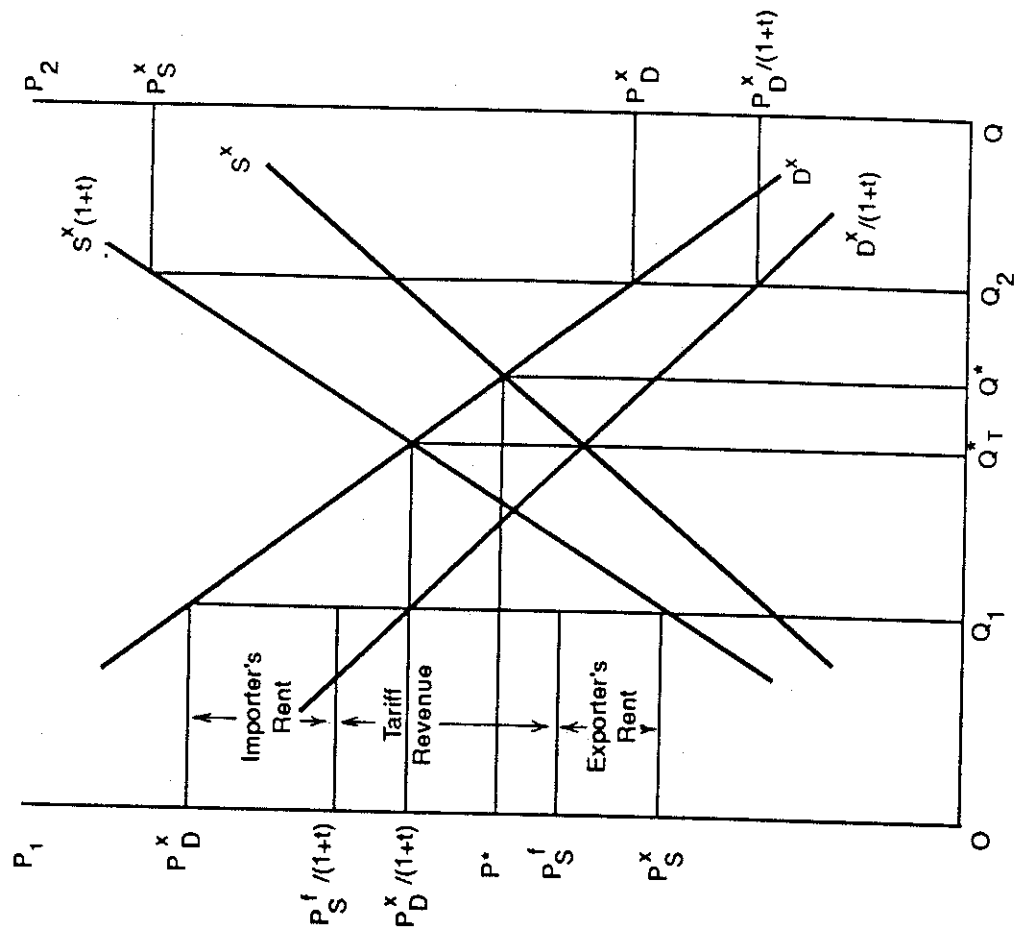
Another new demand curve,  $D^{x''}$ , is added to show the highest price the importer would pay for imports if, in addition to holding the f.a.s. price at or below marginal revenue, an ad valorem tariff of "t" is paid. For any f.a.s. price  $P_S^f$  on the  $D^{x''}$  curve, the corresponding price on the  $D^{x'}$  curve is  $P_S^f(1+t)$ .  $S^x$  and  $S^{x'}$  are unchanged. The market will cover exporter's and importer's rents only if the quota is at or below  $Q''$ . With a quota greater than  $Q''$ , a subsidy will be needed even though positive rents exist, as long as  $P_D^{x'}$  is greater than  $P_S^x(1+t)$  (for simplicity, the supply curve corresponding to this is omitted from figure 1b; it would be the same as  $S^x(1+t)$  in figure 1a). When the quota rises above  $Q''$ , no positive rents are generated in the market. If exporters and importers are receiving excess profits, they are paid out of export subsidies, and  $S$  has four components:  $S_T$ , tariff revenue;  $S_M$ , importer profits;  $S_C$ , cost restitution; and  $S_X$ , exporter excess profits:

$$S = S_T + S_M + S_C + S_X = Q_1[(P_D^{x'} - P_D^{x''}) + (P_D^x - P_D^{x'}) + (P_S^x - P_D^{x'}) + (P_S^{x'} - P_S^x)].$$

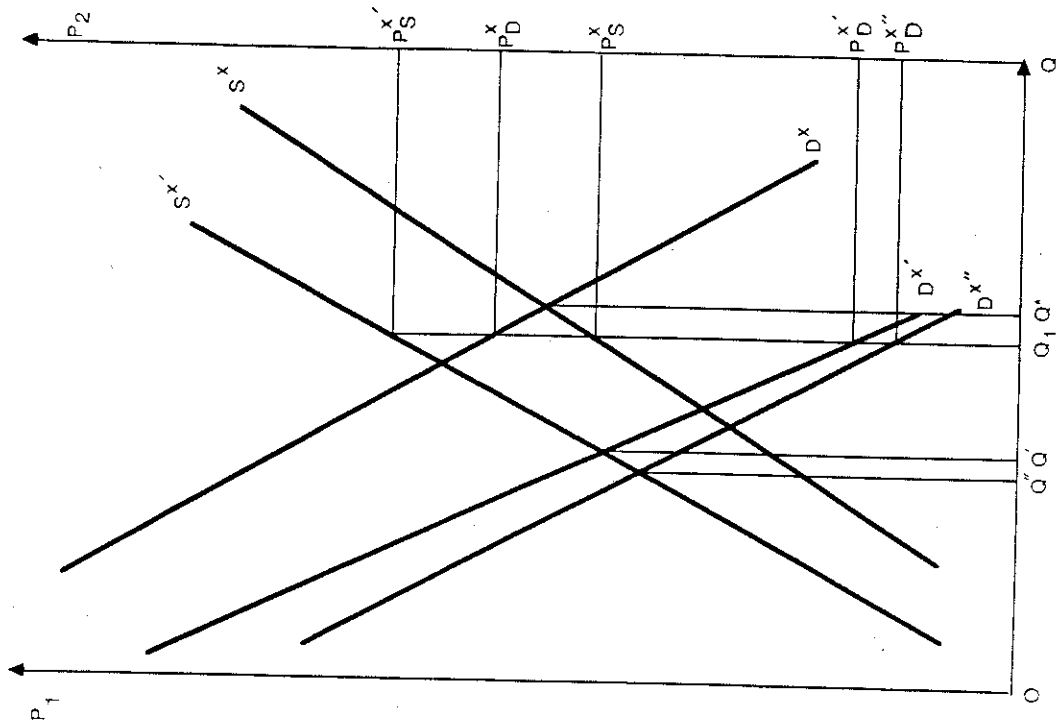
An increase in the tariff will require an increase in the subsidy by lowering  $P_D^{x''}$ .

The size of importers' and exporters' rents may be affected when domestic policy instruments (support buying or deficiency payments) are used in conjunction with import quotas. A complete diagrammatic analysis of these interactions is complicated and is contained elsewhere (Hornig). To summarize, support buying in the importing country, where the government buys the commodity at a stated price, raises the excess demand price above the unsupported level. This either increases quota rents or decreases subsidy requirements, depending on the relative levels of the excess supply and demand prices. Support buying by

Figure 1. Quota Rent and Subsidy Determination



1a. No joint determination



1b. Joint determination



the exporting country, on the other hand, raises the excess supply price, either reducing quota rents or increasing subsidy requirements.

Deficiency-payment schemes have, in all cases, the opposite effects from support buying. Because the government first allows the market to clear and then remits to producers any positive difference between a predetermined target price and the realized market price, the excess demand price in the importing country (or the excess supply price in the exporting country) is lowered. Deficiency payments in the importing country will thus either decrease rents or increase subsidy requirements; used in the exporting country, they will either increase rents or decrease subsidy requirements.

#### Empirical Method for Estimating Rents and Subsidies

To estimate the rent components,  $X$ ,  $M$  and  $T$ , one must obtain five prices for each commodity from each country of origin: the wholesale selling price to the exporter (foreign ex-factory price); the exporter's f.a.s. price to the importer; the customs valuation of the commodity (usually the same as the f.a.s. price); the importer's c.i.f. price at the port of entry; and the domestic wholesale price at which the importer sells the good. The landed cost of the import is calculated by adding the tariff charge to the c.i.f. price, obtained by applying the appropriate ad valorem tariff rate to the customs valuation. All prices are converted to U.S. dollars per pound.

If rents were calculated directly from these price data, they would include normal profits. Thus, some estimate of normal price-cost margins must be obtained to remove from measured profits a normal return for each industry. Denoting the unadjusted foreign and domestic wholesale prices as  $P_S^{x*}$  and  $P_D^{x*}$ , respectively, the exporter's adjusted wholesale price, (the price at which the exporter could resell the good, purchased at  $P_S^x$ , and realize a normal profit  $n$ ), is:  $P_S^x = P_S^{x*} / (1-n)$ ; the importer's adjusted wholesale price, (excluding normal profit but including tariff and c.i.f. charges) is:  $P_D^x = (1-n)P_D^{x*}$ . By substituting these estimated prices into the expressions for  $X$ ,  $M$  and  $T$  and dividing by quota amounts, empirical estimates of the per pound quota rents ( $x, m, t$ ) can be derived.

A useful way to evaluate export subsidies is to compare the actual subsidy to the subsidy which enables the exporter to earn normal returns and offer the good at an f.a.s. price which will allow an importer to cover tariff charges and earn normal returns. Designate the actual per pound subsidy as  $s_A$  and this required subsidy as  $s_R$ :  $s_R = P_S^x - P^*$ , where  $P^* = (P_D^x - \text{c.i.f. charges})/(1+t)$  is the f.a.s. price at which the importer makes normal returns. Then, the excess of the actual subsidy, serving only to increase rents rather than

$$\text{cover costs, is: } S_{AE} = \begin{cases} s_A, & \text{given } s_R < 0 \\ (s_A - s_R), & \text{given } s_R > 0 \end{cases}$$

#### Empirical Application to U.S. Cheese Import Quotas

This section examines actual rents and subsidies under U.S. import quotas between 1974 and 1980. This period was chosen because of the limited availability of data prior to 1974 and because prior to 1980, the U.S. cheese quotas were exclusively country specific, making possible country-by-country comparisons.

A detailed account of how the data were collected and combined to estimate rents and subsidies is in Hornig. U.S. wholesale selling prices of imported goods are from the USDA; c.i.f., f.a.s., and customs prices are from the U.S. Department of Commerce. Tariff rates are from the U.S. Tariff Commission and Presidential Proclamation 4707. The Statistical Office of the European Communities (Eurostat) publishes ex-factory cheese prices, by variety and member country, on an annual basis, in various places. Cheese export subsidies and the monetary coefficients and compensatory amounts used to adjust the refunds are from the Official Journal of the EC (L series). Prices for non-EC countries are obtained from individual country publications (e.g., annual reports of the New Zealand Dairy Board and Australian Dairy Corporation; Norway's Central Bureau of Statistics). All prices are converted to U.S. dollars using IMF average conversion rates; nominal dollars are converted to constant 1980 dollars via the GNP Implicit Price Deflator.

The normal price-cost margin for which both importer and exporter wholesale prices are adjusted is based on the price spread between 40-pound block new Cheddar on the

Wisconsin Cheese Exchange and the same cheese wholesaled in Wisconsin. This measure (suggested by Lough) yields an average margin on sales between 1974 to 1980 of about 8 percent.

Because of limited price and subsidy data from the other and low-fat categories, only six of 59 industries defined by cheese quotas could be examined for more than one year. A seventh could be included for 1980; in two other industries data for importers only was secured. Industries for which importer and exporter data can be obtained (excluding American cheese from New Zealand and Australia) cover 18 percent of total poundage. If these latter categories, plus the one-sided samples, are added, coverage rises to 32 percent.

#### Rent Size

Rent sizes vary considerably across industries but are reasonably consistent within industries over time (Table 1). In 1980, a fairly representative year in that rents are close to weighted averages for the sample period, rents ranged from \$0.23 to \$1.83 per pound, the average being \$0.55. If this rent were being paid on all licensed cheese imports in 1980, total quota rents would have been around \$131 million dollars. When rent sizes are measured as a percentage of the U.S. wholesale price, they are somewhat more consistent across sectors than are actual rents. Over time, rents accounted for between 30 and 45 percent of the cheeses' wholesale prices in the United States. Only for Blue-mold cheese from Denmark and Swiss-type cheese from Norway are rents a significantly smaller share of price.

#### Value of Licenses

By applying the appropriate rent per pound to the licensed amount, one may estimate the value of licenses. Importers' licenses are emphasized because data on the distribution of export rights are generally unavailable and because importers' data were available or could be imputed for several more industries. Blue-mold cheese from Denmark and Italy and Italian IOL from Italy were dropped from the estimation of license values because EC quotas were globalized in 1980. This problem did not arise with Edam and Gouda cheese, since the Netherlands monopolized these exports.

Table 1. Measured Cheese Import Quota Rents and Their Component Parts, Selected Industries, (constant \$1980)

Industry and Year	Total Rent $r=x+m+t$	Importer's Rent $m$	Exporter's Rent $x$	Tariff Revenue $t$	$r/P_D^x$ -percent-
----- \$ per pound -----					
<u>Blue-Mold, Italy</u>					
1980	1.22	0.33	0.60	0.29	39.9
1979	1.27	0.40	0.58	0.28	40.5
1978	1.14	0.40	0.46	0.27	36.4
1977	1.50	0.40	0.82	0.29	45.9
1976	1.38	0.35	0.73	0.30	45.1
1975	1.36	0.31	0.77	0.28	48.0
1974	1.05	0.26	0.56	0.23	44.1
<u>Blue-mold, Denmark</u>					
1980	0.23	-0.01	0.02	0.22	11.7
1979	0.32	0.02	0.06	0.23	15.3
1978	0.33	0.04	0.06	0.24	15.8
1977	0.37	0.05	0.09	0.23	16.9
1976	0.39	0.05	0.09	0.24	18.1
<u>Edam and Gouda, The Netherlands</u>					
1980	0.54	0.04	0.29	0.21	28.5
1979	0.78	-0.03	0.59	0.22	37.7
1978	0.83	0.00	0.58	0.25	37.4
1977	0.83	0.10	0.47	0.26	35.3
1976	0.80	0.01	0.53	0.26	34.7
1975	0.80	0.06	0.50	0.24	35.9
1974	0.53	0.03	0.30	0.20	29.3
<u>Italian IOL, Italy</u>					
1980	1.83	1.15	0.32	0.36	44.6
1979	1.82	0.93	0.38	0.51	39.5
1978	1.54	0.31	0.70	0.53	37.6
1977	1.93	0.90	0.55	0.47	45.2
1976	1.79	0.63	0.67	0.48	44.7
1975	1.65	0.57	0.62	0.45	44.3
1974	1.35	0.39	0.51	0.45	38.5
<u>Cheddar, New Zealand</u>					
1980	0.65	0.27	0.27	0.11	41.4
1979	0.69	0.36	0.21	0.12	44.4
1978	0.66	0.30	0.24	0.13	44.4
1977	0.65	0.15	0.36	0.14	51.7
1976	0.81	0.31	0.36	0.13	44.0
1975	0.68	0.26	0.28	0.14	36.4
1974	0.56	0.03	0.37	0.16	
<u>Cheddar, Australia</u>					
1980	0.53	0.28	0.15	0.10	33.8
1979	0.57	0.39	0.06	0.11	36.6
1978	0.51	0.38	0.02	0.11	34.1
<u>Swiss-type, Norway</u>					
1980	0.37	0.05	0.19	0.13	11.2

Note:  $r/P_D^x$  is rent as a percent of domestic wholesale price. Detail may not add due to rounding.

Sources: Calculated on a per pound basis from appropriate expressions on page 2 and data from Appendix B of Hornig.

The values of import licenses are in Table 2. Overall, the cheese import quota system appears to generate significant rents for the parties involved in trade. Rents accrue to a fairly small number of importers: in 11 of the 12 industries studied, the top five licenses collected more than 3/4 of the total importers' rent.

Quota rents are also significant for exporters. For the seven industries for which two-sided data were found, exporters' rents ranged from \$0.02 to \$0.60 per pound in 1980 (Table 1). A weighted average would be around \$0.22 per pound. Applying this figure to all cheeses imported into the U.S. under quota in 1980 (excluding unlicensed Canadian Cheddar imports), exporters' rent would have been roughly \$52.4 million, or more than 1/3 of the \$131 million total.

#### Export Subsidies and Quota Rents

Export subsidies (export refunds) are used by the EC and other suppliers to promote cheese exports. It is usually assumed that subsidies are needed to allow trade to occur. Close examination of the subsidies on U.S. cheese imports from the EC (the EC being the only exporter to furnish subsidy amounts) suggests that they play a somewhat different role. The required subsidy,  $s_R$ , is negative in all but the case of Blue-mold cheese from Denmark, and generally rather large (Table 3). For cheeses from Italy (Blue-mold and Italian IOL) it ranges from  $-\$0.32$  to  $-\$1.15$ ; for Edam and Gouda from the Netherlands, from  $-\$0.01$  to  $-\$0.46$ . (Recall when the required subsidy is negative, it measures the amount by which the export could have been taxed in the exporting country). Further, because  $s_{AE}$ , as a percentage of  $(x+m)$ , is generally rising, the excess subsidy is paying for a growing share of rents. In 1980, this share ranged from 30 to 100 percent, whereas in 1976, the lowest year, it ranged from 0 to 64 percent.

Why then does the EC subsidize quota rents? The evidence suggests that exporters (or, conceivably, importers through exporters) are able to use the monopoly/ monopsony powers created by the quota system to extract rents, in the form of subsidies, from the exporting country government. How much leverage they have would merit further investiga-

Table 2. Value of Cheese Import Licenses, Selected Industries, 1980

Industry	Number of Import Licenses	Importer's Rent <sup>a</sup>				Actual Quota Fill
		Per Pound	Total	Top Five Firms	Remaining Firms	
		----- \$	-----	-----	----- %	-----
Cheddar, New Zealand	78	0.27	1,843,663	69.7	30.3	99.4
Cheddar, Australia	38	0.28	740,574	85.1	14.9	97.5
American, Other than Cheddar, New Zealand	88	0.27	1,190,048	80.9	19.1	99.6
American, Other than Cheddar, Australia	37	0.29	638,887	84.2	15.8	99.7
Edam and Gouda, Netherlands (EC)	206	0.04	353,278	36.0	64.0	95.4
Swiss and Emmenthaler, Norway	37	0.05	758,702	77.3	22.7	99.6
Swiss and Emmenthaler, Finland	23	0.15	2,711,529	97.2	2.8	99.5
Swiss and Emmenthaler, Austria	88	0.18	2,491,887	80.2	19.8	97.0
Gruyere-process, Austria <sup>b</sup>	26	0.18	364,870	88.7	11.3	96.6
Gruyere-process, Finland <sup>b</sup>	19	0.15	330,426	94.1	5.9	97.8
"Other" Cheese, New Zealand <sup>b</sup>	74	0.27	6,730,351	78.7	21.3	101.2
"Other" Cheese, Australia <sup>b</sup>	9	0.28	648,140	84.3	15.7	116.5

Sources: License numbers and sizes from USDA, 1981 (see Table A.16 of Hornig). Per pound rents from Table I. Importer quota fill rates calculated from statutory quotas in 7CFR Part 6, Import Regulation I, (Federal Register, 20 December 1979, 75604-75610 and actual imports by county and cheese type from USDA, "News", PR40-81.

<sup>a</sup>Value of licenses assumes 100 percent fill rate.

<sup>b</sup>Value is imputed by procedures outlined in Hornig.

Table 3. Export Subsidies in the Cheese Trade, (constant \$1980)

Table 11

Industry and Year	Actual Subsidy $s_A$	Required Subsidy $s_R$	Excess Subsidy $s_{AE}$	Excess Subsidy to Net Rent $[s_{AE}/(X+M)] \cdot 100$	$P^* - P_s^f$
	- - - \$ per pound - - -		- - percent - -		- \$ per pound -
<u>Blue-mold, Italy</u>					
1980	0.28	-0.60	0.28	30	0.28
1979	0.24	-0.68	0.24	24	0.34
1978	0.14	-0.64	0.14	16	0.32
1977	-0.01	-1.15	0.00	0	0.30
1976	-0.03	-1.05	0.00	0	0.30
1975	0.16	-0.87	0.16	15	0.27
1974	0.11	-0.67	0.11	13	0.22
<u>Blue-mold, Denmark</u>					
1980	0.29	0.28	0.01	100	-0.01
1979	0.38	0.30	0.08	100	0.02
1978	0.31	0.21	0.10	100	0.04
1977	0.18	0.05	0.13	93	0.04
1976	0.09	-0.05	0.09	64	0.06
<u>Edam and Gouda, Netherlands</u>					
1980	0.32	-0.01	0.32	97	0.04
1979	0.44	-0.11	0.44	78	0.02
1978	0.34	-0.24	0.34	59	0
1977	0.18	-0.38	0.18	32	0.09
1976	0.08	-0.46	0.08	15	0.01
1975	0.21	-0.34	0.21	38	0.05
1974	0.20	-0.12	0.20	61	0.03
<u>Italian IOL, Italy</u>					
1980	0.85	-0.45	0.85	58	0.98
1979	0.76	-0.38	0.76	58	0.77
1978	0.62	-0.32	0.62	61	0.24
1977	0.41	-0.85	0.41	28	0.72
1976	0.31	-0.89	0.31	24	0.53
1975	0.33	-0.77	0.33	28	0.47
1974	0.16	-0.68	0.16	18	0.32

Source: Calculated using appropriate expressions from page 5 and from detailed data assembled in Appendix B of Hornig.

tion. It could be argued, hypothetically, that even though they are oversubsidized, monopoly exporters (where they exist) hold up f.a.s. prices more successfully than would competitive ones, so that the costs of subsidizing monopoly exporters are actually less than the costs of subsidizing competitive ones.

Another interesting aspect of this system is uncovered by examining in Table 3 the amount by which the cheeses are underpriced,  $(P^* - P_S^f)$ . This measures the implicit benefit to the U.S. of the EC's failing to tax efficiently. In 1980, for instance,  $P_S^f$  was \$0.04 lower than necessary on Edam and Gouda, \$0.28 lower on Blue-mold from Italy, and \$0.98 too low on Italian IOL from Italy. Applied to traded quantities, this suggests that the U.S. trade deficit would have been increased by around \$2.8 million had the f.a.s. prices on these three cheeses been at  $P^*$ .

### Conclusions

Despite some difficulties in obtaining data and in estimating rents and valuing licenses, this analysis of the U.S. cheese import system suggests that consumers of imported cheeses pay a hefty portion of the wholesale price in the form of rents and tariffs. For the representative year of 1980, assuming that the estimated average rents for the categories of cheese examined are applicable to imports as a whole, quotas yielded rents of roughly \$41 million per year to importers, \$52 million to exporters, and \$38 million to the government.

The analysis also suggests that the EC's subsidization of cheese exports to the United States between 1974 and 1980 was largely unnecessary and served primarily to maintain importers' and exporters' rents. The EC's failure to increase f.a.s. prices to the maximum level consistent with U.S. market prices benefited the United States, not only in a private sense by increasing importers' rents, but in a social sense by improving the balance of trade.



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