LGM-Dairy: An Analysis of Program Performance and Cost under Alternative Policy Configurations

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OBJECTIVES

- Review the basic structure of LGM-Dairy
- Examine the sensitivity of Income Over Feed Cost (IOFC) and premium to changes in feeding regimes and
- Quantify impacts of changes in deductible level on important program characteristics

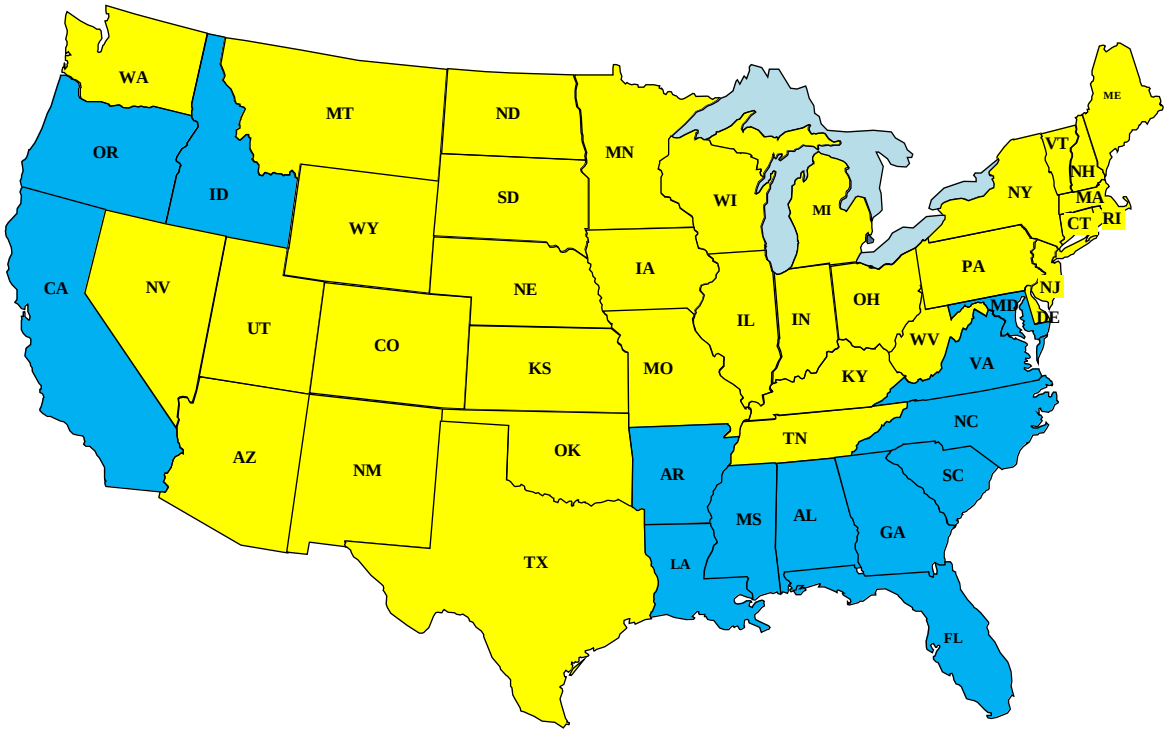
METHODS

- Series of simulations for a hypothetical Wisconsin dairy farm using the University of Wisconsin's LGM-Dairy premium calculator (*http://future.aae.wisc.edu/lgm_dairy.html#2*)

LGM-DAIRY: CHARACTERISTICS

- Sets a floor on dairy producer's income over feed cost (milk revenue less feed costs)

- Currently available in 35 states with the July 2009 insurance offering



LGM-DAIRY: RULES

- **Insurance periods:** There are 12 insurance periods every year and each insurance period runs for 10 months.

  E.g.: For the July 2009 contract, coverage begins in September 2009 and goes through June 2010.

- **Indemnity:** Difference between the contract's Expected Income Over Feed Cost (E-IOFC) and the Actual Income Over Feed Cost (A-IOFC), if positive.

- **No Subsidies:** Revenue neutral

  Premium = Expected Indemnity + 3% overload

  Assessed using 5,000 Monte Carlo replicates

LGM-DAIRY: COVERAGE

- Any milk volume of producer's target marketing for a 10-month period (up to 10,900 MT(240,000 cwt ~ 1,500 milking cows))

- Amount of corn and soybean meal equivalents to be fed during insurance period restricted in the ranges:
  - 0.07280 – 0.52824 kg corn/kg milk
    - 0.00364 – 0.02912 tons corn/cwt milk
    - 0.13 – 1.04 bu corn/cwt milk
    - Default: 0.5 bu (28 lb)
  - 0.0161 – 0.12850 kg SBM/kg milk
    - 0.000805 – 0.006425 tons SBM/cwt milk
    - 1.61 – 12.85 lb SBM/cwt milk
    - Default: 4 lb

LGM DAIRY: DECISIONS FOR THE FARMER

- Target milk marketings (%) to be insured in each one of the 10-month coverage period (0%-100%)
- Estimated amount of feed used to produce covered milk
- Level of deductible or risk assumed ($0 to $0.033/kg milk = $0 to $1.5 per cwt milk in $0.1 increments)

LGM DAIRY: IMPACT ON PREMIUM

- Insured milk (selected)
- Insured feed (selected)
- Deductible level (selected)
- Average futures prices (market determined)
- Volatility of futures prices (market determined)

ALTERNATIVE INSURED ENERGY AND PROTEIN FEEDS USED IN SIMULATIONS

	Corn Equivalents		Soybean meal Equivalents	
Energy and Protein Diet	kg/kg milk	tons/cwt	kg/kg milk	tons/cwt
Lowest	0.07280	0.00364	0.01610	0.00080
Low	0.20020	0.01001	0.04420	0.00221
Medium	0.32760	0.01638	0.07230	0.00361
High	0.45501	0.02275	0.10040	0.00502
Highest	0.52824	0.02912	0.12850	0.00642

DATA FOR SIMULATIONS

- **Four insurance contracts were selected randomly**: February 2000, May 2003, September 2006 and December 2008

- E-IOFC and premium estimated for 25 different combinations of feed diets and 16 levels of deductible.

- E-IOFC and producer premiums obtained for 400 different contract combinations in each contract

ASSUMPTIONS FOR THE SIMULATIONS

- Every insurance contract covers **all of the production over all the 10 month allowable coverage period**

- **Constant levels of milk marketings, corn and soybean meal equivalents** considered for every coverage month
  - E.g.: December 2008 contract:
    - Coverage period: February to November 2009.
    - Lowest energy diet: 0.07280 kg/kg milk corn equivalents in all coverage months
    - Highest protein diet: 0.1285 kg/kg milk soybean meal equivalents in all the coverage months

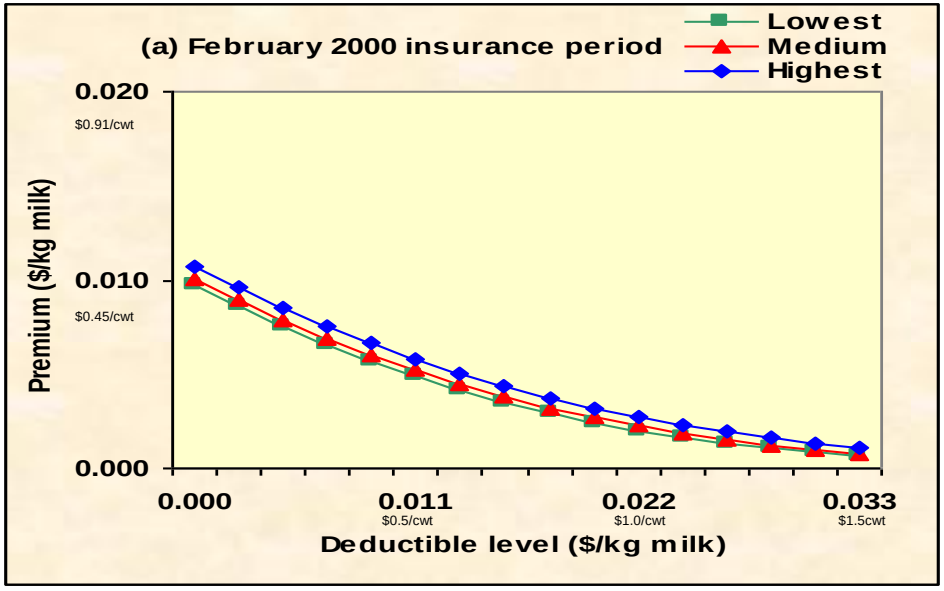
CORRELATION COEFFICIENTS BETWEEN IMPORTANT PROGRAM CHARACTERISTICS

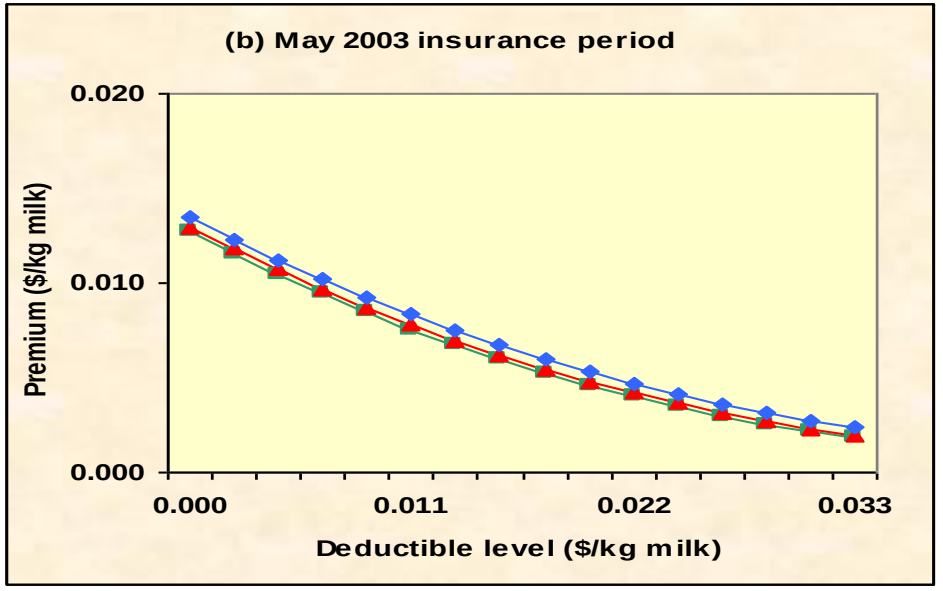
Correlated Variables	Insurance Period			
	February 2000	May 2003	September 2006	November 2008
Deductible level x Premium	-0.971	-0.984	-0.975	-0.962
Corn equivalent x IOFC guaranteed	-0.770	-0.785	-0.823	-0.866
Soybean meal equivalent x IOFC guaranteed	-0.312	-0.373	-0.331	-0.392
Corn equivalent x Premium	0.073	0.056	0.062	0.234
Soybean meal equivalent x Premium	0.023	0.016	0.009	0.006

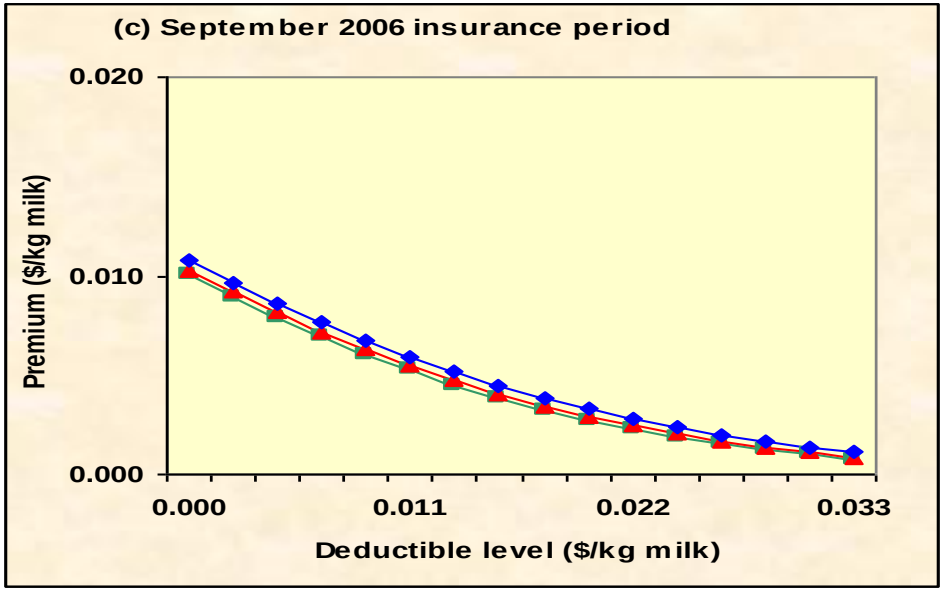
INTERPRETING THE CORRELATION COEFFICIENTS

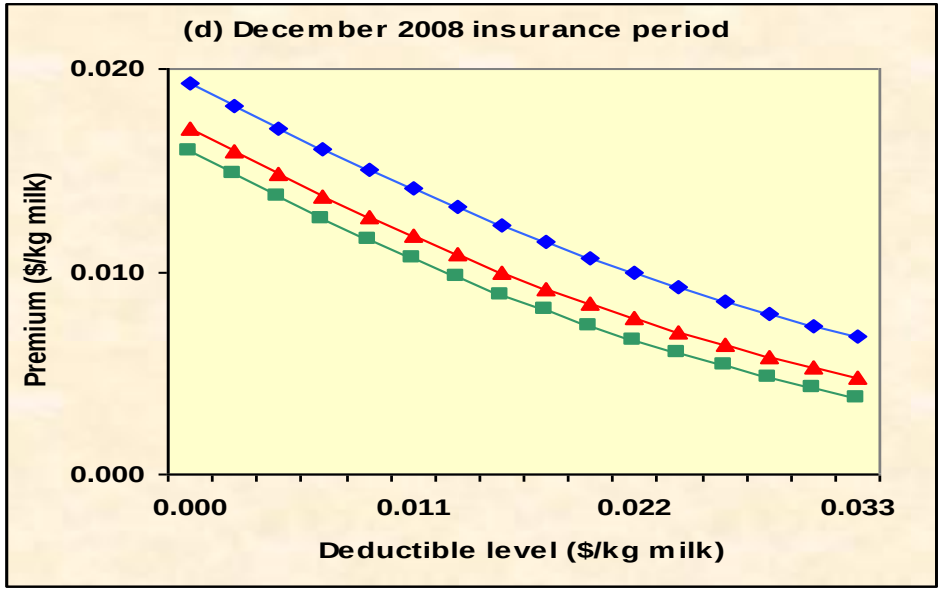
- Premium and deductible are very highly correlated and negatively associated
- E-IOFC and Corn equivalents have a highly negative strong correlation coefficient
- E-IOFC and Soybean meal equivalents have medium and negative correlation coefficient
- Only low correlation exist between feed equivalents and the insurance premium

SENSITIVITY OF DEDUCTIBLE TO PREMIUM: HIGHEST, MEDIUM AND LOWEST FEED DIETS







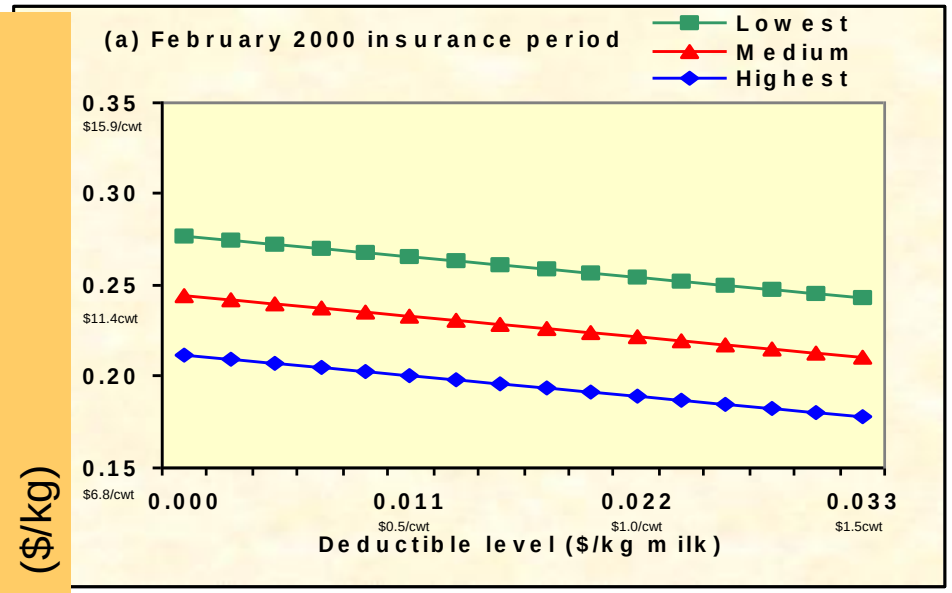


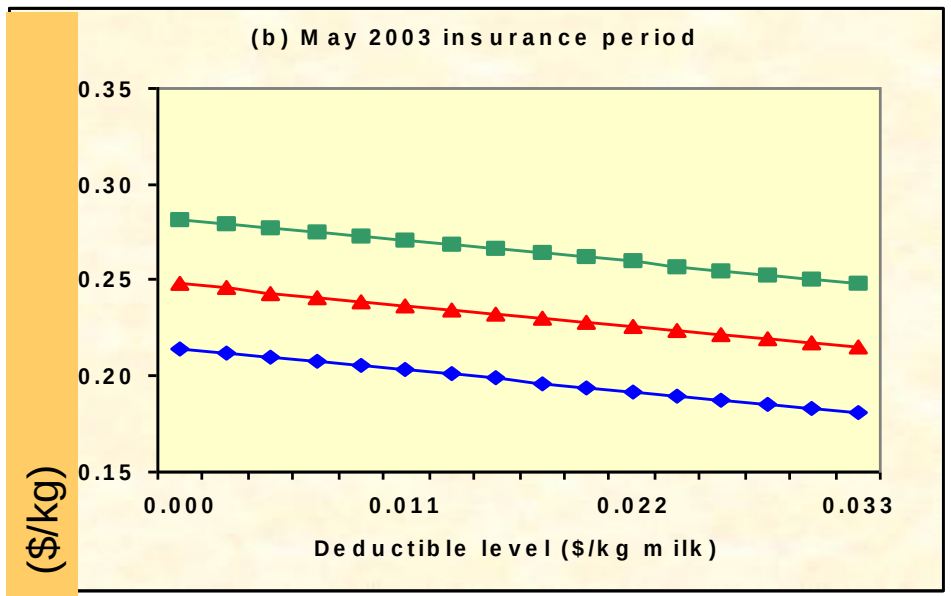
PREMIUM LEVELS ARE VERY SENSITIVE TO DEDUCTIBLE LEVELS AND LESS SENSITIVE TO INSURED FEED DIET

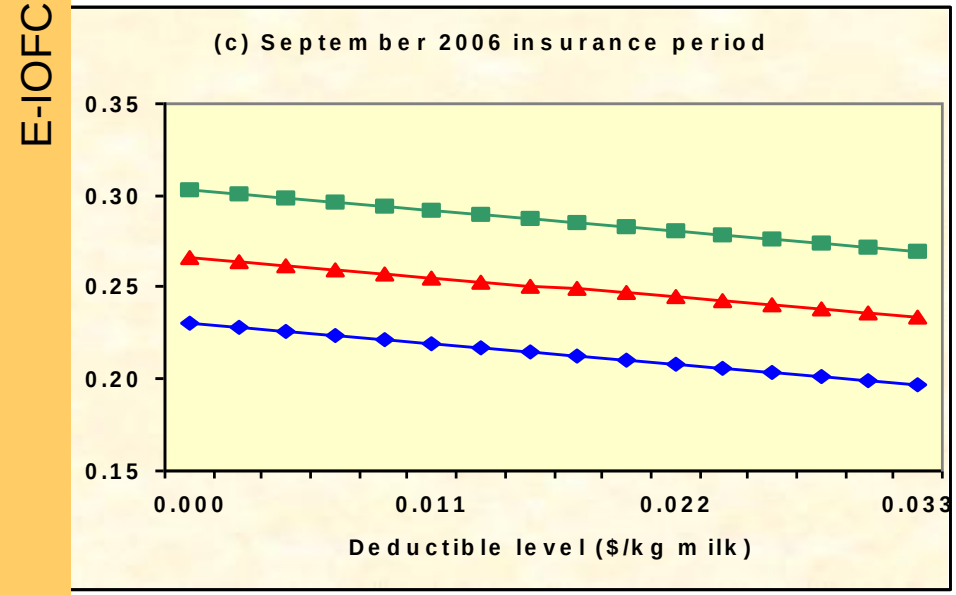
- With an increase in deductible level, premiums decrease as it reduces the potential insurance liability
- At constant insured milk quantity, IOFC decreases by an amount equal to the deductible level while sensitivity of premium to feed diets depends on the volatility in the milk and feed markets at sign-up

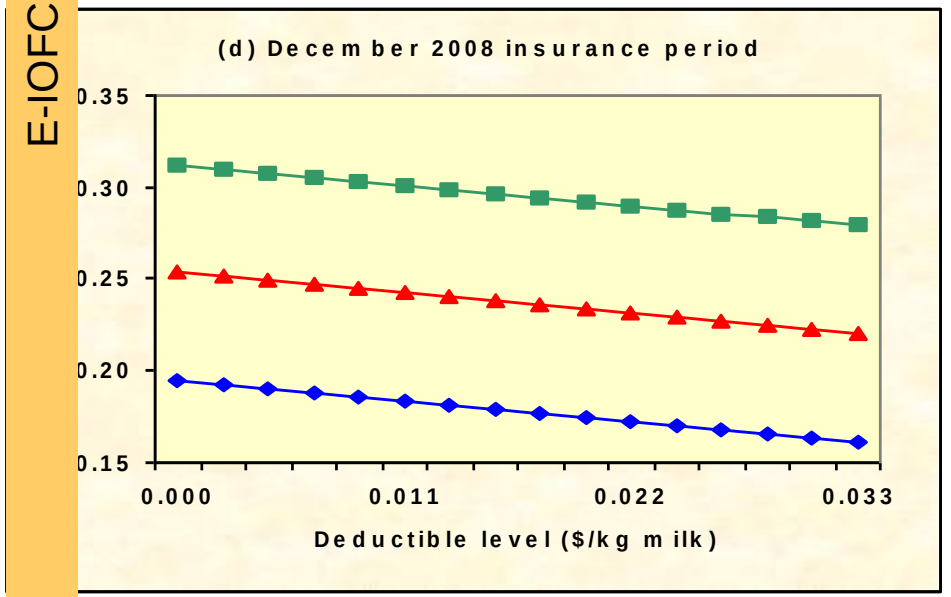
  E.g.: Change in premium with change in insured feed diets is greater in December 2008 than the other three insurance contracts. This is due to higher volatility in the Class III milk, corn and soybean meal futures settle prices at sign-up for the December 2008 insurance period.

SENSITIVITY OF E-IOFC TO DEDUCTIBLE LEVELS AND ALTERNATIVE FEED DIETS









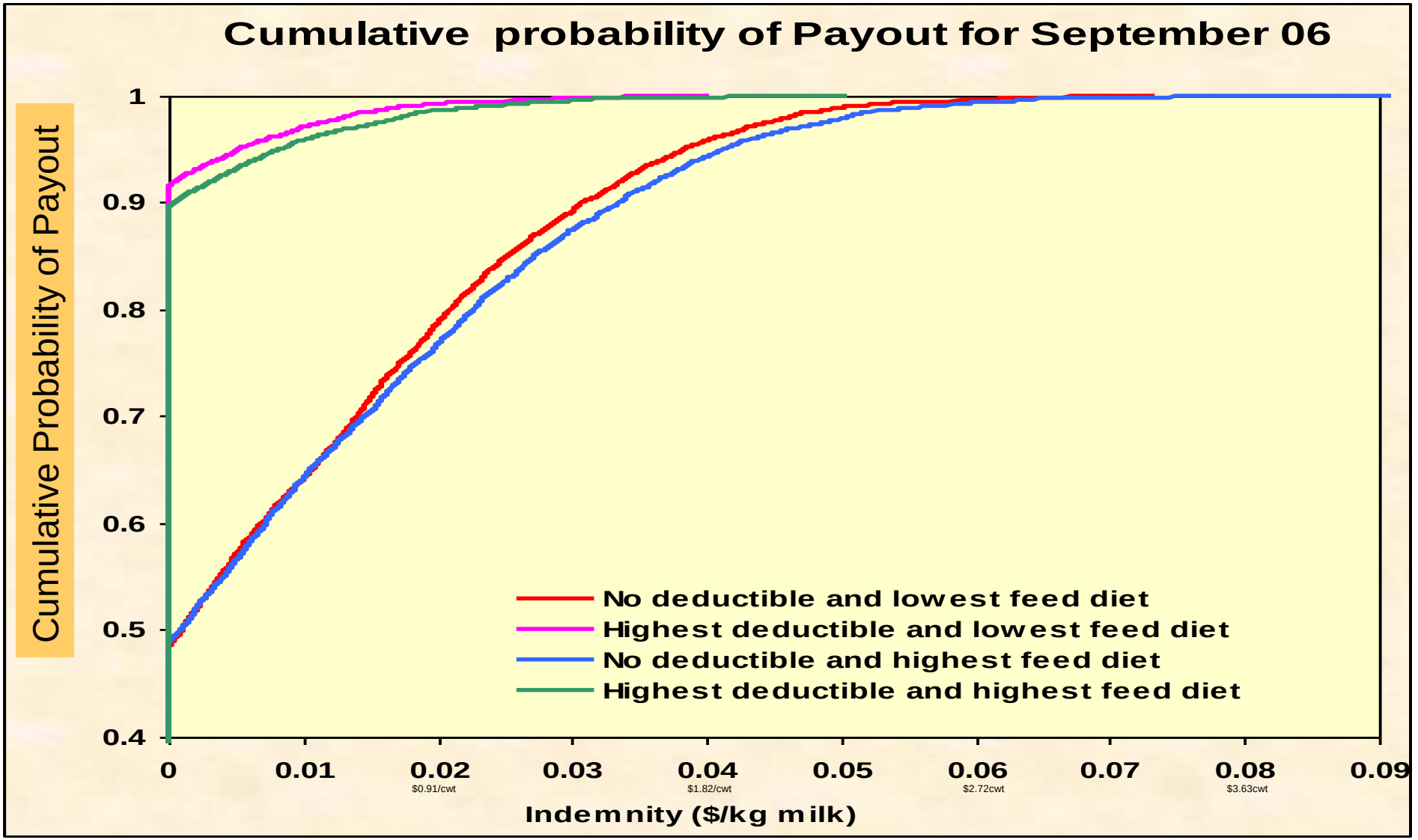
E-IOFC SENSITIVE TO CHANGES IN THE INSURED FEED DIETS

- With an increase in the insured feed quantities, E-IOFC decreases and vice versa.

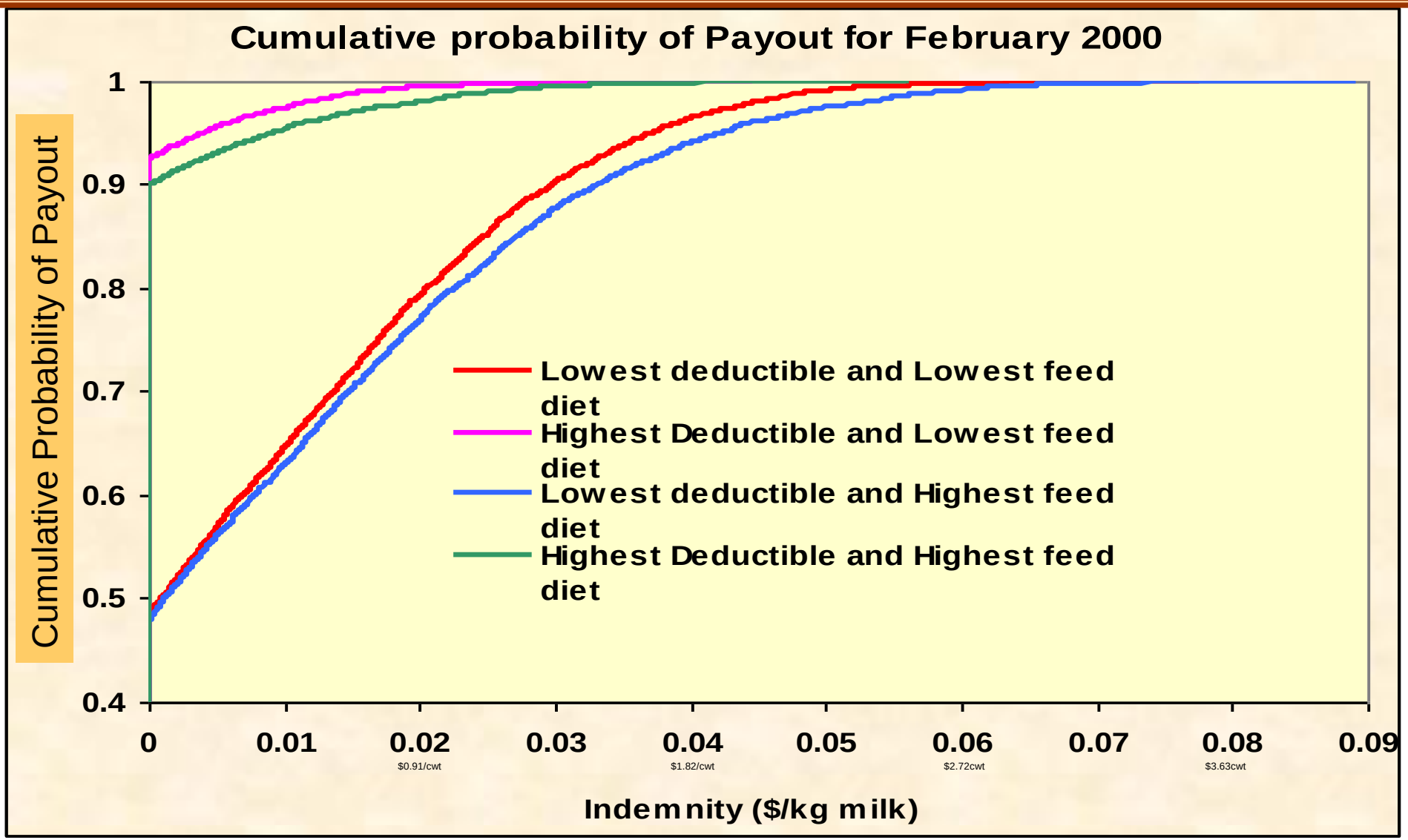
  E.g.: For February 2000 contract, at $0 per kg milk deductible, E-IOFC for the lowest energy and protein diet was $0.277 per kg milk, at medium energy and protein diet was $0.244 per kg milk and for the highest energy and protein diet was $ 0.211 per kg milk

- From the correlation coefficients, E-IOFC is more correlated to energy diet than the protein in the diet

CUMULATIVE PROBABILITY OF INDEMNITIES FOR SEPTEMBER 2006 UNDER ALTERNATIVE FEED DIETS



CUMULATIVE PROBABILITY OF INDEMNITIES FOR FEBRUARY 2000 UNDER ALTERNATIVE FEED DIETS



SENSTITIVITY OF PROBABILITY OF INDEMNITIES TO DEDUCTIBLE AND INSURED FEED DIETS

- At higher levels of deductibles, there is lesser probability of payouts and vice versa. For highest energy and protein diet the range of indemnities is larger than for lowest energy and protein diet.

  E.g.: For September 2006 contract, the probability of a payout at $0 per kg milk deductible was about 52% and at $ 0.0331 per kg milk deductible was about 10%. With highest energy and protein diets the indemnities could reach up to $0.09/kg milk whereas with lowest energy and protein diets this could reach only up to $0.05/kg milk

- For the December 2008 insurance contract, the probability of a payout at the highest level of deductible is > 20% reflecting high volatility in milk prices during this insurance period

Future work

Optimal decisions on months to insure and % production to be covered using optimization and simulations.

Helpful links on LGM-Dairy

- University of Wisconsin's *Understanding Dairy Markets* website: **http://future.aae.wisc.edu/lgm_dairy.html** and **http://www.uwex.edu/ces/dairymgt/dairy.cfm**
- For more updates and information on LGM-Dairy, sign-up for the LGM-Dairy mailing list at **http://future.aae.wisc.edu/elist.html**
- Find other information on dairy price risk management and LGM-Dairy at **http://future.aae.wisc.edu**