

What Happens If There Is Progress On Multilateral Dairy Trade Negotiations???

A Post Cancun WTO Perspective on the Impacts of Developed Economy Domestic and Trade Policies on Developing Countries

Tom Cox and Yong Zhu

Department of Agricultural and Applied Economics, University of Wisconsin-Madison,
20 Taylor Hall, 427 Lorch St., Madison WI 53706
Email: cox@aae.wisc.edu

■ Take Home Points:

- The world dairy sector is heavily distorted by domestic and trade policies. The price support, border protection and surplus disposal policies in key OECD countries benefit their dairy producers by keeping domestic dairy prices above world market levels.
- Due to high domestic dairy prices, protectionist policies in OECD countries tend to generate surpluses of milk and dairy products. These surpluses are exported with considerable subsidy, depressing world market prices, inhibiting the potential for domestic milk and dairy production in developing countries.
- However, low-cost subsidized exports are often used to support domestic dairy processing through “reconstitution” of imported dairy ingredients, to the benefit of consumers (and processors) in developing countries, but at the expense of their milk producers.
- With the removal of all domestic support and trade policy distortions, world dairy trade would increase 43 percent by 2005.
 - a. In developed (OECD) countries, consumer (\$US +17.5 billion, +6.8%) and taxpayer (\$US +1.2 billion) gains would dominate producer welfare losses (\$US -14.5 billion, -25%), generating \$US +4.2 billion (+1.3%) in net welfare gains.
 - b. Conversely in developing economies, producer welfare gains (\$US +2.8 billion, +4.1%) fail to offset consumer (\$US -2 billion, -0.5%) and treasury losses (\$US -1.8 billion), with net welfare losses of \$US -1 billion (-0.2%).

- c. Aggregate world consumer surplus gains (\$US +15.4 billion, +2.5%) dominate aggregate producer surplus (\$US -11.7 billion, -9.3%) and treasury losses (\$US -611 million) to yield world net welfare gains of \$US +3.1 billion (+0.4%) by 2005.

■ Introduction

Provisions in the GATT/Uruguay Round Agreement on Agriculture (URAA) made import protection more transparent, and included disciplines over the use of export subsidies, greater market access through tariffication and minimum access requirements, and controls over many trade-distorting domestic policies used to support farm prices and incomes. It also launched a new framework for more extensive liberalization in the future.

Even with the full implementation of the URAA provisions by the developed countries, it is estimated that almost 60 percent of world dairy trade will still be exported with subsidies (US Dairy Export Council). Market access provisions allow for tariff-rate quotas (TRQs) with prohibitively high rates of over-quota duty (as high as 300 percent *ad valorem*) (Griffin). Also, special safeguards, low minimum access requirements, and small tariff reduction requirements for individual commodities, undermine the market access provisions of the URAA (Coleman). Thus even after full implementation, world dairy markets continue to be characterized by highly subsidized exports, limited market access, and heavy government intervention.¹ As a result, there remains considerable scope for further removal of trade and domestic support policy distortions in the next WTO Round.

The Cancun WTO negotiations highlighted these concerns from a developing country perspective where Brazil, India and China (as well as many other countries) confronted the developed countries with the charge that agricultural domestic support and trade policies by the developed countries substantively disadvantage the economic growth potential of the developing nations. While sugar, cotton, and feed grains are likely the most offensive agricultural sectors from this perspective, the dairy sectors of several developed economies (the EU, Japan, Canada and the US, in particular) are characterized by high levels of domestic support and border protection from current GATT/WTO trade policies. This raises the question as to the empirical evidence supporting the

¹ Cox et al. indicate that extending/expanding the GATT dairy commitments for another 5 years (from 2000 to 2005) would result in a world dairy sector that moved halfway to the impacts of “free trade” in dairy by 2005. Conversely, these results suggest that over 10 years (1995-2005), the GATT liberalizations would have moved the world dairy sector halfway towards free trade, a remarkable achievement.

claims that substantive liberalization in the world dairy sector domestic support and trade policies would generate gains to the developing economies.

The implications of world dairy domestic support and trade liberalization proposals on developed versus developing countries are not well researched. This study attempts to address these questions by simulating various dairy policy liberalization scenarios using the UW-Madison World Dairy Model (UW-WDM: see, Zhu et al., and Cox et al. for further details on the UW-WDM). These simulations provide quantitative measures of the impacts of eliminating current domestic support and trade policies on the heavily protected, developed economies and the developing economies, in terms of producer, consumer and taxpayer economic welfare and world trade.

■ World Dairy Deregulation Scenarios

In order to quantitatively assess the impacts of further domestic support and trade liberalization on the world dairy sector, the UW-Madison World Dairy model² is employed using the year 2000 as the BASE or reference point. The model is solved recursively (one year at a time, with the previous year solution as the starting point for the following year, with regional GDP and population (World Bank data) driven commodity demands and 5 year moving average supply growth rates (from FAO data) from the 2000 to 2005. From this BASE model, the following policy simulations are performed:

Full Dairy Sector (FULL) Liberalization:

All trade and domestic support policies are removed starting in 2001 through 2005. Full world dairy sector liberalization combines two others scenarios: the free dairy trade (FDT) scenario and the no domestic supports (NDS) scenario explained below. The 2005 simulation results, summarized as changes from the BASE scenario for 2005 in Table 1, provide quantitative estimates of the 2005 impacts of full dairy sector liberalization.

² This model is an updated, annualized version of the Cox *et al* and Zhu *et al* model previously used to assess the impacts of full deregulation and extending the GATT dairy modalities another 5 years (from 2000 to 2005). This spatial equilibrium model incorporates 24 regions, 9 dairy products, and 4 milk components (fat, casein, whey protein and lactose) using FAO and OECD databases. All regions and markets are linked via transportation costs and trade policy distortions (export subsidies and/or import tariff rate quotas). With and over quota tariffs, import quotas, and export subsidies are modeled using 2000 GATT/WTO commitments. The interested reader is directed to the citation for more details on this model.

Free Dairy Trade (FDT):

The second scenario (free dairy trade) considers the elimination of all trade distortions starting in 2001 through 2005. All export subsidies and import TRQs (quotas, within and over quota tariffs) are eliminated. Domestic support policies are maintained as in the BASE scenario. This should increase world trade, increase world market prices, and put considerable strain on several domestic support policies (intervention price program costs, in particular) in the protected dairy sectors. The 2005 simulation results, summarized as changes from the BASE scenario for 2005 in Table 2, provide quantitative estimates of the 2005 impacts of eliminating dairy trade policies.

No Domestic Support (NDS):

The third scenario (no domestic support) eliminates all domestic supports starting in 2001 through 2005. These measures include: intervention/support prices for the EU (SMP), Canada (butter and SMP), the US (butter, SMP, cheese) as well as other countries; elimination of classified pricing in the US and Canada (modeled as a price wedge/premium for residual (fluid, soft and frozen) products over manufactured products); and, production/marketing quotas in the EU and Canada.

As the BASE year (2000) saw large US costs via its intervention/price support program (about \$US ~500M in SMP purchases), domestic deregulation could have strong impacts on the US milk prices. Similarly, given the large levels of milk production quota rents in the EU and Canada (35% and 40% of the domestic milk prices, respectively), elimination of these policies sharply increases these countries competitiveness (no milk production quota constraints at sharply reduced milk production costs) and hence, sharply increase their milk production even while milk prices and revenues drop. Note, this will lower prices in the protected dairy economies, hence lower world dairy prices, but not necessarily provide additional access to competitive exports – unless over-quota tariffs become less prohibitive at these lower protected market prices. Additionally, increased milk production from the EU and Canada will need to find a home, potentially beyond their domestic consumption, will likely displace BASE level imports by these protected dairy sectors, and reduce potential export market growth opportunities for competitive exporters.

The 2005 simulation results, summarized as changes from the BASE scenario for 2005 in Table 3, provide quantitative estimates on the 2005 impacts of eliminating domestic dairy support policies.

■ Simulation Results

For convenience in presenting these results, regional impacts are aggregated into 5 sub-groups:

- **a) Developed Economy, Heavily Protected Dairy:** EU-15, Japan, Other West Europe;
- **b) Developed Economy, Less Heavily Protected Dairy:** US and Canada;
- **c) Developed Economy, Competitive Exporters:** Oceania (Australia and New Zealand);
- **d) Less Developed Economies, Potentially Competitive Exporters:** India, Other East Europe, South America-South (Argentina, Uruguay and Chile), China & Mongolia, Poland, South Africa Republic;
- **e) Less Developed Economies, Net Importers:** Former Soviet Union, South America-North (Brazil and Other South America), Other South Asia, Middle East, Rest of World, Mexico, North Africa, Central America & Caribbean, South/North Korea, South East Asia;

Full World Dairy Sector Liberalization.

a) Developed Economy, Heavily Protected Dairy Sectors: EU and Japan. Developed economies with dairy sectors characterized by strong domestic and trade policy induced protection (e.g., EU, US, Canada, Japan) will experience large impacts under this full trade and domestic policy deregulation scenario. In the absence of milk production quota rents, EU-15 milk prices fall -23% by 2005. Elimination of the implied high quota rents generates relatively low marginal cost for milk production and a moderately competitive EU milk sector where milk production expands 8% at prices roughly 20% less than BASE levels by 2005. Note that this expansion implies a potentially radical restructuring of the EU milk sector toward more efficient farms. Dairy exports increase +16% while imports fall -50% by 2005, suggesting that lower domestic prices (intervention price floors are eliminated) and larger domestic milk availability at sharply lower prices (due to quota elimination) both increases the EU export competitiveness and hinders exports to the EU. Competitive exporters will likely not be happy. Producer surplus takes a massive hit -27% (\$US -8.1B) by 2005, and the social/political costs due to the implied radical restructuring of the milk production sector are likely to be non-trivial. Consumers are big gainers from these deregulations (due to falling prices) with welfare gains of +6.6 % (\$US +8.1B). Total government costs fall slightly (\$US -114M: no import tariffs versus no domestic support and export subsidy costs, a net savings). Consumer and treasury gains offset producer losses, yielding net welfare gains of +0.7% (\$US +1.1B).

Japan's milk production falls sharply (-23%), as do milk prices (-54%) and producer surplus (-61% (\$US 3.2B) by 2005. These impacts are similar but slightly less than under the Free Dairy Trade scenario suggesting that the additional domestic support deregulation under this complete dairy sector liberalization scenario has little additional impact. This indicates that Japan likely obtains most of its domestic dairy market protections from its current trade policies, not its domestic subsidies. Imports (+134%) and consumer surplus (+19%, \$US 4B) increase sharply, roughly equal to the Free Dairy Trade results. Net government revenues fall \$US -21M (elimination of tariff revenues versus smaller domestic policy costs), but consumer gains offset producer and treasury losses to generate net welfare gains (+2.8%, \$US +1.1B).

b) Developed Economy, Less Heavily Protected Dairy Sectors: US and Canada. While both the US and Canada dairy sectors employ trade and domestic support protection, both are found to enjoy substantive protection due to trade policies (subsidized exports and limited import access due to import quotas and higher over-quota tariffs) and domestic subsidy policies. Canada milk prices (-44%) and production (-4%) fall more sharply than under the No Domestic Supports scenario (-24% and +3.2%, respectively), indicating the magnitude of Canada's additional exposure to removing its trade policy based border protections beyond domestic support liberalization. Dairy exports fall -6% while imports increase +215% under Full Liberalization (versus +80% and -5%, respectively, under the No Domestic Supports scenario), again indicating that Canada enjoys considerable protection from trade policies over and above its domestic subsidies. Producer surplus falls sharply (-50%, \$US 1.4B) by 2005 but is offset by large consumer welfare gains (+14%, \$US +1.6B). Total government revenues fall slightly (\$US -12M as the loss of tariff revenues basically equals the gains from elimination of export subsidies, the intervention price program and production/marketing subsidies). Consumer welfare gains offset producer and treasury losses, yielding a small net welfare gain of +2.7% (\$US +385M).

By 2005, US milk production (-7%), prices (-12%) and producer surplus (-17%, \$US -2.7B) fall more than under the No Domestic Supports results (milk production (-2.1%), milk price (-3.8%) and producer surplus (-5.5%, \$US 857\$), or Free Dairy Trade (which generated modest gains to the US). These relative impacts indicate a substantive spillover from Canadian domestic support (in particular, milk quota) removal when accompanied by removal of trade barriers (hence, allowing more Canadian products into the US market). Reinforcing this observation, US exports fall -61% (-331K MT) while imports more than double (+130%, +510K MT) by 2005. US consumer (+4%, \$US +3.4B) gains and reduced government costs (\$US 147M: loss of import tariff revenues is less than gains from eliminating intervention price and export subsidy costs)

dominate producer losses (\$US -2.7B) to generate modest net welfare gains of +0.7% (\$US +729M) by 2005.

c) *Developed Economy, Competitive Exporters: Oceania (Australia and New Zealand).* As expected, Oceania's dairy producers and processors gain under this scenario, despite giving up large import quota rents (especially New Zealand) associated with current preferential (quota) access to many of the protected developed economy markets. Milk production (+6%), prices (+22%), producer surplus (+42%, \$US +1.1B), and exports (+21%, 429K MT) increase sharply by 2005 as these low cost exporters are able to more fully enjoy their comparative advantage in undistorted world dairy markets. These gains are less than under Free Dairy Trade (milk production (+8.6%), prices (+36%), producer surplus (+57%, \$US +1.2B), and exports (+21%, 425K MT)) due to the substantive production/trade spillovers from the EU and Canada induced by elimination of domestic supports and the expansion of milk supplies in the absence of production quotas. Consumer losses (-1%, \$US -133M) pale in comparison to elimination of treasury costs (\$US 72M) and substantive producer gains, and generate net total welfare gains (+8.8%, \$US +1.0B) by 2005.

d) *Less Developed Economies, Potentially Competitive Exporters.* As shown in Table 1, developing country exporters enjoy the same benefits from full dairy sector liberalization as Oceania, but at slightly lower levels of gain. Increased import access to the developed economy markets and elimination of export subsidies generate aggregate increases in milk production (+2.6%), prices (+1% to +24%), and producer surplus (\$US +2.5B, +9.3%), suggesting that there are substantive import substitution and exporting opportunities available to these countries (in particular South America/South, Other East Europe, South Africa and Poland). Aggregate consumer surplus for these countries falls \$US -2.6B (-1.9%) due to elimination of subsidized imports and higher domestic prices. All countries with the exception of Other East Europe experience diminished consumer surplus. Together with the loss of tariff revenues (\$US -114M), aggregate consumer/treasury losses slightly dominate producer gains generating modest net welfare losses (\$US -173M, -0.1%) by 2005.

e) *Less Developed Economies, Net Importers.* Consumers in primarily net importing dairy regions will gain or lose depending on the tradeoffs in increased world/import prices (negative impact) and increased dairy trade (positive impact) due to elimination of import tariffs into these regions. Hence, the loss of previously subsidized exports can be offset by potential gains due to broadly expanding trade depending on the size, composition, and direction of import price increases. While there may be some opportunity to expand domestic production to substitute for these previously subsidized imports, the cost competitiveness of extant and scale efficient exporters may make this less

viable. The simulation results suggest this to be the case for many of these countries/regions (South America/North, Mexico, Central America/Caribbean, S/N Korea) who experience negative impacts on milk production, prices, and producer surplus. These producer surplus losses are offset by gains in consumer surplus, most notably South America/North (dominated by Brazil), where dismantling MERCOSUR's common external import tariffs generates lower prices, hence large consumer gains (\$US +1.7B, +3.3%). However, several regions have substantive production, price and producer surplus gains, most notably FSU (producer surplus: \$US +2.6B, +23%). Treasuries in all countries/regions suffer due to loss of import tariff revenues. Aggregate treasury revenue losses (\$US -1.7B, -99%) dominate modest aggregate producer (\$US +298M, +0.7%) and consumer gains (\$US +521M, +0.2%) to generate net welfare losses (\$US -861M, -0.3%) by 2005.

Summary: Impacts of FULL Dairy Sector Liberalization on Aggregate World Dairy Sector. Aggregate world milk production increases +1.1% by 2005, as does production in developed and developing countries. Average world milk prices decrease overall (-7.8%) and in the developed countries (-20.7%), while increasing in the developing countries (+2.7%). World dairy trade increases +43% (+2,103K MT) by 2005 as the impacts of domestic deregulation (mainly quota removal) reinforce (rather than reduce, as suggested by the domestic deregulation results alone) the impacts from just the elimination of trade barriers (+34%, 1,667K MT under the Free Dairy Trade scenario). World producer surplus falls sharply in the developed countries (\$US -14.5B, -25%) while increasing in the developing countries (\$US +2.8 M, +4.1%). Developed country losses are due primarily to the loss of quota value in the EU and Canada, as well as in the other developed country dairy sectors with substantive domestic supports (Japan and the US).

Elimination of domestic and export subsidies (costs) dominate elimination of tariff revenues in the developed countries, generating a net treasury savings (\$US +1.2B) by 2005. In developing countries, domestic supports are generally much smaller and their elimination fails to offset the loss of tariff revenues, generating net increases in treasury costs (\$US -1.8B). Aggregate world treasury revenues fall nearly \$US -611M by 2005 (loss of tariff revenues dominates elimination of export subsidy and domestic program costs).

Consumer welfare increases \$US +17.5B (+6.8%) in the developed countries, while falling \$US -2B (-0.5%) in the developing regions. Consumer and taxpayers gains in the developed countries dominate developed country producer welfare losses, generating \$US +4.2B (+1.3%) in net welfare gains by 2005. Just the opposite occurs in the developing regions, where producer welfare gains fail to offset consumer and treasury losses, with net welfare losses of \$US -1B (-0.2%).

Given the magnitude of the developed versus developing region markets, aggregate world consumer surplus gains (\$US +15.4B, 2.5%) dominate aggregate producer surplus (\$US -11.7B, -9.3%) and treasury losses (\$US -611M) to yield world net welfare gains of \$US +3.1B (+0.4%) by 2005.

Free Dairy Trade Scenario.

This scenario models the immediate (2001) elimination of export subsidies and all TRQ barriers (tariffs and quotas). Note however, that in contrast to the previous scenario, substantive domestic policy support remains and is exacerbated by this type of policy as intervention prices and/or production, marketing and/or consumption subsidies would likely need to increase in order to meet the objectives of the domestic policies. This will raise WTO Aggregate Measures of Support (AMS) issues, and suggests that aggressive partial liberalizations such as this, still need to be broadly focused to include domestic support liberalization. In a sense, complete elimination of trade barriers without domestic support liberalization may represent a somewhat inconsistent, and potentially welfare debilitating, partial liberalization scenario illustrating the fiscally unsustainable nature of domestic programs under free trade.

a) Developed Economy, Heavily Protected Dairy Sectors: EU and Japan.

Dairy producers in developed economies with dairy sectors that enjoy strong trade policy induced border protection are expected to suffer substantive losses as their domestic dairy consumption is open to world market forces. The EU and Other West Europe experience decreased milk prices (-16.8% and -19.2%, respectively), decreased exports (-598K MT) increased imports (+532K MT), and declines in producer surplus (\$US -6.1B and \$US 302M, respectively) by 2005. Exports fall sharply without export subsidies (-37%), while imports increase 5 fold (+471%) in the absence of trade barriers. Consumer surplus increases (\$US +3.7B and \$US + 421M, respectively) due to lower prices, cheaper imports, and increased consumption. Elimination of export subsidy costs fail to offset the loss of tariff revenues, yielding net treasury losses (\$US -114M and \$US -574M, respectively). Producer and treasury losses dominate consumer gains, yielding net welfare losses of \$US 3B in the EU-15 by 2005. In contrast, Other West Europe generates modest net welfare gains (\$US 140M) in 2005.

Japan's milk production falls sharply (-22%), as do milk prices (-52%) and producer surplus (\$US 3B, -59%) by 2005. These results indicate that Japan's dairy trade policies generate sizeable market distortions, even in the presence of domestic supports. With the elimination of import tariffs, dairy imports more than double (+126%), generating lower price/increased consumption induced consumer surplus gains (\$US +4B, +20%) by 2005. Consumer gains dominate producer and treasury losses, leading to an increase in net total welfare of \$US +822M (+3.2%) by 2005.

b) Developed Economy, Less Heavily Protected Dairy: US and Canada. The US and Canada, gain or lose depending on the degree of their trade policy based border protection and non-subsidized export potential. Canada gives up higher over quota tariffs and less export subsidies than the US under this scenario. The net effect of these countervailing impacts is an empirical issue. Both the US and Canada have considerably less export subsidies compared to the EU, and somewhat lower, though still substantive border protections.

The tradeoff of improved market access for exports versus imports is suggested by the differential increase in exports (+22%, 133K MT) versus imports (+26%, 116K MT) by 2005. Note that imports originally increase sharply (+35%, 2001) and gradually erode over time as adjustments to this large policy shock occur. Impacts on milk production are modest (+0% in US, -1.6% in Canada) as are milk price impacts in the US (+0%), but not Canada (-37%) by 2005. This suggests that Canada's dairy sector is likely more trade policy protected than the US dairy sector, a view widely held based on the level over quota tariffs and import quotas. By 2005 US producer welfare roughly breaks even (\$US 4 M) while Canada producers suffer large welfare losses (\$US 1.2B).

US consumer gains erode and roughly breakeven by 2005 (\$US -13M) while Canadian consumers show steady gains under lower prices and increased imports to net large increases in welfare (\$US +1.1B) by 2005. Domestic and trade policy cost remain roughly unchanged in both the US and Canada. Given the small changes in US producer, consumer and treasury impacts, US total welfare erodes over time from \$US +165M (2001) to a modest \$US -21M loss by 2005. Canada has similar net impacts, where large producer losses offset large consumer gains. It is interesting to note that N. America generates net welfare gains in 2001 (\$US +179M) that erode over time into small losses (\$US -98M) by 2005.

c) Developed Economy, Competitive Exporters: Oceania (Australia and New Zealand). Oceania's dairy producers and processors have strong gains under this scenario, as expected, due to free access to the higher priced, protected developed markets. Oceania's milk production (+8.6%) and prices increase (+36%) by 2005, generating strong gains in producer welfare (\$US +1.5B, +57%). While strong initial export increases (+691K MT in 2001) erode over time, export growth remains strong by 2005 (+491K MT). Due to increased dairy product prices, consumer welfare declines \$US -520M (-5.8%) by 2005. The dominance of Oceania's dairy export sector and producer gains relative to consumer losses generates substantive net welfare gains of \$US +1.1B (+9.5%) by 2005.

d) Less Developed Economies, Potentially Competitive Exporters. As shown in Table 2, developing country exporters again enjoy the same benefits from

free dairy trade as Oceania but, as before, at lower levels. Increased import access to the developed economy markets and elimination of export subsidies generate aggregate increases in milk production (+3%), prices (+0% to +26%), and producer surplus (\$US +2.8B, +11%), suggesting that there are substantive import substitution and exporting opportunities available to these countries under dairy trade liberalization. In particular, results indicate that South America/South, Other East Europe, Poland, and South Africa are likely to enjoy these prospects. Aggregate consumer surplus falls \$US -2.9B (-2%) with the elimination of subsidized imports and higher domestic prices. All countries in this grouping (except China/Mongolia) experience diminished consumer surplus. Together with the loss of tariff revenues (\$US -114M), aggregate consumer/treasury losses slightly dominate producer gains generating modest net welfare losses (\$US -179M, -0.1%) by 2005.

e) Less Developed Economies, Net Importers. As with the full liberalization results, consumers in primarily net importing dairy regions may gain or lose depending on the tradeoffs in increased world/import prices (negative impact on consumers) and increased domestic production and trade (positive impact on producers) due to elimination of import tariffs into these regions. Hence, the loss of previously subsidized exports can be offset by potential gains due to broadly expanding trade depending on the size, composition, and direction of import price increases. As these regions are primarily net importers, regional conditions favorable to dairy production and processing are not likely to generate much domestic production expansion to substitute for these previously subsidized imports (at least over the 3-5 year period simulated here).

The simulation results support this hypothesis as many of these regions (S/N Korea, South America/North, Central America/Caribbean, and Mexico) experience negative impacts on milk production, prices, and producer surplus that are offset by gains in consumer surplus (most notably South America/South (\$US +1.7B, +3.3%) in 2005). However, several regions have substantive producer surplus gains at the expense of consumer surplus, most notably the FSU (\$US +3.6B producer surplus versus \$US -3.5B consumer surplus). Treasuries in all countries/regions suffer due to loss of import tariff revenues (\$US -1.7B). Aggregate treasury revenue and consumer surplus losses dominate the strong producer gains to generate modest net welfare losses (\$US -691M, -0.2%) by 2005.

SUMMARY: Impacts of FREE DAIRY TRADE on the Aggregate World Dairy Sector. Under this trade liberalization proposal, world milk production increases +0.8% by 2005 (versus +1.1% under Full Dairy Sector Liberalization), while average world milk prices decrease -3.7% (versus -7.8%). World dairy trade increases +34% by 2005 (versus +37% under Full Dairy Sector Liberalization). Developing country producers gain (\$US +4.3B) at the expense of developed country producers (\$US -9.1B) and developing country consumers (\$US -3.4B). Developed country consumers enjoy large gains (\$US +8.7B). World net treasury revenues fall due to elimination of tariff revenues, and these losses are larger in developing countries (\$US -1.8B) than in developed countries (\$US -607M).

World producer surplus falls \$US -4.8B as developed economy losses are not offset by gains to the competitive exporters and developing country producers. These losses are not fully offset by aggregate world consumer gains (\$US +5.3B). Hence, net world welfare decrease \$US -1.9B (versus \$US +3B under Full Dairy Sector Liberalization), reflecting the well known economic principle that partial liberalizations often generate second best welfare outcomes compared to the status quo and the analytical benefits of full liberalization. This net welfare loss holds both for developed (\$US -1B) and developing (\$US -869M) countries.

- ▶ *These results indicate that a more balanced portfolio of liberalizations might generate stronger gains than a more narrowly focused liberalization such as this scenario. As well, these results provide a quantitative measure of the spillovers of current WTO trade policies distortions on world dairy markets for both developed and developing countries.*

No Domestic Dairy Support

a) Developed Economy, Heavily Protected Dairy Sectors: EU and Japan. Dairy producers in developed economies with strong domestic policy induced protection will experience large impacts under this scenario. In the absence of milk production quota rents, W. Europe milk prices fall almost 25% by 2005. Given that removal of high quota rents implies a low marginal cost of milk production, EU milk quota elimination yields a moderately competitive EU-15 milk sector and production expands 6% by 2005. Note that expansion by EU producers at prices 20%-25% less than BASE levels implies a potentially radical restructuring of the EU milk sector toward more efficient farms. This is unlikely to be politically/socially feasible (at least in the short run).

EU dairy exports fall -25% (+446K MT) while imports are almost eliminated (-78%, -102K MT), suggesting that lower domestic prices (intervention price floors are eliminated) and larger domestic milk availability at sharply lower prices (due to quota elimination) will hinder exports to the EU. Competitive

(developed and developing country) exporters will not be happy. Producer surplus takes a massive -30% hit (\$US -9B) by 2005, offset by strong consumer welfare gains of +9.7% (\$US +11.9B). Total government costs fall \$US -1.1B (reduced domestic costs dominate reduced import tariff revenues), yielding substantive net welfare gains +2.7% (\$US +4B). This net welfare gain is much larger than the full dairy sector liberalization results (\$US +1.1B) suggesting that the EU enjoys considerable protection from its domestic dairy supports, which in turn, induce substantive distortions on the EU (and world, see below) dairy sector.

Japan's milk production falls slightly (-1.2%), as do milk prices (-2.7%) and producer surplus (-3.4%, \$US -176M) by 2005. Compared to the Free Dairy Trade scenario (producer surplus falls \$US -3B), these results suggest that Japan's dairy sector is more protected by trade than domestic support policies. Imports increase +2% in the face of less domestic production due to the removal of domestic supports. Consumer surplus (due to higher prices), however, falls slightly -0.4% (\$US -115M) and net total welfare decreases -1.1% (\$US -294M) by 2005.

b) Developed Economy, Less Heavily Protected Dairy Sectors: US and Canada. While both the US and Canada dairy sectors enjoy domestic support policies, Canada probably does more so due to its milk production quotas. Hence, while both will suffer from lower prices due to the removal of the intervention/price support programs, Canada should be harder hit than the US due to elimination of Canadian milk quotas.

In the absence of milk production quota rents, Canada milk prices fall -24%. Given high quota rents, this implies a moderately competitive Canada marginal cost price of milk. Not surprisingly, milk production expands 3.2% by 2005. Note that expansion by Canadian milk producers at prices ~23% less than BASE level (due to quota elimination) implies a potentially radical restructuring of the Canadian milk sector towards the type of those farms paying these observed high quota prices in Canada.

As with the EU, dairy exports increase +80% (+54K MT) while imports fall -5% (-3K MT) by 2005, suggesting that lower domestic commodity prices (removal of intervention prices) and larger domestic milk availability at sharply lower milk prices makes Canada both a more competitive exporter (there is no additional market access under this scenario) and a slightly less attractive export market. Competitive exporters will not be happy.

Producer surplus decreases -27% (-\$US 756M) by 2005, but is offset by consumer welfare gains of +12% (\$US +893M). Total government revenues/costs fall slightly (reduced costs of intervention price program and production/marketing subsidies), yielding a small net welfare gain of +1.8%

(\$US +254M) by 2005. These results suggest that Canada's domestic dairy policies induce lower net welfare losses than trade and domestic policy distortions combined (Full Dairy Sector Liberalization: \$US +385M, +2.7%). However, as with the EU, the implied potentially radical restructuring of the Canadian milk production sector is unlikely to be politically/socially viable (at least in the short run).

In contrast to Canada, where observed milk quota rents generate competitive marginal cost prices for milk (hence, radically lowering milk production costs under this scenario), the US bears the full brunt of its domestic policy deregulation. US milk production (-2.1%), milk price (-3.8%) and producer surplus (-5.5%, \$US -857M) fall by 2005. Compared to the Free Dairy Trade scenario (production 0%, price 0% and producer surplus \$US +4M (0%)), these results suggest that the US milk producers are more protected by domestic supports rather than trade policies. US dairy exports fall -9.4% (-189K MT) as do imports (-55%, 32K MT), indicating that lower domestic commodity prices (due to removal of intervention price floors) make the US a slightly less attractive export destination. US consumer surplus increases +1.6% (\$US +1.3B). With reduced government costs due to domestic deregulation and substantive consumer gains to offset producer losses, US net total welfare increases +0.4% (\$US +445M) by 2005.

c) Developed Economy, Competitive Exporters: Oceania (Australia and New Zealand). New Zealand gains but Australia loses under this scenario. In aggregate Oceania dairy producers and processors lose as the lifting of milk quota constraints expands milk production and exports in two key import markets, the EU and Canada. As well, lower prices in the protected economies due to removal of intervention/price supports, reduces the quota rents associated with current Oceania (New Zealand, in particular) preferential (quota) access to these markets. Not surprisingly, in this context, milk production (-1.5%), prices (-12.8%), producer surplus (-6.2%, \$US -168M), and exports (-3%, \$US -56M) fall by 2005. These producer losses slightly offset consumer gains (+2.9%, \$US +261M) and generate modest net total welfare gains of 0.8% (\$US +95M) by 2005.

d) Less Developed Economies, Potentially Competitive Exporters. As shown in Table 3, milk production, prices and producer surplus rise across most all of the developing country/regions, South America/South and South Africa in particular. Aggregate production (+0.6%) and producer surplus (\$US +571M, +2.1%) increase at the expense of consumers (\$US -626M, -0.5%). Reduced tariff revenues (\$US -37M, due to more import substitution from locally expanding production) and consumer losses (\$US -626M, -0.5%) slightly dominate producer gains to generate modest net welfare losses (\$US 92M, -0.1%).

e) Less Developed Economies, Net Importers. Impacts on net importing developing countries/regions are quite similar to those for potential developing country/region exporters, with the notable exception of the Former Soviet Union where consumer gains (\$US +119M) dominate producer losses (\$US -110M) to generate a breakeven net welfare impact. In aggregate, producer gains are quite modest (\$US +127M, +0.3%) and are dwarfed by consumer losses (\$US -489M, -0.2%) to yield net welfare losses of \$US -464M (-0.2%).

SUMMARY: Impacts of NO DOMESTIC DAIRY SUPPORT on the Aggregate World Dairy Sector.

Under this partial domestic policy liberalization proposal, world milk production increases +1.1% by 2005, a similar result to both the Full Dairy Sector Liberalization (+1.1%) and Free Dairy Trade (+0.8%) simulation results. Average world milk prices fall -6.3% versus -7.8% and -3.7%, under the Full Dairy Sector Liberalization and Free Dairy Trade scenarios, respectively. This suggests that the aggregate/world negative spillover impacts of domestic subsidies (dominated by developed countries) on developing countries are larger than the spillover impacts of current WTO dairy trade policies (Free Dairy Trade scenario). Perhaps the Cancun WTO sentiments with respect to the impacts of domestic support policies are correct with respect to the world dairy sector.

While aggregate producer surplus decreases \$US -10.2B, most of these losses occur in developed country/regions (\$US -10.9B), not developing country/regions (\$US +698M). Consumer impacts are just the opposite, where aggregate world consumer welfare increases \$US +13.2B, as the consumer gains from developed country/regions (\$US +14.3B) offset the losses to consumers in developing country/regions (\$US -1.1B).

Aggregate net welfare increases \$US +4B (+0.5%), mostly due to net welfare gains in developed countries/regions (\$US +4.5B) offsetting the losses in developing country regions (\$US -553M). In contrast, aggregate/world net welfare impacts increase less under Full Dairy Sector Liberalization (\$US +3.1B) and decrease under Free Dairy Trade (\$US -1.9B) scenarios. These results again suggests that, in aggregate, domestic policy distortions have larger negative aggregate/world net welfare impacts than current trade policy distortions or the combined impacts of domestic and trade policy distortions. These results, however, vary by the sub-aggregate groupings analyzed here.

These results provide a quantitative measure of the spillovers of extant domestic support policies (as modeled here), which tend to be dominated by developed economies, on the developing countries and the distortions to world dairy markets. The gains by developing country producers and developed country consumers dominate the losses to developed country producers and

developing country consumers. As well, aggregate world welfare gains (\$US +4B) are larger than under the Full Dairy Sector Liberalization scenario, indicating that domestic support policies are likely the major source of distortion in world dairy markets.

■ **Conclusions**

Given the complexity of the world dairy sector, the diverse roles of its major players (competitive and subsidized importers, subsidized versus competitive exporters, major producers and/or consumers. etc.) and the multifaceted domestic and trade policy distortions characterizing this sector, a commodity, policy, and regionally detailed simulation model was used to assess the impacts of potential liberalization scenarios on developed versus developing countries.

While the usual limitations of sectoral simulation studies should be kept in mind, these results provide a quantitative measure of economic and welfare impacts across regions, producers, consumers and government treasuries. These types of modeling results (despite their potential shortcomings) help to quantify the nature and magnitudes of the current myriad of domestic and trade policy distortions characterizing this sector.

In this context, results of this exercise confirm what most, standard economic policy analyses of these distortions suggest would happen to developed versus developing economies. That is, the numerous and sizeable distortions used by most developed economies to protect their domestic dairy sectors have potentially large spillover impacts on competitive exporters and/or developing countries. While liberalization can generally be expected to lessen these spillovers, hence provide some opportunities for growth in the domestic and potentially export oriented portions of the dairy sectors in developing countries, several caveats must be noted.

World Dairy Sector Growth: A Component Perspective

World product markets are increasingly driven by milk components (milk fat and fat fractionations; casein, whey, and other protein fractionations; and lactose). Current world dairy sector demand growth trends are dominated by “industrial” demand for dairy based ingredients (intermediate versus final demand products). These trends in world dairy based ingredient demand are driven by advances in food processing technology, both on the input side (fractionations of milk components) and product side (processes to optimize cost and functionality using the evolving dairy based ingredients), the functional characteristics of inputs and final products, and, the continual search by processors for low-cost ingredients and improved product functionality. It is

essential to develop a component based marketing plan, incentive structure, and quality standards to evolve a competitive dairy sector in a world dairy market context. These dairy-based ingredients require a moderately sophisticated food-processing sector and technology. Size/scale economies are important characteristics of many of these processes, suggesting differential advantages to larger firms and to foreign direct investment by firms who bring the knowledge, expertise and capital from other developed markets.

Prospects for World Dairy Policy Liberalization

Trends in dairy product development and markets occur in the context of current and evolving WTO dairy trade legislation. However, short term prospects for further dairy trade liberalization may be somewhat limited. The heavily protected dairy economies (US, EU, Canada, and Japan) are likely not motivated to open their dairy markets. While the US and Canada would likely support liberalization in grains, oilseeds, and livestock products, dairy is a politically sensitive industry. The EU is substantively absorbed in the planned EU expansion and the new CAP reforms of the mid term review which leaves dairy relatively unchanged. The US dairy policy in the US 2002 farm bill leaves the dairy sector relatively untouched (except to increase domestic subsidies via the Milk Income Loss (MILC) program). Low-cost dairy exporters (Australia, Argentina, and Eastern Europe) will push hard for additional market access (lower tariffs and export subsidies, increased import quotas). The bottom line question is where will the trade policy bargaining power reside with respect to dairy issues and Cancun/WTO has likely changed this calculus. There may be strong opportunities for regional trade agreement expansion (e.g., EU expansion, FTAA, etc.) which will limit access by non-members. EU expansion will provide preferential access to new members and several East European dairy sectors should gain from their eventual inclusion into the EU. But, managing the current EU structural milk surplus will remain challenging in the face of current WTO commitments, integration of Eastern Europe, and the relatively strong entrenchment of EU protectionists farm lobbies. The economic interest and political power of EU dairy processors and consumers seeking more competitive milk procurement) must vie with the established interests of the farm milk sectors.

Developing Economy Perspective

Domestic market growth potential is driven primarily by population and (especially) by GDP growth. In addition, "Westernization" trends in many of these economies will generate food-service (hotel, restaurant and institutional (HRI)) market growth. Growth trends in traditional dairy product consumption versus increasing preferences for new value added products (likely income growth dependent) will influence the mix of increased "value added" versus

bulk/commodity processing opportunities. Slow GDP growth will result in slower consumption growth in these markets.

What firms will supply this growth: local or multi-national firms using local milk supplies and/or imported dairy based ingredients? Industry structure and infrastructure are crucial. Scale efficient (low-cost) and innovative processing firms are likely to have competitive advantages in meeting these potential growth markets. Local versus multinational ownership of these firms will be influenced by access to and cost of capital, and by the progressiveness of their integrated marketing/procurement business strategies. Foreign direct investments (with marketing, procurement and processing expertise as well as access to capital) are often used to avoid market access limitations imposed by the current WTO agreement. There are also issues associated with the quality/procurement standards of foreign-owned food service (HRI) markets and potential infrastructure improvements required to support processing and wholesale/retail logistic demands.

Export potential into the developed economy markets will be closely linked to further dairy trade liberalization with increased market access and reduction of developed economy domestic subsidies. In this context, world supply/demand balance will remain a crucial determinant of world export prices; hence will define the competitive context of world trade. If recent trends in world supply/demand balance continue (rapid expansion trends in low cost production/processing regions coupled with sluggish world demand growth due to macroeconomic forces), this suggests relatively competitive world dairy export markets with weaker prices. Value added (more income responsive) versus bulk commodity (less income responsive, more price responsive) market growth opportunities will require careful consideration in this context.

■ Acknowledgement

This research is Supported by the Babcock Institute for International Dairy Research and Development (<http://babcock.cals.wisc.edu/>).

■ Background References

- Coleman, J.R. "World Dairy Trade Overview: Trade Policy and the WTO." Paper presented at the Workshop for Dairy Economists and Policy Analysts, Cornell Program on Dairy Markets and Policy, Baltimore, Oct. 26-27, 1998.
- Cairns Group Farm Ministers. 1998. In communiqué following talks on the upcoming WTO talks on agriculture. Sydney, Australia, April 2-3.

- Cox, T.L., J.R. Coleman, J.P. Chavas, and Y. Zhu (1999). "An Economic Analysis of the Effects on the World Dairy Sector of Extending Uruguay Round Agreement to 2005." *Canadian Journal of Agricultural Economics*, 47(1999): 169-183.
- Griffin, M. 1999. The Effects of Agricultural Trade Liberalization on Global Dairy Markets. Paper presented at the 4th Interleite Symposium on Intensive Dairy Production, Caxambu, Brazil, July 22-24.
- Soufi, W. "North Africa And Middle East Dairy Supply And Consumption: Economic Policy, Disaggregation Of The Area And Econometric Modeling" Ag & Applied Economics working paper, University of Wisconsin, Madison, Fall 2002.
- Peng, T. "A Study of Income Effects on Dairy Consumption and Milk Supply Elasticity in Asia," , Ag & Applied Economics, working paper University of Wisconsin - Madison, Fall 2002.
- Kirkpatric, E., Chairman, U.S. Dairy Export Council. 1998. Editorial comments. *Cheese Reporter*. July 10.
- Megli, k., T. Peng, and W. Soufi. "Eastern Europe and Former Soviet Union Dairy: A look at policy, country groupings and income elasticity," Ag & Applied Economics working paper, University of Wisconsin Madison, Fall 2002.
- Megli, K. "South America in the UW World Dairy Model: Policy, Grouping, and Elasticity," Working paper University of Wisconsin Madison, Fall 2002.
- Oxford Analytica. (1998). European Union: Farm Trade. Daily Brief. June 2.
- U.S. Dairy Export Council. International Dairy Food Association, National Milk Producers Federation. American Dairy Products Institute. 1999. "White Paper: Preparing for the Seattle Round: U.S. Dairy Industry Negotiating Priorities." July 21, 1999.
- Zhu, Y., T.L Cox, and J.P. Chavas (1999). "An Economic Analysis of the Effects of the Uruguay Round Agreement and Full Trade Liberalization on the World Dairy Sector." *Canadian Journal of Agricultural Economics*, 47(1999): 187-200. Table 1 Table 2



TABLE 1: Full Dairy Trade and Domestic Support Liberalization -- Changes From BASE in 2005.

	Milk Production % chg	Milk Price (% Chg)	Producer Surplus		Consumer Surplus		Total Gov Rev/Costs (\$US M)	TOTAL WELFARE	
			\$US M	% chg	\$US M	% chg		\$US M	% chg
Developed Economy, Heavily Protected Dairy									
EU-15	7.6%	-22.6%	(8,067)	-27.0%	8,116	6.6%	(114)	1,119	0.7%
Japan	-23.2%	-54.1%	(3,152)	-60.8%	3,981	19.4%	21	715	2.8%
O. W. Europe	-11.6%	-19.5%	(307)	-25.4%	448	5.4%	1,070	162	1.7%
Total:	4.9%	--	(11,526)	-31.8%	12,545	8.3%	977	1,996	1.1%
Developed Economy, Less Heavily Protected Dairy									
USA	-6.5%	-12.2%	(2,671)	-17.2%	3,412	4.0%	147	729	0.7%
Canada	-3.9%	-43.8%	(1,402)	-49.8%	1,640	14.1%	(12)	385	2.7%
Total:	-6.3%	--	(4,073)	-22.2%	5,052	5.2%	135	1,114	1.0%
Developed Economy, Competitive Exporters									
New Zealand	7.0%	7.9%	960	69.7%	92	1.7%	0	331	5.0%
Australia	4.6%	41.9%	167	12.7%	(225)	-6.4%	72	735	15.1%
Total:	5.9%	--	1,127	41.9%	(133)	-1.5%	72	1,066	9.2%
Less Developed Economies, Potentially Competitive Exporters									
Total:	2.6%	--	2,501	9.3%	(2,560)	-1.9%	(114)	(173)	-0.1%
Less Developed Economies, Net Importers									
Total:	0.0%	--	298	0.7%	521	0.2%	(1,680)	(861)	-0.3%
Developed TOTAL	1.1%	-20.7%	(14,472)	-25.3%	17,464	6.8%	1,184	4,176	1.3%
Developing TOTAL	1.1%	2.7%	2,797	4.1%	(2,039)	-0.5%	(1,795)	(1,037)	-0.2%
World TOTAL	1.1%	-7.8%	(11,675)	-9.3%	15,425	2.5%	(611)	3,139	0.4%

TABLE 2: Domestic Support Liberalization -- Changes From BASE in 2005.

	Milk Production % chg	Milk Price (% Chg)	Producer Surplus		Consumer Surplus		Total Gov Rev/Costs (\$US M)	TOTAL WELFARE	
			\$US M	% chg	\$US M	% chg		\$US M	% chg
Developed Economy, Heavily Protected Dairy									
EU-15	0.0%	-16.8%	(6,142)	-20.6%	3,719	3.0%	(114)	(2,997)	-2.0%
Japan	-22.3%	-52.1%	(3,049)	-58.8%	3,985	19.5%	21	822	3.2%
O. W. Europe	-11.4%	-19.2%	(302)	-25.0%	421	5.1%	(574)	140	1.5%
Total:	-1.9%	--	(9,493)	-26.2%	8,125	5.4%	(667)	(2,035)	-1.1%
Developed Economy, Less Heavily Protected Dairy									
USA	0.0%	0.0%	4	0.0%	(13)	0.0%	(0)	(21)	0.0%
Canada	-1.6%	-37.4%	(1,198)	-42.5%	1,121	9.6%	(12)	(77)	-0.5%
Total:	-0.1%	--	(1,194)	-6.5%	1,108	1.1%	(12)	(98)	-0.1%
Developed Economy, Competitive Exporters									
New Zealand	6.9%	28.0%	939	68.2%	(288)	-5.3%	0	385	5.8%
Australia	10.5%	41.0%	601	45.7%	(232)	-6.6%	72	707	14.5%
Total:	8.6%	--	1,540	57.2%	(520)	-5.8%	72	1,092	9.5%
Less Developed Economies, Potentially Competitive Exporters									
Total:	3.0%	--	2,845	10.6%	(2,910)	-2.1%	(114)	(179)	-0.1%
Less Developed Economies, Net Importers									
Total:	0.7%	--	1,505	3.6%	(516)	-0.2%	(1,680)	(691)	-0.2%
Developed TOTAL	-0.3%	-13.4%	(9,147)	-16.0%	8,713	3.4%	(607)	(1,041)	-0.3%
Developing TOTAL	1.7%	4.2%	4,348	6.3%	(3,422)	-0.9%	(1,795)	(869)	-0.2%
World TOTAL	0.8%	-3.7%	(4,799)	-3.8%	5,291	0.8%	(2,402)	(1,910)	-0.3%

TABLE 3: Domestic Support Liberalization -- Changes From BASE in 2005.

	Milk Production % chg	Milk Price (% Chg)	Producer Surplus		Consumer Surplus		Total Gov Rev/Costs (\$US M)	TOTAL WELFARE	
			\$US M	% chg	\$US M	% chg		\$US M	% chg
Developed Economy, Heavily Protected Dairy									
EU-15	6.1%	-24.9%	(8,965)	-30.1%	11,902	9.7%	(3)	4,007	2.7%
Japan	-1.2%	-2.7%	(176)	-3.4%	(115)	-0.6%	0	(294)	-1.1%
O. W. Europe	0.0%	0.0%	0	0.0%	1	0.0%	1,070	1	0.0%
Total:	5.4%	--	(9,141)	-25.2%	11,788	7.8%	1,067	3,714	2.0%
Developed Economy, Less Heavily Protected Dairy									
USA	-2.1%	-3.8%	(857)	-5.5%	1,331	1.6%	117	445	0.4%
Canada	3.2%	-23.8%	(756)	-26.8%	893	7.7%	(29)	254	1.8%
Total:	-1.5%	--	(1,613)	-8.8%	2,224	2.3%	88	699	0.6%
Developed Economy, Competitive Exporters									
New Zealand	1.9%	-12.8%	82	6.0%	297	5.5%	0	49	0.7%
Australia	-7.0%	3.6%	(250)	-19.0%	(36)	-1.0%	2	46	0.9%
Total:	-2.4%	--	(168)	-6.2%	261	2.9%	2	95	0.8%
Less Developed Economies, Potentially Competitive Exporters									
Total:	0.6%	--	571	2.1%	(626)	-0.5%	(37)	(92)	-0.1%
Less Developed Economies, Net Importers									
Total:	0.0%	--	127	0.3%	(489)	-0.2%	(102)	(464)	-0.2%
Developed TOTAL	2.2%	-14.9%	(10,922)	-19.1%	14,273	5.5%	1,157	4,508	1.4%
Developing TOTAL	0.3%	0.7%	698	1.0%	(1,111)	-0.3%	(140)	(553)	-0.1%
World TOTAL	1.1%	-6.3%	(10,224)	-8.1%	13,162	2.1%	1,017	3,955	0.5%