

# The U.S. and World Milk Price Outlook: An Improving Prospect?

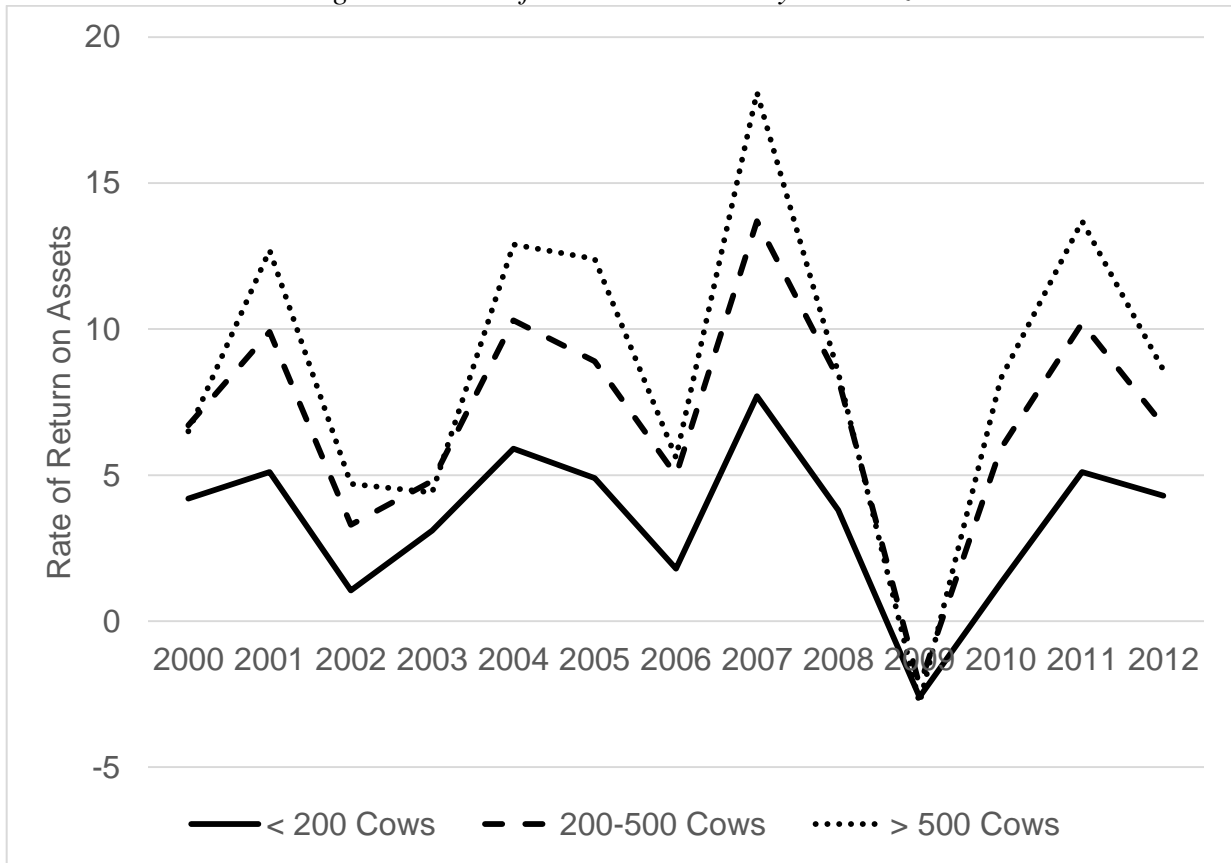
Mark Stephenson, Ph.D.  
Director of Dairy Policy Analysis  
University of Wisconsin, Madison  
Email: [mark.Stephenson@wisc.edu](mailto:mark.Stephenson@wisc.edu)  
Phone: 608-890-3755

There is an unending curiosity about milk price forecasts, and I think, rightly so. Having some knowledge about income in the year ahead may help to plan production targets for your operation and certainly, cash flow projections will help with investment decisions.

Before about 2005, the U.S. was relatively isolated from imports and export opportunities of dairy products—both represented about 3-4 percent of U.S. production. An active price support program also suppressed milk price volatility through the mid-1990s until that program was first diminished in effectiveness and later repealed. Prior to this time milk price forecasting was both easy to do and relatively uninteresting.

The volatility of milk prices and the uncertainty of profitability have created much more risk in the dairy industry, but with the additional risk also comes the possibility of greater rewards for those who manage the business well. My colleagues and I have recently conducted a study of farm level financial data from three major dairy states—Wisconsin, New York and Michigan. These states have a diversity of farm sizes and business models and we tracked about 12,000 annual data records of the same farms over more than a decade of observations. One of the interesting conclusions was that all farms suffered similar low rates of return on their businesses during low profit years, but in years with high prices, larger farms tended to experience much better return on investments than smaller farms did. I.e., better management practices yielded better rewards in the good years (Figure 1).

Figure 1. Rate of Return on Assets by Herd Size.



### Milk Price Cycles

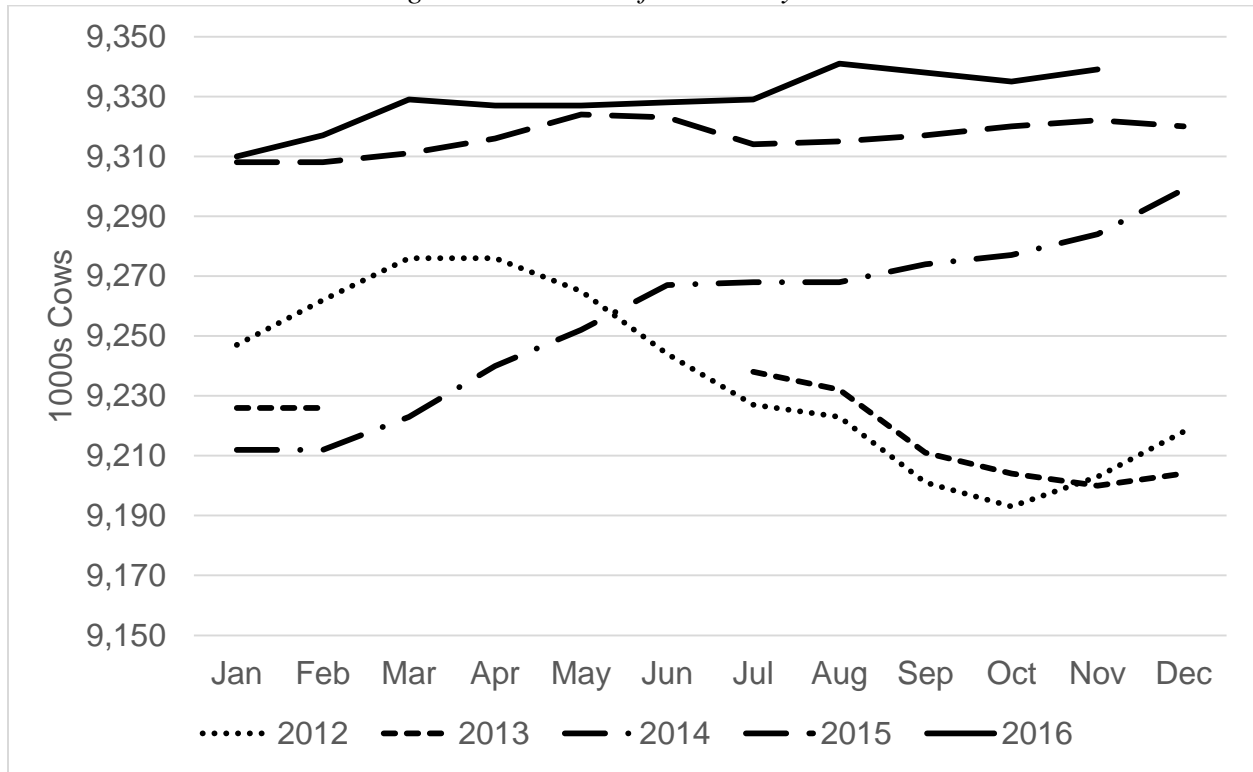
Milk price volatility has developed a cyclical nature. Spectral decomposition of the wave elements of price shows that there is clearly an annual cycle which corresponds to the continued seasonal nature of milk production and a seasonal demand that is almost counter-cyclical to milk production. I.e., milk production still has a spring flush and a fall short season while demand declines when schools recess for summer but accelerates in the fall from Thanksgiving through the Super Bowl. This basic annual pattern has been the same for about the last century.

The cycle that is newer and much more impactful is one that is about three years in length. The length has varied a bit from about 33 months to nearly 44 months over the last 15 years, but it has averaged close to 36 months from peak to peak or trough to trough during that time. While the causes of the seasonal cycle are well explained, the causes of the three year cycle are less well understood.

A big milk price, like dairy farms received in 2014, is a market telling producers that it wants more milk, and the price provides not only the signal but also the wherewithal to increase milk production. Some of the milk production happens because cows are fed a more concentrated diet and we get a bit more milk per cow, but we also tend to keep cows in the herd that we might have culled in other circumstances. We may also raise heifers from more marginal cows and generally, the U.S. herd

size increases over several months. We can see this happening in the number of cows in the U.S. in 2014 (Figure 2).

*Figure 2. Number of U.S. Dairy Cows.*



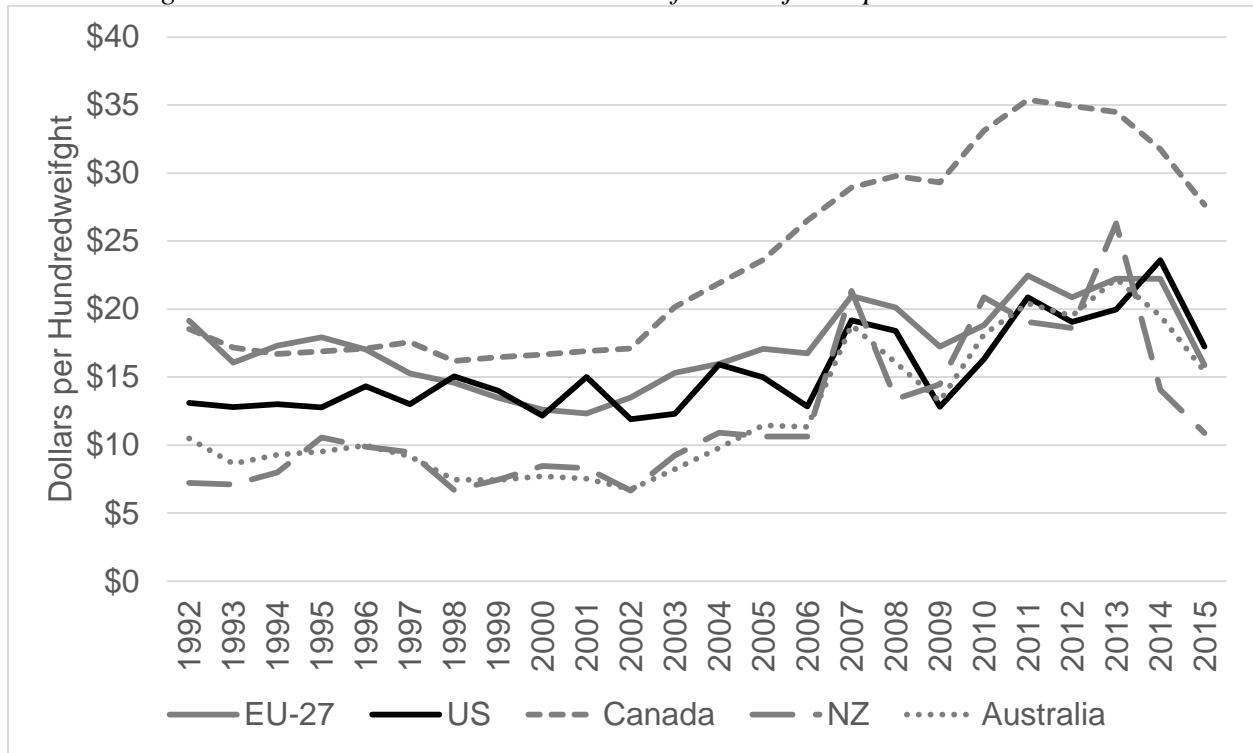
By the time the extra heifer calves are raised, bred and brought into the milking herd, the independent decisions of 40,000 U.S. dairy farms has a tendency to over-shoot the demand for dairy products. This then leads the market place to send the next signal to farms to reduce production by presenting them with a low milk price as was the case in 2012 (Figure 2).

These lags between the perceived need for product and the too-much, too-late delivery is a classic example of an uncoordinated supply chain causing price cycles and the volatility that we have seen in the last couple of decades. This has more recently been complicated by the emergence of the U.S. as a major exporter of dairy products.

### Dairy Exports

When the U.S. imported and exported about 3-4 percent of its milk supply, we had the luxury of ignoring what was happening in the rest of the world. Our domestic dairy industry was a fairly closed system. But, we have grown to be the third largest exporter of dairy products after the European Union and New Zealand which brings new opportunities but also new complications. If we are going to export dairy products, then we must be price competitive with other exporting regions or else countries wanting to import dairy products will source them from other sellers. In 2007, the four major dairy exporters achieved convergence of farm gate milk prices and they have tracked closely together in most years since that time (Figure 3).

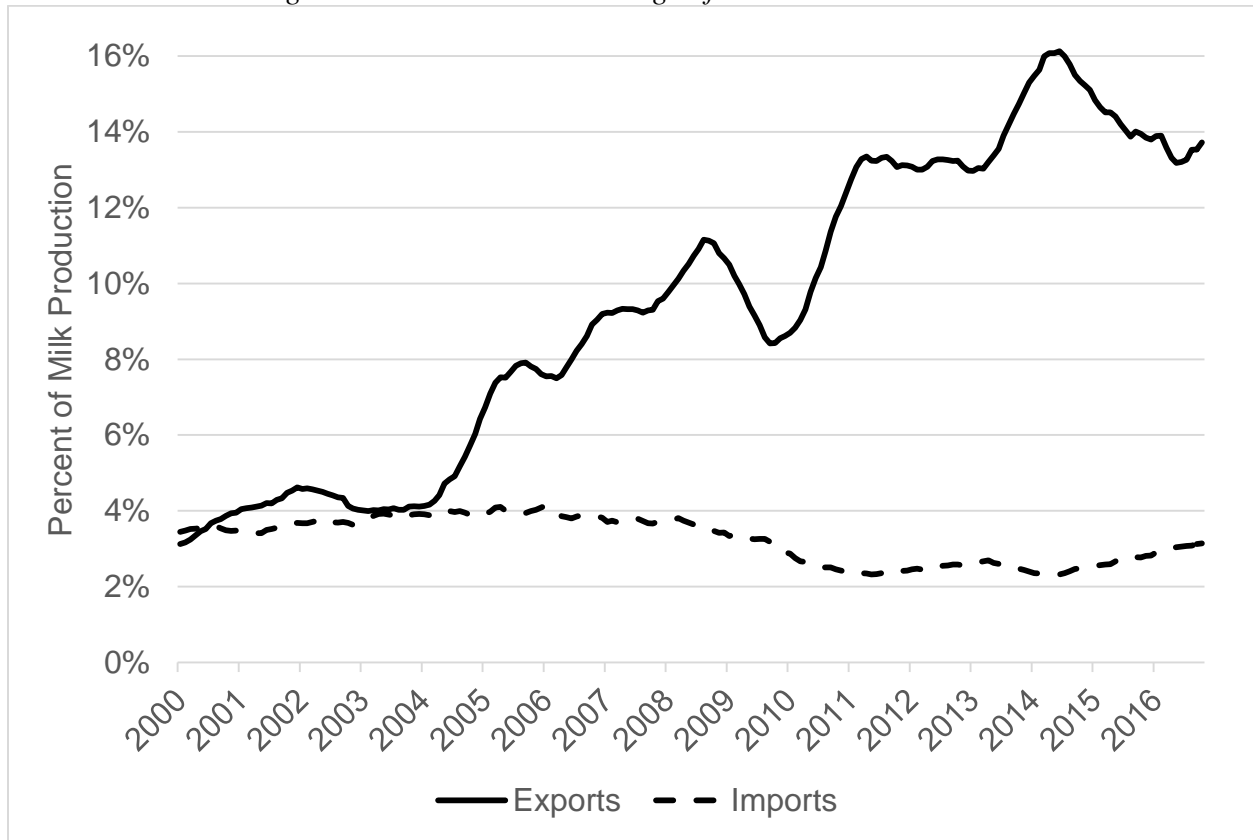
Figure 3. Annual Farm Gate Milk Prices from Major Exporters and Canada.



U.S. milk production per cow is a long and remarkable trend in increased efficiency. This very linear increase of about 284 pounds of milk per year shows no sign of either slowing down or speeding up to any significant degree. The highest yielding cows are now capable of producing more than 70,000 pounds of milk per year which is well above the U.S. average of about 23,000. Although there must be an upper limit to milk yield per cow, this difference suggests that there is still a good deal of room for the trend to persist. About half of the increase can be attributable to better selection of genetics and the other half to better management of the cow. However, this trend does have implications for dairy markets.

The average increase in milk per cow was outgrowing the average increase in per capita consumption of dairy products and our population growth. The implication is that we simply didn't need as many cows to support our domestic demand for dairy products. With the convergence of milk prices across the globe, we could find new demand for dairy products outside the U.S. and support continued higher levels of milk production.

Figure 4. Trade as a Percentage of U.S. Milk Production.



In about 2005 we began to export more significant quantities as our dairy product prices converged with the other exporting countries. Export trade has increased fairly steadily since that time reaching a high of about 16 percent of milk production. There have been a couple of notable exceptions during 2009 and the last two years.

The world slipped into a global recession in the last quarter of 2008 and most of the countries where we had found export sales simply couldn't afford to purchase as much as they had been. The loss of export sales amounted to about 2 percent of our milk production and the extra product stayed in this country. The U.S. was also in recession and selling the extra dairy products into our relatively poor domestic economy only happened at the very low prices of 2009.

We also lost sales of exports over the last two years; in fact, about the same amount as in 2009. However this time the product stayed into what has been a recovering and almost robust domestic economy. Farm milk prices have been depressed in 2015-16, but not nearly by as much as they were in 2009. Per capita domestic sales of cheese hit all-time highs in 2016 and butter sales have been higher than they have been in decades. Even fluid milk sales have recently seemed to stop their decline and sales of whole milk have been particularly strong. The medical community has declared a truce in the war on butterfat.

## Outlook for Dairy Prices

Milk prices hit their low point of the current cycle in May of 2016 and have been recovering since that time (Figure 5). I am forecasting continued price recovery through 2017 at a fairly steady pace with a plateau for the second half of the year. For your budgeting purposes, the 2017 U.S. All Milk price will average about \$2.50 higher than the average for 2016.

Figure 5. Actual and Forecast Milk Prices.



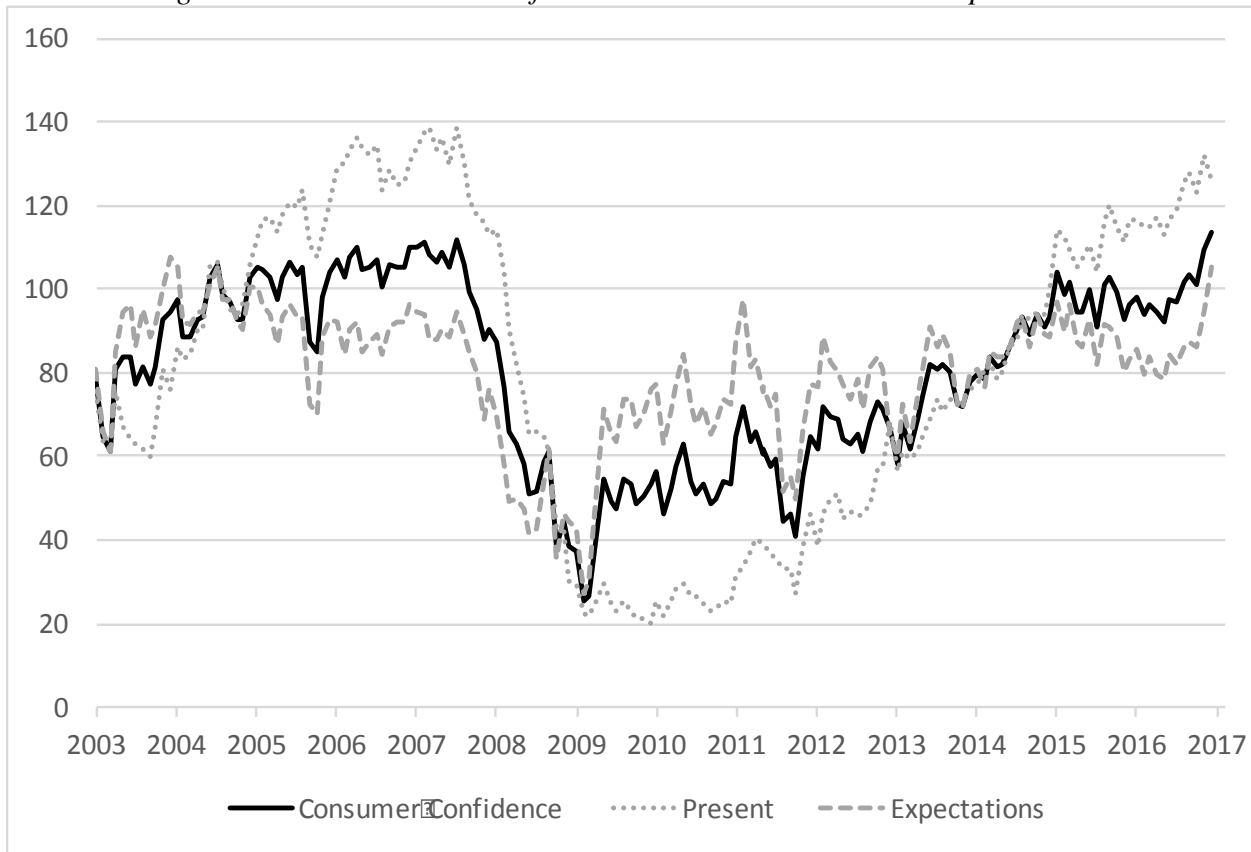
I come to this price forecast with the assumption that our domestic economy will continue to remain strong. The U.S. is basically at full employment now and other measures such as Leading Index for the United States, or the ISM Purchasing Managers Index are all indicating strength for the economy.

The Consumers Confidence Index is also supportive of a strong economy. This index is composed of two sets of questions that are asked of survey respondents monthly: one set is the Present Situation—“how are you feeling about the economy today”, and the other set is the Expectations—“what do you think about the economy in the near future”. The Confidence Index itself is just the average of the present and the expectations responses but we can often learn quite a bit by looking at the detail beneath the composite index.

Notice with the Confidence Index (Figure 6) that in 2008 consumers were saying two things: “the present situation is excellent but I’m concerned about the future”. When this happens, consumers

get conservative and begin to use caution with their spending—they put off buying a new car and they don't go out to eat as much, etc. In an economy that is largely driven by consumer spending, this begins to be a self-fulfilling prophecy about the future. This, and other circumstances drove the economy into the recession of 2009 which, as I've said, had implications for milk prices too.

*Figure 6. The Consumer Confidence Index with Present and Expectations.*



Through the depths of the recession in 2009-11, consumer response was basically saying “it’s awful today, but I’m optimistic about the future”. And this optimism began to pull us out of the recession and into the recovery that we enjoy today. Fast forward to 2015 and you can begin to see the divergence between the assessment of the present and the future that drove us into the last recession. I’m not forecasting recession in 2017, but I am urging that we keep our eyes on the consumer to make sure that we aren’t caught unaware of consumer pessimism again.

### **What Could Change My Forecast?**

Currently, the market appears to have optimism about the new Congress and the incoming Administration. I hope that optimism holds but it seems to me that there are more unknowns about what the actual changes in policy will be than in many past elections. If consumers begin to become pessimistic about the future, then we could well slide into a softer economy and one that doesn't support strong sales of dairy products.

I think that foreign markets hold more of the key to a different milk price outcome than our own domestic economy does. China seems to be showing signs of buying more dairy products again.

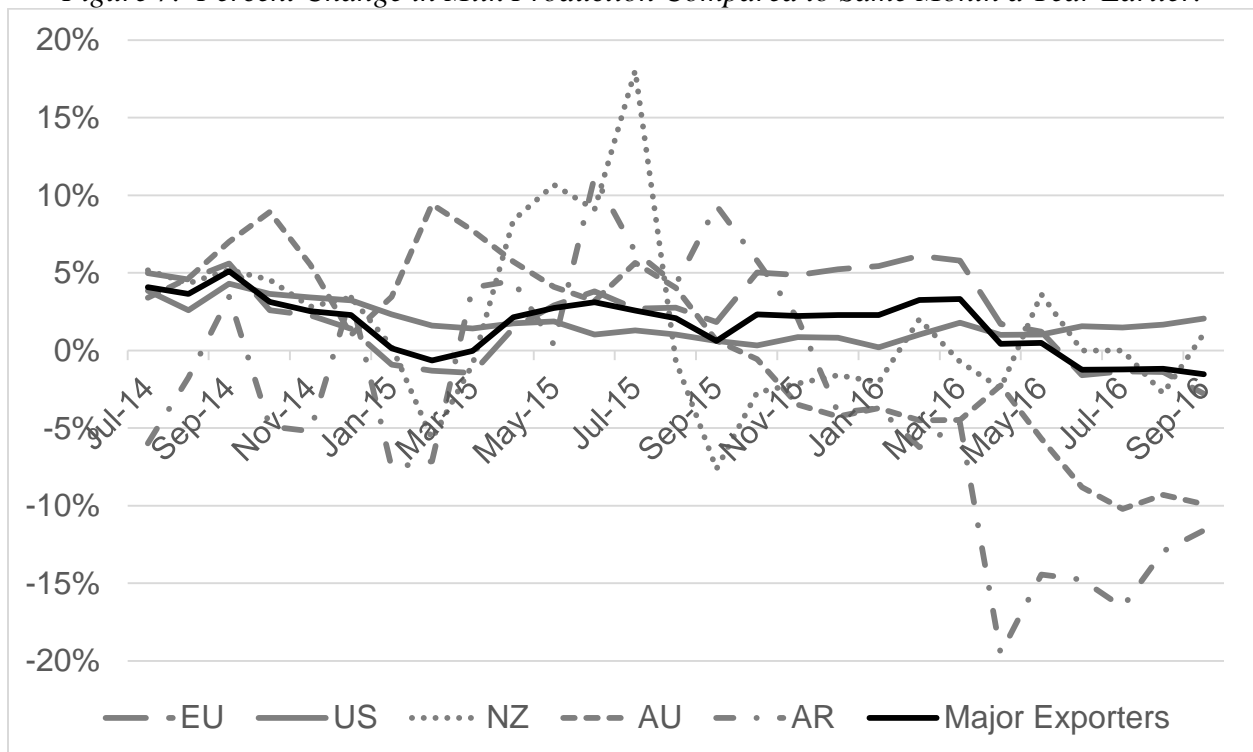
Their purchases of milk powder in late 2013 and early 2014 were primarily what led to the surge in milk prices for us in 2014. We also think that other Southeast Asian country demand will strengthen in the new year with India perhaps emerging as a new importer of dairy products. But to me, it is the exporting countries of the world that hold the key to the future of milk prices.

The European Union has been the largest exporter of dairy products for many years. The EU exports were surpassed by New Zealand for a recent few years but not by much. Europe’s agricultural policy revoked long-standing milk production quotas in April of 2015. Many of the countries of Europe were under constraint in milk production because of the quotas and several of the countries exploded into growth when the quotas came off. Notably Ireland, the Netherlands and Germany—some of Europe’s larger milk producers—increased production significantly throwing the world into a surplus of dairy products and the subsequent price depression we have recently been working our way through.

We began to see that low milk prices were having an impact on producer choices of output. In about April of 2016, growth in world milk production was less than the growth in demand for dairy products allowing the world to begin to pull down some of the surplus stocks that were weighing on prices. By May, it was obvious that world milk production would be negative and allow a faster draw-down of stocks. This was when we saw some of the first increases in product prices as buyers wanted to secure stocks at a time when prices were at their bottom.

By the end of 2016, only the U.S. had modest growth in milk production of the top 5 exporting countries (Figure 7). By June of 2016, the major exporters of the world were producing less milk and dairy products than in the previous year.

*Figure 7. Percent Change in Milk Production Compared to Same Month a Year Earlier.*





New Zealand, Australia and Argentina are all southern hemisphere countries with a predominant grazing and seasonal calving business model. All of these countries are well into their production season and will not make changes in stocking rates until the beginning of next year's production cycle. Europe may show some urge to grow as prices improve, but I think there are some other constraints that will hold them back.

The Netherlands has implemented a restriction on phosphorous application to their limited land mass. This is likely to reduce the dairy herd in that country by more than 100,000 cows. As milk prices declined, producers in several other countries of Europe bred dairy cows to beef bulls to search for profit in a different market. The calf crop of beef animals will play out over the next couple of years also limiting milk production potential. It is likely that milk production in the major exporting countries will be somewhat slow to respond to improved profitability in 2017.

The next major spike in milk prices will likely happen when dairy buyers around the world realize that stocks are getting tight. I believe that there is a chance that could happen by the fourth quarter of 2017 or possibility on into 2018. That would make our current cycle one of the longer cycles (from peak to peak) that we have seen but not out of the range.

### **In Summary**

2017 will be a year of recovery for dairy farmers around the world. Milk prices have been low for the better part of two years and most producers have put off major reinvestment of their capital assets for those years. Milk prices for the year should average about \$2.50 above the 2016 levels with greater price gains possible by the end of the year. This improved profitability will show up more markedly on the bottom line of the better producers across the country as a higher return on assets. I also expect that class III and IV milk prices will converge again, improving milk prices to western U.S. dairy producers where more butter and milk powders are manufactured.

As dairy buyers around the globe are looking for product, the U.S. will be in good position to supply some of those needs. This will put our export sales back on track to represent a greater proportion of our milk production. However, our competitors around the globe will not let us grab market share without a struggle. Expect them to chase a high price—the market signal that the world wants more milk. This of course will ultimately lead to over production and the cycle returns again.

Notes: