Monsanto Dairy Business Producer Council
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Dairy Economic Modeling

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Discussion Topics

- Need for economic modeling
- Economic model (spreadsheet) example
  - 2005 vs 2006 for various regions
- Increased volatility (milk and corn prices)
  - Low input vs high production
- Management interventions

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Industry is changing…

… industry trends increase the need for dairy managers to better understand the ***relative*** strengths and weaknesses of their businesses if they are going to be economically competitive in the future.

Economies of size…

… as the proportion of "large" dairies increases, the economies of size benefits will diminish. In other words, the benefits to getting to a certain size (e.g., 3,000 cows) will likely be less in the future than they were in the past.

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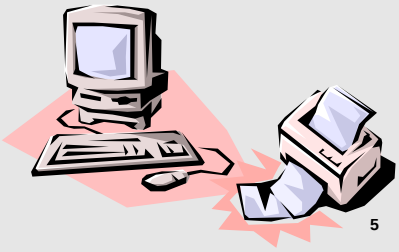
Decision-making…

… agricultural producers (including dairy) have made a lot of profitable decisions based on "gut-feel" in the past. While this will continue, the importance of more "numbers-based" decisions will likely increase as margins tighten and competition increases due to increased consolidation.



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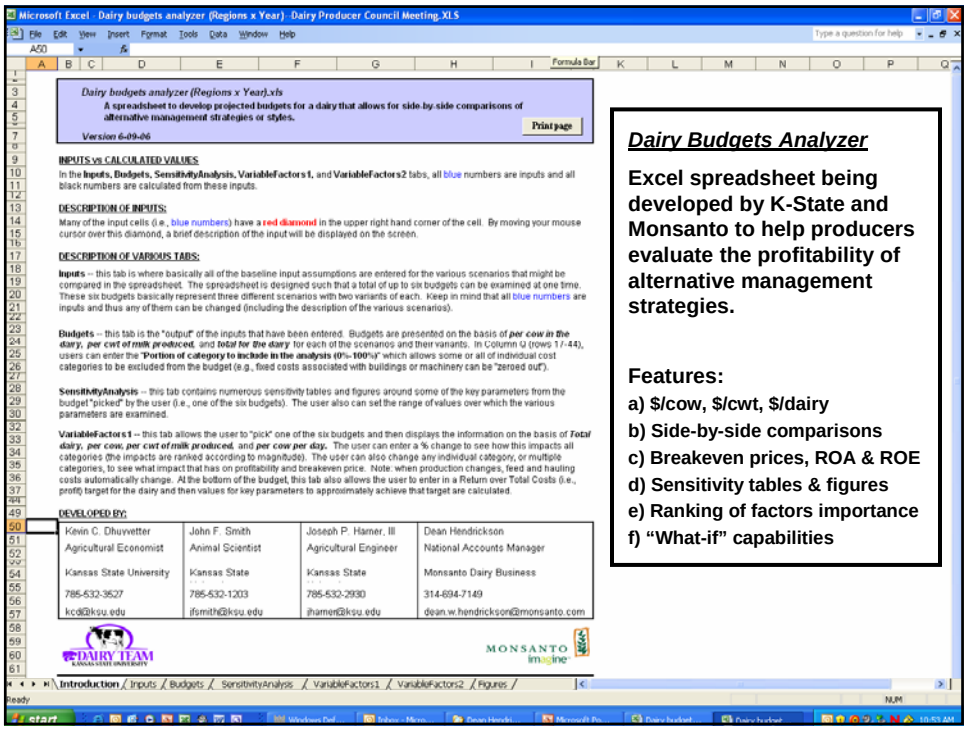

Dairy Budgets Analyzer

Excel spreadsheet being developed by K-State and Monsanto to help producers evaluate the profitability of alternative management strategies.

Features:

a) $/cow, $/cwt, $/dairy
b) Side-by-side comparisons
c) Breakeven prices, ROA & ROE
d) Sensitivity tables & figures
e) Ranking of factors importance
f) "What-if" capabilities

Dairy Budget Analyzer.xls – Example #1

- **Comparison of 2005 vs. 2006**
  - CA/AZ
  - ID/WA
  - IN/OH
- **Differences (annual and/or regional)**
  - Milk prices and production
  - Feed costs
  - Labor, utilities, fuel, hauling costs
  - Cow prices
  - Investment
  - Interest rates

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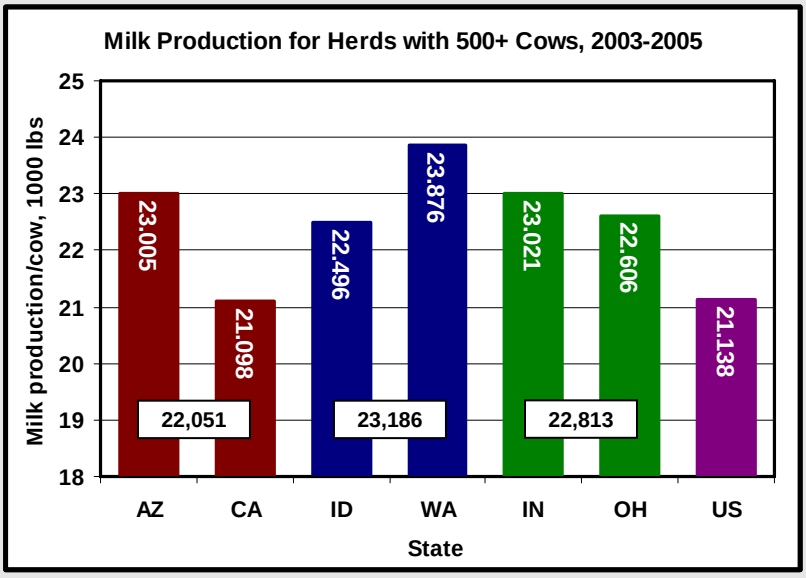
2003-05 Regional Milk Production/Cow



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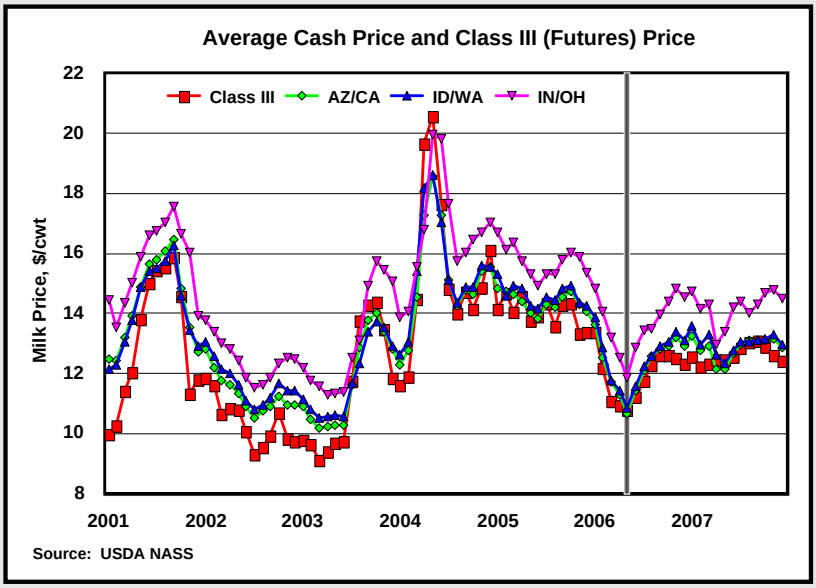
2001-07 Class III and Regional Milk Prices

Source: USDA NASS & KSU



Source: USDA NASS

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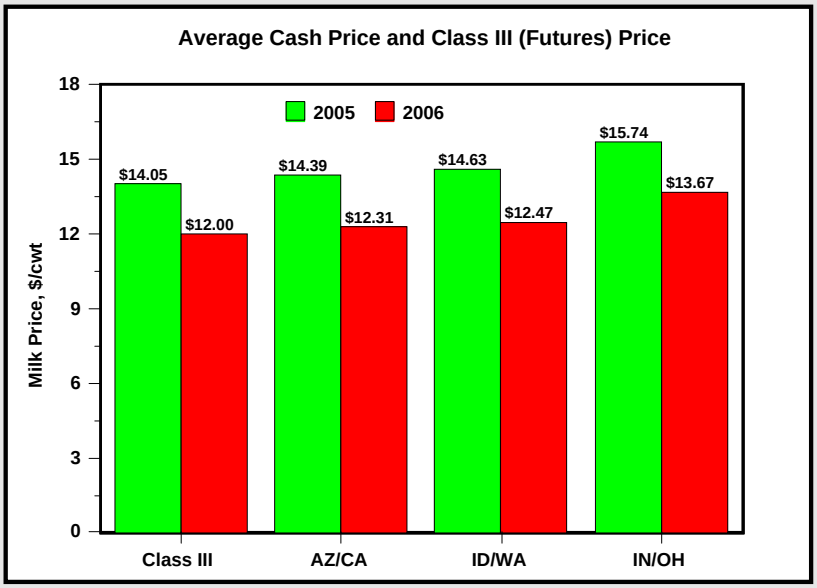
2005 vs 2006 All Milk Prices

Source: USDA NASS & KSU



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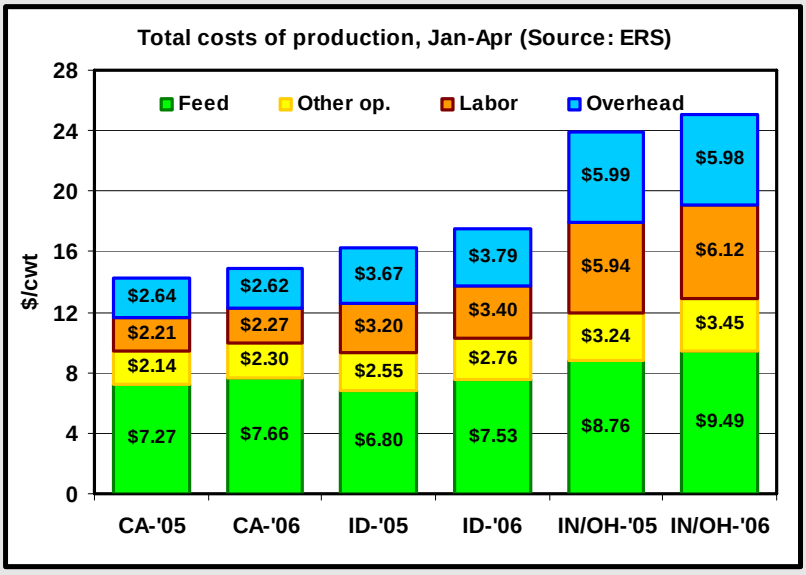
2005 vs 2006 Regional Costs of Production



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Percent change in costs (2006 vs 2005)

Cost category	CA	ID	IN/OH
Feed	5.4%	10.7%	8.3%
Other op.	7.1%	8.1%	6.5%
Labor	2.7%	6.2%	3.0%
Overhead	-0.7%	3.1%	-0.2%
Total	4.1%	7.7%	4.6%

Source: Economic Research Service (ERS)

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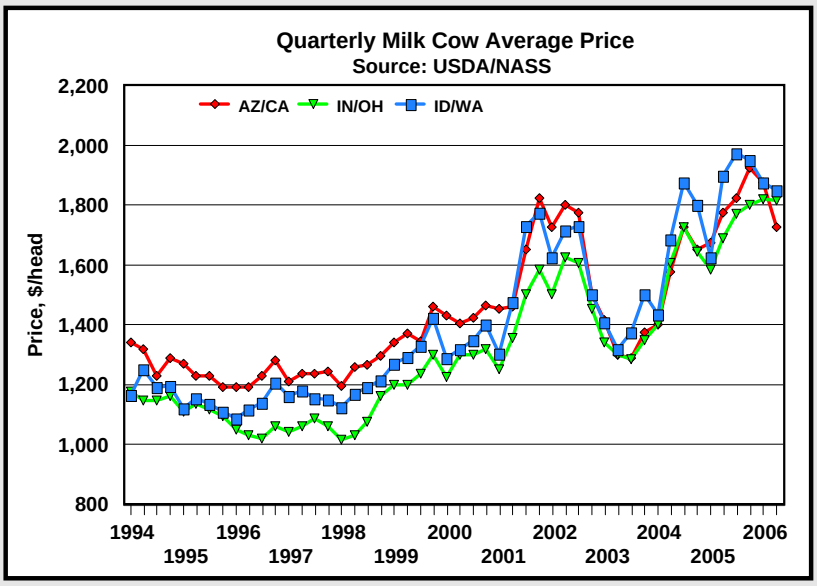
1994-05 Regional Milk Cow Prices



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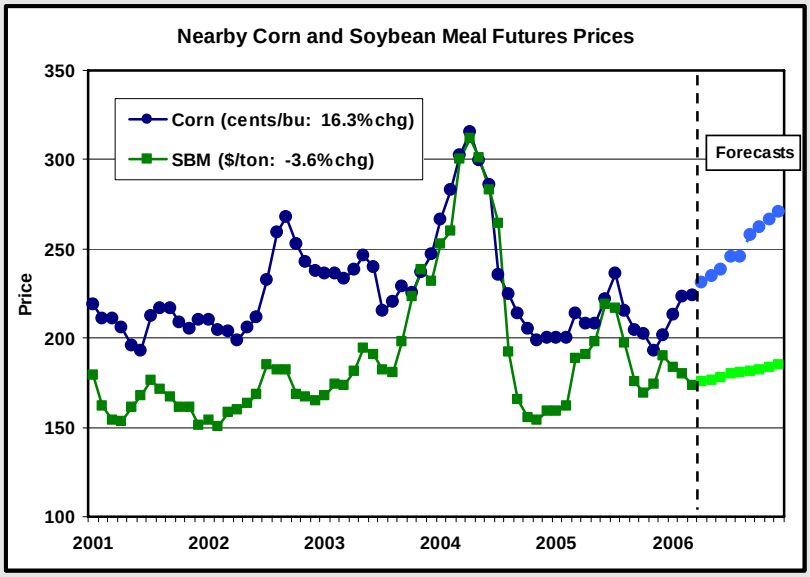
2001-06 CBT Corn and SBM Futures Prices



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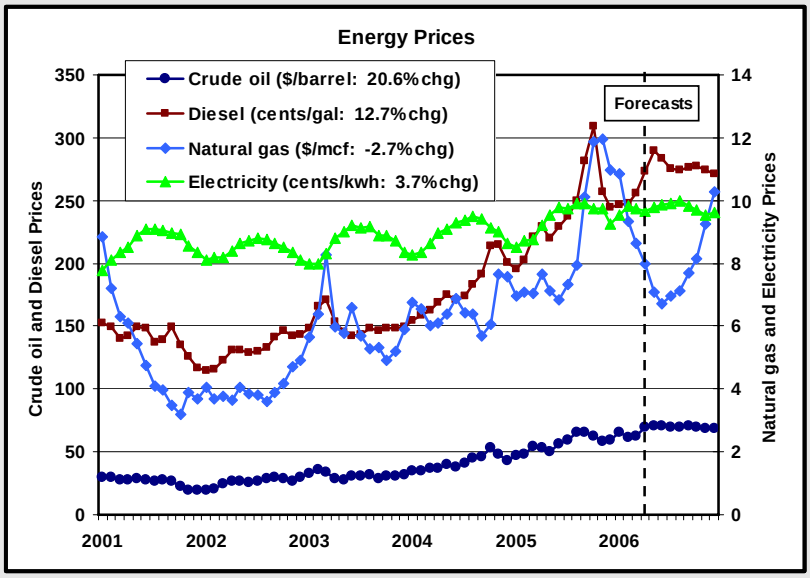
2001-06 Energy Prices

Source: EIA



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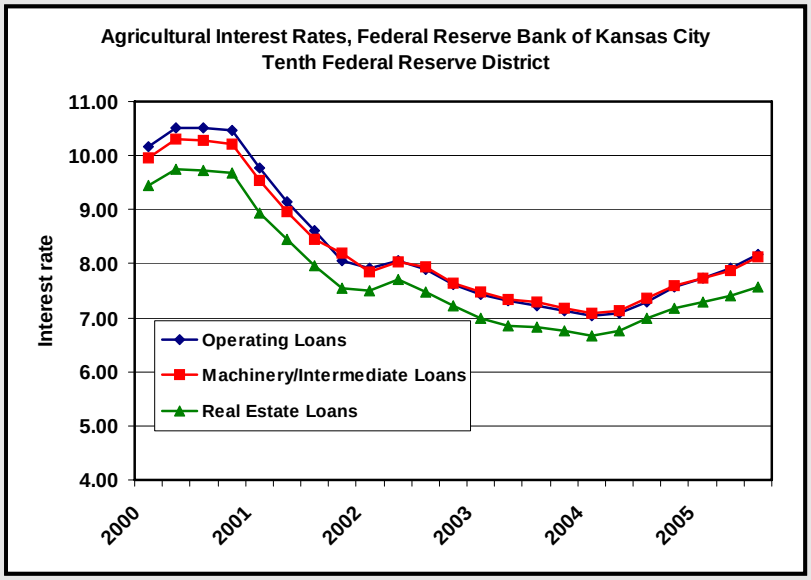
2000-05 Agricultural Interest Rates



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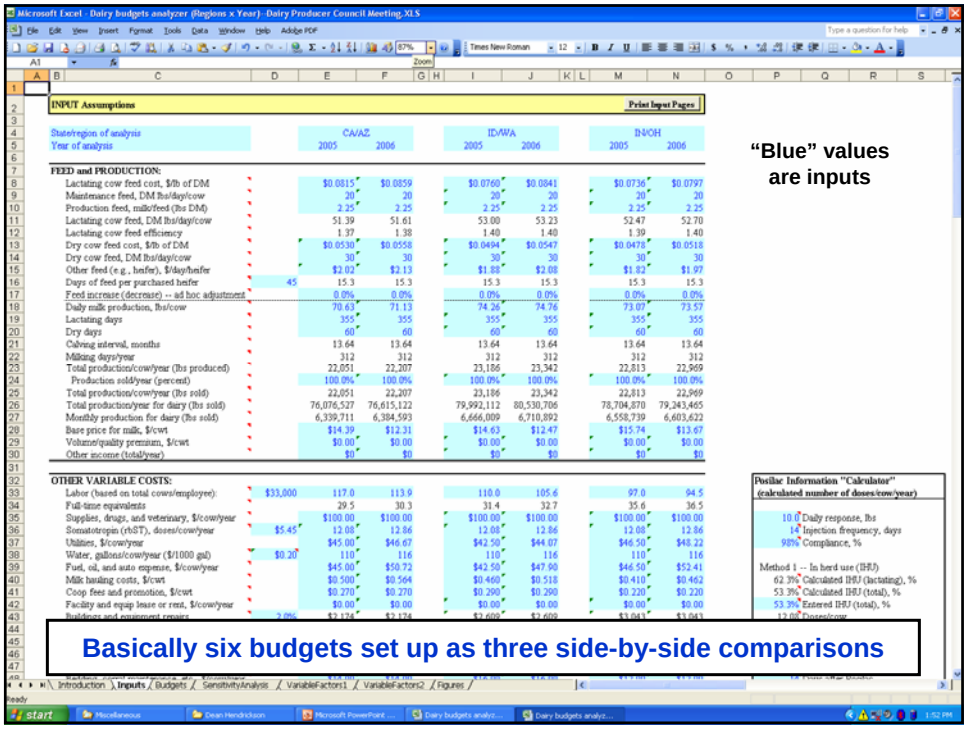
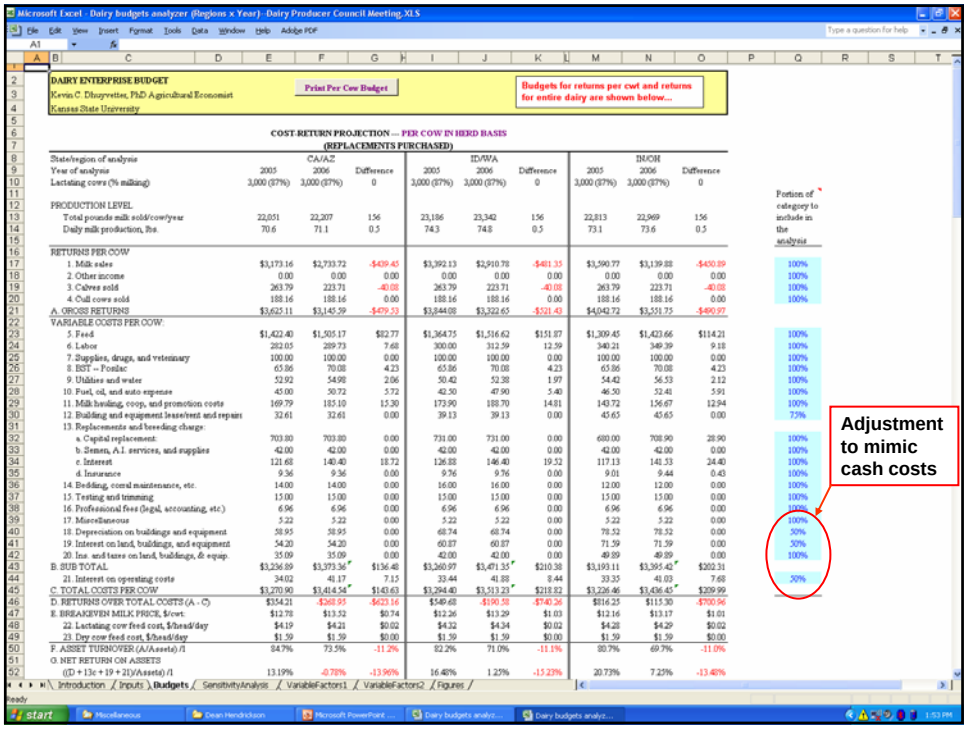
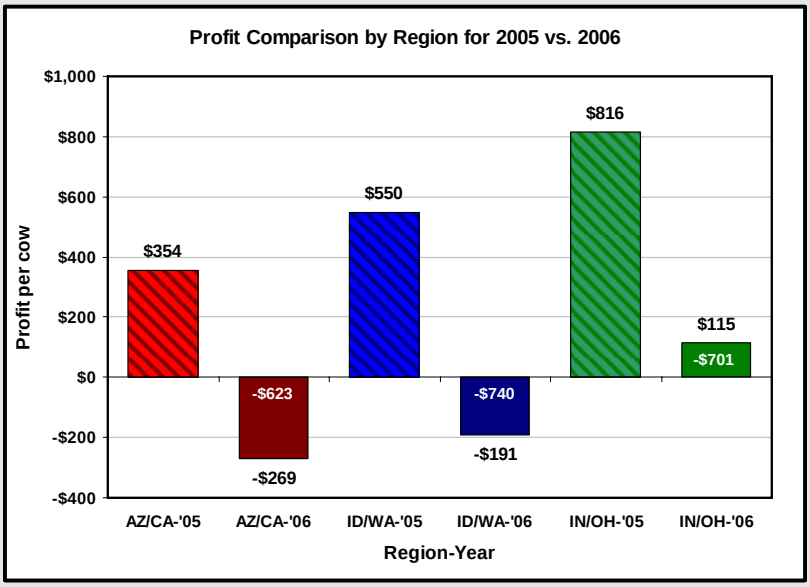

"Blue" values are inputs
Basically six budgets set up as three side-by-side comparisons


Adjustment to mimic cash costs

Profit by region and year…



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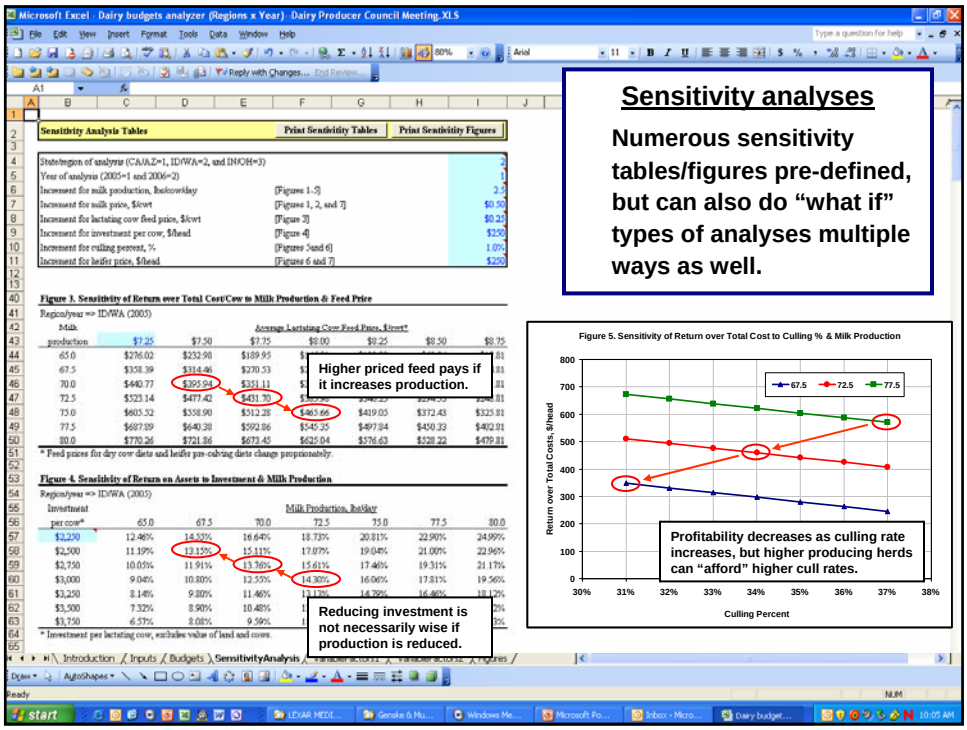

Economic strategies given volatility

- **Comparison of production alternatives for a 3,000 lactating cow dairy**
  - **Low input**
  - **High production**
- **Expected profit simulated for 2500 "months" given variability in milk prices, feed prices, and production (all costs constant except feed and hauling).**

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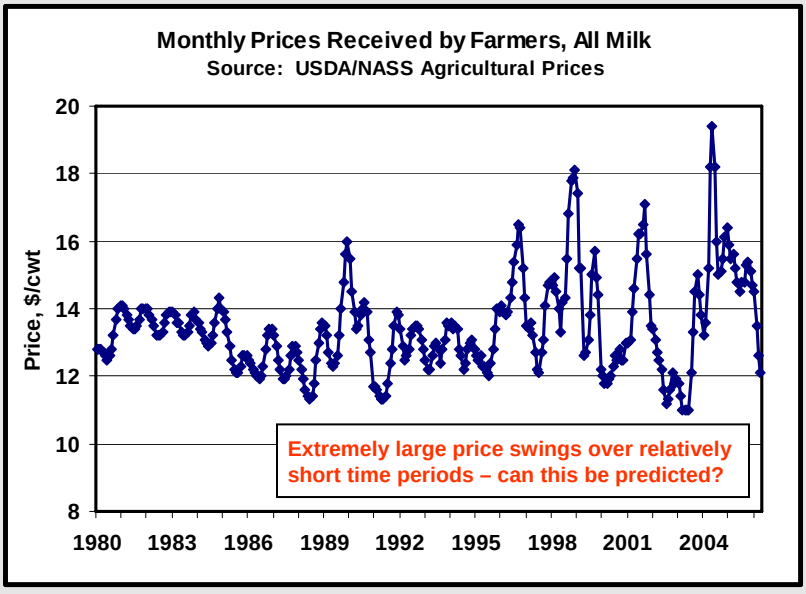
Monthly milk prices…

Levels constant for last 25 years, but increasing volatility.



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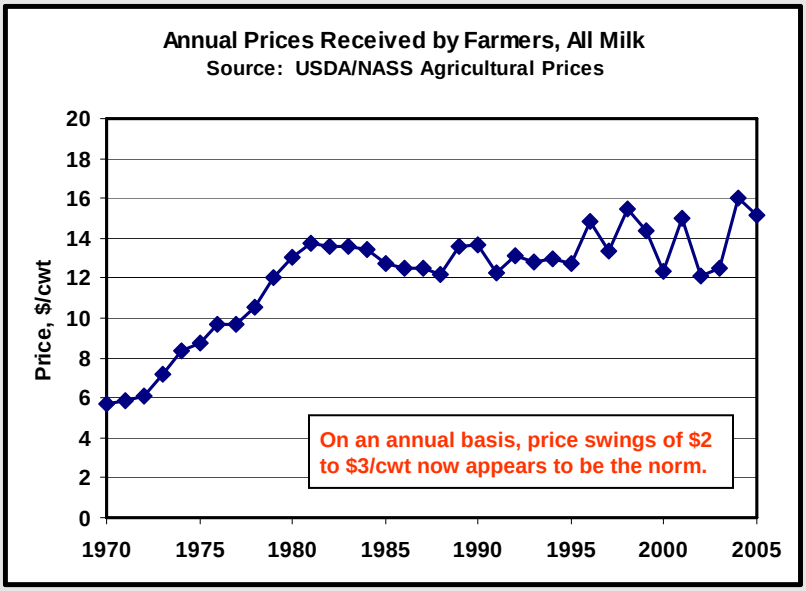
Annual milk prices…

Levels constant for last 25 years, but increasing volatility.



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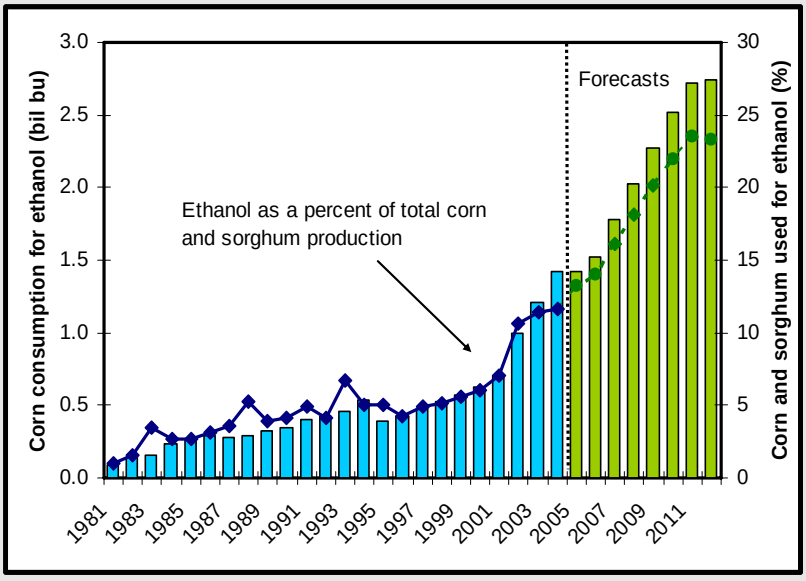
Corn prices…

Potential for significant increase in volatility in future???



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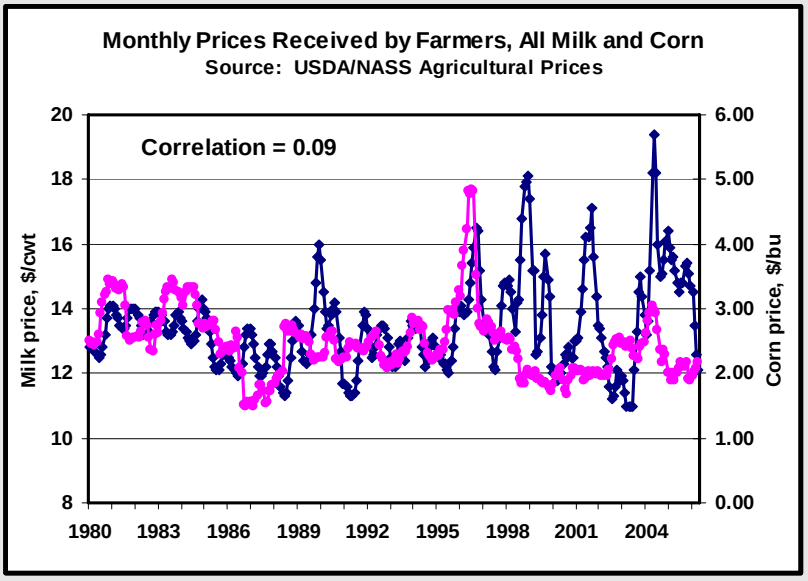
Relationship between milk & corn prices…



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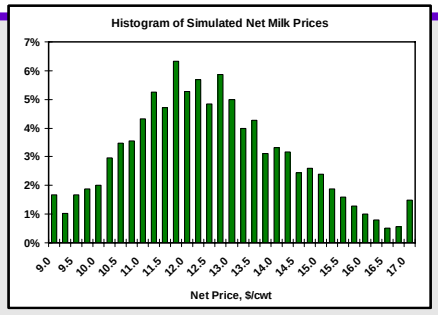
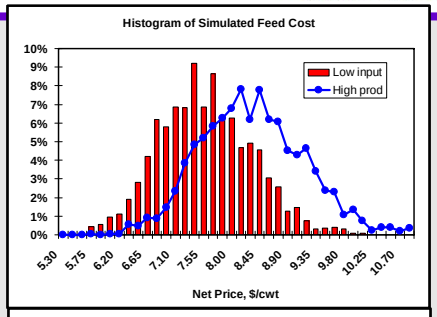
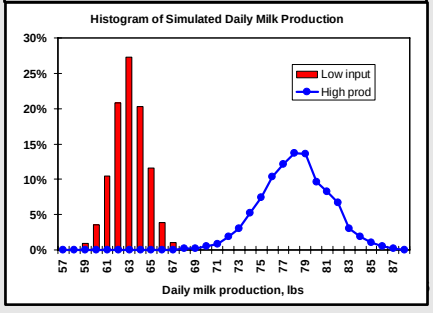
Variability of inputs for analysis…







Variables are assumed to be independent in the simulation process.

Variable	Avg	Min	Max	Std
Milk price	$12.41	$9.00	$17.00	$1.79
Feed cost (LI)	$7.50	$5.20	$10.00	$0.75
Feed cost (HP)	$8.25	$5.75	$10.75	$0.82
Milk production (LI)	62.54	56.88	68.10	1.51
Milk production (HP)	77.58	67.50	88.70	3.02

Summary of annual returns…

COMPARISON OF ANNUAL COSTS AND PROFIT -- PER DAIRY						
	Average		Minimum		Maximum	
Variable	Low-Input	High-Prod	Low-Input	High-Prod	Low-Input	High-Prod
Feed cost	$4,374,343	$5,311,748	$3,880,096	$4,706,636	$4,858,634	$5,906,412
Difference	$937,405		$826,540		$1,047,778	
Total cost	$10,104,567	$11,766,868	$9,610,320	$11,161,755	$10,588,858	$12,361,532
Difference	$1,662,301		$1,551,436		$1,772,674	
Profit	-$253,798	$94,512	-$1,384,706	-$1,306,514	$735,159	$1,355,885
Difference	$348,310		$78,192		$620,726	

Analysis based upon full economic costs.

5-year period: $348,310 x 5 = $1,741,550

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Summary of annual returns…

COMPARISON OF ANNUAL COSTS AND PROFIT -- PER COW						
	Average		Minimum		Maximum	
Variable	Low-Input	High-Prod	Low-Input	High-Prod	Low-Input	High-Prod
Feed cost	$1,268	$1,540	$1,125	$1,364	$1,408	$1,712
Difference	$272		$240		$304	
Total cost	$2,929	$3,411	$2,786	$3,235	$3,069	$3,583
Difference	$482		$450		$514	
Profit	-$74	$27	-$401	-$379	$213	$393
Difference	$101		$23		$180	

Analysis based upon full economic costs.

Costs per cow measures are *NOT* particularly useful benchmarks

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Summary of annual returns…

COMPARISON OF ANNUAL COSTS AND PROFIT -- PER CWT						
	Average		Minimum		Maximum	
Variable	Low-Input	High-Prod	Low-Input	High-Prod	Low-Input	High-Prod
Feed cost	$6.39	$6.25	$5.68	$5.56	$7.08	$6.92
Difference	-$0.13		-$0.12		-$0.15	
Total cost	$14.76	$13.85	$14.02	$13.09	$15.43	$14.56
Difference	-$0.90		-$0.93		-$0.86	
Profit	-$0.37	$0.11	-$2.02	-$1.54	$1.07	$1.58
Difference	$0.48		$0.48		$0.51	

Analysis based upon full economic costs.

Per cwt measures are never worse for high production dairy due to the benefit of diluting fixed costs across higher levels of production

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Summary of annual returns…

COMPARISON OF ANNUAL RETURN ON ASSETS AND RETURN ON EQUITY						
	Average		Minimum		Maximum	
Variable	Low-Input	High-Prod	Low-Input	High-Prod	Low-Input	High-Prod
ROA	5.72%	8.01%	-2.35%	-0.60%	12.77%	15.76%
Difference	2.29%		1.75%		2.98%	
ROE	3.90%	8.59%	-12.28%	-8.67%	18.05%	24.13%
Difference	4.69%		3.61%		6.09%	

Analysis based upon full economic costs.

Note: analysis does not account for changing equity positions over time (i.e., values in table are all relative to initial starting point, 50% leverage)

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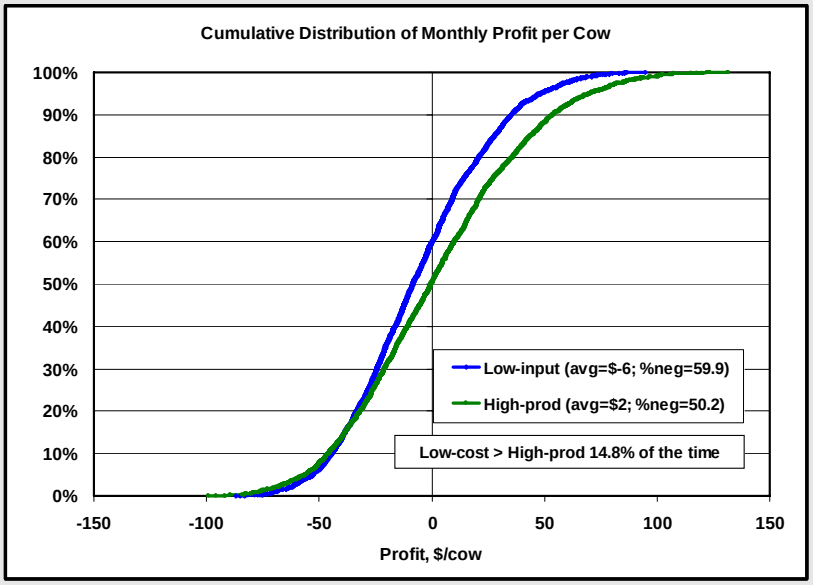
Distribution of *monthly* returns

Analysis based upon full economic costs



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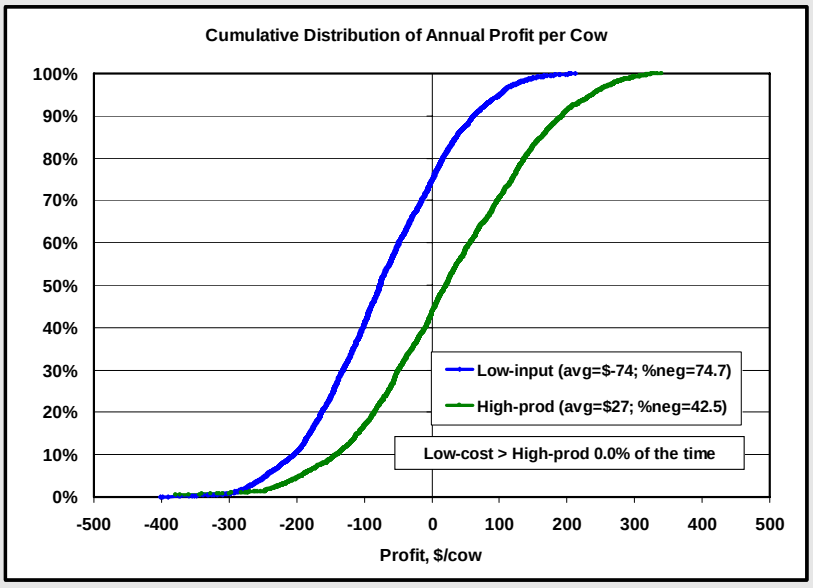
Distribution of *annual* returns

Analysis based upon full economic costs



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In a volatile market – who will thrive?

- In a commodity market, the most efficient producers will survive
- Efficiency is defined as producing the commodity at the lowest cost (relevant cost is cost per cwt)
- Cost/cwt is almost always lower with higher production due to dilution of huge fixed costs (parlor, barns/corrals, cow, labor, equipment,…)
- What are best financial measure of success?
  - $/cwt
  - ROA and ROE

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Management…

What should a dairy manager focus on?

- Planning
  - UNDERSTAND THE SITUATION (what are your constraints)
- Optimize Efficiencies (production & costs interaction)
  - WHY?
  - HOW?
  - ALTERNATE MODELS AND THEIR IMPACT ON RETURNS
- Marketing
  - FOCUS EFFORTS ON THINGS YOU CAN CONTROL

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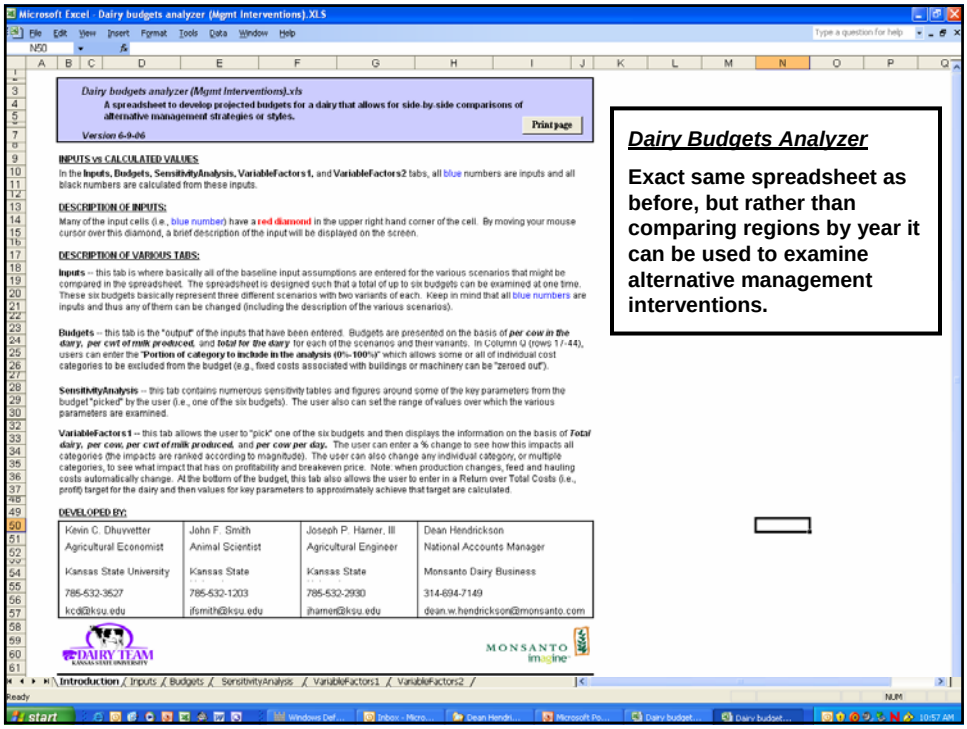

Dairy Budgets Analyzer

Exact same spreadsheet as before, but rather than comparing regions by year it can be used to examine alternative management interventions.

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Future…

- **Current trends will likely continue and may even accelerate**
  - Consolidation and structural change
  - Shifts in regional milk production
- **Change is always a challenge, especially when it occurs rapidly**
- **Industry survivors will capture EOS and will manage dairies such that they are low cost producers** (typically means high production)

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Questions ?
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