



SPECIAL REPORT

Dealing with Volatility in Dairy Markets



Agrifax

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DAIRY INDUSTRY RISKS AND HEDGING OPPORTUNITIES

This report examines dairy price risk and the tools available to the global dairy industry to hedge against price volatility.

DAIRY INDUSTRY RISKS

Participants in the dairy industry are exposed to many types of risks. These risks include:

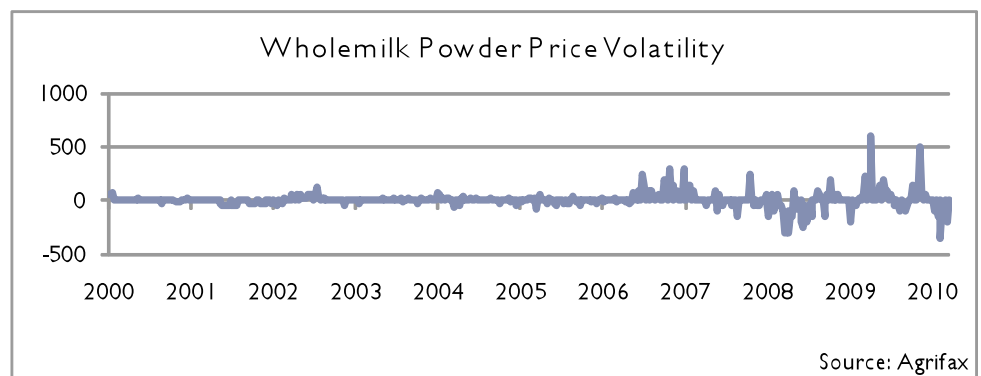
- credit risks such as not getting paid for products sold;
- operational risks such as processing machinery failure;
- compliance risks, for example not meeting environmental standards;
- climatic risks including production risks due to adverse weather conditions and;
- market risks such as commodity price and foreign exchange risks.

The majority of successful dairy farmers and processors will have systems or plans in place to mitigate at least some of the effects these risks pose to their businesses.

MARKET VOLATILITY

Historically, dairy commodity price risk was relatively small when compared with price risks other commodities were exposed to. Dairy commodity price movements were traditionally small with a steady upwards long-term trend. The Agrifax wholemilk powder (WMP) weekly price series, which commenced in 1991, moved by more than \$US100 per tonne on just one occasion, prior to June 2006. Since this time Agrifax has recorded 32 occurrences of a weekly WMP price movement, of greater than \$US100 per tonne.

Market volatility can be defined as “the degree to which prices fluctuate over time”¹. It is also widely accepted that “historical volatility is a guide to what future volatility may be.”²



There are several factors which have led to increased volatility of dairy commodity prices. These include:

- Supply and demand for dairy products not in equilibrium
- Global economic uncertainty during and following the recent credit crisis and subsequent financial crisis
- A reduction in intervention stock levels in both the US and the EU.
- Structure of the global dairy markets.

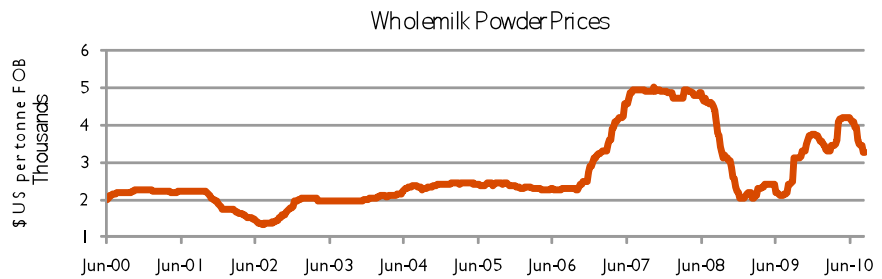
The United Nation's Food and Agricultural Organisation has blamed the volatility on changes in dairy farming, in which “more pasture-based, variable production has increased its market shares”³. If this logic is accurate then it is unlikely that we will see any reduction in volatility in the near future as dairy output from New Zealand is not expected to slow down.

¹ “Introduction to Futures and Options Contracts” eDairy Inc www.dairy.nu

² “Introduction to Futures and Options Contracts” eDairy Inc www.dairy.nu

³ “Spate of milk futures launches a ‘critical step’,” Agrimoney.com 3rd June 2010.

SUPPLY AND DEMAND FACTORS



Source: Agrifax

In 2007, the growth in demand for dairy products expanded at a greater rate than the growth in milk supply and the subsequent production of dairy products. This resulted in prices more than doubling then leveling off through 2008. However, "by late 2008 it was evident to market participants that supply was exceeding demand and the expected retraction of dairy commodity prices commenced"⁴. At this point the credit crisis started to unravel and the subsequent fallout resulted in a sharp drop in the demand for the highly priced dairy products.

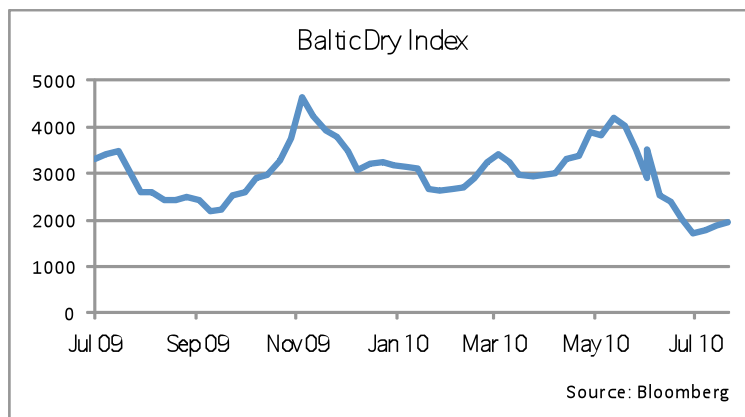
Demand for dairy products increased again in 2009, especially in the developing Asian markets. Dairy prices rapidly responded to the increase in demand and prices regained ground throughout the 2009 calendar year.

"Market volatility is a function of demand and supply dynamics. In the case of dairy markets it is likely that the increased volatility seen in recent times is not going to diminish, nor can it be suppressed in a sustainable way by policy mechanisms."¹

GLOBAL ECONOMIC UNCERTAINTY

Since the onset of the global financial crisis, credit has become much harder to obtain. This has hindered the trade of global commodities. Buyers are also more reluctant to purchase forward when prices are volatile. They don't want to end up in the situation where they have purchased goods at a higher price than their competitors. Over the past three years Agrifax has witnessed a change in buyer behaviour to a greater emphasis on short-term requirements. Longer term contracts are no longer favoured by buyers and sellers alike due to uncertainty in future price movements. Murray Goulburn general manager of international sales and marketing Mal Beniston said they "have always had the capability to manage price risk through longer term contracts of three and six months. These worked when volatility was capped. We could enter into a contract with a level of certainty but in today's market it's a much wilder ride and it's harder to make commitments that far forward".

This change in buyer behaviour has in turn generated further instability in the markets and a greater level of price volatility. The dairy industry is not alone in experiencing increased price volatility. The Baltic Dry Index is a measure of shipping activity and is considered a lead indicator of commodity trade activity. The graph below reflects the continued volatility being experienced in commodity markets in general.



Source: Bloomberg

⁴ "globalDairyTrade – Instigator of price falls or an insight into global market conditions" NZX Agrifax, January 2009.

GLOBAL DAIRY MARKET STRUCTURE

There are many different but interlinked markets for dairy products. These can be broadly be categorised as the United States (US), the European (EU), and the “global” dairy markets. The EU and the US are two of the largest producers of dairy products in the world. These regions also have very large domestic markets for dairy products, which account for the majority of the dairy products they produce.

“International dairy trade absorbs only about 5 percent of the cow’s milk produced globally.”⁵ “Historically, international trade in dairy products has only occasionally been important for the US dairy industry. In coming years, however, international trade may have a greater impact on the domestic industry.”⁶

When the internal supply surpasses demand for dairy products, the excess produce is either placed into storage or enters global markets. The structuring of global dairy markets adds to volatility, “The primary reason for this [volatility] is that Australia [and New Zealand] sit on the fringes of overall global milk supply. We trade in the same space that Europe and the US trade their domestic surpluses. We can’t control their internal supply / demand balances, let alone those of other nations such as our key markets in Asia.”⁷ “The United States has not been a major exporter of dairy products on a sustained basis. There have been sporadic unsubsidised exports of butter and nonfat dry milk powder over time but more often some subsidy has been required.”⁸

A small change in global milk production has a magnified effect on the global supply of dairy products. “If global demand or supply moves by 1%, a relatively small number by any standards, the product shortage or surplus equates to 14% of free global trade.”⁹

Stocks of skim milk powder and butter held in government storage programmes have reduced significantly in recent years. These stocks have a moderating effect on price movements within the EU and US dairy commodity markets as they limit price rises and falls. If prices fall too low product is purchased and placed into storage, creating a floor for the market. When prices rose significantly product was released from storage, thus increasing supply and restricting rising prices. At lower stock levels global market price signals infiltrate these markets more readily.

The EU and the US markets are also highly regulated by import tariffs, production quotas, regulated milk prices, export subsidies, government storage programmes etc. These distort price signals and result in price differentials between these markets and the world market. “Dairy markets are among the most protected in the world and dairy products are subject to larger export subsidies than any other food product. Support for the domestic dairy industries in the EU and the US distorts international dairy trade, for example through the export of subsidised dairy products on price sensitive international markets.”¹⁰

Regulation of the EU and US markets results in additional volatility in the world dairy commodity markets. “The absence of producer supports and dependence on global commodity markets has meant that New Zealand dairy farmers have been exposed to a level of milk price volatility historically.”¹¹ Generally any measures taken by EU and US regulators to protect their own producers disadvantages those operating outside of that particular region.

MANAGING DAIRY COMMODITY PRICE RISK

It is widely accepted that dairy commodity markets will remain volatile and prices will continue to fluctuate. “In the case of dairy markets it is likely that the increased volatility seen in recent times is not going to diminish, nor can it be suppressed in a sustainable way by policy mechanisms.”¹² “Market analysts and participants are still struggling to understand the dynamics of the market, and the fragile balance between supply and demand where only about 7% of dairy produce is actually traded across national borders.”¹³

Dairy industry participants have a choice to either accept price volatility and the chaos this can cause to their businesses or look for ways to mitigate price risk. Mal Beniston, Murray Goulburn has stated “A lot of customers are asking us for price risk management mechanisms. Murray Goulburn is getting a lot more feedback from customers who are looking for a way to mitigate their price risk. In the past that sort of inquiry was only coming from large global companies now it’s also coming from medium and smaller size players as well as from markets that wouldn’t normally have been concerned”¹⁴.

The need for a tool to manage the price risk of globally traded dairy commodities has resulted in the recent development of a number of dairy futures products by exchanges.

⁵ USDA Economic Research Service “Dairy Trade” March 19, 2009 <http://www.ers.usda.gov/briefing/Dairy/Trade.htm>

⁶ USDA Economic Research Service “Dairy Trade” March 19, 2009

⁷ “On the cause of milk price volatility” Dr Jon Hauser Xcheque.com 22nd August 2010

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⁹ “On the cause of milk price volatility” Dr Jon Hauser Xcheque.com 22nd August 2010

¹⁰ Ministry of Agriculture and Forestry – Dairy Report 2002.

¹¹ “GlobalTrade Q&A Part 2: Managing Price Volatility” Fonterra, January 2010.

¹² “GlobalTrade Q&A Part 2: Managing Price Volatility” Fonterra, January 2010

¹³ Barry Wilson’s Dairy Industry Newsletter flyer for Annual Conference May 2010.

¹⁴ Interview Mal Beniston – Murray Goulburn.

WHAT ARE FUTURES & OPTIONS?

A futures contract is a standardised, legal document calling for delivery of a particular commodity (or its cash equivalent) at a predetermined point in the future.”¹⁵ “An option is the right, but not the obligation, to buy or sell something at a fixed price in the future”¹⁶ at a price set today.

Futures products are traded by hedgers and speculators. “Hedgers produce or use the commodity traded and utilise futures contracts to manage price risk while speculators trade solely for profit and add liquidity to the market.”¹⁷ “Hedgers may use the futures market to lock in a price. Producers hedge to minimise the risk associated with a price decline while product users try to minimise the risk associated with a price increase.”¹⁸

“Futures contracts can be useful when marketing agricultural commodities because they can be used as a temporary substitute for an intended transaction in the cash market which will occur at a later date.”¹⁹

Futures contracts have several advantages over forward contracts. “They provide liquidity, potentially lower transactions costs, transparent and readily available price information and the ability to hedge to offset financial risk in the market.”²⁰

Futures products can be either physically settled or cash settled against a reference price. The majority of the dairy related products in existence today are cash settled.

DAIRY INDUSTRY USE OF FUTURES PRODUCTS

Futures have been traded on exchanges since 1848 when the Chicago Board of Trade (CBOT) was formed to trade grain futures. Trade of dairy futures also has a long history and can be traced back to “a forerunner of the Chicago Mercantile Exchange (CME)...formed in 1874 when the Chicago Product Exchange was organised to trade butter”.²¹

Dairy futures contracts that we recognise today were established in the US market in 1993 by the Coffee, Sugar and Cocoa Exchange (CSCE).²² Volatility of dairy commodity prices within the US in the early 1990s led to the CSCE establishing a cheddar cheese and a non-fat milk futures contract in 1993. Trade of these contracts was limited. “One reason given for the thin volume was the lack of cross hedging of milk in cheese futures.”²³ In 1995, the CSCE launched a futures contract for milk which also lacked liquidity. In 1996 the Chicago Mercantile Exchange (CME) also introduced a milk future which competed directly with the CSCE contract. Both exchanges then commenced trading butter contracts in the same year. The CME continued to launch additional contracts, adding a cheddar cheese contract in 1997 and in 1998 non-fat dry milk futures and whey futures. A decade ago the CSCE (by then part of the New York Board of Trade) stopped trading all dairy futures products.

The CME has made some changes to the products it has on offer over the past five years to meet industry needs. These include the introduction of a cash settled butter contract (in addition to the existing physically delivered contract) and a cash settled dry whey contract. In 2008 two nonfat dry milk contracts were added, one cash settled the other physically settled.

In June 2010 the CME commenced the trade of cash settled cheese futures and options. Tim Andriesen, CME Group Managing Director of Agricultural Commodities, was reported as saying “This contract was requested by our customers such as manufacturers and processors of cheese to better fit the needs of their risk profile”²⁴.

GLOBAL DEMAND FOR FUTURES PRODUCTS

More recently there has been industry demand for futures products to hedge against dairy price volatility in the markets aside of the US. The idea of a futures market has been supported by Bruno Le Maire, France’s agriculture minister, who stated “A futures market might increase stability for European milk producers”.²⁵

There has also been support for this from the United Nations who stated in June 2010 “The dairy contracts proposed by the Frankfurt-based Eurex exchange and Wellington’s NZX, and launched last month by CME Group, the operator of the Chicago’s grain and livestock

¹⁶ NZX Blog – “What is a clearing house”

¹⁷ “Introduction to Futures and Options Contracts” eDairy Inc www.dairy.nu

¹⁸ “Milk Futures, Options and Basis” Michael Haigh, Matthew Stockton, David Anderson and Robert Schwart, Texas Cooperative Extension, The Texas A&M University System.

¹⁹ “Introduction to Futures Markets” Risk Management Education

²⁰ “GlobalTrade Q&A Part 2: Managing Price Volatility” Fonterra, January 2010

²¹ “Introduction to Futures Markets” James Mintert, Mark Waller, Rob Borchardt, Kansas State University, February 1999

²² The Coffee, Sugar & Cocoa Exchange (CSCE) became part of the New York Board of Trade, which subsequently became a subsidiary of the Intercontinental Exchange (ICE).

²³ “Analysing Relationships between Cash and Futures Dairy Markets Using Partially Overlapping Time Series” Marin Bozic, T Randall Fortenbery, University of Wisconsin-Madison, Feb 2010.

²⁴ “CME Group Expands Dairy Complex with Cheese Futures” Futures Mag.com

²⁵ “Brussels mulls milk futures to help farmers”, Agrimoney.com 17th September 2009.

markets, were a “critical step forward to managing some of the risks associated with dairy product price volatility”.²⁶”

To meet such demand the CME launched an International Skimmilk Powder Futures in May 2010. In the same month, the Eurex started offering Skimmilk Powder and Butter Futures. The NZX plans to launch its Wholemilk Powder Futures on October 8, 2010.

A CLOSER LOOK AT FUTURES PRODUCTS ON OFFER

The following table summarises what dairy futures products are currently available or proposed.

Contract/ Commodity	Exchange	Contract Size	Terminal Price/ Settlement Method	First traded
Class III Milk *	CME	200,000lbs	Cash Settled against USDA announced Class III price for contract month	1997 (as BMP Milk Contract, became Class III contract in 2000)
Class IV Milk *	CME	200,000lbs	Cash Settled against USDA announced Class IV price for contract month	July 10, 2000
Cash-Settled Butter *	CME	20,000lbs	Cash Settled against USDA announced butter price for contract month	September 19, 2005
Butter (deliverable)	CME	40,000lbs	Physical Delivery	
Dry Whey *	CME	44,000lbs	Cash Settled against USDA announced butter price for contract month	March 19, 2007
Nonfat Dry Milk *	CME	44,000lbs	Cash Settled against USDA announced butter price for contract month	October 10, 2008
Deliverable Nonfat Dry Milk	CME	44,000lbs	Physical Delivery	April 20, 2009
Cash-Settled Cheese*	CME	20,000lbs	Cash Settled against USDA announced monthly average cheese price for contract month	June 20, 2010
International Skimmed Milk Powder	CME	20,000 metric tonnes	Physical Delivery in Auckland (NZ), , Melbourne (Australia), Rotterdam (Netherlands) Los Angeles ,Newark, Seattle (United States)	May 24, 2010
Skimmed Milk Powder	Eurex	5 metric tonnes	Cash Settled against Eurex Skimmed Milk Powders Index	May 31, 2010
Butter	Eurex	5 metric tonnes	Cash Settled against Eurex Butter Index	May 31, 2010
Global Wholemilk Powder	NZX	1 metric tonne	Cash Settled against <i>globalDairyTrade</i> WMP prices	October 8, 2010
Skimmed Milk Powder	NYSE Liffe	24 metric tonnes	Physical Delivery at a point within 150km of Antwerp, Hamburg or Rotterdam	Yet to be confirmed

* denotes options also available

²⁶ “Spate of milk futures launches a ‘critical’ step”, Agrimoney.com, 3rd June 2010.

The CME contracts, with the exception of their International Skimmed Milk Powder futures, are focused on the US domestic dairy markets.

The Class III contract has the longest trading history and accounts for the greatest volume of trades. Class III milk is used to produce cheese. In July 2010, there were 19,302 trades of

Class III milk futures and an additional 10,898 options traded.

Some other CME products are less liquid. The deliverable Butter contract has traded only once in the calendar year to July 2010 while the Deliverable Nonfat Dry Milk contract has traded only five times during the same time period.

There is a correlation between the prices the CME markets settle their US focused contracts at and global market prices. However, these prices do not always move in tandem. Therefore, if participants in the global markets use the CME products to hedge their commodity price risk, they will be subject to varying degrees of basis, the difference between the spot market price and the futures price.

The majority of the futures contracts currently available to the dairy industry are cash settled products. Cash settled products have an advantage over physically settled in that participants do not run the risk of having to deliver or receive product that might not meet their preferred specifications. Futures markets are not generally used to purchase goods but, rather, are used as a financial tool.

However, for cash settled markets to work effectively it is important that settlement is made against transparent and credible reference prices.

FUTURES PRODUCTS FOR NON-US MARKETS

The CME International Skimmed Milk Powder product is settled by physical delivery of product to various global locations. Contract size is 20 metric tonnes of SMP. Just one trade has occurred for this product since it was launched on May 24, 2010.

The Eurex launched Skimmilk Powder and Butter futures on May 31, 2010. These products are cash settled against Eurex generated indices. These indices are calculated by averaging reference prices which are reflective of spot prices for butter and SMP from Germany, France and The Netherlands markets. The contract size for both of these products is five metric tonnes. Since the launch of these two futures products there has been one trade on the SMP futures and the butter futures is yet to trade.

NYSE Liffe announced earlier this year they would launch a Skimmed Milk Powder (SMP) futures contract in Q3 2010. The proposed contract is for physical delivery within a 150km range of Hamburg, Antwerp and Rotterdam with a contract size equivalent to one truckload (24 tonnes).

NZX will launch its dairy futures market with a wholemilk powder futures product on October 8, 2010, with skimmilk powder (SMP) and anhydrous milkfat (AMF) futures contracts to follow. The NZX product has a contract size of one metric tonne and will be cash settled against *globalDairyTrade* (gDT) prices.

DIFFERENCES BETWEEN THE NZX WMP FUTURES AND OTHER FUTURES PRODUCTS

The NZX WMP futures will be the first futures product available specifically for wholemilk powder. WMP is the largest dairy commodity exported from Oceania by volume and therefore it is important to the industry that a risk management tool exists specifically for this commodity. Wholemilk powder is less subjected to distorting price mechanisms than skimmilk powder. Due to the lower fat content skimmilk powder can be stored for longer periods of time than wholemilk powder. Therefore SMP is often stored in government intervention programmes. When product is released from these storage programmes market price signals are distorted due to the increase in supply. "Futures markets thrive in free market conditions that are absent from artificial price intervention."²⁷

The NZX WMP futures product will be settled to *globalDairyTrade* (gDT) prices. *globalDairyTrade* auction results are highly watched and is the most credible and transparent reference price the world dairy market currently has. gDT prices influence a much greater volume of trade than just that traded on the auction itself. Trade volume patterns are based around the gDT auction cycle, with the majority of trade occurring approximately a week after the auction occurs when the gDT price has been absorbed and factored in by market participants. Brian Cloughley, Director of Investment Banking (Agribusiness) at Craigs Investment Partners, supports using gDT as a reference price "*globalDairyTrade*

²⁷ "Managing Market Volatility" Ian Dudden, Director Commodity Derivatives, NZSE Liffe. Presented at Dairy UK Conference – September 2009

prices provide an ideal reference price. The auctions are regular, independently operated, have a high level of integrity and are based on export prices for the key commodity used to determine milk prices in NZ. The move to fortnightly [gDT] auctions will only improve things because it improves pricing information”.

John Williams, General Manager, sales, marketing and innovation Warrnambool Cheese and Butter, stated “An auction where there is one seller, listing a relatively very small volume of product to a select group of buyers in a limited part of the global dairy market should not, by its very nature, be deemed as the true benchmark for the dairy commodity market. But the reality is that the gDT has become such a strong determining factor for dairy price management that an informal, de facto futures market is being created around it. I am not comfortable about that as I have no physical buyin nor can I truly offset risk over what is essentially an in house auction system. I do believe that the dairy market is demanding more tools to manage risk and the NZX WMP futures structure does provide the market with a far better management tool than what exists at the moment.”

An additional factor which differentiates the NZX dairy futures product from other products in the markets is the small contract size. According to Mal Beniston, general manager of international sales and marketing at Murray Goulburn, “The contract size of one tonne will give it wider appeal and the fact it is starting with whole milk powder makes it the first full cream milk powder futures product available in the world, also creating a level of interest.”

Williams said “I do believe that while the volatility that we have had to manage over recent years exists, the demand for management tools is there and will grow and if that is the case then that will set the success.”

Bruce Turner, Fonterra director of commodity risk and trade, was reported by the NZ Herald as saying “There’s no reason why this [the NZX WMP futures] shouldn’t be successful. Whole milk powder is a very good risk management tool for New Zealand. It’s not only applicable to New Zealand farmers, via the co-operative and the producers, but it’s also kind of interesting for a whole range of other investment vehicles.”²⁸

Beniston also believes there is market demand for risk management tools. “The level of demand from customers for price risk management means the NZX WMP futures product is something Murray Goulburn has to take a serious look at.” And went on to say “We’re looking at it [the NZX WMP futures] closely and building up our knowledge so we can develop a position on it.”

When asked if Westland would participate in the NZX WMP futures market, CEO Rod Quin stated “Westland is likely to initially hang back on the sidelines and be an interested observer. Trading futures products adds a new layer of complexity to the business which requires specialist skills.” This approach is expected to be taken by many potential futures traders who are yet unfamiliar with using futures products as risk management tools.

Brian Cloughley, Director Investment Banking (Agribusiness) Craigs Investment Partners, also iterated that caution was required when using futures products as risk management tools. “Anyone will be able to trade in milk futures contracts but using them as an effective hedging tool will require knowledge and expertise. Craigs Investment Partners will be taking a very cautious approach to advising farmers on the use of milk futures as a hedging tool.”

IN SUMMARY

Dairy price volatility has significantly increased over the past four seasons. Volatile prices have a negative effect on dairy processors and end users of dairy products alike. High price risk impedes the trade of dairy commodities. Demand exists for risk management tools which are focused on the global dairy markets. A number of exchanges have recently launched or are planning on launching derivative products to meet industry demand for tools to manage price risk. The NZX Wholemilk Powder futures product provides a tool to directly hedge against WMP price movements, is cash settled against a credible reference price (*globalDairyTrade*), operates within a free market environment and is supported by physical market participants.

²⁸ Global dairy futures market on the way by Owen Hembry NZ Herald, May 3, 2010

NZX Agrifax is a wholly owned subsidiary of NZX Limited and specialises in the analysis and reporting of data and information for the agriculture sector. NZX Agrifax uses an extensive database which dates back to 1987, covering farm and export prices for lamb, beef, venison, dairy products, wool, wheat, forestry, seafood and horticultural products.

NZX Agrifax (www.nzxagrifax.co.nz) products of special interest to the dairy sector include a monthly dairy report, covering milk supply, pricing and demand for dairy commodities; and The Dairy Trader, a free report available at least three days a week to provide a regular link to NZX’s Dairy Futures activity.

Another NZX subsidiary, NZX Agri, publishes several farming publications including The New Zealand Dairy Exporter, a monthly magazine for the dairy farming and processing/exporting sector (www.dairyexporter.co.nz).