Tariffs on U.S. Imports of Dairy Products: A Product Component Analysis

Isin Tellioglu , Kenneth W. Bailey, and David Blandford[1]

[1]The authors are, respectively, graduate student, associate professor and professor in the Department of Agricultural Economics and Rural Sociology, The Pennsylvania State University, University Park, PA.

Selected Paper prepared for presentation at the American Agricultural Economics Association Annual Meeting, Long Beach, California, July 23-26, 2006.

Abstract

A methodology for dairy product component tariff and price calculation is developed and applied to various products. Since the majority of dairy products are imported for their ingredients, component tariffs need to be considered in evaluating the protection provided by the tariff structure rather than tariffs on end products as listed in the HTS schedule. The results of the Uruguay Round tariffication of dairy products for the United States indicate that implied milk fat and protein AVE's vary substantially among and within product groups. Different tariffs applied to finished products may have unintended impacts on economic incentives due to their impact on the relative prices of imported milk components.

Tariffs on U.S. Imports of Dairy Products: A Product Component Analysis

A cornerstone of U.S. dairy policy has been high internal support prices coupled with import protection. For many years imports of dairy products were tightly regulated by import quotas which effectively isolated U.S. markets from global competition. Rigid quotas also protected the domestic price support program. Since the Uruguay Round trade agreement, imports have been regulated by a tariff rate quota system. Quotas and other forms of import protection were replaced with a transparent system of tariffs (one tariff applying within the quota, another higher tariff above the quota) with the objective of liberalizing trade over time. The World Trade Organization's (WTO) Doha Round of trade negotiations could require the dairy sector to undergo further liberalization. This could include tighter limitations on domestic support and increased market access for imports with corresponding reductions in price supports and restrictions on direct payments such as the Milk Income Loss Compensation Program (MILC).

The objective of the WTO negotiations is to increase global trade by reducing internal rates of support and increasing market access (reducing import tariffs). By definition, the negotiations focus on traded products. For the dairy industry, this means tariff and quota regimes that affect products such as cheese, butter, and non fat dry milk. Milk can be divided into its components from which many processed products are made. Most imported dairy products are intermediate products that are used in further processing. These products are substitutable and trade is increasingly related to their component characteristics. Yet the products and, by implication, their key components can have very different levels of tariffs. This opens the possibility that a domestic food manufacturer that is seeking milk protein, for example, can respond to a high tariff on one intermediate product, say skim milk powder, by importing milk protein concentrate which has a lower tariff and higher protein content. Problems may arise if tariff negotiations treat dairy products as finished goods rather than as intermediate products used in further food processing. A given level of import protection on one set of products could be completely or partially offset by imports of similar products with lower tariffs.

The objective of this paper is to examine the existing tariff protection for U.S. dairy imports on both a product and component basis. Rather than focusing on finished dairy products, tariffs are computed on a component basis. The implications for the structure of protection are examined. In this way one can more effectively assess the potential impact of various trade proposals on the U.S. dairy industry. More specifically, the focus on tariffs on a component basis highlights some of the potential consequences of the current Doha Round of WTO negotiations.

A Methodology for Computing Effective Tariffs and Prices for Milk Components

Food manufacturers face a range of market prices and tariffs for dairy products.

Most of these are intermediate products used in the manufacture of consumerready dairy products or other food products. Food manufacturers want to purchase the milk components contained in the intermediate products and use them in their manufacturing processes. Thus the real or effective price that influences their purchasing decision is that relating to the components, rather than the intermediate products themselves. In this section we develop a methodology to derive the effective prices and tariffs for intermediate dairy products at the component level. To do this we use the following steps.

First, world prices for components are derived from the ratio of component values to component content in a particular dairy product. Once the component prices and values are known we can derive ad valorem tariffs (AVE's) at the component level

Values for each component are estimated using equations (1-5) below:

(1) $$\text{MFV}_j = \frac{\%MF_j}{\%TS_j} * \text{P}_j$$

(2) $$\text{PRV}_j = \frac{\%PR_j}{\%TS_j} \text{P}_j$$

(3) $$\text{OSV}_j = \frac{\%OS_j}{\%TS_j} * \text{P}_j$$

(4) $$\%\text{TS}_j = \%\text{MF}_j + \%\text{PR}_j + \%\text{OS}_j \text{ and}$$

(5) $$\text{TV}_j = \text{MFV}_j + \text{PRV}_j + \text{OSV}_j = \text{P}_j$$

where *j* denotes a dairy product, MFV is milk fat value, PRV is protein value and OSV is other solids value; $\%MF_j$, $\%PR_j$ and $\%OS_j$ are are the percent milk fat, protein and other solids content of product j respectively; $\%TS_j$ is the total solids content of product j; and P_j is the world price of product j.

The effective prices of the components are then derived by using the computed component values derived from the market price of the intermediate product and the component content of that product:

(6) $$P_j^{MF} = \frac{MFV_j}{\%MF_j}$$

(7) $$P_j^{PR} = \frac{PRV_j}{\%PR_j}$$

(8) $$P_j^{OS} = \frac{OSV_j}{\%OS_j}$$

where P_j^{MF}, P_j^{PR}, P_j^{OS} is the milk fat, protein and other solids component prices for dairy product *j*, respectively.

Next, tariffs for the intermediate dairy products are allocated among the components based on the ratio of the component value to world price. Note that the percentage component can also be used. Fixed component tariffs are computed as follows:

(9) $$FT_j^{MF} = \frac{MFV_j}{P_j} * FT_j$$

(10) $$FT_j^{PR} = \frac{PRV_j}{P_j} * FT_j$$

(11) $$FT_j^{OS} = \frac{OSV_j}{P_j} * FT_j$$

where FT_j^{MF}, FT_j^{PR}, FT_j^{OS} are the fixed tariffs of milk fat , protein and other solids components in dairy product *j*, respectively.

Finally, the fixed tariffs at the component level are converted to ad valorem equivalents by using the derived component prices as follows:

(12) $\text{AVE}_j^{MF} = \dfrac{FT_j^{MF}}{P_j}$

(13) $\text{AVE}_j^{PR} = \dfrac{FT_j^{PR}}{P_j}$

(14) $\text{AVE}_j^{OS} = \dfrac{FT_j^{OS}}{P_j}$

(15) $\text{AVE}_j = \text{AVE}_j^{MF} + \text{AVE}_j^{PR} + \text{AVE}_j^{OS}$

where AVE_j^{MF}, AVE_j^{PR}, AVE_j^{OS} are the ad valorem equivalent tariffs for milk fat, protein and other solids in dairy products *j*, respectively, and AVE_j is the ad valorem tariff on the intermediate dairy product *j*.

In addition to the component tariff calculation, we also develop a formula to express the sum of the tariffs applied ad valorem terms. This ad valorem calculation makes tariffs on finished and intermediate products and their components comparable when component AVEs are calculated. Tariffs on agricultural products are of two forms: fixed and ad valorem. Some dairy products have both kinds, but most have either fixed or ad valorem forms. We combine these two measures of the existing Uruguay Round tariffs, which we call the 'total Uruguay Round AVE'. To convert fixed tariffs into an ad valorem equivalent, the fixed tariff is divided by the world price of the product (the fixed tariff is expressed as a percentage of the world price), this is then added to the original ad valorem tariff expressed in the tariff schedule as follows:

(16) $\text{TAVE}_j = \text{AVE}_j + \dfrac{FT_j}{WP_j}$

where $TAVE_j$ is the total Uruguay Round AVE for dairy product j, AVE_j is the ad valorem tariff for product j, FT_j is the published fixed tariff for product j and WP_j is the world price.

While the main purpose of this paper is to examine the tariff structure for dairy imports under the Uruguay Round Agreement using milk components, we also examine groupings of products that share similar product characteristics (i.e., the same end use, common percentage of components). This is done to simplify the analysis. Thus 5 dairy product classes are defined: cheese products, milk fat products, protein and whey products, dried milk (high fat) and dried milk (low fat) products.

Cheese is a preserved food. The main milk components (protein and milk fat) are concentrated and protected from rapid deterioration and spoilage from microorganisms. Cheese is both a finished and an intermediate product used in processed cheese or for cut and wrap purposes. With over 400 varieties available, cheese and cheese products are used as ingredients in entrees, side dishes and ready-to-eat snacks. The cheese product market continues to grow at an annual rate of four per cent. (U.S. Department of Agriculture, 2006) Cheese products contain a equal balance between protein (21-23 percent) and milk fat (28-35 per cent) (Chandan, 1997).

The butter group is characterized by a high percentage of milk fat. It contains products with 90 per cent milk fat on average, with a range from 87.5 per cent to 95 per cent. All other milk components (i.e. protein, other solids, moisture) are negligible which necessitates organizing these products into one group. Salt, flavorings, or preservatives are sometimes added to butter. The products can be spray butter, butter cream, butter milk, anhydrous milk fat etc. Spray butter is melted and blended butter (with non fat dry milk) that is homogenized and spray dried. The milk fat content in butter cream is 80 percent; it is a creamy oil emulsion in water in contrast to dense structure butter. Butter milk is a by product of butter production. It represents the liquid phase of milk fat after churning. In anhydrous milk fat, all moisture is removed from pasteurized butter. Butter products have a large variety of uses: as a flavoring, as a spread, as a condiment and in cooking applications such as baking, sauce making, and frying (Chandan, 1997).

The protein and whey group is characterized by a relatively high protein level in comparison to other groups. The group containes casein, caseinates, milk protein concentrates (MPCs), and various whey products, including whey protein concentrates (WPCs) both in liquid and dried form. It also contains lactose which has no protein but finds its place in this group because it is crystallized from condensed whey.

Dried milk products other than those included in the protein and whey group are organized into two different groups based on their fat content: dried milk products that have a significant fat content (10 per cent or more), which are termed dried milk high fat (i.e. sweetened condensed milk, dried sour cream) and others that contain negligible amounts of fat (less than 10 per cent) which are termed dried milk low fat (i.e.unsweetened condensed milk, skim milk powder). The reason for separating this class on the basis of fat content is related to the methodology of computing ad valorem tariffs at the component level which is explained below.

In addition to their product classes, all five groupings are separated by their Tariff Rate Quota (TRQ) status (i.e. quota QT and over-quota OQ) as the world prices, component prices and AVE are have significantly different values by tariff rate quota status.

Assumptions

The general model presented in equations (1)-(14) allows us to derive prices and tariffs at the component level. But a number of assumptions must be used in applying the model in a real world context. These assumptions are based on observed commercial practices in the global market for dairy products.

We assumed a market price for other solids (OS) because some milk products have a very high other solids content even though they are traded on the basis of their more valuable components. For example, while skim milk powder, MPC and skim milk blends contain various levels of lactose (major part of OS), most of the value of these products comes from their protein content. In fact, most food manufacturers have to remove the lactose. So in our case, deriving an other solids price based on relative percentages in the relevant dairy product will likely lead to an over estimate of the market value for other solids, and will under estimate the market value for milk fat and protein. Also, for some dried milk products, a market price for milk fat (derived from the butter products group) is used since milk fat has a very low percentage compared to other components in those dried milk products. On the other hand, if the percentage of milk fat is greater than 10 per cent, we compute a component price for milk fat using the methodology outlined.

OS prices were approximated by using dried whey (HTS Code: 0404.10.4000) export prices after allowing for further processing costs. This type of dried whey is preferred among other whey products as it is the one with the highest OS percentage and the lowest export price. As the United States does not import whey products, the market determined price for these products is calculated from the export data as follows:

(17) $P^t_W = \frac{EV^t_W}{EQ^t_W}$

(18) $P^t_{OS} = P^t_W$ - Make Allowance

where P^t_W is the dried whey world price in year t (in $ per ton), EV^t_W is dried whey export value at year t (in dollars) and EQ^t_W is dried whey export quantity at year t (in tons). We computed a make allowance of $350 per ton in order to approximate processing costs base on data from the U.S. federal milk marketing orders. We then derived a net price for dried whey which is used as an approximation for the OS market price denoted by P^t_{OS}. This derived market-based value of OS is used throughout the analysis.

The assumed market-based milk fat price used in the dried milk products group is computed from the world price of anhydrous milk fat (fats and oils, HTS code: 0405.90.10 for imports within the quota and 0405.90.20 for imports exceeding the quota). Anhydrous milk fat was used as an approximation for the milk fat price as this product has the highest milk fat percentage.

Based on these assumptions, the model outlined above is modified, as described below.

If a value for OS is assumed to apply, equations (3) and (8) in our general model are modified. Since we know P^{OS}_j, we can calculate OSV_j as follows:

(19) $OSV_j = P^{OS}_j * \%OS_j$

After calculating a value for OS based on its market price, it is deducted from the total value of a product in order to determine the remaining value of the components. $\%OS_j$ is also deducted from $\%TS_j$. This requires altering equations (4) and (5) in the following way:

(20) $TS'_j = TS_j - \%OS_j = \%MF_j + \%PR_j$

(21) $RV_j = P_j – OSV_j$

In equations (19) - (21) above, OSV_j is calculated from the assumed OS price (by multiplying pre-assumed P_j^{OS} with its percentage in product j) and then deducting from the total value of the given product (P_j) to compute the remaining value for fat and protein components (RV_j). This remaining value then replaces P_j in the remaining equations to calculate milk fat and protein AVE, and prices for dairy product j.

If a milk fat price is assumed and OS is assumed to have no value, equations (1) and (6) in the general model are modified. We know P_j^{MF} and can calculate MFV_j as follows:

(22) $MFV_j = P_j^{MF} * \%MF_j$

After calculating a value for MF based on its market price, this value is deducted from the total value of a product to determine the values for other components and $\%MF_j$ is deducted from $\%TS_j$. This requires altering equations (4) and (5) in the following way:

(23) $\%TS'_j = \%TS_j - \%MF_j = \%PR_j$ (note that $OSV_j = 0$ here)

(24) $RV_j = P_j – MFV_j$

In equations (22) - (24) above, MFV_j is calculated from the assumed MF price (by multiplying P_j^{MF} by its percentage in product j) and then subtracting from the total value of the dairy product (P_j) to compute the remaining value for the protein component (RV_j). This value then replaces P_j in the remaining equations to calculate the protein AVE and price for dairy product j. Note that in those cases where a price for MF is assumed, OS is assumed to have zero value because of its negligible physical share in the product. Therefore, the equations used to find OS value, price, fixed tariff or AVE are not employed.

Implications of the Component Price and Tariff Calculation Methodology

We now apply our model (equations (1)-(14)) and our assumptions to illustrate how to compute component based tariffs and prices. We begin by using the example of a high fat sour cream product in the milk powder category. This product has a significant amount of milk fat, protein, and other dairy solids. Most of the market value for this product is in the milk fat and the protein, not in other solids. We use equations (17) and (18) to derive a market value of $243 per ton for OS and then derive a price and tariff for milk fat and protein.

The following are the elements of the calculation (USITC Harmonized Tariff Schedule, 2005; USITC Interactive Tariff and Trade Dataweb):

Fat Percentage > 10 (belongs to dried milk high fat dairy product group)

HTS Code: 0403.90.61

Year: 2004

Category: Milk Powders (MP)

Description: Dried sour cream containing 35 per cent to 45 per cent butter fat

TRQ Status: QT

Contents: 34% protein (PR)

48% fat (MF)

5% per cent moisture

13% per cent other solids (OS)

World price: $1,166.67 per ton

Tariff: $137.00 per ton

Ad Valorem Equivalent of tariff on milk powder:

$$\frac{FT_{MP}}{P_{MP}} = \frac{137}{1{,}166.67} = 0.12$$

where FT_{MP} is the tariff on milk powder and P_{MP} is the world price for milk powder.

P_{MP}^{OS}: $243.39 per ton based on equations (14) and (15)

$OSV_{MP} = P_{MP}^{OS} * \%OS_{MP}$ = $243.39 * 0.13 = $31.64

where P_{MP}^{OS} is the price of other solids in milk powder and $\%OS_{MP}$ is the percentage of other solids in milk powder. Note we rearranged equation (3) above since we now have an assumed value for OS.

Next, we use the world price for milk powder and the assumed market price for OS to compute the remaining component value as follows:

$RV_{MP} = P_{MP} – OSV_{MP}$ = $1,166.67 – $31.64= $1,135.03 per ton

where RV_{MP} is the remaining component value in milk powder, and OSV_{MP} is the value of other solids. In other words, the remaining total solids (TS) (34% protein and 48% milk fat) are worth $1,135.03 per ton.

Component Values of Milk Powder:

$\%TS_{MP} = \%PR_{MP} + \%MF_{MP}$ = 34% + 48% = 82%.

$$PRV_{MP} = RV_{MP} * \frac{\%PR_{MP}}{\%TS_{MP}} = \$1{,}135.03 * \frac{0.34}{0.82} = \$470.62 \text{ per ton.}$$

$$MFV_{MP} = RV_{MP} * \frac{\%MF_{MP}}{\%TS_{MP}} = \$1{,}135.03 * \frac{0.48}{0.82} = \$664.41 \text{ per ton.}$$

where PRV_{MP} is the value of protein in MP, MFV_{MP} is the value of milk fat in MP. $\%PR_{MP}$ is the protein percentage in MP, $\%MF_{MP}$ is the milk fat percentage in MP and $\%TS_{MP}$ stands for the total considered solid percentage in MP. RV_{MP} *is* the remaining component value in milk powder as before.

Component Prices of Milk Powder:

Using equations (6) and (7),

$$P_{MP}^{PR} = \frac{PRV_{MP}}{\%PR_{MP}} = \frac{470.62}{0.34} = \$1{,}384.18 \text{ per ton}$$

$$P_{MP}^{MF} = \frac{MFV_{MP}}{\%MF_{MP}} = \frac{664.41}{0.48} = \$1{,}384.19 \text{ per ton.}$$

Specific Component Tariffs for Milk Powder

Using equations (9) and (10), we can compute the specific tariffs for protein and milk fat in milk powder as follows:

$$FT_{MP}^{MF} = \frac{MFV_{MP}}{P_{MP}} * FT_{MP} = \frac{581.45}{1{,}166.67} * 137 = \$82.2$$

$$FT_{MP}^{PR} = \frac{PRV_{MP}}{P_{MP}} * FT_{MP} = \frac{470.62}{1{,}166.67} * 137 = \$54.8$$

where FT_{MP}^{MF} is the milk fat specific tariff on milk powder and FT_{MP}^{PR} is the protein specific tariff on milk powder.

Ad Valorem Equivalents of Component Tariffs for Milk Powder:

$$\text{AVE}_{MP}^{PR} = \frac{FT_{MP}^{PR}}{P_{MP}} = \frac{54.8}{1{,}166.67} = 5\%$$

$$\text{AVE}_{MP}^{MF} = \frac{FT_{MP}^{MF}}{P_{MP}} = \frac{82.2}{1{,}166.67} = 7\%$$

where AVE_{MP}^{PR} is the protein AVE in milk powder, FT_{MP}^{PR} is the specific tariff on the protein component in milk powder and P_{MP} is the world price of milk powder as before. AVE_{MP}^{MF} is the milk fat AVE in milk powder and FT_{MP}^{MF} is the specific tariff on the milk fat component in milk powder.

Using this methodology and assumptions, we derive a market price of protein and milk fat of $1,384 per ton, which is significantly higher than our market-based price of $243 per ton for OS. Also, we are able to take the specific tariff for the product, compute an AVE, and then split this AVE into a protein and milk fat effective tariff.

Analysis of the Tariff Schedule

We now use the methodology and assumptions and apply them to all five product groups in order to compute effective prices and tariffs at the component level.

We simplify our analysis by focusing on a single year, 2004. Second, our detailed analysis will focus on one product group: cheese. We choose this product group because it has the most observations. Third, we present the frequency distributions for the milk fat and protein component AVEs in OQ and QT cheese products graphically in figures 1-3. Finally, tables summarizing the statistical properties of the cheese group are given in tables 1 and 2. We then summarize the results of our analysis for all the product groups in table 3.

U.S. cheese imports are heavily regulated under the TRQ system. The tariff on within-quota imports is significantly lower than that on over-quota imports. Our analysis focuses on quota and over quota calculations for both milk fat and protein AVE's. The results can be seen in figures 1-4. In addition, the statistical properties of cheese milk fat and protein AVE's for QT and OQ are presented in tables 1-2.

The protein AVE for quota cheeses contains 30 observations and is distributed between two and nine per cent (figure 1)Twenty-one of 30 (70 per cent) of these protein AVEs fall between three and five per cent. It is notable that only two observations exceed seven per cent. The OQ protein distribution is given in figure 3. In this case the lowest OQ protein AVE is five per cent and 18 of 32 (56 percent) of protein AVEs in this group lie between 10 and 20 per cent. The AVE calculations for components mirror the results for the intermediate products in that component AVEs for products traded in OQ volumes are significantly higher than the QT product component AVEs. On average, OQ cheese protein AVEs of 14 per cent are approximately three times higher than the QT cheese protein AVEs of five per cent (table 1).

Next we examine the cheese milk fat AVE's. These are presented in figures 2 and 4 and table 2 for QT and OT cheeses. Average cheese milk fat AVE's are slightly higher than cheese protein AVE's (seven per cent versus five per cent, respectively). The cheese milk fat AVE for QT cheese can be as low as three per cent while there are cheese products that have more than 10 per cent milk fat AVE (figure 2). Thus, there exists a range of implicit import prices for those importers who are interested in the milk fat in cheese.

It is important to emphasize that although there exist 30 observations in QT and 32 observations in OQ cheese groupings, there is a surprisingly wide distribution of cheese milk fat and protein ad valorem equivalent tariffs.

Other Groups

Table 3 summarizes the results for the five product groups examined in this paper. Each product group is further divided into QT and OT products based on their TRQ status. We eliminated all non-quota HTS lines since there are limited imports under that quota status compared to QT and OQ in our analysis. The means and ranges for the world price, total AVE, component prices and component AVE are presented. The second row for each QT or OQ group presents the range (in parentheses). Also, for purposes of our analysis, it is interesting to note that the product AVEs are computed from the HTS schedule, whereas the component AVEs are computed using our methodology. This allows us to compare a product`s AVE with its component AVEs.

The QT tariffs for the components are much lower than the OQ tariffs for components as was the purpose of the TRQ system. This result might be anticipated since the component tariff is derived from that for the finished good (see equations (7)-(9)). And in general, tariffs on finished goods are higher than the tariffs on their components.

AVE’s on cheese OQ components are very restrictive. For example, the cheese QT protein AVE range is three to nine per cent while the cheese OQ protein AVE range is from five to 42 per cent. However, it is likely that AVE’s on cheese protein and milk fat are less relevant than the total AVE since cheese is imported as a "whole product", not for its components. (i.e., average total AVE on OQ cheese as a whole product is 39 per cent, the average AVE on OQ cheese protein is 14 per cent, and the average AVE on OQ cheese milk fat is 20 per cent) (see table 3).

The component AVE's for groups other than cheese have a huge range for the OQ products. These products are imported for their components. Dried milk products are mainly traded for their fat content and the protein whey group products are traded for their protein. Therefore, rather than the total AVE on these finished or intermediate products, the protein and fat component AVEs should be considered in any trade analysis.

In the milk fat group, QT milk fat tariffs are relatively low with a mean of nine per cent and a range of six to ten per cent. OQ milk fat tariffs are large and have a wide range. Their mean is 58 per cent and they range from 35 to 77 per cent.

In the protein-whey group both QT and OQ protein tariffs are large and have similar ranges except that the lower end of the range is greater in OQ protein tariffs and the upper end of the range is greater in QT protein tariffs. The range is from 4 per cent to 98 per cent in QT protein tariffs and from 42 per cent to 70 per cent in OQ protein tariffs for this group.

In the dried milk high fat group, we observe more moderate OQ and QT component tariffs than for the cheese, milk fat and protein-whey component tariffs. However, the range is still wide. The dried milk high fat group has a very low milk fat and protein QT tariff, four per cent and three per cent on the average, respectively.

In the dried milk low fat group, average protein AVE is approximately the same with the dried milk high fat group for QT. The OQ milk fat tariff has a considerably higher mean value and a wider range than QT milk fat in the dried milk low fat group.

On the basis of these results we may conclude that the economic incentives that appear to apply to dairy products are not guaranteed to apply to components. For example, obtaining protein from cheese is cheaper than doing so from the dried milk low fat group, although cheese is much more expensive on average. Our results suggest that, world prices and total AVEs do not always reflect the component prices or AVEs.

There are many combinations of component AVEs and component prices within each product group. If producers (importers) are to maximize profits, they have to choose those combinations with the lowest price and lowest AVE. For example in the dried milk high fat group, milk fat prices range from a low of $1,384 to high of $24,401 and AVEs are from one to eight per cent for QT. It is quite possible that an importer may choose a component combination which has a lower price (after the tariff is added) than the fat in the milk fat group which has the highest milk fat percentage and lowest average price.

Summary and Conclusions

U.S. dairy trade is experiencing significant trade liberalization pressures. If the WTO's Doha round proposals to reduce import tariffs are accepted, there could be significant implications for U.S. milk producers, dairy product manufacturers and importers. In examining the implications of tariff reductions, attention needs to be directed to the components of dairy products since many of these are intermediate products in various food manufacturing processes. To reflect this, tariffs and prices for milk components need to be computed. In this paper, the structure of tariff protection for U.S. dairy imports has been analyzed on both a product and component basis using a model to derive component price and tariff calculations.

Although some imported products, for example, certain types of cheese are imported for sale to consumers, many others are imported mainly for their ingredients. Therefore, component tariffs need to be considered in evaluating the protection provided by the tariff structure rather than the tariffs on end products as listed in the HTS schedule.

The results of the Uruguay Round tariffication of dairy products for the United States indicate that milk fat and protein AVE's vary substantially among and within product groups. This has implications for a manufacturer who wants to source ingredients. A manufacturer seeking to minimize costs would tend to base their purchasing decisions on the lowest component price (inclusive of tariffs) rather than the lowest product price. Our results also indicate that end product prices and tariffs need not be positively related to component prices and tariffs. For example the protein-whey group's finished product tariffs are higher for QT than OQ, although protein component tariffs have exactly the reverse relationship.

The United States and other WTO member countries are currently engaged in ongoing WTO negotiations under the Doha Round. These negotiations will likely result in reduced tariffs. The impact of various tariff reduction formulas for dairy products may have unanticipated impacts on economic incentives due to their impact on the relative prices of imported milk components. The users of imported dairy products may be able to find new lower cost options for obtaining the ingredients they need as a result of changes in the tariffs on dairy products. The component tariff calculation methodology developed in this paper permits these issues to be examined and can prove helpful in assessing the implications of future trade commitments.

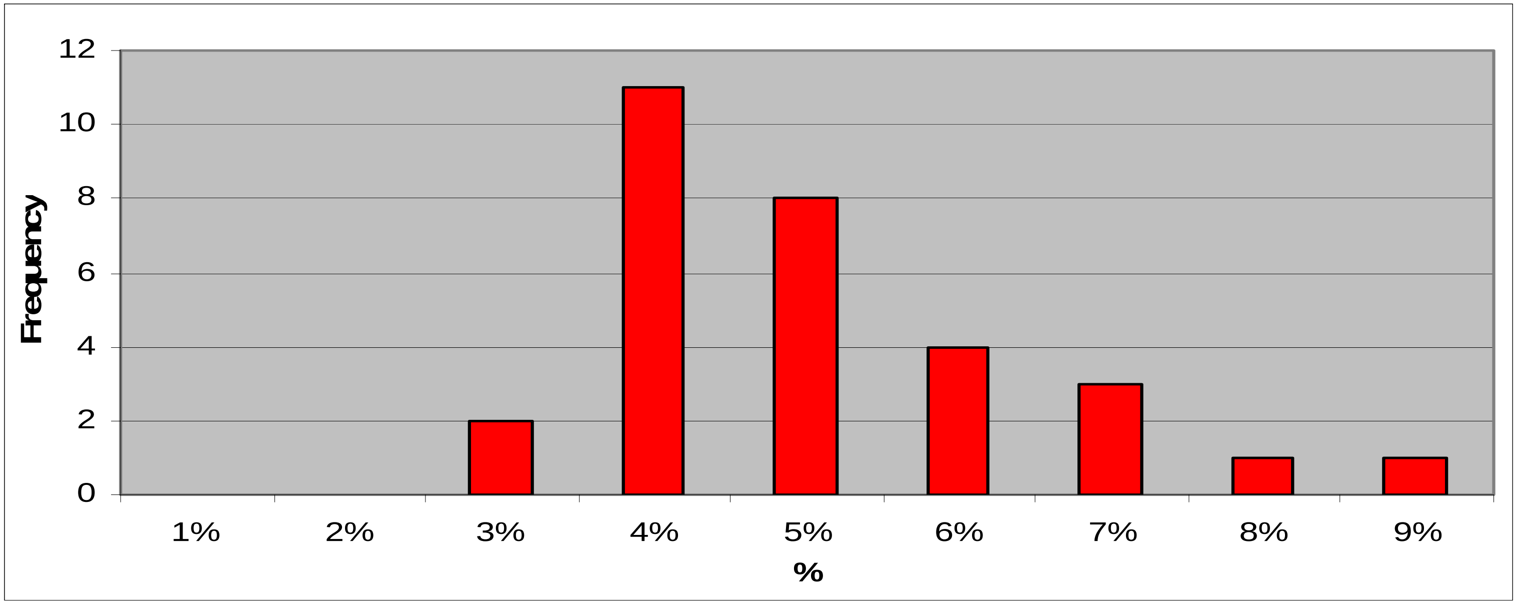

Figure 1. Cheese protein AVE frequency distribution-QT (2004)[1]

[1]Data presented in the graph are obtained from USITC HTS Schedule and Interactive Trade Dataweb.

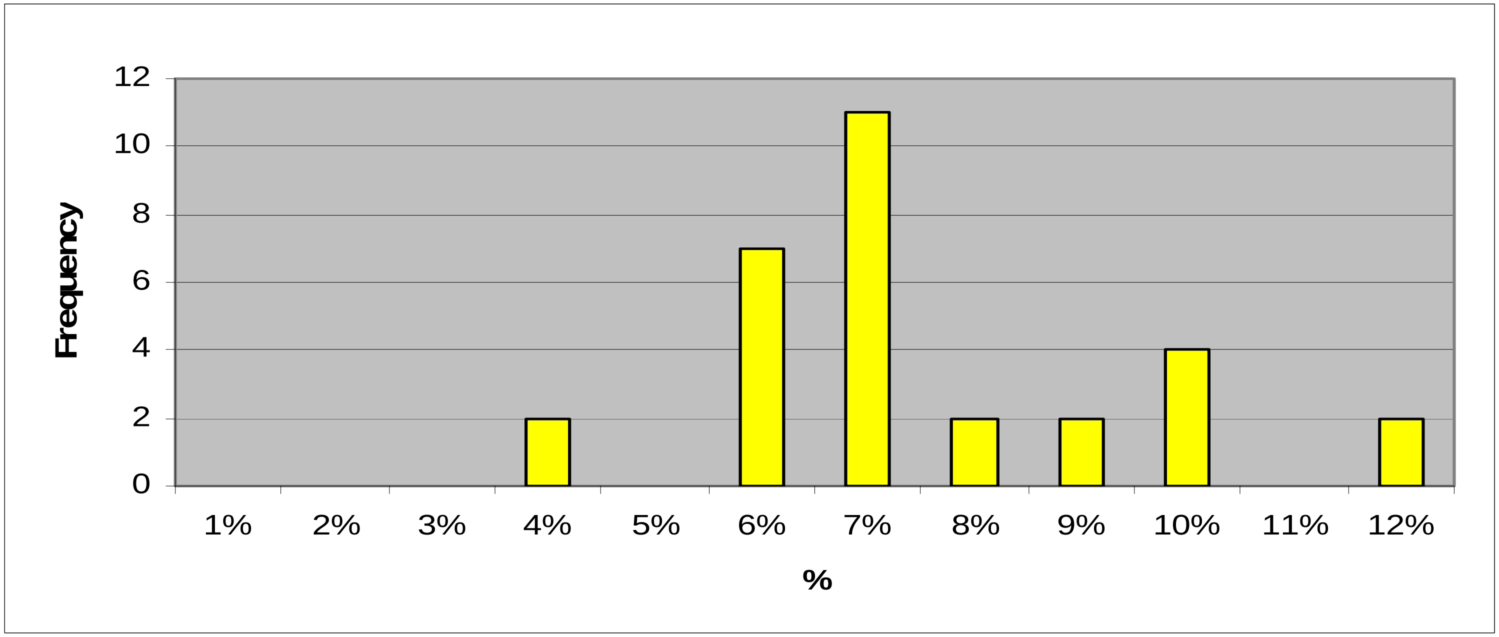

Figure 2. Cheese milk fat AVE frequency distribution-QT (2004)[2]

[2] Data presented in the graph are obtained from USITC HTS Schedule and Interactive Trade Dataweb.

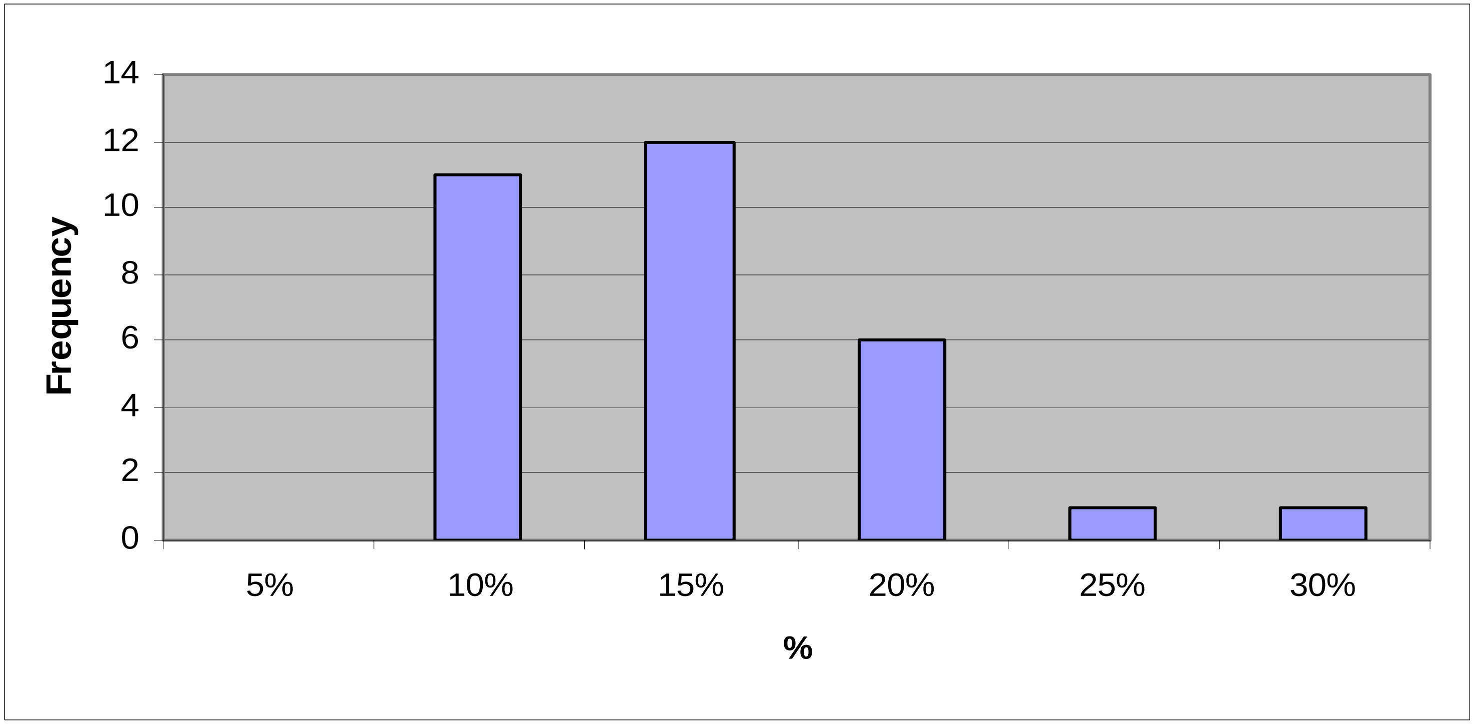

Figure 3. Cheese protein AVE frequency distribution-OQ (2004)[3]

[3] Data presented in the graph are obtained from USITC HTS Schedule and Interactive Trade Dataweb.

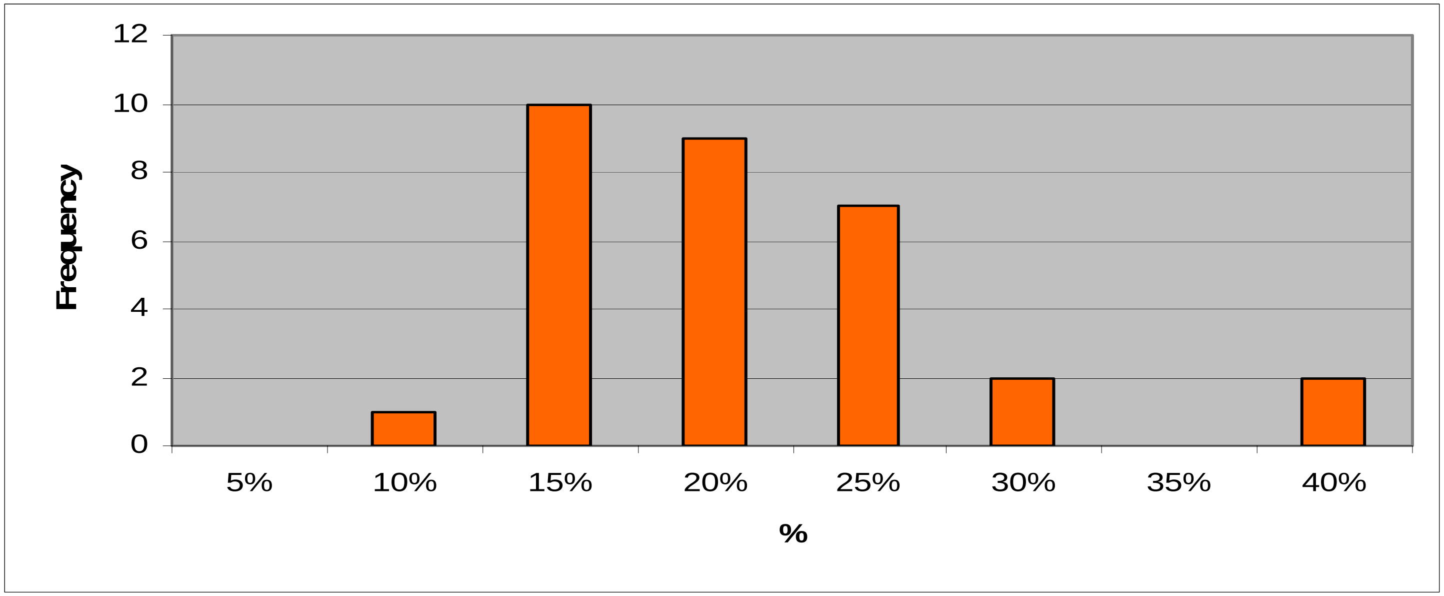

Figure 4. Cheese milk fat AVE frequency distribution-OQ (2004)[4]

[4] Data presented in the graph are obtained from USITC HTS Schedule and Interactive Trade Dataweb.

Table 1. Cheese protein AVE characteristics (2004)[5]

Cheese Protein AVE Characteristics-**QT**				Cheese Protein AVE Characteristics-**OQ**			
Frequency Distribution		*Descriptive Statistics*		Frequency Distribution		*Descriptive Statistics*	
Bin	*Frequency*			*Bin*	*Frequency*		
1%	0	Mean	5%	5%	0	Mean	14%
2%	0	Standard Error	0.002	10%	11	Standard Error	0.01
3%	2	Median	4%	15%	12	Median	13%
4%	11	Mode	4%	20%	6	Mode	na
5%	8	Standard Deviation	0.014	25%	1	Standard Deviation	0.069
6%	4	Sample Variance	0.000	30%	1	Sample Variance	0.005
7%	3	Kurtosis	1.05			Kurtosis	8.27
8%	1	Skewness	1.10			Skewness	2.47
9%	1	Range	0.06			Range	0.36
		Minimum	3%			Minimum	5%
		Maximum	9%			Maximum	42%
		Sum	141%			Sum	435%
		Count	30			Count	32

[5] Data presented in the table are obtained from USITC HTS Schedule and Interactive Trade Dataweb.

Table 2. Cheese milk fat AVE characteristics (2004)[6]

Cheese Milk Fat AVE Characteristics-**QT**				Cheese Milk Fat AVE Characteristics-**OQ**			
Frequency Distribution		*Descriptive Statistics*		Frequency Distribution		*Descriptive Statistics*	
Bin	*Frequency*			*Bin*	*Frequency*		
1%	0	Mean	7%	5%	0	Mean	20%
2%	0	Standard Error	0.003	10%	1	Standard Error	2%
3%	0	Median	6%	15%	10	Median	18%
4%	2	Mode	6%	20%	9	Mode	na
5%	0	Standard Deviation	0.019	25%	7	Standard Deviation	0.10
6%	7	Sample Variance	0.000	30%	2	Sample Variance	0.01
7%	11	Kurtosis	0.68	35%	0	Kurtosis	9.33
8%	2	Skewness	0.98	40%	2	Skewness	2.64
9%	2	Range	0.08			Range	0.55
10%	4	Minimum	4%			Minimum	8%
11%	0	Maximum	11%			Maximum	63%
12%	2	Sum	206%			Sum	645%
		Count	30			Count	32

[6] Data presented in the table are obtained from USITC HTS Schedule and Interactive Trade Dataweb.

Table 3. Summary of all dairy product groups[7]

		World Price	Total AVE	Protein	Milk Fat	Protein	Milk Fat
		$/ton	*%*	*$/ton*	*$/ton*	*%*	*%*
Cheese	***QT***	4,926 (2,000-19,500)	17% (6-166%)	8,895 (3,747-33,621)	8,891 (3,744-33,621)	5% (3-9%)	7% (4-11%)
	OQ	5,831 (2,000-16,000)	39% (13-220)	10377 (3,534-27,586)	10,375 (3,534-27,586)	14% (5-42%)	20% (8-63%)
Milk Fat	***QT***	1,924 (1,762-2,077)	9% (6-10%)	NA NA	2,030 (1,762-2,373)	NA NA	9% (6-10%)
	OQ	2,535 (2,035-3,000)	58% (35-77%)	NA NA	2,982 (2,035-4,000)	NA NA	58% (35-77%)
Protein and Whey	***QT***	343 (307-378)	1.47 (0.09-2.85)	1,092 (818-1,366)	NA NA	51% (4-98%)	NA NA
	OQ	2,405 (1,408-3,401)	63% (43-82%)	9,473 (9,329-9,617)	NA NA	56% (42-70%)	NA NA
Dried Milk High Fat	***QT***	2,994 (927-10,630)	8% (1-18%)	6,362 (1,384-24,401)	6,362 (1,384-24,401)	3% (0-8%)	4% (1-8%)
	OQ	3,689 (1,194-11,067)	38% (15-61%)	7,152 (2,095-25,404)	7,152 (2,095-25,404)	12% (1-19%)	24% (14-55%)
Dried Milk Low Fat	***QT***	2,172 (941-3,667)	2% (1-4%)	16,274 (4,408-33,743)	NA NA	2% (0-3%)	NA NA
	OQ	4,043 (1,083-10,600)	31% (12-52%)	54,924 (8,947-233,329)	NA NA	29% (11-48%)	NA NA

[7]Data presented in the table are obtained from USITC HTS Schedule and Interactive Trade Dataweb.

References

Chandan, R. 1997. *Dairy-Based Ingredients.* Eagan Press Handbook Series.

U.S. Department of Agriculture. 2006. Economic Research Service. Briefing Rooms: WTO. available online at: http://www.ers.usda.gov/Briefing/WTO

U.S. International Trade Commission. 2005. *Harmonized Tariff Schedule of the United States.* Washington DC.

U.S. International Trade Commission Interactive Tariff and Trade DataWeb, available at: http://dataweb.usitc.gov/