Chapter 5. Grain and Feed

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The growing demand for grains and oilseeds, relative to available supplies, is raising the average level of commodity prices and increasing price variability. Biofuel processors' demands are a well-known, though still relatively recent factor influencing prices. Another source of increased demand for farm commodities is the growing income and population in China and India.

Prices are influenced not just by current economic conditions, but also by expected supplies and demands. Given the uncertainty about future economic and crop conditions, it is clear why prices will continue to vary. News arrives in markets every day about the many, world-wide factors influencing prices of commodities. Thus, it is difficult to provide helpful outlook statements, except to say that price levels will remain high relative to historical experience, and will vary substantially from day to day.

Wheat

After a short crop last year, U.S. production of wheat in 2007-8 rebounded to near the level of two years ago (Table 5-1). Global wheat production is also larger this year relative to last, but expected supply is small relative to expected use. Wheat production is down in Australia and Europe, reflecting adverse weather conditions, especially in Australia. Year-end inventories for the world are forecast to be 17.4% of use, which is relatively small for the world as a whole.

For the U.S., the ending wheat inventory is projected to be 312 million bushels, the smallest level in almost 60 years. The stocks-to-use ratio is expected to be 13.6%, down from 26.5% just two years ago (Table 5-1). Wheat prices for December 2007 futures on the Chicago Board of Trade hit an all-time high this Fall of over $9.50 per bushel. Prices have since declined from the record levels, as high prices discouraged export demand. Nonetheless, the farm-level price of wheat is forecast to average over $6 per bushel for the current marketing year. This compares with $4.26 last year and $3.42 two years ago.

With stocks small relative to use, daily price changes are likely to be especially large. The December futures contract on the Chicago Board of Trade has experienced some "limit moves" of 30 cents per day. Unexpected news about exports, the size of next year's crop in the U.S. and abroad, and other factors will have dramatic effects on prices. Prices of contracts for future delivery suggest that the average level of wheat prices will remain high relative to historical experience. New crop futures (July 2008 through May 2009) are trading over $6.50 per bushel, as are futures contracts for the 2009-10 year. If other crop prices remain high, as they likely will, wheat prices will need to remain high in order to maintain acres in wheat production in forthcoming years. An increase in acres planted to wheat would have to be attracted from other crops. This is, of course, true for other crops as well. Markets must work to find an equilibrium among supplies and demands for all crops within the context of a relatively fixed supply of cultivatable land.

Corn

When farmers made planting decisions last Spring, they expected corn prices to be high at harvest, and accordingly they increased the acres planted. Thus, acres harvested for corn for grain this Fall are estimated to be over 86 million, up from 70.6 million in 2006 (Table 5-2), and with a relatively good yield, production is estimated to be 13.2 billion bushels. This is a record crop, and with a carryover of 1.3 billion, total supply will be about 14.5 billion bushels.

TABLE 5-1. U.S. SUPPLY AND DEMAND BALANCE SHEET FOR WHEAT[a]			
	2005-06	2006-07E	2007-08F
Supply:			
Harvested Acres (million)	50.1	46.8	51.0
Yield (bushels per acre)	42.0	38.7	40.5
		(Million Bushels)	
Beginning Stocks	540	571	456
Production	2,105	1,812	2,067
Imports	81	122	90
Total Supply	2,726	2,505	2,613
Use:			
Food	915	934	940
Seed	78	81	86
Feed & Residual	160	125	125
Total Domestic Use	1,152	1,140	1,151
Exports	1,003	909	1,150
Total Use	2,155	2,049	2,301
Ending Stocks	571	456	312
Stocks/Use Ratio	26.5%	22.3%	13.6%
Avg. farm price, U.S., $bu.	3.42	4.26	6.10
Avg. farm price, NYS, $bu.	3.34	4.03	-

[a]Data from USDA, "World Agricultural Supply and Demand Estimates," (November 9,2007) WASDE-452.

This supply is needed in the sense that a record demand exists. The demand for corn for food and industrial uses is projected to jump over a billion bushels, much of this related to increased use for ethanol production (Table 5-2). Exports are also projected to increase over 200 million bushels, and corn used for animal feed is expected to be up about 50 million bushels. The net effect is that the ending inventory on August 31, 2008 is forecast to be nearly 600 million bushels more than this past August 31. The stocks-to-use ratio is thus forecast to be 15.1%, which is in line with historical experience. Over the 13 year period, 1994-5 to 2006-7, the ratio has been below 15% five times (one of which was 2006-7).

As an aside, the estimated use of corn for feed in 2006-7 looks small. Since it is computed as a residual (total supply minus exports, food and industrial uses, and ending inventories), this number may have a large error. If, for example, the crop size for 2006-7 were revised upward, other things equal, feed use would increase. Some observers believe that this will happen in January when the USDA makes its "final" estimate for the 2006-7 crop. If this happens, the forecast of feed use for the current marketing year would increase, thereby reducing the forecast of ending stocks. To the degree that the market does not anticipate such a revision–and it is uncertain–prices would rise. This uncertainty will not be resolved until the January report is released.

While U.S. ending stocks are forecast to be near normal, the stocks-to-use ratio world-wide continues to decline (Table 5-3). The huge U.S. crop has the consequence that world production is up in 2007-8. But, the carry-in of inventory for 2007-8 is small by historical standards.

TABLE 5-2. U.S. SUPPLY AND DEMAND BALANCE SHEET FOR CORN[a]			
	2005-06	2006-07E	2007-08F
Supply:			
Harvested Acres (million)	75.1	70.6	86.1
Yield (bushels per acre)	148.0	149.1	153.0
		(Million Bushels)	
Beginning Stocks	2,114	1,967	1,304
Production	11,112	10,535	13,168
Imports	9	12	15
Total Supply	13,237	12,514	14,487
Use:			
Feed & Residual	6,155	5,598	5,650
Food, Seed and Industrial	2,981	3,488	4,590
Ethanol for Fuel[b]	1,603	2,117	3,200
Total Domestic Use	9,136	9,086	10,240
Exports	2,134	2,125	2,350
Total Use	11,270	11,210	12,590
Ending Stocks	1,967	1,304	1,897
Stocks/Use Ratio	17.5%	11.6%	15.1%
Avg. farm price, U.S., $bu.	2.00	3.04	3.50
Avg. farm price, NYS, $bu.	2.29	3.30	-

[a]Data from USDA, World Agricultural Outlook Board, (November 9, 2007) "World Agricultural Supply and Demand Estimates." WASDE - 452
[b]Ethanol for fuel is included in the food, seed, and industrial category and presented for illustrative purposes.

TABLE 5-3. WORLD SUPPLY AND DEMAND BALANCE SHEET FOR CORN[a]			
	2005-06	2006-07E	2007-08F
		(Million Metric Tons)	
Supply:			
Beginning Stocks	130.68	123.02	104.98
Production	696.36	703.45	768.22
Imports	79.47	89.22	90.49
Use:			
Feed, Domestic	476.31	471.33	481.50
Total, Domestic	704.03	721.48	762.82
Exports	80.93	91.79	91.89
Ending Stocks	123.02	104.98	110.39
Stocks/Use Ratio	17.5%	14.6%	14.5%

[a]Data from USDA, World Agricultural Outlook Board, (November 9, 2007) "World Agricultural Supply and Demand Estimates." WASDE - 452

The stocks-to-use ratio this past year for the world was 14.6%, and is projected to be 14.5% at the end of the current marketing year. These ratios are small relative to historical experience. The increased demand reflects not just ethanol use, but also increased demand for corn as livestock feed, especially in countries like India and China where income and population, and hence meat and dairy demand, are growing.

Production of corn, and other feed grains, is having a difficult time keeping pace with the growing demand. The market **expects** these demands to continue to grow in future years, and this is an important factor determining prices for current and future delivery (Table 5-4). Interestingly, the prices for forthcoming crop years (2008, 2009, 2010) are higher than current prices. In "normal" years, new crop harvest-time futures prices would be below the storage-month prices for the current year, but the market appears willing to pay some firms to carry inventory from this year to the next. The price of December 2008 futures is approximately 45 cents per bushel higher than for December 2007 delivery. The market clearly expects that the future demand for corn is going to be difficult to balance with supply.

TABLE 5-4 FUTURES PRICES FOR CORN
CHICAGO BOARD OF TRADE, NOV.9, 2007

Contract Month	- $ per bu. -
December 2007	3.8675
March 2008	4.04
May 2008	4.1375
July 2008	4.225
September 2008	4.2575
December 2008	4.315
December 2009	4.315

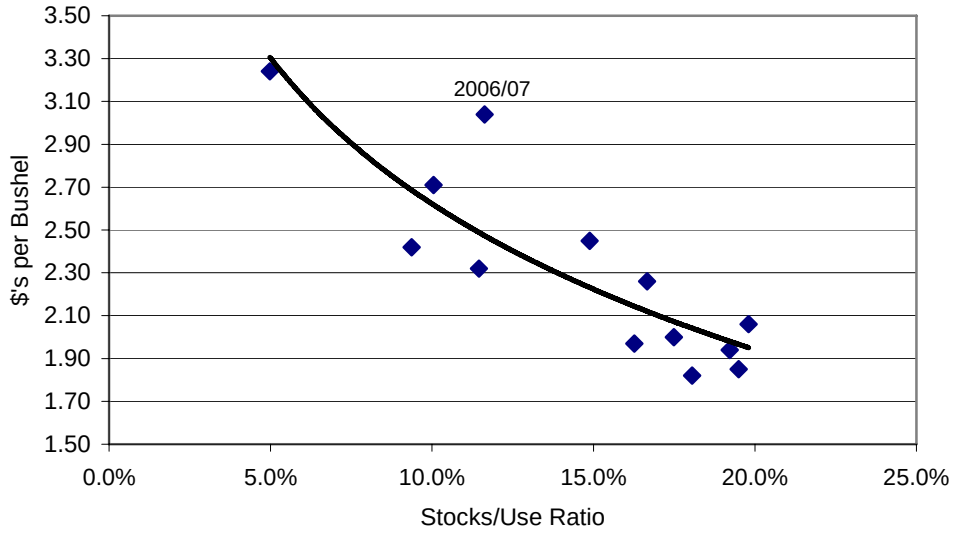
If one examines the historical relationship of the farm price of corn to the stocks-to-use ratio in the U.S. (Figure 5-1), it is clear that the price in 2006-7 was high relative to the historical relationship, and this is forecast to be true for 2007-8 as well. The relationship is shifting up and to the right. Apparently, the market wants larger inventories relative to use, given the upward trend in total use.

Are there factors that could result in lower prices? The answer is yes, though the probability of returning to the historical relation depicted in Figure 5-1 is small. If a world-wide recession occurs, then the demand for livestock products would decrease, reducing the demand for feed grains. Unexpected increases in feed grain production in other countries would also reduce the demand for U.S. exports. Political instability is still another factor that might influence corn exports, hence corn prices. And surprise data revisions could cause prices to rise or fall.

In recent months, the gasoline refining sector has not had adequate infrastructure to use all of the ethanol that was being produced. Thus, notwithstanding the increase in oil and gasoline prices, ethanol prices declined to the $1.50 to $1.60 per gallon range. As this is written, ethanol prices are showing signs of recovery, but they are still well below historical highs. A question is, how rapidly can refiners increase their capacity to use the ethanol that is being produced? To the degree that ethanol supply exceeds demand, there could be some downward pressure on corn prices in the short run. Presumably the capacity to use ethanol will improve.

The bottom line for corn, like wheat, is that prices are likely to remain at high levels by historical standards, but it is possible for prices to vary in a considerable range over the current marketing year.

FIGURE 5-1. RELATIONSHIP BETWEEN CORN PRICES AND THE STOCKS-TO-USE RATIO, U.S.,1994-2006.



Soybeans

The increase in area planted to corn came at the expense of other crops, especially soybeans. Thus, harvested acres for soybeans are estimated to be 62.8 million this year compared with 74.6 million last year (Table 5-5). The national average yield is also down over one bushel per acre from last to this year. So, production in Fall 2007 is estimated to be about 2.6 billion bushels compared with 3.188 billion in 2006.

The smaller U.S. crop is somewhat offset by the upward trend in soybean production in the Southern hemisphere, particularly Brazil. However, the increase in production elsewhere will not completely offset the smaller U.S. crop. U.S. exports are forecast to decline about 150 million bushels, but domestic crushing of soybeans is expected to change little from year to year. Data about soybean use for biofuel is sketchy; at current prices, the margin on processing beans to fuel oil looks slim. In any case, the stocks-to-use ratio is expected to decline in both the U.S. and the world. The U.S. ratio of 7.1%, forecast for August 31, 2008, is relatively small. The world's stocks are also somewhat smaller than normal (Table 5-6).

Thus, it is not surprising that soybean prices are high. The mid-point of the USDA price forecast for soybeans for the 2007-8 crop is $9.00 per bushel (Table 5-5); this number represents the national, farm-level average for the marketing year. As reported in Table 5-7, futures market prices, for delivery on the Illinois waterway, range from $10.56 per bushel (in January) to $10.74 (in July). If an average basis is subtracted from the futures prices, the implied national, farm-level price is somewhat above the $9.00 forecast of the USDA. NYS prices of soybeans have typically run a little below the national average.

New crop futures prices (for November 2008 and November 2009) are somewhat below current prices, but still high relative to historical experience. The consensus of traders in markets appears to be that relative to spring 2007, some acreage will move away from corn and back into soybeans. We will not have a reasonable indication of farmers' intentions to plant, however, until March and April.

TABLE 5-5. SUPPLY AND DEMAND BALANCE SHEET FOR SOYBEANS[a]			
	2005-06	2006-07E	2007-08F
Supply:			
Harvested Acres (millions)	71.3	74.6	62.8
Yield (bushels per acre)	43.0	42.7	41.3
	(Million Bushels)		
Beginning Stocks	256	449	573
Production	3,063	3,188	2,594
Imports	3	9	6
Total Supply	3,322	3,647	3,173
Use:			
Crushings	1,739	1,806	1,825
Exports	940	1,118	975
Seed	93	78	86
Residual	101	71	77
Total Use	2,873	3,074	2,963
Ending Stocks	449	573	210
Stocks/Use Ratio	15.6%	18.6%	7.1%
Avg. farm price, U.S., $bu.	5.66	6.43	9.00
Avg. farm price, NYS, $bu.	5.20	6.17	-

[a]Data from USDA, World Agricultural Outlook Board, (November 9, 2007) "World Agricultural Supply and Demand Estimates." WASDE 452

TABLE 5-6. WORLD SUPPLY AND USE BALANCE SHEET FOR SOYBEANS[a]			
	2005-06	2006-07E	2007-08F
	(Million Metric Tons)		
Supply:			
Beginning Stocks	47.46	52.94	62.08
Production	220.44	235.77	220.81
Imports	64.18	68.96	75.20
Use:			
Crush, Domestic	185.03	195.41	203.07
Total, Domestic	215.21	224.91	233.53
Exports	63.92	70.68	75.22
Ending Stocks	52.94	62.08	49.35
Stocks/Use Ratio	24.6%	27.6%	21.1%

[a]Data from USDA, World Agricultural Outlook Board, (November 9, 2007) "World Agricultural Supply and Demand Estimates." WASDE 452

With a small inventory of soybeans, prices are going to be especially sensitive to unexpected news about supplies or demands. How good will the crop in Brazil and Argentina be this Spring? Will there be surprises in international markets, like China? Etc. To get some sense of orders of magnitude, using data for 2006-7, world production of soybeans was 235.8 million metric tons. Of this amount, the U.S. produced 86.8 million, Brazil 59 million, and Argentina 47.2 million. China imported 28.75 million metric tons, or 12% of world production. Put another way, the beginning inventory for the 2006-7 marketing year was 52.9 million tons, and China's imports were more than half of beginning inventories. To re-emphasize, when inventories are small relative to demand, shocks to the market have large price impacts.

Like soybeans, meal prices are expected to decline somewhat in the 2008-9 crop year relative to current prices (Table 5-7). Futures prices for delivery this year have been as high as $295 per ton, but as of November 12 were about $285 for July delivery. Quotes for delivery in December 2008 were about $250 per ton as of November 12. But, like soybeans, meal prices are likely to be volatile.

TABLE 5-7. FUTURES PRICES FOR SOYBEANS AND SOYBEAN MEAL THE CHICAGO BOARD OF TRADE, NOV. 9, 2007

Contract Month	Beans $ per bu.	Meal $ per ton
January 2008	10.56	281.80
March 2008	10.705	286.70
May 2008	10.7225	286.70
July 2008	10.74	286.70
August 2008	10.57	279.00
September 2008	10.15	269.00
November 2008	9.895	252.50 (Dec)
November 2009	9.45	243.00 (Dec)

In summary, corn and soybean meal prices are going to remain high, and are likely to be highly variable around the average. Procuring feed at favorable prices is going to be a challenge. Given the expected volatility of prices, futures market quotes are a good way to keep informed about changes in aggregate market expectations. Evidence from the research literature suggests that futures markets provide as good quality forecasts as statistical models, but that all forecasts are inaccurate beyond three or four months into the future. In technical terms, futures prices are unbiased forecasts of delivery month prices, but have large standard errors of forecast–large confidence intervals. The research evidence also suggests that some experts can add information to that contained in futures quotes, especially information about regional conditions, and for the "best" forecast, one should combine futures quotes with expert analysis. Of course, futures prices are available continuously while other forecasts are available much less frequently.

Feed Costs

As mentioned above, recent expansions of the U.S. biofuels industry and corresponding increased demands for grains and oilseeds is affecting the structure of agricultural commodity markets. These changes have substantially different implications for crop and livestock operations across the country. In states such as New York, higher grain prices may provide some opportunities to expand cash crop production, but for dairy and other livestock producers, management adjustments will be required to respond to the anticipated higher and more variable feed costs, and to take advantage of supplies of alternative energy by-product feeds.

Combined with the existing higher fuel and energy prices, higher feed costs for dairy and livestock producers are having immediate impacts on farm profitability. This was particularly so for dairy producers in 2006 when high feed costs were concurrent with low milk prices. While increases in milk prices in 2007 have provided some reprieve from tighter operating margins, some producers are utilizing current increases in milk revenues to compensate or "catch up" from these recent tight margin periods. Given the expectation that corn and soybean meal prices will remain high (and highly variable) for the next year, there remains substantial interest in evaluating the outlook for future livestock feed prices, the availability of lower-priced biofuels by-products as feed ingredients, and in identifying potential risk management strategies producers can use to assist in the financial management of their operations.

While the potential increased supplies of biofuels' by-product feeds, primarily corn distillers dried grains with solubles (DDGS), may provide a lower-priced feed ingredient, several limitations and barriers will need to be addressed to minimize the impact of increased grain and oilseed prices. The ultimate effect on overall feed costs will vary by livestock sector, given varying feedstock prices and the degree of feasible ration adjustments. Ration adjustments will be limited by nutritional considerations, nutrient management implications, and availability of a quality and consistent product. The degree of feasible substitutability of these by-product feeds in livestock rations will also depend on the relative prices of various feed ingredient components. Even so, it is clear that higher grain prices will result in higher feed costs.

Biofuels Production in NYS

The Renewable Fuels Association reported in October 2007 that 131 corn-based fuel ethanol plants were in production in the U.S., with capacity of 6.9 billion gallons per year. Another 83 are under construction or expanding and, if completed as planned, would add another 6.6 billion gallons of capacity. Over the last four years alone, U.S. ethanol production has increased nearly 40% each year. Since one bushel of corn produces about 2.75 gallons of ethanol, these plants represent a significant demand for corn.

Biodiesel processing, while at an earlier stage of development, currently is produced from 105 plants in the U.S. with production capacity of 864 million gallons per year. Another 85 plants are under construction or expanding that would add another 1.7 billion gallons of capacity per year. According to the National Biodiesel Board, U.S. biodiesel sales increased from 75 million gallons in 2005 to 250 million gallons in 2006, a 133% increase over this one year period! To a large extent in the U.S., these plants utilize soybeans for the oil input, implying related feed market effects through soybean and soybean meal price adjustments. These adjustments are concurrent to those already experienced through adjustments being captured in corn markets. Perhaps more important, the availability of local crushing capacity will likely dictate industry development as current capacity is insufficient to sustain industry growth.

Corn ethanol and biodiesel facilities are no longer confined to the Corn Belt. Plant development beyond traditional areas is proposed in such states as WA, CA, GA, and NY, to name a few. Four corn ethanol plants are moving forward with developmentor construction plans in New York (Table 5-8). Combined, these plants will produce an anticipated 265 million gallons per year (mgy) of ethanol and require 107 million bushels (mbu) of corn. Planned local sourcing of corn represents 200,000 acres, or 37% of 2007 harvested corn grain acres in NYS. Similarly, two biodiesel plants are expected to produce 5 mgy requiring around 4.8 mbu of soybeans (Table 5-8). While the anticipated amount of local crop sourcing is not available, the feedstock acreage equivalent based on 2007 NYS harvested acres of soybeans is in excess of 50%. Such local demands for corn and soybeans will likely result in considerable impacts on local prices and price variability.

TABLE 5-8. CURRENT AND/OR PROPOSED CORN ETHANOL AND BIODIESEL PLANTS IN NEW YORK, 2007 [a]

Plant / Location	Plant Type	Fuel Production	Feedstock Requirment	Planned Local Sourcing
Northeast Biofuels, LLC Fulton, Oswego County	Dry Mill Corn Ethanol	100 mgy	41 mbu	10 mbu 78K acres
Cilion, Inc (CA) Caledonia, Livingston County	Dry Mill Corn Ethanol	55 mgy	22 mbu	4.6 mbu 36K acres
Western NY Energy, LLC Shelby, Orleans County	Dry Mill Corn Ethanol	50 mgy	20 mbu	4 mbu [b] 31K acres
Empire Biofuels, LLC (Cilion, Inc) Romulus, Seneca County	Dry Mill Corn Ethanol	60 mgy	24 mbu	6 mbu [b] 46K acres
Total Corn Ethanol		**265 mgy**	**107 mbu**	**24.6 mbu 191K acres**
NextGen Fuel, LLC Fulton, Oswego County	Biodiesel	5 mgy	2.4 mbu	*52K* acres [c]
Empire AgriFuel & Morrisville State College Cortlandville, Cortland County	Biodiesel	5 mgy	2.4 mbu	*52K* acres [c]
Total Biodiesel		**10 mgy**	**4.8 mbu**	**104K acres**
2007 Corn Grain Harvested Planned Ethanol Acreage	540K acres 37%	(123 bu/acre)		
2007 Soybeans Harvested Plant Acreage Equivalent	210K acres 51%	(38 bu/acre)		

[a] Sources: Renewable Fuels Association (www.ethanolrfa.org), authors' estimates, and New York Agricultural Statistic Service (crop plantings).
[b] Estimates of local sourcing not available, estimated at 25%.
[C] Local sourcing data not available; sourcing for biodiesel plants are expressed as the plant needs acreage equivalent.

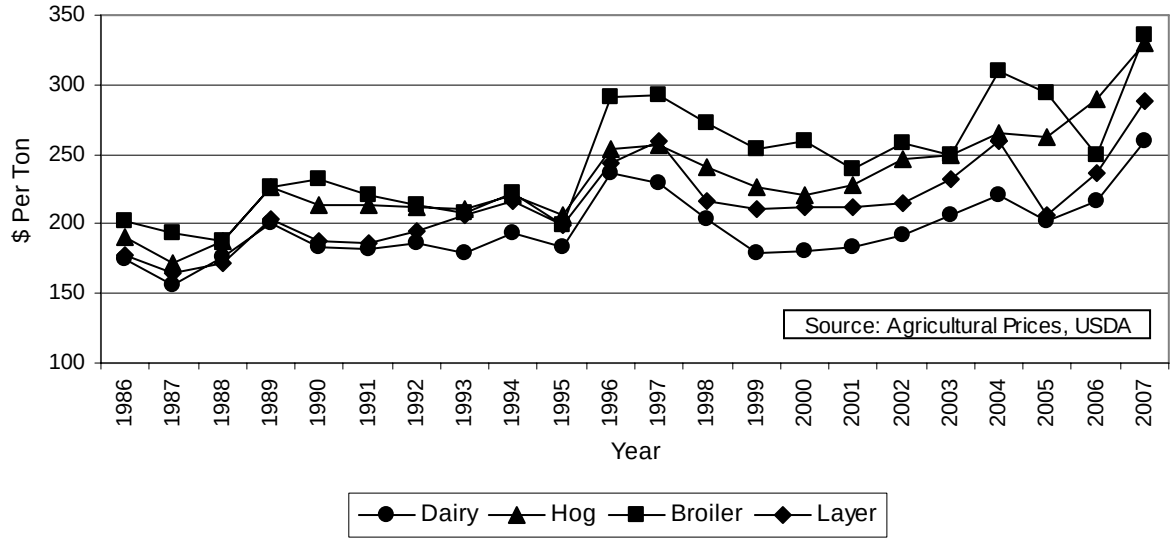
Outlook for Livestock Feed Costs

To better quantify anticipated feed costs for dairy and livestock producers in NYS (and the Northeast), we need to look at the relation of input prices to feed costs. Specifically, we can estimate the technical relationships between ingredient prices and feed prices for various livestock sectors in the Northeast. Then, given these estimates, we can use estimates of future grain and feed ingredient prices to estimate the potential effect on feed costs. Prices of futures contracts for corn and soybean meal (above) will be utilized as our source of expected changes in commodity prices. Given an uncertain future, such information can serve as a useful tool for planning production and feeding decisions; however, with the understanding that these prices reflect **current** information and expectations for the future, both of which can, and likely will, change with time.

The prices of four complete livestock feeds -- dairy (18% protein), hog (14-18% protein), broilers, and layers -- for the Northeast U.S. are plotted against years in Figure 5-2. The prices have clearly trended upward over the last 22 years, and the year-to-year changes have some correlation. Presumably these correlations are related importantly to the common influences of ingredient costs. Corn prices are perhaps the single most important driver of feed costs, but related ingredient prices also contribute to the variation.

The price of a feed can be decomposed into its cost components and a profit margin. If complete information were available for all these components, then an identity would exist at any point in time between the feed price and its cost components; however, such information is unavailable, particularly for changes over time. For example, suppose the price of a mixed feed (P_F) at a particular point in time depends on the prices of two commodity inputs (P_Y and P_X), and Y and X are used in a 0.6 and 0.4 proportion, then for a point in time, $P_F = 0.6P_Y + 0.4P_X$. If this is known, then no estimation is required. But, in practice, the right-hand side is more complex, and the technical coefficients may vary with the price levels.

FIGURE 5-2. NORTHEAST FEED COSTS BY LIVESTOCK SECTOR, APRIL, 1986-2007



In this context, regression models can provide insights into the price relationships, but should be viewed as descriptive of **historical average technical relationships**. The regression approach also permits a comparison of impacts of higher commodity prices across livestock sectors (e.g., dairy and poultry), and regression models allow us to estimate future feed prices conditional on possible future ingredient costs. Basically, the models attempt to capture the effects of the changes in major cost components on feed prices, with the omitted costs captured by a trend variable and the residual.

Specifically, we use the historical prices for representative complete mixed-feeds (Figure 5-2), along with principal commodity inputs and feed ingredients in the Northeast region, and estimate their technical relationships.[1] The availability of ethanol by-products as feedstocks, primarily corn distillers dried grains with solubles (DDGS), will also be considered in relation to substitutability of other feedstock products (like corn and soybean meal). Feed prices are reported regionally by the National Agricultural Statistics Service (NASS), USDA and collected annually during April using farm establishment surveys. As such, the numbers reported above

[1] While becoming less common in livestock production enterprises as a whole, historical prices are available for complete feeds; i.e., feeds supplying energy, protein, and vitamins/minerals. It is more common today to work with protein supplements at high crude protein levels and purchase and blend other feed ingredients (e.g., corn grain). As we are considering changes in prices of feed components for both energy and protein, complete feed costs are utilized.

(Figure 5-2) represent an average for the Northeast region. Commodity input and ingredient prices were obtained from the weekly magazine *Feedstuffs* and are wholesale prices FOB Buffalo, NY.

While the feed ingredients reflect the major feedstock components to livestock rations, DDGS also represents a by-product produced from corn ethanol dry milling. Growing ethanol production implies a larger supply and potentially lower prices for this by-product. Likewise, increased demand for soybean oil for use in biodiesel production implies lower prices for soybean meal, given increased crushing activity and supply of meal, all else held constant. The differential cost impacts across livestock sectors is important given that corn DDGS can be utilized more readily by ruminants (i.e., dairy cows) than non-ruminants (i.e., hogs and poultry).

We apply projected prices for corn and soybean meal based on Chicago Board of Trade (CBOT) settlement prices for corn and soybean meal futures contracts on November 9, 2007 (see above). The results, conditional on market information November 9th, provide current estimates of future feed cost levels. The predicted feed costs across livestock sectors for several levels of CBOT corn and SBM contract prices are reported in Table 5-9. The top of Table 5-9 shows the increases in feed costs from 2006 to 2007. Corn (in particular) and soybean meal prices both increased substantially. Corn DDGS prices also increased 13% from $124 to $140 per ton, thus not reflecting the 'over-supply' condition (yet), as expected by many industry analysts that would put downward pressure on its price. Resulting feed cost increases ranged from 13% to over 18%, or $35 to $40 per ton, across livestock sectors - a dramatic increase in a one-year time span. Note that while the nutritional feasibility to incorporate corn DDGS into livestock rations is one factor in determining feed cost increases, the relative proportions of ingredients in rations varies by livestock sector and will also affect changes in feed costs.

TABLE 5-9. PREDICTED NORTHEAST FEED COSTS AND POTENTIAL CORN DDGS COST SAVINGS. [a]

Year	Corn Price ($/bu)	SBM Price ($/ton)	Dairy Feed ($/ton)	Hog Feed ($/ton)	Broiler Feed ($/ton)	Layer Feed ($/ton)
2006	$2.45	$194.90	$210.41	$275.35	$279.37	$241.46
2007	$4.05	$229.00	$249.17	$310.22	$326.88	$281.99
% Change	65.31%	17.50%	18.42%	12.66%	17.00%	16.78%
Contract Year (Corn / SBM)	December	January	Historical Correlation (Corn to DDGS = 0.45) [b]			
2007 / 2008	$4.12	$261.80	$255.34	$316.05	$338.66	$281.92
2008 / 2009	$4.57	$232.50	$255.41	$320.80	$334.27	$286.35
2009 / 2010	$4.57	$223.00	$256.48	$324.89	$336.18	$289.62
			Estimated Correlation (Corn to DDGS = -0.82) [c]			
2007 / 2008	$4.12	$261.80	$254.59	$315.02	$338.66	$281.34
2008 / 2009	$4.57	$232.50	$249.87	$313.90	$334.27	$281.30
2009 / 2010	$4.57	$223.00	$250.95	$317.99	$336.18	$284.58
			DDGS Pricing Cost Savings [d]			
2007 / 2008	$4.12	$261.80	-0.30%	-0.33%	na	-0.20%
2008 / 2009	$4.57	$232.50	-2.17%	-2.15%	na	-1.76%
2009 / 2010	$4.57	$223.00	-2.16%	-2.12%	na	-1.74%

[a] Future corn and SBM prices are based on CBOT contract settlement prices for November 9, 2007. Contract prices were adjusted for average NYS differentials; i.e. plus $0.25/bu on corn and minus $20/ton on SBM.

[b] The historical price correlation of corn to DDGS was computed from the annual NASS, USDA data, 1986-2007.

[c] The negative price correlation of corn to DDGS is computed from price predictions in "FAPRI 2007 U.S. and World Agricultural Outlook," FAPRI Staff Report 07-FSR, January 2007.

[d] The DDGS pricing cost savings reflects the difference between the estimated and historical price correlations. Note that DDGS prices were not included in the Broiler equation due to a lack of statistical significance.

The next section of Table 5-9 shows computed livestock feed prices based on future December and January corn and soybean meal contracts, respectively. Due to a lack of sufficient futures trading on corn DDGS, we compute its implied price based on the historical price correlation between it and corn. While corn DDGS has been available and utilized in rations for many years, it has been typically in short supply. Hence, the correlation between the two prices is positive; i.e., when corn price goes up, corn DDGS prices will also increase. Using historical corn and corn DDGS prices in New York, this correlation was estimated to be 0.45. Based on this relationship, feed costs across livestock sectors would remain 3% to 5% above current levels for the next few years, even with expected decreases in soybean meal prices. The largest relative increase is in the hog sector due mostly to a higher proportion of corn fed in the diet.

The dramatic growth in ethanol production is resulting in a larger supply of corn DDGS; each bushel of corn used in ethanol production produces about 17 pounds of corn DDGS. Larger supplies of DDGS are expected to reduce its price and, therefore, make it a relatively more preferable feed ingredient. But, its use is limited by nutritional constraints (particularly for non-ruminants). Whether or not the historically positive price correlation between corn and corn DDGS will continue depends on the growth in supply relative to demand, and it does appear likely that supply will grow relative to demand. If corn DDGS prices do drop, then this correlation could decline and become negative. We explore these correlation relationships in the other two sections of Table 5-9.

Utilizing national crop-year predicted price data from FAPRI's 2007 *U.S. and World Agricultural Outlook* report (FAPRI Staff Report 07-FSR), we compute the expected price correlation coefficient between corn and corn DDGS over the crop years 2006/2007 through 2016/2017. Indeed, using this data as a reasonable proxy for future pricing conditions, we compute a price correlation coefficient of -0.82. It is this inverse relationship that has the potential to partially offset increases in livestock feed costs from rising corn prices. In fact, this level of negative correlation is indeed quite large, compared with historical relationships.

Utilizing the same expected prices for corn and soybean meal based on futures contract settlement prices, we compute the implied price of corn DDGS and apply these prices to our feed cost model. As corn prices between December 2007 and December 2009 are expected to increase, corn DDGS prices are expected to fall. The resulting computed feed costs are in the next section of Table 5-9, followed by the percentage changes in feed costs relative to the historical correlation scenario. Based on the historical utilization of feed ingredient components and relative prices, offsetting corn DDGS price impacts are expected to be limited, at around 2%, at least in the short run.[2] While the cost savings appear lower for the nonruminant sectors, the differences are minimal.

What does this say about feed cost affects with an increasing supply of lower-priced corn DDGS? Given historical utilization rates, little if any costs savings are forecasted, even with relatively strong negative price correlations. Certainly, the technical relationships estimated will likely change with time and a ready supply of corn DDGS feedstocks. Limited supplies in earlier periods may have physically limited actual utilization levels, even though relative prices may have indicated otherwise.

Even so, much of the current concern over this 'new' feedstock may also limit its utilization. Issues of poor quality corn DDGS feedstocks are common, as well as considerable variation in product components across plants or even at the same plants across time. Such issues will severely limit its utilization by livestock producers and feed dealers, even if the supply is readily available. Biofuel refineries realize this, of course, and are working to address these deficiencies. Improved plant production and handling techniques, and marketing and branding of higher quality by-product components will drive utilization and, perhaps, larger feed cost savings than estimated here.

[2] Note that the price of corn DDGS was excluded from the broiler equation due to poor statistical results. As a result, there are no differences in feed costs between the two scenarios.

In summary, higher and more variable corn and soybean meal prices will translate into the same effects on livestock feed costs. Based on historical utilization of corn DDGS, reductions to this rise in feed costs are likely to be minimal, at least in the short run. In particular, if past conditions hold between corn and corn DDGS prices, we anticipate dairy feed costs to remain $6 to $7 per ton above those realized early in 2007 for the next one to two years. At best, even if the inverse pricing relationship materializes, dairy feed costs are expected to remain at the higher levels currently being experienced by dairy producers.