Economic Data and Projections for Analysis of Dairy Trade on a Component Basis

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This data document contains information used to parameterize a model that simulates the effects of various scenarios of alternative U.S. dairy policy changes for trade with Australia (Alston et al). The data includes projected baseline values for prices, production and consumption of fat and solid-not-fat (snf) for each of four trading regions, for 2014. The projections are shown in Table 1.

Quantity data on production, consumption and trade of dairy products are available from the Food and Policy Research Institute (FAPRI) for the year 2003, and as projections for 2013, for Australia, the United States, and New Zealand. We extrapolate the FAPRI data by one year to 2014 by adding the average yearly change for the period 2010 to 2013 to the 2013 data point. These projections were used to deduce the corresponding quantities of fat and snf given information on the component content of the products projected.

Projections of dairy quantities are not available for most other countries of the world, but it is possible to derive quantities produced, consumed, and traded in aggregate by that part of the rest of the world that actively responds to world market prices. Below we label this aggregate as region R.

We use data from United Nations, Food and Agricultural Organization FAO (2004), and FAPRI (2004), along with several assumptions, to calculate the production and consumption of dairy products in region R. The FAO presents data for production,

consumption, and trade for raw milk and the four major dairy products. Region R is defined to include all of Central America and the Caribbean, South America, much of Asia, and about half of dairy production and consumption in Africa. In the data presented here, China, India, Pakistan and Japan are excluded from region R because of their lack of price responsiveness or lack of connection to world dairy markets. Most of Africa outside South Africa, and a number of small markets that account for only about 10 million metric tons of milk production are also excluded from region R as is Europe, including Russia. According to the FAO database, in 2003, region R then accounts for 100 million metric tons of raw milk production (almost 25 percent of total raw milk production in the world). The United States, Australia and New Zealand account for another 100 million tons in 2003 and the rest of world production is in region O and thus outside the market-driven part of world dairy trade.

Milk is about 4 percent fat and 9 percent snf in region R, and therefore region R produces about 4 million metric tons of fat and 9 million metric tons of snf. Converting to billion pounds of components yields production of 8.82 billion pounds of fat and 19.84 billion pounds of snf in 2003. No direct data is available on consumption in region R, however, we do have data showing that region R is a net importer. Net imports of fat in the form of butter, cheese, skim milk powder and whole milk powder are about 11 percent of production and net imports of snf are about 13 percent of production. Thus net imports are 0.97 billion pounds of fat and 2.58 billion pounds of snf and consumption is about 9.79 billion pounds of fat and 22.42 billion pounds of snf in 2003.

Data for production, consumption and net exports for 2014 in Australia, the United States and New Zealand are based on the FAPRI projections. For region R, production for 2014

is found by applying the projected growth to 2014 in the region R countries that are reported by FAPRI to the 100 million tons of milk produced in 2003 (after weighing each individual region R country's projected growth by its 2003 production). Based on these data and methods, region R will produce about 138 million tons of milk in 2014. Applying the component shares for fat and snf and converting to pounds, regional R fat production will be 12,187 million pounds, and snf production will be 27,421 million pounds (Table 1). Recall that about 11 percent of fat production and 13 percent of snf production in R are imported. FAPRI projected that fat and snf imports in major countries comprising R will increase slightly to 2014. This increase is equivalent to an increase in one percent in net imports of fat in the form of butter, cheese, skim milk powder and whole milk powder so that fat imports in 2014 amount to 12 percent of production. Net imports of snf are also projected to increase by one percent in 2014 and total about 14 percent of production. Adding these quantities to domestic production allows us to project consumption of fat and snf in region R.

Production, consumption and net export data based on these sources are displayed in the rows of Table 1 labeled "without WTO."

Differences between prices for the milk components in the United States and other markets reflect trade barriers and transport costs. Price levels are much less important in the model than the differences because freer trade unleashes trade in quantities that cause prices to converge. The magnitude of the initial baseline price differences determines the amount of trade required to cause equalization in component prices. Baseline component prices under the "without WTO" scenarios are based on prices of traded dairy products adjusted for component shares in those products. We

started with the FAPRI projections for non-fat dry milk. U.S. prices are projected to remain low, approximately at the minimum of the U.S. price support, throughout the period. This is at or below the projected world price of a similar product and we expect prices to be equal for an equivalent product given lack of an effective trade barrier from the United States to Australia or New Zealand. Non-fat dry milk is 99 percent snf and so the prices are approximately equal. We therefore set prices for snf equal to $0.84 cents per pound, which is consistent with the FAPRI projection for the U.S. price in 2014.

For the price of the fat component the price projection situation is more complex. Butter is approximately 80 percent milk fat and we attribute the value of butter to the component price of milk fat. The FAPRI price projection for international butter prices is approximately $1.18 (Northern Europe). We adjust this for transport cost to the United States market and use a price of $1.29 for the equivalent border price of milk fat facing the United States. The U.S. price has been unusually high in recent years and FAPRI projects the high butter price in the United States to continue based on the current price support and marketing order policy and implementation parameters. The FAPRI projection is for a milk-fat equivalent price of about $1.75 per pound. Our assessment is that this price is not consistent with domestic U.S. market trends and we expect a price equivalent for milk fat of $1.59 per pound. Therefore the price gap in our baseline is $0.30 per pound. For milk fat we set the region R price equal to the milk point between the Australian export price and the U.S. price. This reflects considerable imports but remaining trade barriers.

Table 1 also shows rows for projections to 2014 under the assumption that a moderate WTO agreement is achieved under the Doha Development Agenda negotiations

and that the agreement is implemented by 2014. In order to devise the projections for the baseline under the "with WTO" scenarios we used the FAPRI/CARD analysis reported in Babcock et al. (2002) and Babcock et al. (2003). The Doha WTO case envisions effects on markets equivalent to elimination of dairy export subsidies, moderate reform of domestic subsidy, and 50 percent increases in market access by tariff cuts and expansion of TRQs. The "with WTO" baseline anticipates slightly lower U.S. internal prices as a reflection of expanded import quantities (under lower U.S. tariffs and TRQ expansion in the United States). More importantly, the "with WTO" baseline includes an increase in world market prices reflecting a general opening of major import markets and elimination of export subsidies (mainly in countries such as Japan, Korea and the European Union that are not currently open to market-driven trade and excluded from our explicit model). The quantities for production, consumption and trade for the four regions included in our model under the "with WTO" baseline are consistent with the underlying demand and supply elasticities used in our model and with the projections in the FAPRI/CARD analysis. We emphasize that the most important consequence of the "with WTO" baseline is the much smaller differential between the U.S. internal price and the implied baseline world price of fat.

Table 1: *2014 Production and Consumption Projections*

		Trading Region			
		Australia (A)	United States (U)	New Zealand (Z)	Other Markets (R)
Milk fat			(million lbs)		
Production	without WTO	1,282	7,382	1,643	12,187
	with WTO	1,336	7,365	1,712	12,553
Consumption	without WTO	727	7,485	213	13,528
	with WTO	700	7,494	205	13,314
Net Exports	without WTO	555	-103	1,430	-1,341
	with WTO	636	-129	1,507	-761
Milk snf			(million lbs)		
Production	without WTO	2,745	16,609	3,518	27,421
	with WTO	2,860	16,571	3,665	28,244
Consumption	without WTO	1,524	16,379	1,285	31,534
	with WTO	1,497	16,388	1,263	31,298
Net Exports	without WTO	1,221	230	2,233	-4,113
	with WTO	1,363	183	2,402	-3,054
Prices			($/lb)		
Milk fat	without WTO	1.290	1.590	1.290	1.440
	with WTO	1.540	1.580	1.540	1.560
Milk snf	without WTO	.840	.840	.840	.840
	with WTO	.840	.840	.840	.840

Note: The without WTO rows reflect the baseline under current international policies. The with WTO rows envision moderate trade reform equivalent to elimination of export subsidies, moderate reform of domestic subsidy and 50 percent increases in market access by tariff cuts and expansion of TRQs. Projections of milk component production, consumption and prices in 2014 without a Doha WTO agreement are based on the FAPRI 2004 baseline. Projections of production and consumption of milk components in the "with WTO" scenarios result from our projected changes in component prices (relative to the "without WTO"), along with the component supply and demand elasticities. See Alston et al. for details.

List of References and Sources

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