DEVELOPMENTS IN WORLD DAIRY MARKETS, 2002–2006—IMPLICATIONS FOR THE U.S. DAIRY INDUSTRY

William D. Dobson
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DEVELOPMENTS IN WORLD DAIRY MARKETS, 2002–2006 — IMPLICATIONS FOR THE U.S. DAIRY INDUSTRY

William D. Dobson

EXECUTIVE SUMMARY

This paper summarizes and updates selected findings from Babcock Institute Discussion Papers published during 2002–2006, emphasizing papers that have potentially important implications for the U.S. dairy industry.

DAIRY TRADE ISSUES

The Widening U.S. Dairy Trade Deficit

- The U.S. dairy trade balance has generally trended downward since 1993. In 2005, the U.S. dairy industry established record dairy exports of $1.6 billion but had a negative overall trade balance of $1.0 billion.
- Large imports of premium-priced European cheeses identify the potential merits of an import substitution strategy for the U.S. dairy industry.
- While expanded production of specialty cheeses by U.S. firms represents an implicit import substitution strategy, this strategy might be more effective if it focused more heavily on the competitive threat posed by European cheeses.

The Rocky World Trade Agreement (WTO) Negotiations under the Doha Round

- Progress toward a new WTO trade agreement under the Doha Round has been slow since the start of the negotiations in 2001.
- The one major achievement to date is an agreement to end agricultural export subsidies — including those under the USDA’s Dairy Export Incentive Program — by 2013. However, disagreements on market access and trade-distorting domestic support have made it difficult for negotiators to reach an overall agreement.
- If a Doha Round agreement is not reached by the end of 2006 or early 2007, this could spell the end of multilateral trade negotiations and cause still greater reliance to be placed on bilateral and regional Free Trade Agreements.

The U.S.-New Zealand Challenge to Canada’s Dairy Export Subsidies

- Important progress was made in defining exactly what constitutes a dairy export subsidy as a result of the successful U.S.-New Zealand challenge to Canada’s dairy export subsidy programs under the WTO.
- WTO decisions regarding Canada’s Commercial Export Milk Program indicate that government programs can produce indirect, partly-disguised export subsidy programs that are not WTO legal.
- WTO decisions on the Canada case give those developing producer-financed export programs for selling surplus U.S. dairy products in foreign markets guidance on what is acceptable under the WTO.

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1 W.D. Dobson is an Agribusiness Economist with the Babcock Institute. Helpful comments on the manuscript by Professor Edward Jesse of the Department of Agricultural and Applied Economics at the UW-Madison are acknowledged.
COUNTRY STUDY ISSUES

New Zealand-Australia

- In the early 2000s, the dairy industries of both New Zealand and Australia were further deregulated, making them among the lowest recipients of government support in the world. Both dairy industries are heavily dependent on exports. The two countries accounted for about 50 percent of global dairy exports in 2003.
- Arguably the most important recent developments in the dairy industries of New Zealand and Australia relate to strategic actions of Fonterra, New Zealand’s dominant dairy cooperative.
- Fonterra acquired a 43 percent interest in China’s San Lu Dairy Group in 2006. Fonterra’s $107 million acquisition of a share of San Lu represented the largest foreign acquisition to date of a Chinese dairy business.
- Fonterra entered into an agreement in 2004-05 with SanCor Cooperative in Argentina to sell SanCor’s commodity dairy ingredients outside of Argentina.
- Fonterra’s strategic moves will give the cooperative (a) early mover advantages for serving China’s growing dairy market, and (b) additional control over international markets for milk powder and other dairy ingredients.

Poland

- The EU-15 was expanded to include ten eastern European countries on May 1, 2004 to form the EU-25.
- Poland had by far the largest dairy industry of the ten accession countries. In the EU-25, only Germany, France, and the UK recorded larger milk production than Poland in 2004.
- Poland’s milk producers became subject to EU milk quotas when the country was added to the EU. The EU milk quotas will be a major force shaping the evolution of Poland’s dairy industry.
- The quota will influence the rate of restructuring of Poland’s production sector, the composition of Poland’s dairy product mix, dairy exports, and foreign direct investment in processing. Unless Poland’s milk quota is increased substantially, Poland is likely to become a net importer of dairy products in six years.
- Poland’s dairy industry became more internationally competitive as a result of the restructuring needed to meet EU requirements. However, the milk quotas will limit Poland’s milk production, effectively denying Poland the ability to take full advantage of its newly-established international competitiveness.
- As an EU-25 member, Poland will continue to be an important exporter of milk powder but it will no longer be a big exporter of low-cost, low-quality milk powder. The main opportunities for U.S. dairy product sales in Poland will probably be in dairy genetics.

India

- India has emerged as the world’s largest milk producer, recording production of about 92 million metric tons of milk (cow’s milk plus buffalo milk) in 2004.
- In recent decades, India’s National Dairy Development Board (NDDB) and the internationally-known Operation Flood program were instrumental in moving India to near self-sufficiency in milk production.
- The Government of India and the NDDB have a strong interest in maintaining milk self-sufficiency. However, it is unclear whether this will be possible given the expected robust growth in demand for dairy products in India.
- Potential exporters of dairy products to India will find it useful to monitor developments with regard to dairy self-sufficiency issues. It may become possible for exporters to sell more production-enhancing technologies and/or dairy products to India to meet demand-driven requirements in that country for dairy products.

DEVELOPMENTS IN THE DAIRY INDUSTRIES OF MEXICO, ARGENTINA AND BRAZIL

Mexico
- Mexico's milk production will continue to fall short of domestic demand. Thus, the country will continue to be a major importer of dairy products from the U.S.
- Poor sanitation and genetics, inefficient cold storage and refrigeration, and outdated transportation and marketing facilities will continue to limit expansion of Mexico's dairy industry.
- Mexico's tariff on U.S. milk powder imports will go to zero in 2008 under the NAFTA.

Argentina
- Argentina's dairy industry has staged a remarkable recovery from the recession of the late 1990s and early 2000s. Argentina is again the "dairy supplier of Latin America" and is positioned to expand further into other dairy export markets.
- The country's dairy industry can again quickly shrink (as it did in the late 1990s and early 2000s) if adversity hits and other farm enterprises become more profitable than dairying.

Brazil
- Brazil has moved closer to self-sufficiency in dairy products and is steadily increasing dairy export sales.
- A host of government programs have been put in place in Brazil to expand milk production and reduce dairy imports.
- Brazil’s milk production is forecast to rise from 24.7 billion liters in 2005 to 29 billion liters in 2015, a 17 percent increase.
- Brazil’s dairy imports in 2005 were equivalent to only about 30 percent of the country’s dairy imports in the late 1990s.
- Brazil’s currency, the real, fell by about 30 percent against the U.S. dollar from 2001 to 2006, making the country’s dairy exports more competitive in international markets.
- Problems with infrastructure and credit will constrain Brazil’s ability to expand milk production and exports, but Brazil continues to position itself to become a stronger competitor in international dairy markets.
DEVELOPMENTS IN WORLD DAIRY MARKETS, 2002–2006—IMPLICATIONS FOR THE U.S. DAIRY INDUSTRY

Established in 1991, the Babcock Institute for International Dairy Research and Development conducts studies on international dairy marketing and trade and on dairy science issues that have international dimensions. A Babcock Institute paper published in 2001 summarized policy and management implications of the Institute’s work during 1991 to 2001 [13]. The Institute’s international dairy marketing and trade work after 2001—the focus of this paper—has produced studies of U.S. dairy imports and exports, the impact of the Doha Round of WTO negotiations, an analysis of the U.S.-New Zealand challenge to Canada’s dairy export subsidy program, country studies of the dairy industries of New Zealand and Australia, Poland, and India, and studies of developments in the dairy industries of Latin America. This paper summarizes and updates findings from selected Babcock Institute papers published during 2002–2006 that have potentially important implications for the U.S. dairy industry.

This summary paper addresses only certain papers and selective parts of the 16 Babcock Institute Discussion Papers published by the Institute during 2002–2006. This paper also reflects the author’s judgment regarding points to summarize and update. The reader is encouraged to consult the Babcock Institute’s website to gain access to the Discussion Papers cited in this paper and other Discussion Papers published by the Institute during 2002–2006. The Discussion Papers available on the website will provide expanded coverage of issues discussed in this summary paper and show the views of numerous other authors.

DAIRY TRADE ISSUES

The Widening U.S. Dairy Trade Deficit

Figures describing trends in the U.S. dairy trade balance carry rich implications for America’s dairy industry. As noted in Figure 1, the U.S. dairy trade balance has generally trended downward since 1993 [25]. In 2005, the U.S. dairy industry established record dairy exports of $1.6 billion but recorded a negative overall trade balance of $1.0 billion.

The record large dollar value of U.S. dairy exports in 2005 is traceable in part to increases in U.S. exports of skim milk powder and whey products, and high world prices for these products. The strong world prices permitted U.S. skim milk powder to be sold in international markets without export subsidies in 2005. U.S. exports of dairy-based food preparations, lactose and cheese also contributed to the record dollar value of U.S. dairy exports in 2005.

As has been true for many years, cheese was the leading U.S. dairy import in dollar value in 2005 with the value of all U.S. cheese imports exceeding $1.0 billion. Cheese imported from Switzerland and Norway accounted for an additional 10 percent of the value of U.S. cheese imports. European cheeses tend to be high-valued products. For example, cheese imported by the U.S. from Italy, France, Spain, Cyprus, Greece and Switzerland were valued at more than $3 per pound in 2005. By contrast, cheese imported from New Zealand—frequently the largest exporter of cheese to the U.S. in tonnage terms—carried an average price of only $1.30 per pound.

It is not surprising that U.S. imports of high-priced cheeses have increased. There is a trend in the U.S. toward expanding imports of high-valued food and agricultural products. This has had important impacts on the overall U.S. agricultural trade balance. Specifically, the overall U.S. agricultural trade balance shrunk from a positive $27 billion figure in 1996 to a still positive but much smaller trade balance of $5 billion in 2005, in part because of larger U.S. imports of premium-priced foreign foods.

The presence of large imports of premium-priced cheeses from Europe identifies the potential merits of an import substitution strategy for the U.S. dairy
Developments in World Dairy Markets, 2002-2006—Implications for the U.S. Dairy Industry

FIGURE 1. U.S. Dairy Trade Balance

Exports
Imports
Trade Balance

$Million

<table>
<thead>
<tr>
<th>Year</th>
<th>Exports</th>
<th>Imports</th>
<th>Trade Balance</th>
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<tbody>
<tr>
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<td>2005</td>
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</tbody>
</table>

industry. Such a strategy could help the U.S. dairy industry retain more of the specialty cheese business. (Specialty cheese is defined as cheese produced in limited volumes, with distinctive characteristics that result in high-quality products, create added value and command a premium price from consumers.)

Consumption of premium-priced, specialty cheeses has grown rapidly in the U.S. in recent years. A 2004 California Milk Advisory Board study reported that specialty cheese consumption increased five times faster than total cheese consumption in the ten years prior to the California study [21, p. i]. In response to rising consumer demand, specialty cheese production in Wisconsin has more than doubled since 1994 [21, p. i]. In 2005, specialty cheese production in Wisconsin rose seven percent from year-earlier levels, to 355 million pounds, and accounted for 15 percent of the state's cheese production [42]. While the competitive specialty cheese business will likely become more concentrated in the future, 77 of Wisconsin's 115 cheese plants produced specialty cheeses in 2005 [42].

Wisconsin cheese processors and others who have successfully expanded production of premium-priced, differentiated cheeses are pursuing strategies that could increase their market shares and profits. Many references in the dairy marketing literature indicate that U.S. specialty cheese producers focus heavily on capturing sales from domestic competitors. Wisconsin specialty cheese producers, for example, recognize the need to compete effectively against California, Vermont, and other domestic specialty cheese producers. They also are aware of the potential payoffs from taking business away from commodity cheese producers. However, Wisconsin and other U.S. specialty cheese producers now face growing competition from foreign specialty cheeses. The California Milk Advisory Board study reported that the 815 million pounds of specialty cheese produced in the U.S. in 2003 had a value of $6.4 billion, a total that has undoubtedly increased since 2003. Imports of cheese from the EU-25 and other European countries in 2005 carried a value equivalent to a non-trivial 12 percent of the $6.4 billion figure. Hence, U.S. firms that desire to retain their specialty cheese markets need to recognize fully the competitive threat represented by foreign specialty cheeses.

While specialty cheese production is a highly competitive and complex business, the increased emphasis that the U.S. dairy industry has placed on specialty cheeses—which amounts to an implicit import substitution strategy—is appropriate. As U.S. consumers gain familiarity with premium-quality, domestically-produced cheeses, these cheeses may displace more of
the high-priced European cheeses. But things should not be left on auto pilot. For example, additional market research might be conducted to determine the nature of U.S. consumer preferences for European specialty cheeses. Such information could help the domestic industry to pursue import substitution strategies effectively.

**The Rocky WTO Trade Negotiations under the Doha Round**

The Doha Round of World Trade Organization (WTO) negotiations got off to a rocky start in 2001 [25]. As in the Uruguay Round GATT/WTO negotiations and earlier multilateral negotiating rounds, agricultural issues have been among the most contentious in the Doha Round. Indeed, rancorous meetings with few breakthroughs have characterized the agricultural negotiations since the beginning of the Doha Round. World dairy industries—many of which are among the most protected of industries—will remain largely impervious to liberalized trade if the multilateral framework provided the format, but not the specifics, for modalities for agriculture in July 2004.

After the collapse of the Cancun Ministerial Meetings in 2003, WTO negotiators put together a framework for modalities for agriculture in July 2004. This framework provided the format, but not the specifics, for eliminating agricultural export subsidies, increasing market access, and reducing the amount that government farm programs distort trade in agricultural products. The framework for modalities was structured to provide a basis for additional agricultural trade negotiations before the Hong Kong, China Ministerial Meetings in December 2005.

Prior to the Hong Kong Ministerial Meetings, the U.S. tabled an ambitious two-step proposal that would have eventually eliminated agricultural trade barriers. The Group of 20 richer developing nations (led by Brazil and India) also put forward a proposal that would have produced substantial agricultural trade liberalization. However, the EU-25 advanced a proposal that represented relatively little concession on the part of the Union regarding market access and reductions in trade-distorting farm support, putting the EU-25 in the camp of foot-draggers in negotiations leading up to the Hong Kong Ministerial Meetings.

WTO Director General, Pascal Lamy, said that as a result of the Hong Kong Ministerial Meetings the Doha Round was 60 percent complete, as compared to 55 percent completed prior to the Ministerial Meetings [35, p.1]. While accomplishments were meager in the Hong Kong Ministerial, the WTO negotiators recorded one significant achievement that has relevance for the U.S. and world dairy industries: namely an agreement to end all agricultural export subsidies by 2013. The agreement to end export subsidies would have noteworthy impacts on the U.S. dairy industry. Specifically, to comply with any Doha Round agreement, the USDA would be required to end use of export subsidies under the Dairy Export Incentive Program (DEIP)—an action which would have its greatest impact on U.S. nonfat dry milk (NDM) exports. This is important because—unlike the situation in 2004 and 2005—the U.S. again may find itself unable to export NDM at world prices. As noted in Table 1, the equivalent of over 9 percent of 2005 U.S. production of NDM could be exported with subsidy under the provisions of the Uruguay Round WTO agreement.

<table>
<thead>
<tr>
<th>Product</th>
<th>Maximum Subsidized Exports Permitted (1,000 mt)</th>
<th>% of 2005 Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>Butter</td>
<td>21.1</td>
<td>3.5%</td>
</tr>
<tr>
<td>NDM</td>
<td>68.2</td>
<td>9.2%</td>
</tr>
<tr>
<td>Cheese</td>
<td>3.0</td>
<td>0.1%</td>
</tr>
</tbody>
</table>

Sources: USDA [39,40].

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2 The Group of 20, also variously known as G21, G22 and G20+, is a bloc of developing nations established on August 20, 2003. Proposals advanced by the Group of 20 first emerged in September 2003 at the Cancun, Mexico WTO Trade Ministerial Meetings. In March 2006, the membership of the Group of 20 consisted of the following countries: Argentina, Bolivia, Brazil, Chile, China, Cuba, Egypt, Guatemala, India, Indonesia, Mexico, Nigeria, Pakistan, Paraguay, Philippines, South Africa, Tanzania, Thailand, Uruguay, Venezuela and Zimbabwe.
It is important to recognize the limitations of the agreement to end agricultural export subsidies. Andrew Stoler, Executive Director of the Institute for International Business, Economics and Law at Australia’s University of Adelaide, puts the point as follows [35, p. 2]:

(The) agreement . . . to end export subsidies by 2013 . . . has to be seen as a success from the meeting. However, the not so fine print of the Declaration also tells us that this date sticks only to the extent that other parts (provisions to increase market access and reduce impacts of domestic farm programs on international trade) of the negotiation move ahead successfully on schedule.

After the Hong Kong Ministerial meetings, Pascal Lamy gave member countries an April 30, 2006 deadline for completing full modalities for agriculture and an end of 2006 deadline for completing all negotiations under the Doha Round. Lamy’s April 30 deadline called for member countries to establish the rules and formulas for implementing reforms in agriculture, focusing on specific formulas, depth of tariff and subsidy cuts, phase-in periods and other rules. The April 30, 2006 deadline for completing full modalities for agriculture passed without significant progress.

At this writing in July 2006, the WTO negotiators appear far from completing an agreement relating to market access and trade-distorting domestic support under the Doha Round by the end of 2006. The end of 2006 target date is important because of U.S. political considerations. President Bush’s Trade Promotion Authority (fast-track negotiating authority) expires on July 1, 2007. Fast track negotiating authority calls for the U.S. Congress to give an up or down vote on a trade agreement and not tinker with provisions of the agreement. Such negotiating authority needs to be in place during the entire Doha Round because other countries would be unwilling to negotiate an agreement with the U.S. if the Congress could modify the provisions in possibly unacceptable ways. Moreover, in the run-up to the 2008 Congressional and Presidential elections it is questionable whether the U.S. Congress will renew the President’s fast track negotiating authority.

In summary, a large amount of difficult negotiating remains to be completed before the Doha Round negotiations on agriculture can be finished, creating the following possibilities:

1. A Doha Round agreement is reached where meaningful reforms of agricultural and non-agricultural trade are obtained.
2. President Bush obtains an extension of fast track negotiating authority for additional months in 2007 and 2008 to allow additional time for completing the Doha Round negotiations.
3. A less than fully meaningful Doha Round Agreement is reached in order to satisfy the end of 2006 deadline (“Doha Lite”).
4. Negotiations are not completed by the end of 2006 and further WTO negotiations are delayed for several years until a new U.S. Administration again has fast track negotiating authority.

Unfortunately, the third and fourth possibilities appear more likely than the first two. Completing a meaningful agreement by the end of 2006 will be difficult partly because the Doha Round negotiations must produce results that satisfy not just the U.S. and EU-25 but the Group of 20 richer developing nations as well. In addition, many U.S. agricultural groups would prefer no agreement to a bad agreement of the type that might materialize under a hurry-up process. It is possible, of course, that President Bush could obtain an extension of fast track negotiating authority beyond the mid-2007 expiration date. However, for this to occur the Republicans would need to retain control of both houses of Congress in the 2006 elections and the President would need to obtain the support of most of his party for the extension of fast track negotiating authority —far from sure things.

A collapse of Doha Round negotiations or any lengthy delay in those negotiations could give the U.S. and other countries incentives to push for additional bilateral or regional Free Trade Agreements (FTAs). This is currently not an optimal strategy for the U.S. since, with one important exception, it is not clear that the U.S. has much to gain from additional FTAs. The Free Trade Agreement of the America’s —an ambitious trade agreement that could carry important benefits for the U.S.—is stalled. The U.S. does have ongoing FTA negotiations with the United Arab Emirates, the five nations of the Southern Africa Customs Union...
(Botswana, Lesotho, Namibia, South Africa and Swaziland), Thailand (on hold in mid-2006), Panama, Colombia, Peru, and Malaysia [15]. The Bush Administration may be able to push these agreements through to completion, but none will bring about agricultural trade reform comparable to that obtainable under the Doha Round of the WTO.

The exceptional FTA that could produce important benefits for the U.S. is the U.S.-South Korea FTA. Negotiations on this agreement began in February 2006. South Korea is a major U.S. trading partner and an important importer of U.S. agricultural products, especially corn, soybeans, wheat, processed foods, cotton, fresh fruits and nuts [41]. Korean imports of U.S. beef—which in 2003 totaled nearly $800 million—may again become large due to the expected re-opening of the South Korean market in mid-2006. Despite a 49.5 percent South Korean tariff on imports of the product, U.S. whey exports to Korea were substantial in 2005, accounting for about 8 percent by value of total U.S. whey exports [25]. Korean imports of other dairy products were smaller, partly because of South Korea’s high tariffs on U.S. exports of products such as skim milk powder (176 percent over-quota tariff) and cheese (36 percent). Lower dairy product tariffs negotiated under the FTE should expand U.S. dairy exports to South Korea moderately.

Other trading partners are pursuing FTAs with vigor. For example, Australia and New Zealand—both major dairy exporting countries—are aggressively pursuing FTA’s with China. The two countries are also exploring whether it would be feasible for them to negotiate a FTA with Mexico. Such trade agreements—if they materialize—will limit future dairy trade gains for the U.S. from FTAs.

It is probably no overstatement to conclude that successful completion of the Doha Round in 2006 or early 2007 would show that meaningful multilateral negotiations on agriculture are still possible under the WTO. Collapse of the negotiations would show the opposite.

The U.S.-New Zealand Challenge to Canada’s Dairy Export Subsidies

In the early 2000s, important progress was made in defining exactly what constitutes a dairy export subsidy. This is noteworthy since it will help prevent disguised dairy export subsidy programs from being used under the Doha Round WTO agreement or under the existing Uruguay Round WTO agreement if no agreement is reached under the Doha Round. Progress in defining dairy export subsidies arose as a result of the U.S.-New Zealand challenge to Canada’s dairy export subsidy programs, details of which are discussed in Babcock Institute Discussion Paper 2005-2 [11].

Canada’s Dairy Export Subsidy Program. The challenges to Canada’s dairy export subsidy programs under WTO dispute settlement machinery, the appeals, and the ultimate resolution of the dispute can be briefly summarized as follows [22, 23, 24, 43]:

- In 1995, the Canadian government established a two-tiered pricing system in which processors paid higher prices for milk used domestically and lower prices for milk used to produce export products. As part of the two-tiered program, Canada established special 5(d) and 5(e) classes that included the following products:
  - **Class 5(d):** Specific negotiated exports, including cheese under quota, destined for the U.S. and UK markets—evaporated milk, whole milk powder, and niche markets.
  - **Class 5(e):** Surplus removal, including exports of surplus dairy products.

The Class 5(e) program drew sharp criticism from certain competing dairy exporters in other countries who claimed that it represented an export subsidy.

- Canada argued that price discounts applied to milk used to produce export products were not export subsidies, and therefore not subject to limits agreed to by Canada in the Uruguay Round WTO agreement. The U.S. and New Zealand challenged Canada’s export subsidy program under the WTO in October 1997.

- In October 1999, a WTO dispute settlement panel upheld the challenges brought by the U.S. and New Zealand and ruled that Canada had illegally exceeded the WTO dairy export subsidy limits. In December 1999, Canada agreed to implement changes in its dairy export program.

In 2000, Canada’s government and dairy industry
worked to establish a replacement program that met WTO rules and satisfied needs of Canada's dairy industry.

- In August 2000, Canada's federal government eliminated the Optional Export Program and the special surplus removal milk class, 5(e). Exports under Class 5(d) were limited to quantities of subsidized dairy exports that Canada had agreed to under the Uruguay Round WTO agreement. As a replacement for the terminated programs, Canada's provincial governments implemented new export programs with the involvement of the federal government, notably the Commercial Export Milk (CEM) program.

- In February 2001, the U.S. and New Zealand governments returned to the WTO dispute settlement process to ask a compliance panel to determine if Canada's new system complied with the 1999 ruling. Each country also asked for permission to levy $35 million in retaliatory sanctions against Canada if that country was found to be in violation of the 1999 ruling.

- The compliance panel review ruled on April 12, 2001 that Canada still was not in compliance with WTO export subsidy limits on dairy products. Canada appealed the decision to the WTO Appellate body. In January 2002, the Appellate body ruled that the compliance panel used an incorrect standard to analyze whether Canada had made dairy export subsidy payments. The Appellate body ruled that the determination of whether there was an export subsidy needed to be based on average cost of milk production for Canada, not on Canada's domestic milk price. Because the Appellate body did not have access to suitable information, it was unable to make a final ruling regarding the consistency of Canada's dairy export program with WTO dairy export subsidy limits.

- As a result, the U.S. and New Zealand governments asked the WTO to re-hear the case using milk cost of production figures. On June 24, 2002, the WTO compliance panel again ruled in favor of the U.S. and New Zealand, concluding that Canada was continuing to exceed WTO limits on subsidized dairy exports. On December 20, 2002, the WTO Appellate body issued its final ruling in favor of the U.S. and New Zealand.

- In May 2003, the U.S., New Zealand, and Canada reached an agreement that settled the case. Canada agreed to eliminate its export subsidies. As part of the agreement, Canada eliminated its CEM program.

Of particular interest is the CEM program that Canada implemented in response to the panel and Appellate body decisions. Sales of CEM were made by Canadian milk producers to Canadian milk processors for production of various dairy products for export. Canadian milk producers could sell any quantity of CEM to a processor on terms and conditions freely negotiated between the producer and the processor. Sales of CEM did not require a quota or any form of government permit from the Canadian government or its agencies. Revenues derived from sales of CEM were collected directly by producers without government involvement.

Canada's dairy industry and Canada's government argued that since the CEM program did not involve the government, payments made under that program should not be considered dairy export subsidies. The WTO panel concluded that the CEM program included "payments" to processors within the meaning of Article 9.1 (c) of the Uruguay Round's Agreement on Agriculture, which defines such payments, in part, as follows [43, p. 22]:

... payments on the export of an agricultural product that are financed by virtue of governmental action, whether or not a charge on the public account is involved...

The WTO panel's conclusion regarding CEM payments, which was upheld on appeal, said that subsidy payments to processors were involved since sales of milk under the CEM program were made at prices below the industry average cost of production standard (average fixed plus variable costs for milk production across Canada) used in determining whether subsidy payments were involved in CEM sales.

The WTO panel concluded that a significant percentage of Canadian milk producers were able to recover both fixed and variable costs through in-quota

sales of milk in the domestic market. As a result, the WTO panel concluded that such producers can afford to sell milk for sale as export products under the CEM program at marginal cost and need not cover total costs for such sales. Thus, the panel found that governmental action regulating the domestic market cross-subsidized many sales of milk—including milk destined for production of export products under the CEM program—that otherwise would not be made.

The WTO panel’s findings—and the Appellate body’s decision upholding the findings—with respect to the CEM program are significant since those findings indicate that domestic price support programs can indirectly cross-subsidize export sales. Hence, by permitting farmers to sell milk to processor-exporters at prices that cover their marginal production costs (but not total costs), the CEM program represents an export subsidy under the WTO. The interpretation of export subsidies appears to have important implications for other government programs that create surpluses that are sold commercially in export markets at less than producers’ total cost of production.

Implications for the U.S. Dairy Industry. The WTO decisions with respect to Canada’s dairy export subsidies have implications for U.S. groups that develop producer-financed export programs for disposing of surplus dairy products in foreign markets. The WTO decisions regarding Canada’s CEM program indicate that government programs can produce indirect, partly-disguised export subsidies that are not WTO legal. While U.S. producer-financed export programs would not necessarily parallel the CEM program closely, the broadly inclusive definition of export subsidies that emerged in the Canadian case suggests that care will be required to develop a producer-financed export program that is capable of avoiding a WTO challenge.

It is possible, of course, to make too much of the Canadian case. Small quantities of subsidized exports—even if technically illegal under the WTO—would be unlikely to attract a WTO challenge. U.S. producer-financed export subsidy programs that observe the limits on permitted dairy export subsidies for the DEIP and related programs would be acceptable under the WTO. Programs that fail to meet these tests raise red flags. The WTO panel reports and appellate body reports for the Canada case give those planning to develop producer-financed export programs for disposing of surplus U.S. dairy products in foreign markets in excess of WTO limits useful guidance on what is acceptable under the WTO.

COUNTRY STUDY ISSUES

New Zealand-Australia

The Babcock Institute completed a study entitled “The Dairy Sectors of New Zealand and Australia: A Regional Study” in 2004 [1]. This study examined the structure of the New Zealand and Australia dairy industries and developments affecting the evolution and competitiveness of the dairy industries of the two countries. In the early 2000s the dairy industries of both New Zealand and Australia were further deregulated, making both among the lowest recipients of government support in the world. The dairy industries of both countries are heavily dependent on exports. New Zealand exports the equivalent of about 95 percent of that country’s milk production. Australia, with its larger domestic market, exports the equivalent of about 50 percent of that country’s milk production.

The two countries combined accounted for about 50 percent of global dairy exports in 2003 [6, p. 19].

Many developments in the dairy industries of New Zealand and Australia remain much as described in the 2004 Discussion Paper and are not repeated here. However, it is noteworthy that the pasture-based dairy industries of both countries have experienced weather-related problems that have reduced milk production and dairy exports. Australia experienced a major drought during 2002–03 that is still curtailing that country’s milk production. New Zealand’s milk production, which peaked at 15 million metric tons in 2003–04, has not yet returned to peak levels, partly because of adverse pasture conditions. For New Zealand in particular, the vulnerability of domestic production to weather factors raises questions about whether
the industry can rely on domestic production as a main source of raw product for the country's worldwide dairy exports.

**Fonterra's Evolving Strategies.** Arguably the most important recent developments in the dairy industries of New Zealand and Australia relate to strategic moves made by Fonterra—New Zealand's dominant dairy cooperative. Fonterra represents the mega-cooperative formed by the merger of the New Zealand Dairy Group, Kiwi Cooperative Limited, and the New Zealand Dairy Board in October 2001, a merger permitted by New Zealand's Dairy Industry Restructuring Act of 2001. When the New Zealand Dairy Board was merged into Fonterra, it was stripped of its single desk (monopoly) exporting privilege. However, during a 10-year period, Fonterra retained full or partial preferential access to high-priced dairy quota markets, including those in the U.S. and EU.

Fonterra has made a number of important acquisitions, divestments and strategic agreements in recent years, notably those indicated below [16, 17, 18, 28, 31, 32]:

- **Acquisition in 2006 of a 43 percent interest in China's San Lu Dairy Group located in Hebei Province, which surrounds China's capital city of Beijing.**
- **Raised Fonterra's ownership interest in Bonlac Foods of Australia to 100 percent in 2004-05.** The New Zealand Dairy Board had previously acquired a 25 percent interest in Bonlac in 2000, which was raised by Fonterra to 50 percent in 2003.
- **Sold Fonterra's 19 percent interest in National Foods of Australia in 2005.**
- **Sold New Zealand Milk of Mexico in 2004-05.**
- **Entered into a sales agreement in 2004-05 with SanCor Cooperative of Argentina, under which Fonterra will distribute SanCor's bulk commodity dairy ingredients outside of Argentina.**
- **Entered into a joint venture with South African Dairy Company, Clover Industries Ltd., to form Clover-Fonterra Ingredients in May 2005. This joint-venture business will handle the marketing of bulk dairy ingredients, carry out contract ingredient manufacturing and supply food service products to fast-food restaurants throughout the sub-Saharan region.**

Undoubtedly, the most noteworthy of Fonterra's moves was the acquisition of the 43 percent share of San Lu Dairy in China. In this largest acquisition by a foreign firm of a Chinese dairy business, Fonterra paid about U.S.$107 million. This was not the first move by Fonterra and its legacy firms in China. China is Fonterra's fourth largest market by volume and fifth largest by value [31]. Most of Fonterra's sales in China have been in the form of milk powder. To facilitate sales in China, the cooperative has established offices in Hong Kong, Beijing, Shanghai and Guangzhou.

San Lu, which has its headquarters in Shijiazhuang, the provincial capital of Hebei, started out as a large-scale state enterprise raising dairy cows and processing and packaging milk and milk powders. The firm now produces about sixty varieties of milk powder, including baby formulas and nutritional supplements, and has expanded into liquid milk, yogurt and flavored drinks [31]. San Lu believes that it will benefit from access to Fonterra's management experience, R&D and advanced marketing skills under the ownership arrangement.

Andrew Ferrier, Fonterra's CEO, made the following comments about the San Lu investment [32]:

*Developing a closer working relationship with San Lu is the logical next step for Fonterra's business in China. . . . It complements our existing importing and consumer businesses there by partnering with a local company that has access to local fresh milk supplies. . . . New Zealand has been a successful exporter of dairy ingredients to China for decades, but as local production increases to meet the rapidly growing local demand, becoming part of the local industry will give Fonterra further opportunities to employ our expertise in all areas of the business from milk collection to consumer goods.***

Ferrier believes that the San Lu acquisition will give Fonterra early mover advantages for serving China's growing dairy market. China's consumers presently make limited purchases of dairy products—less than half that of their counterparts in Japan, South Korea,
and Taiwan—but that is changing. Consumption of dairy products in China is growing by about 10 percent per year [31]. Ferrier believes that consumption could reach 30 to 40 kilograms per person in China in a decade. Arla of Sweden and France-based Danone recently have made investments in China’s dairy industry, suggesting that other multinational firms share Fonterra’s views about growth prospects in China’s dairy industry [28]. Fonterra’s acquisition of a 100 percent stake in Bonlac Foods is mostly a sign of the growing integration of the dairy industries of New Zealand and Australia. Fonterra had sought to further expand its business in Australia through acquisition of dairy manufacturer, National Foods, but lost out in the bidding for the firm to San Miguel of the Philippines. After being outbid by San Miguel, Fonterra sold its 19 percent interest in National Foods.

The reasons for the sale of New Zealand Milk of Mexico are not clear. But such a sale is not unusual since Fonterra frequently adjusts its portfolio of foreign investments to enhance net revenues.

Fonterra’s entry into a sales agreement with SanCor Cooperative of Argentina (frequently Argentina’s largest dairy exporter) to market SanCor’s bulk dairy ingredients outside of Argentina is noteworthy [20]. This appears similar to the Dairy America agreement that Fonterra entered into with an association of seven U.S. dairy cooperatives in 2001. Under the Dairy America agreement, Fonterra markets 100 percent of the milk powder that the seven U.S. dairy cooperatives wish to export. The SanCor and Dairy America agreements allow the Argentine firm and Dairy America to outsource part of their export sales businesses to Fonterra, which has extensive experience and connections in international dairy markets. It also provides Fonterra with important control over additional, large segments of the international milk powder market. The Clover-Fonterra Ingredients joint venture in South Africa gives Fonterra a small amount of additional control over markets for dairy ingredients.

Fonterra hopes that tariff burdens on its dairy exports can be reduced by FTA’s or regional trade agreements. Among the agreements Fonterra supports are those with the Association of South East Asian Nations (ASEAN Group), whose members purchase about one-quarter of New Zealand’s dairy exports, Mexico and the U.S. Mexico is Fonterra’s seventh largest market for New Zealand-origin dairy products. Fonterra correctly notes that it may be difficult for New Zealand to complete an FTA with the U.S. before President Bush’s Trade Promotional Authority expires in mid-2007.

**Implications for the U.S. Dairy Industry.** The main implications for U.S. dairy firms that emerge from Fonterra’s strategies relate to the firm’s (a) efforts to gain early mover advantages in China’s growing dairy market, and (b) efforts to obtain additional control over international milk powder markets.

U.S. and other foreign dairy firms entering China’s dairy markets likely will encounter strong competition from Fonterra, which will have gained market share and experience in selling dairy products in China’s complex markets as a result of its early mover efforts. While Fonterra has not acquired a monopoly over international milk powder and other dairy ingredient sales, it has undoubtedly gained additional influence over those markets through the agreement to market SanCor’s substantial foreign sales of dairy ingredients. More generally, by sourcing and marketing milk powder and other dairy ingredients from different foreign countries, Fonterra will be able to supply customers with these products when local conditions limit supplies available in New Zealand. Moreover, Fonterra will be positioned to use domestically-produced milk powder for making differentiated, higher-value products and sell milk powder sourced from the foreign markets to users needing commodity milk powder. Given Fonterra’s history of making differentiated products—e.g., baby formulas, branded milk powders—from New Zealand milk powder, the latter point may be important to the firm.

**Poland**

The EU-15 was expanded to include 10 East European countries on May 1, 2004 to create the EU-25. Of the 10 countries added to form the EU-25, Poland had by far the largest dairy industry. In the EU-25 only Germany, France and the UK recorded larger milk production than the 11.8 million tons of milk produced in Poland in 2004. The Babcock Institute conducted a study entitled, "The Dairy Sector of Poland: a Coun-
Implications for the evolution of Poland’s dairy sector and the adjustments dairy sector—are the main focus of this paper. The adjustments needed to comply with EU milk quotas had far-reaching impacts on Poland’s dairy industry. Accordingly, the EU quotas—which will be a major driving force shaping Poland’s dairy sector—are the main focus of this paper.

Poland’s dairy industry had about 700,000 milk producers in 2005 [30]. Many were small one- or two-cow dairy farms, producing milk only for home consumption. A National Farmers Union report from the UK claims that only about 42 percent of the 700,000 dairy farmers were commercial, wholesale milk suppliers [30].

Historically Poland has been a low-cost producer. Poland’s low cost of production stemmed mainly from the labor-intensive nature of small-herd dairying characterized by minimal housing facilities, hand milking, grazing as a major feed source, and a low assigned opportunity cost for labor. But, substantial numbers of larger, commercial dairy farms resembling those found in the U.S. and Western Europe have emerged in Poland in recent years. The larger farms will not possess the low cost structure of the small farms. Moreover, costs for expansion-minded dairy farmers in Poland will be increased by the need to purchase quota for additional production.

Prior to the accession Poland was a substantial exporter of milk powder, some of which was of low quality. From 1995 to 2004, Poland exported an average of about 96,000 metric tons of milk powder per year, trailing only New Zealand, Australia, the U.S. and EU-15 in tonnage of milk powder exports [39]. Poland’s milk powder frequently sold at a discount to milk powder marketed by the by U.S., EU-15, and Australasian processors.

The Impact of EU Milk Quotas. The allocation of EU dairy quota was a contentious issue for Poland. The EU’s allocation of quota to Poland’s dairy industry reflected the following considerations:

- Of the ten accession countries, Poland received the largest milk quota of 8.96 million metric tons.
- The 8.96 million metric tons of quota represented only 65 percent of Poland’s request for quota.

Other accession countries received 75 percent of the requested quota.

- In addition to the 8.96 million metric tons of quota, Poland will conditionally receive a 416 thousand ton quota reserve for 2006. This reserve is to account for an expected increase in retail demand for milk following an expected reduction in on-farm consumption. As of this writing in mid-2006, it was not clear whether the EU would award the 416,000 ton increase in quota to Poland.

The EU quota for Poland’s milk production—even if supplemented by the reserve for 2006 that brings the total to 9.38 million metric tons—will restrict the size of Poland’s dairy industry. The 9.38 million metric ton total is equal to only about 81 percent of Poland’s average milk production for 2000 to 2004 and 61 percent of the 1989 production figure (Table 2).

The quota will heavily influence the rate of restructuring of the production sector, the composition of Poland’s product mix, dairy exports and direct foreign investment in processing. Unless its milk quota is increased substantially, it is anticipated that Poland will become a net importer of dairy products in about six years. For reasons discussed in the country study, quota restrictions will elevate the cost of milk production on expanding farms in Poland and shift domestic milk supplies increasingly into higher-valued fresh products and cheese and away from milk powders.

Why did Poland obtain such a restrictive milk quota from the EU during the accession negotiations? An
important reason was that Poland could not document to the EU in a satisfactory fashion the sales of milk made directly by producers to consumers, labeled as "Direct Sales" in Table 2. In Poland, there were only limited records of direct milk sales comparable to records available for farm sales to commercial dairy plants. The assumption made by the EU was that the large difference between milk production and the adequately-documented sales was accounted for by on-farm consumption. Farm milk consumption received no quota.

Ironies abound regarding the imposition of EU milk quotas in Poland. As detailed in the country study, the EU provided restructuring funds that permitted many of Poland's dairy farms and dairy processing plants to upgrade the quality of milk and dairy products to EU standards. Poland's government provided additional funding to improve and modernize the country's dairy industry. Thus, as a result of EU accession, Poland now has a more internationally competitive dairy industry. However, the imposition of restrictive quotas will limit Poland's milk and dairy product production, effectively denying Poland the ability to take full advantage of its newly-established international competitiveness. This may give Poland's dairy industry incentives to push for an end to the EU-25 dairy quotas at the earliest feasible date.

Implications for the U.S. Dairy Industry. There are a limited number of implications for the U.S. dairy industry from Poland's accession to the EU. The destination of Poland's dairy exports will change. More of Poland's dairy exports—increasingly consisting of hard cheeses—will be channeled to other EU countries in the future. This is both because of proximity advantages for serving other EU countries and because zero import tariffs will apply to such sales. While Poland will continue to be an important exporter of milk powder for a few years, the country no longer will be an exporter of low-cost, low-quality milk powder. The main opportunities for U.S. dairy product sales to Poland probably will be in dairy genetics.

India

India has emerged as the world's largest milk producer, recording production of about 92 million metric tons of milk (cow's milk plus buffalo milk) in 2004-05. The Babcock Institute published a study in Discussion Paper No. 2006-2 that analyzed the growth of milk production in India, the nature of the milk production, processing and distribution in the country, the industry's unique institutions, and government policies affecting India's dairy industry [2].

While India's dairy industry has made major advances in recent decades, it is unclear whether the country will remain largely self-sufficient in milk production or become an important dairy importer. The country's ability to remain essentially self-sufficient in milk production will be determined in part by whether domestic milk production can keep pace with the demand for dairy products driven by India's huge (1.1 billion) and growing population and rapid increases (7.5 percent real GDP growth in 2004-05) in consumer incomes.

In the 1950s and 1960s, India was one of largest dairy importing countries in the world. For example, India's commercial imports of milk powder peaked at over 50,000 metric tons in 1963-64. The large dairy imports in the 1960s retarded development of India's domestic dairy industry, causing milk production in the country to plateau at about 20 to 22 million metric tons per year for that decade. This happened partly because it was cheaper for India's domestic milk processors to import milk powder and butter products and make reconstituted milk than to buy milk from India's dairy farmers.

This situation concerned Indian officials, who reasoned that dairying would be a good vehicle for promoting employment and rural development. Moreover, government officials recognized that India's population growth, urbanization, income growth, the high income elasticity of demand for dairy products, and changes in consumption habits, all might support profitable expansion of the country's dairy industry. Hence, the government embarked on an import substitution policy that produced near self-sufficiency in dairy products. Initially, this policy was basically a dairy cooperative development program.

India's National Dairy Development Board (NDDB) and internationally-known Operation Flood program were instrumental in moving India to near self-sufficiency in milk production. The foundations for development of India's modern dairy industry reside

with the Kaira District Cooperative Milk Producers' Union (AMUL). AMUL, in turn, formed the basis for the Anand Model of Dairying in India. The Operation Flood program, which was initiated in 1970 and which replicated the Anand Model for Dairy Development widely in India, carried out the following functions:

- Organized village dairy cooperatives.
- Created the physical and institutional infrastructure for milk procurement, processing, marketing and production-enhancing services at the union level.
- Established dairies at India's major metropolitan centers—i.e., Bombay, Calcutta, Delhi and Madras.

A Harvard Business School case summarized the impacts of Operation Flood from the late 1960s to the late 1990s as follows [36]:

Through . . . Operation Flood, the NDDB had created, in India's 25 states, more than 70,000 village dairy cooperatives with ten million members. Operation Flood had helped increase India's milk output at a compounded annual growth rate (CAGR) of 4.7% since 1969 (up from a 0.7% CAGR from 1947 to 1969). . . . Operation Flood-inspired cooperatives had raised the incomes of millions of landless or marginal farmers who constituted the cooperatives' membership . . . Amul branded products had dominated the retail dairy sector in India for more than 30 years. Amul was India's most well-known food brand.

In addition to financial support for dairy cooperatives, the Government of India sharply limited dairy imports from the early years of Operation Flood until the early 1990s, justifying the action partly as protection for an infant industry.

Whether the near self-sufficiency in milk production that India has achieved can be maintained will depend, of course, on future milk production and consumption levels.

Price and income elasticities for India's dairy products are useful for predicting approximate changes in future consumer purchases of dairy products in India. The price elasticity of demand estimates in Table 3 are high compared to estimates from other countries (in absolute terms) and do not likely support the theoretical implication that reducing prices will increase total revenue of milk processors, especially in light of the already low milk prices in India. Other factors are probably causing what appear to be spurious results.

The income elasticity of demand estimates in Table 3 are more plausible, indicating that milk and dairy product consumption is strongly responsive to increases in income in India. India's population has grown at the rate of 1.4 percent annually recently and real gross domestic product (proxy for income) grew by 7.5 percent in 2004–05.

Approximations of future annual consumption increases can be obtained by adding population growth to the product of income growth and income elasticity of demand. Thus, combining the NDDB roadmap income elasticity of 0.6 and the 1.4 percent population growth figure produces an annual growth in dairy product consumption of 5.9 percent for India. Weighting the income elasticity estimates provided by Dastageeri by the percentages of population in rural India (70 percent) and urban India (30 percent) yields an income elasticity of 1.27. This elasticity and the population and income figures used in the first example predict an annual increase in dairy product consumption of 10.9 percent in India. Both estimates of annual increases in demand exceed the recent rates of increase in milk

Table 3. Selected Price and Income Elasticities for Milk and Dairy Products in India.

<table>
<thead>
<tr>
<th>Elasticity Characteristics</th>
<th>Price or Income Elasticity</th>
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</thead>
<tbody>
<tr>
<td>Price Elasticity of Demand for Milk [8]:</td>
<td></td>
</tr>
<tr>
<td>Rural Areas</td>
<td>-2.99</td>
</tr>
<tr>
<td>Urban Areas</td>
<td>-2.77</td>
</tr>
<tr>
<td>Price Elasticity of Demand for Milk and Milk Products [9]:</td>
<td></td>
</tr>
<tr>
<td>Rural Areas</td>
<td>-1.65</td>
</tr>
<tr>
<td>Urban Areas</td>
<td>-1.15</td>
</tr>
<tr>
<td>Income Elasticity of Demand for Milk [8]:</td>
<td></td>
</tr>
<tr>
<td>Rural Areas</td>
<td>1.36</td>
</tr>
<tr>
<td>Urban Areas</td>
<td>1.07</td>
</tr>
<tr>
<td>Income Elasticity of Demand for Milk and Milk Products [29]:</td>
<td></td>
</tr>
<tr>
<td>Rural Areas</td>
<td>0.60</td>
</tr>
<tr>
<td>Urban Areas</td>
<td></td>
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</tbody>
</table>
production in India, which have averaged 4–5 percent per year.

Implications for the U.S. Dairy Industry. The Government of India and the NDDB have a strong interest in maintaining self-sufficiency in milk production in India. However, it is unclear whether government policies and other developments will permit India’s dairy industry to keep pace with the growing demand for dairy products in the country. Growth in demand for dairy products in India is likely to continue to be robust, partly because dairy products are regarded as preferred products by the large number of Indian people who are lacto-vegetarians.

DEVELOPMENTS IN THE DAIRY INDUSTRIES OF MEXICO, ARGENTINA AND BRAZIL

The dairy industries of Mexico, Argentina, and Brazil were in transition and/or turmoil during the early 2000s. As a result of the North American Free Trade Agreement (NAFTA), Mexico’s dairy industry became more open to exports of dairy products from the U.S. Argentina’s dairy industry shrank substantially in 2002 and 2003 because of currency devaluations, inflation, bankruptcies and other problems besetting their economy. These developments sharply reduced Argentina’s dairy exports. Brazil’s dairy industry experienced a few problems in the early 2000s because of macroeconomic difficulties similar to those that hit Argentina, but the impacts on Brazil’s dairy industry were less severe. Indeed, in 2002 to 2006 Brazil continued to approach a balance in terms of dairy imports and exports and was positioned to become a more important dairy exporting country.

These developments are described in greater detail in the Babcock Institute Discussions Papers entitled, “How Mexico’s Dairy Industry Has Evolved Under the NAFTA—Implications for U.S. Dairy Exporters and U.S. Investors in Mexico’s Dairy-Food Businesses [12]” and “Developments in the Dairy Industries of Mexico, Central America, Argentina and Brazil—Implications for the U.S. Dairy Sector [10].” Many developments in the dairy industries of Mexico and Brazil continue to unfold as forecast in the earlier Discussion Papers and require limited updating in this

<table>
<thead>
<tr>
<th>Year</th>
<th>Mexico (1,000 mt)</th>
<th>% Change from Year Earlier</th>
<th>Argentina (1,000 mt)</th>
<th>% Change from Year Earlier</th>
<th>Brazil (1,000 mt)</th>
<th>% Change from Year Earlier</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>9,501</td>
<td>+2.1%</td>
<td>9,500</td>
<td>-3.1%</td>
<td>22,300</td>
<td>+0.8%</td>
</tr>
<tr>
<td>2002</td>
<td>9,560</td>
<td>+0.6</td>
<td>8,500</td>
<td>-10.5</td>
<td>22,635</td>
<td>+1.5</td>
</tr>
<tr>
<td>2003</td>
<td>9,784</td>
<td>+2.3</td>
<td>7,950</td>
<td>-6.5</td>
<td>22,860</td>
<td>+1.0</td>
</tr>
<tr>
<td>2004</td>
<td>9,874</td>
<td>+0.9</td>
<td>9,250</td>
<td>+16.4</td>
<td>23,317</td>
<td>+2.0</td>
</tr>
<tr>
<td>2005 (P)</td>
<td>9,835</td>
<td>-0.2</td>
<td>9,850</td>
<td>+6.5</td>
<td>24,250</td>
<td>+4.0</td>
</tr>
<tr>
<td>2006 (F)</td>
<td>9,976</td>
<td>+1.2</td>
<td>10,300</td>
<td>+4.6</td>
<td>25,220</td>
<td>+4.0</td>
</tr>
<tr>
<td>Average</td>
<td>9,758</td>
<td>+1.2</td>
<td>9,225</td>
<td>+1.2</td>
<td>23,430</td>
<td>+2.2</td>
</tr>
</tbody>
</table>

Sources: USDA [26,34,38,39].
paper. However, Argentina's dairy industry has staged an important come-back and warrants more detailed analysis.

The fundamental changes (or lack thereof) in the dairy industries of Mexico, Argentina, and Brazil during 2002 to 2006 are reflected in changes in milk production in the three countries (Table 4). Mexico recorded irregular changes in milk production ranging from small negative amounts to a maximum year-to-year gain of 2.3 percent. Argentina's big turn-around in milk production is shown in the figures in Table 4. That country's year-over-year change in milk production went from a double-digit decline in 2002 to a 16 percent increase in 2004. Brazil notched steady increases in milk production during 2002 to 2006, recording the larger increases in the latter years of the period.

**Mexico**

Mexico has become a major market for U.S. dairy exports. Mexico and Canada accounted for nearly half of the value of U.S. dairy exports in 2005 [25]. Mexico was a leading destination for U.S. exports of NDM, whey and cheese in 2005. The increased exports of U.S. dairy products to Mexico reflect, in part, the reductions in Mexico's tariffs under the NAFTA. For example, Mexico's tariffs on imports of cheese from the U.S. declined to zero in 2003. Mexico continues to apply tariffs to imports of NDM from the U.S. For 2006, the over-quota tariff on U.S. milk powder is 23.5 percent. This tariff will go to zero on January 1, 2008 under the NAFTA. Mexico's dairy industry has sought to reduce imports of milk powder by expanding domestic milk production. This is partly because milk powder is a highly important product for Mexico's dairy industry, finding use in production of reconstituted milk, cheese, and other dairy products. Efforts to expand domestic milk production and promote import substitution have met with little success. As noted in Table 4, Mexico increased milk production by only about one percent per year from 2002 to 2006. Thus, Mexico's imports of milk powder during 2002 to 2006 were equal to about 50 percent of consumption, a percentage similar to that recorded during 1995 to 2000 [10.39].

As noted in Figure 2, Mexico was the destination for nearly 41 percent of U.S. NDM exports in 2005. Mexico may account for a still larger percentage of U.S. nonfat dry milk powder exports when Mexico's over-quota tariff on those imports goes to zero in 2008. The following developments will likely characterize Mexico's dairy industry in the next few years:

- Mexico's milk production will continue to fall short of domestic demand. Assuming a population growth rate of 1.17 percent per year, growth of real income of 3 percent per year [4] and an income elasticity of demand of 0.68 [27], the demand for dairy products in Mexico is likely to grow by about 3.2 percent per year, a rate of increase about two percentage points higher than the rate of increase in domestic milk production in the country from 2002 to 2006.
- Mexico's milk production will likely remain at only about 75 percent (+ or -5 percent) of domestic needs for the foreseeable future, much as forecast in earlier Discussion Papers.
- Poor sanitation and genetics, inefficient cold storage and refrigeration, and out-dated transportation and marketing facilities continue to limit expansion of Mexico's dairy industry.
- New Zealand and Australia will attempt to gain advantages for serving Mexico's dairy markets by negotiating FTAs with Mexico.
- Mexico will exhibit the normal characteristics of a mature market for commodity dairy exports. Thus margins on exports of commodity dairy products to Mexico will be thin.
- Mexico will regain access to U.S. and Canadian dairy cattle, access that was lost when BSE (mad cow disease) was found in the U.S. and Canada. Accordingly, U.S. and Canadian cattle will displace cattle that were imported into Mexico from New Zealand and Australia during 2004 and 2005.

Argentina

Argentina's dairy industry has staged a remarkable turnaround from the problems that beset it in the early 2000s. Mr. Chris Phillips of Dairy Australia described the resurgence of Argentina's dairy exports as follows [33]: "After several years of flat sales, Argentina's dairy exports doubled between 2001 and 2005 and now account for more than 4 percent of world trade."

It is instructive to review briefly the conditions that affected Argentina's dairy industry as a result of the country's macroeconomic problems in the late 1990s and early 2000's [10]:
- With the beginning of the Argentine recession in 1999, weaknesses in retail prices for dairy products and Argentina's overvalued currency—which discouraged exports—put negative pressure on milk prices at the farm gate.
- Returns to dairy farmers and milk processors dropped. By 2001, milk production had fallen by 8 percent from 1999 levels, reversing eight years of increases in milk production.
- The devaluation of the Argentine peso in early 2002 improved Argentina's competitiveness in international markets for some farm products, but contributed to additional reductions in milk production. This is because the peso devaluation had differential effects on milk and crop prices. Prices of grains and soybeans increased in almost the same proportion as the devaluation, and the competition for land favored crop production over milk production. In late 2002, net returns per hectare from corn and soybean production in Argentina were about seven times greater than from milk production.
- As a result of the low returns from dairying, many Argentine dairy farmers stopped or reduced feeding silage and grains and reverted substantially to pasture-based systems of feeding, which curtailed milk production.

This analyst and others forecasted that the dismantling of part of Argentina's dairy sector would limit the export potential of the country's dairy sector for several years. The year 2003 continued to be difficult for Argentina's dairy industry—milk production in that year was below domestic consumption in the late 1990s and early 2000s. However, after bottoming out in 2003, Argentina's milk production increased substantially beginning in 2004. The country's dairy exports also rebounded sharply.

What accounts for the remarkable rebound in milk production and dairy exports? The recovery of Argentina's dairy industry was helped by recovery of Argentina's economy. Real GDP growth in Argentina went from -10.9 percent in 2002 to +8.8 percent in 2003. This turnaround reflected a devaluation by two-thirds of the Argentine peso after 2001, which sharply increased the ability of Argentine dairy firms to export. The Government of Argentina (GOA) also took measures, which at least partially controlled inflation.

The sharply devalued peso helped Argentine dairy firms expand exports at a time of high world prices for dairy products. In 2004, Argentina exported 195,000 tons of dairy commodities valued at US$575 million, a quantity of exports equivalent to about 23 percent of the country's milk supplies [33, p.3]. Argentine dairy firms became particularly competitive in international markets for whole milk powder and cheese. In 2005 and 2006, Argentine dairy exporters found customers with strong purchasing power in oil exporting countries such as Algeria, Venezuela, Nigeria and Mexico.

The expanded milk production, which made the increase in dairy exports possible, resulted partly from relatively high returns reflecting high farmgate milk prices, favorable weather, and relatively low feed prices. A 2005 FAS-USDA GAIN report contains the
following comment about the profitability of dairy farming in Argentina [26, p. 4]:

Private sources indicate that the current cost of production (not including land costs) for a liter of milk is roughly between US$0.12-0.13, while the farm-gate price is about US$0.17-0.18. No big change is expected in 2006, except for certain increases in milk production costs.

The GOA shaved some of the luster off the recovery of Argentina's dairy industry by increasing export taxes from 5 percent to 15 percent on milk powder and from 5 percent to 10 percent on cheese in mid-2005. This action was taken in an effort to reduce inflation, which averaged about 9.5 percent in 2005.

At present, Argentina's dairy industry is clearly in an expansion mode. Technology used in both the farm and processing sectors is being improved. Additional foreign direct investment in the processing sector is also expected.

On balance, Argentina is again the "dairy supplier of Latin America" and is positioned to expand further into other markets. Whether this will happen smoothly depends partly on whether the GOA can keep macroeconomic conditions reasonably favorable for the industry. Controlling inflation will be a substantial challenge for the GOA. If export taxes on major dairy exports continue, this will be a drag on the dairy industry. It also should be clear that Argentina's dairy industry can quickly shrink (as it did in the late 1990s and early 2000s) if adversity hits the industry and other farm enterprises become more profitable than dairying.

Brazil

Brazil, which in the late 1990s was a major importer of dairy products, has moved close to self-sufficiency and is steadily increasing export sales. These changes have been possible partly because Brazil's economy and dairy industry have experienced greater stability than was the case in Argentina.

The Organization for Economic Cooperation and Development forecasts that Brazil's milk production will rise from about 24.7 billion liters in 2005 to 29 billion liters in 2015, a 17 percent increase [33, p. 2]. Brazil's dairy exports have increased steadily in recent years. In 2004, Brazil's dairy exports (mainly milk powder and condensed milk) totaled 79,000 tons valued at US$115 million [33, p. 3]. While Brazil imported about 70,000 tons of dairy products in 2005, this quantity was equivalent to only about 30 percent of the country's imports in the late 1990s.

The following developments have contributed to making Brazil more nearly self-sufficient in milk production and a potentially larger exporter of dairy products:

- Expanded numbers of large-scale commercial farms (with 300 to 500 milking cows) with low production costs have pushed up Brazil's milk supply.
- Professional farmer groups are improving animal genetics, feed equipment and pastures. These farmer groups are also modernizing cooling tanks and upgrading milking equipment to produce milk of the quality needed for demanding domestic customers and export markets.
- A host of government programs have been put in place to foster modernization of Brazil's dairy farms. Government funds provided by the programs are used to improve milk cooling and transportation systems, improve irrigation systems, rebuild silos, improve pastures and improve genetics. Funds for these programs are distributed in part via subsidized credit or government loan programs.
- Processors such as Nestle and Parmalat also provide assistance to farmer-suppliers to improve productivity on dairy farms and milk quality.
- Brazil's currency, the real, fell by about 30 percent against the U.S. dollar from 2001 to 2006, making the country's dairy exports and other exports more competitive in international markets.
- Cargill's acquisition of Nestle's whey derivatives production facilities in Porto Ferreira, Sao Paulo, Brazil may foster increased exports of Brazilian whey products [19].
- SERLAC, a private Brazilian trading company, has had success in expanding dairy exports to Algeria, Morocco, Libya and the Middle East. SERLAC, which includes five major
dairy companies and cooperatives, patterns its operations after the former New Zealand Dairy Board.

- DPA, a Nestle-Fonterra joint venture, has expanded Brazil's exports throughout Latin America and the Caribbean.

While these developments will help to facilitate expanded milk production and dairy exports, Brazil's dairy industry faces challenges. One problem is the limited government expenditures on infrastructure in Brazil. Phillips of Dairy Australia reports that only 6 percent of Brazil's roads are sealed and there is no extensive railroad system in the country, making logistics a significant problem for the dairy industry [33, p. 5]. Interest rates are also high in Brazil. While some Brazilian dairy farmers qualify for subsidized interest rates under the programs described above, those who fail to qualify for such programs frequently must pay interest rates as high as 20 percent for farm loans. The upshot is that farmer borrowing tends to be for short-term production expenses rather than for capital investment or dairy farm expansion. Thus, credit constraints could limit the ability of the many small dairy farmers in Brazil to become commercial operators that expand the country's milk supply.

Phillips characterizes the dairy exporting environment facing Brazil and Argentina as follows [33, p. 7]:

In the near term .. (these countries) are likely to retain a strong focus on exporting dairy products to neighboring countries in South America where population growth continues to stimulate demand. However, with milk production growing throughout the entire South American region, the Latin dairy exporters will also look to grow sales in markets outside their traditional destinations. The increased linkage of Latin dairy processors into global dairy distribution systems will add to this pressure.

Phillips provides a reasonable forecast. As reported in Babcock Institute Discussion Paper 2003-1, Brazil is a country to watch [10]. Brazil continues to position itself to be a strong competitor in international dairy markets.

REFERENCES

42. USDA-NASS. “Specialty Cheese Reaches 15 Percent of Total Cheese Production,” May 16, 2006.