The ride is getting wilder by the minute:
The costs of nutrients and comparison of feedstuffs prices[1]

Dr. Normand St-Pierre[2]
Dairy Management Specialist
Department of Animal Sciences
The Ohio State University

I recall just a few months ago when the whole cottonseed market jumped above $250/ton. I received numerous phone calls and emails requesting help on how to deal "with these obscene cottonseed prices". I imagine that most dairy producers wouldn't mind still paying $250/ton for whole cottonseed. But the rapid changes in feed prices have opened many opportunities for judicious ingredient substitutions in dairy diets. There are bargains out there!

As usual in this column, I used the software SESAME™ that we developed at Ohio State to price the important nutrients in dairy rations to estimate break-even prices of all major commodities traded in Ohio, and to identify feedstuffs that currently are significantly underpriced. Price estimates of net energy lactation (NEl, $/Mcal), metabolizable protein (MP, $/lb – MP is the sum of the digestible microbial protein and digestible rumen-undegradable protein of a feed), non-effective NDF (ne-NDF, $/lb), and effective NDF (e-NDF, $/lb) are reported in Table 1. Compared to August 2008, the cost per unit of net energy is down slightly (-1.2¢/lb), MP is up (+5 ¢/lb), ne-NDF is down (1.6¢/lb), while e-NDF is slightly up (+0.3¢/lb). Compared to historical averages (i.e., since January 2005), NE_L is costing a premium of approximately 6¢/Mcal, or a 60% premium over the 4 year average. For MP, these figures stand at a premium of about 9¢/lb, or a 45% premium over the 4 year average. Thus, although the sticker shock associated with soybean meal prices has focused our attention on protein prices, it is the dietary energy that has seen the most dramatic relative increase in unit price. The cost of ne-NDF is currently severally discounted by the markets (i.e., feeds with a significant content of non effective NDF are heavily price discounted). Thus, maximizing the use of n-NDF in dairy rations could lead to significant cost savings. Meanwhile, unit costs of e-NDF are historically high, with a premium of about 5 ¢/lb over the 4-year average. Home-grown forages can be inexpensive sources of this important nutrient.

Table 1. Prices of dairy nutrients, Ohio, September 2008.

Estimate of Nutrient Unit Costs		
Nutrient name	Estimate	
NEl - 3X (2001)	0.158973	**
Metabolizable Protein (MP, g	0.292608	**
ne-NDF	-0.235281	**
e-NDF	0.074354	*

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[2] Contact: st-pierre.8@osu.edu

Based on mid September wholesale prices, central Ohio, feed commodities can be partitioned into the three following groups.

Bargains	**At Breakeven**	**Overpriced**
Canola meal	Alfalfa hay	Beet pulp
Corn, ground, shelled	Bakery byproducts	Blood meal
Corn silage	Feather meal	Brewers grains, wet
Distillers dried grains	Gluten meal	Citrus pulp
Gluten feed	Meat meal	41% Cottonseed meal
Hominy	Tallow	Whole cottonseed
Molasses		Fish meal
Soybean meal - expeller		48% soybean meal
Roasted soybeans		44% soybean meal
Wheat middlings		Soybean hulls
		Wheat bran

As usual, I must remind the readers that these results do not mean that you can formulate a balanced diet using only feeds in the bargain column. Feeds in the "bargains" column offer savings opportunity and their usage should be maximized within the limits of a properly balanced diet. In addition, prices within a commodity type can vary considerably because of quality differences as well as non-nutritional value added by some suppliers in the form of nutritional services, blending, terms of credit, etc.

One must remember that SESAME compares all commodities at one point in time, mid September in our case. Thus, the results do not imply that the bargain feeds are cheap on a historical basis. As a matter of fact, all commodities would be considered expensive on a historical basis. There are some feeds that are relatively more expensive than others and some that are cheaper.

In Table 2 we report the detailed results for all 29 feed commodities. The lower and upper limits mark the 75% confidence range for the predicted (break-even) prices. Feeds in the "Appraisal Set" were either deemed outliers (completely out of price), or had an unknown price (e.g., alfalfa hay of different qualities).

Table 2. Actual, breakeven (predicted) and 75% confidence limits of 27 feed commodities used on Ohio dairy farm.

Calibration set					
Name	Actual [/T]	Predicted [/T]	Lower limit	Upper limit	Corrected
Alfalfa Hay - 44 NDF 20 CP	215.000	229.294	206.758	251.830	229.294
Bakery Byproduct Meal	265.000	263.549	252.616	274.481	-
Brewers Grains, wet	45.000	34.903	30.221	39.585	-
Canola Meal (2008)	225.000	244.326	233.892	254.761	-
Citrus Pulp dried	245.000	200.958	191.773	210.143	-
Corn Grain, ground, dry	210.000	271.848	262.186	281.510	-
Corn Silage, 32-38% DM	64.000	83.648	76.333	90.964	83.648
Cotton Seed Meal, 41% CP	355.000	286.054	273.407	298.701	-
Cotton Seed, Whole w lint	395.000	373.058	344.087	402.029	-
Distillers Dried Grains w Sol	160.000	196.546	178.440	214.651	-
Feathers Hydrolyzed Meal	545.000	533.196	510.816	555.577	-
Gluten Feed, dry	162.000	206.305	194.279	218.330	-
Gluten Meal, dry	544.000	531.372	508.762	553.982	-
Hominy	195.000	212.687	202.290	223.084	-
Meat Meal, rendered	440.000	452.967	438.874	467.061	-
Molasses, Sugarcane	200.000	213.345	204.805	221.884	-
Soybean Meal, expellers	414.000	434.734	419.864	449.604	-
Soybean Meal, solvent 44%	375.300	346.319	337.306	355.332	-
Soybean Meal, solvent, 48	384.300	400.482	389.292	411.671	-
Soybean Seeds, whole roa	473.000	504.026	488.213	519.838	-
Tallow	750.000	718.248	684.250	752.247	-
Wheat Bran	120.000	75.921	54.787	97.056	-
Wheat Middlings	113.000	115.528	97.577	133.478	-

Appraisal set			
Name	Actual [/T]	Predicted [/T]	Corrected
Alfalfa Hay - 38 NDF 22 CP	0.000	262.550	289.157
Alfalfa Hay - 48 NDF 17 CP	0.000	214.671	196.933
Beet Sugar Pulp, dried	530.000	138.549	-
Blood Meal, ring dried	905.000	646.557	-
Fish Menhaden Meal, mech.	995.000	555.213	-
Soybean Hulls	199.000	-9.738	-

We can use estimated nutrient costs to benchmark feeding costs. In fact, these estimates are used to calculate the Cow-Jones Index, an index constructed here at Ohio State to measure the difference between milk revenues and the costs of providing the required nutrients at a production level of 65 lbs/cow per day. The Cow-Jones is conceptually very similar to income-over-feed costs, but is calculated without making reference to any specific diet (Table 3).

Table 3. Calculation of the Cow-Jones Index (CJI), October, 2008.

Date:	Sep-08		
Animal inputs			
Cow weight (lbs)	1500		
Milk (lbs/d)	65		
Fat %	3.6		
Prot %	3		
Other solids %	5.7		
Milk component prices inputs			
Fat ($/lb)	$ 1.8196		
Protein ($/lb)	$ 3.2689		
Other solids ($/lb)	$ 0.0234		
Nutrient costs inputs			
NE_L ($/lb)	$ 0.1590		
MP ($/lb)	$ 0.2926		
e-NDF ($/lb)	$ 0.0744		
ne-NDF ($/lb)	$ (0.2353)		
Nutrient Requirements Calculations			
NE_L (Mcal)	31.33		
MP (lbs)	4.64		
e-NDF (lbs)	10.15		
ne-NDF (lbs)	3.38		
Milk Income	***$/cow d***		***$/cwt***
Fat	$ 4.26	$	6.55
Protein	$ 6.37	$	9.81
Other solids	$ 0.09	$	0.13
TOTAL	$ 10.72	$	16.49
Nutrient Costs	***$/cow d***		***$/cwt***
NE_L	$ 4.98	$	7.66
MP	$ 1.36	$	2.09
e-NDF	$ 0.75	$	1.16
ne-NDF	$ (0.80)	$	(1.23)
TOTAL	$ 6.30	$	9.69
Income over nutrient costs			
	$ 4.42	$	6.80
(Cow-Jones Index)		$	6.80

From this table, one can see that the cost of supplying the nutrients required to produce 65 lbs/d amounts to a sizeable portion of milk income. We currently estimate that it costs on an average $9.69/cwt ($6.30/cow/day) – or close to 60% of the milk income - to provide all the nutrients required by a 1,500 lb cow producing 65 lbs of milk per day at 3.6% fat and 3.0% protein.

For the third month in a row, the Cow-Jones stands below the break-even threshold of $8.00/cwt. Thus, although milk prices are still strong from a historical standpoint, the majority of dairy producers are currently loosing money at an alarming rate. In fact, the financial situation on dairy farms could soon resemble what we had in the spring of 2006; it wasn't pretty then and it won't be any prettier now.