

Economic Evaluation of Swine Health and Disease Interventions

2009 Iowa Pork Regional Conferences

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The conventional wisdom that served the industry reasonably well for the last two or three decades is no longer adequate

- The biology of the pig and the management fundamentals that lead to high levels of productivity have not changed
- **But**, the relative importance of things that can be managed has changed drastically

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Outline of Presentation

- 1) The relative contribution of market hog, corn and soybean meal prices and disease to profit risk
- 2) Impact of health – how changes in wean-to-finish productivity measures affect profitability as diet costs rise
- 3) The trade-off between throughput and producing a healthy, high-quality wean pig that converts feed well

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Relative to 2000, rate the importance of managing: Feed ingredient price risk

1. Much less important today
2. Less important today
3. Equally important
4. More important today
5. Much more important today

Importance Rating	Percentage
Much less impo...	0%
Less impo...	0%
Equally impo...	0%
More important...	21%
Much more impo...	74%

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Relative to 2000, rate the importance of managing: Market hog price risk

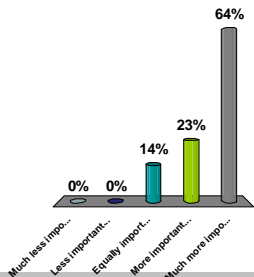
1. Much less important today
2. Less important today
3. Equally important
4. More important today
5. Much more important today

Importance Rating	Percentage
Much less impo...	0%
Less impo...	0%
Equally impo...	16%
More important...	16%
Much more impo...	68%

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Relative to 2000, rate the importance of managing: Disease / health

1. Much less important today
2. Less important today
3. Equally important
4. More important today
5. Much more important today



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Nearby monthly market hog futures prices (high-low-close, 2000-2008)



Source: www.futures.tradingcharts.com

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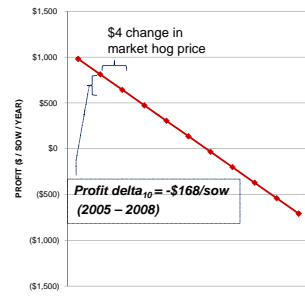
“Profit Delta₁₀” is a crude, standardized measure of profit risk contributed by variability in prices or production measures

- Calculated as the change in profitability over the range of the price or performance measure evaluated divided into 10 equal increments
 - The range may be observed or predicted and is for some specified period of time
- The change in profitability may be estimated with the aid of a budgeting model
 - A breed-to-finish budgeting model for a 1000 sow herd was used for estimates presented here (will discuss in more detail later in presentation)
- Assumes all else equal
 - That is, all other parameters are held at baseline levels

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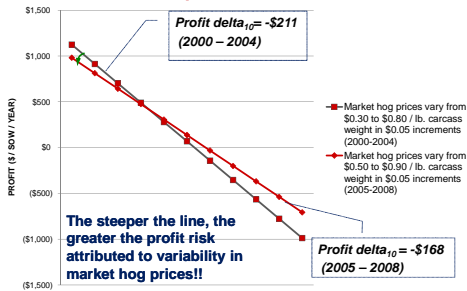
Profit delta₁₀ for market hog prices (2005-2008)

- Range of market hog prices from 2005 to 2008 is \$90 - \$50 = \$40
- Divide by 10 to get 10 equal increments of \$4
- Profit Delta₁₀ is the change in profit (\$/sow/year) when market hog prices change by \$4
 - Change in profit is from budgeting model
- A large negative Profit Delta₁₀ means greater profit risk is attributed to variability (observed or predicted) in the price or production measure



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Variability in market hog prices contributed less to profit risk in 2005-2008 compared to 2000-2004



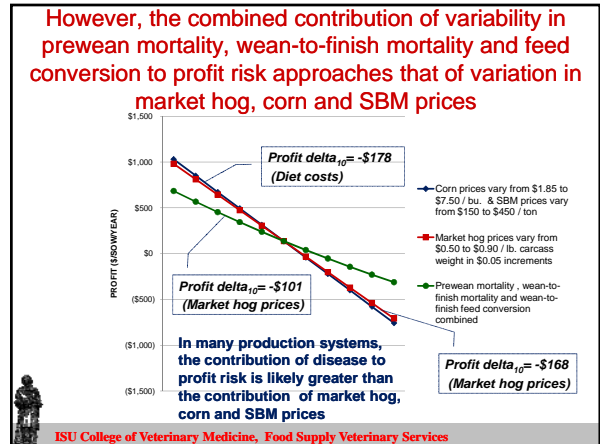
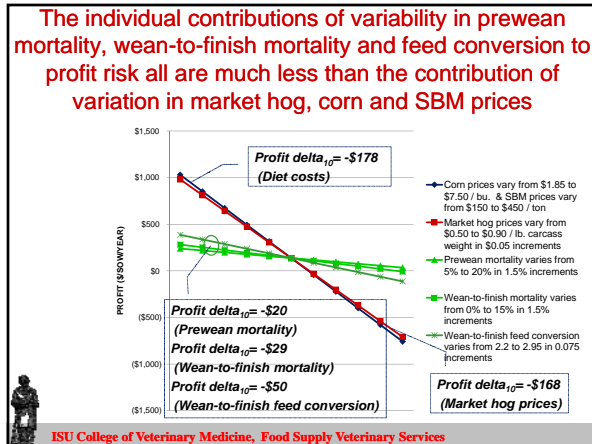
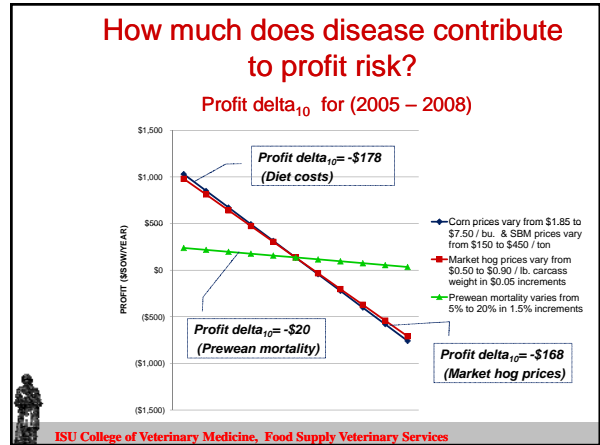
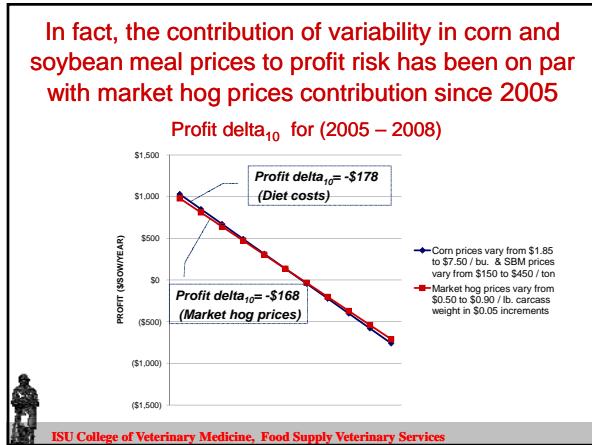
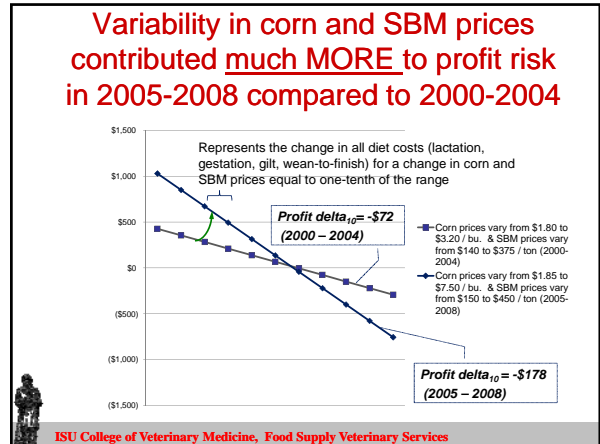
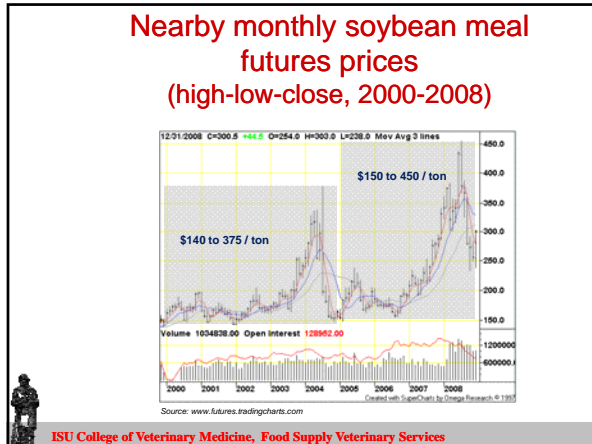
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Nearby monthly corn futures prices (high-low-close, 2000-2008)



Source: www.futures.tradingcharts.com

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Implications for risk management


- Manage the margin!!
- Importance of managing feed prices paid is now on par with managing market hog prices received
 - The relative contribution of variation in diet costs to profit risk has increased substantially since 2005
- Disease is still a major contributor to profit risk



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- 2) Impact of health – how changes in wean-to-finish productivity measures affect profitability as diet costs rise
- 3) The trade-off between throughput and producing a healthy, high-quality wean pig that converts feed well



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Impact of health - How has higher diet costs increased the importance of a healthy pig?

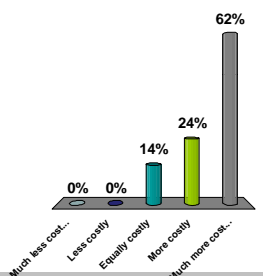
- We know that as diet costs rise, disease related losses of wean-to-finish FCR are increasingly costly
- Can we generalize to say that rising diet costs increase the negative impact of disease on profitability?
 - **No**, the financial impact depends upon which productivity measures are affected most




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When diet costs rise disease that degrades feed conversion is:

1. Much less costly
2. Less costly
3. Equally costly
4. More costly
5. Much more costly



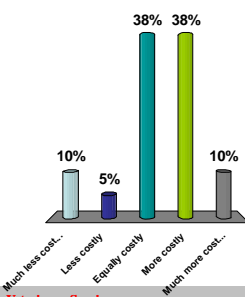
Category	Percentage
Much less costly	0%
Less costly	0%
Equally costly	14%
More costly	24%
Much more costly	62%




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When diet costs rise disease that degrades early mortality is:

1. Much less costly
2. Less costly
3. Equally costly
4. More costly
5. Much more costly



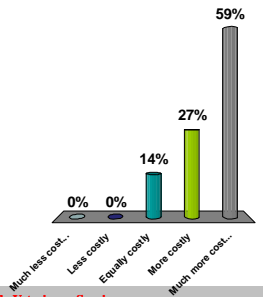
Category	Percentage
Much less costly	10%
Less costly	5%
Equally costly	38%
More costly	38%
Much more costly	10%




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When diet costs rise disease that degrades late mortality is:

1. Much less costly
2. Less costly
3. Equally costly
4. More costly
5. Much more costly



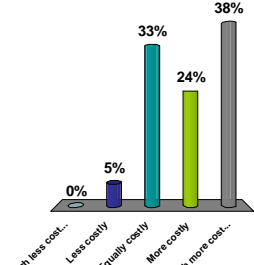
Category	Percentage
Much less costly	0%
Less costly	0%
Equally costly	14%
More costly	27%
Much more costly	59%



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When diet costs rise disease that degrades average daily gain is:

1. Much less costly
2. Less costly
3. Equally costly
4. More costly
5. Much more costly



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A wean-to-finish budgeting model is used to evaluate how profitability is influenced by productivity changes attributed to disease

- Changes in profitability resulting from changes in
 - Wean-to-finish FCR
 - Wean-to-finish mortality
 - Wean-to-finish ADG
- Evaluated for two scenarios:



1. "Low" wean-to-finish weighted average diet cost (\$150/ton)
2. "High" wean-to-finish weighted average diet cost (\$200/ton)

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About the budgeting model used

- A wean-to-finish budgeting model for a single turn of a 1000 head barn was used
- The model accounts for all costs and revenues

How Costs Accrue in Wean-to-Finish Model			
	Fixed	Per pig placed	Per lb. of gain
Fixed Costs	X		
Wean pig costs		X	
Non-feed variable costs		X	X
Feed costs			X
Revenue			X

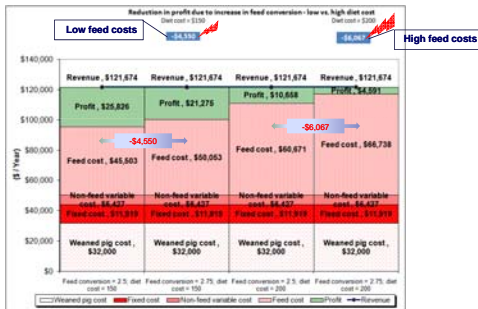
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Assumption for feed conversion scenarios

- Wean-to-finish feed conversion increases from 2.50 to 2.75 pounds of feed/pound of gain

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Change in profitability due to disease that impacts feed conversion is greater as diet costs rise (1000 head)



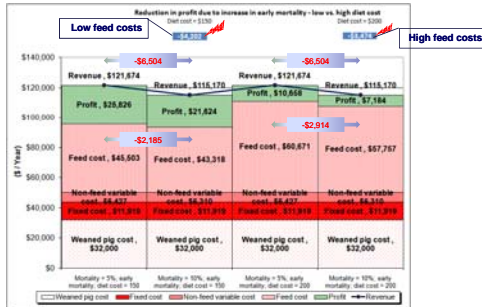
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Assumption for mortality scenarios

- Wean-to-finish mortality increases from 5% in baseline to 10%
 - "Early" mortality scenario assumes 10% of gain has occurred when pigs die
 - "Late" mortality scenario assumes 90% of gain has occurred when pigs die

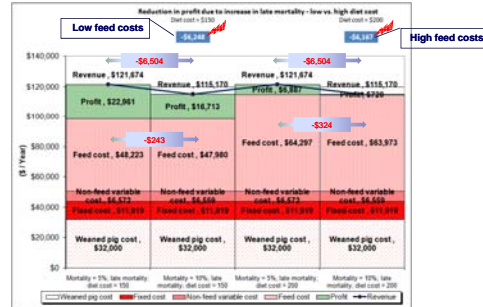
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Change in profitability due to disease that impacts early mortality is less as diet costs rise (1000 head)



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Change in profitability due to disease that impacts late mortality is ~unchanged as diet costs rise (1000 head)



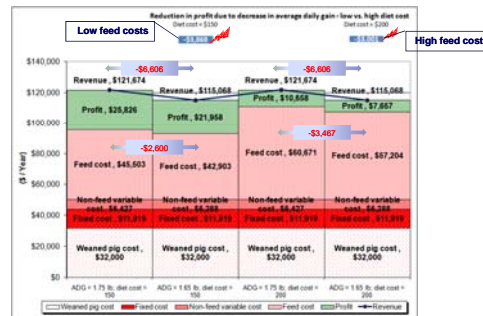
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Assumption for average daily gain scenarios

- Wean-to-finish average daily gain decreases from 1.75 to 1.65 pounds per day
 - Baseline market weight is 271pounds
 - Market weight under reduced ADG scenarios is 256 pounds
- Assumes no change in the average market hog price

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Change in profitability due to disease that impacts average daily gain is less as diet costs rise (1000 head)



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As diet costs rise, managing diseases that reduce feed conversion become much more important!

- Feed conversion – more
- Late mortality – ~equal
- Early mortality – less
- Average daily gain - less



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Relative to 2000, rate the importance of managing: Throughput in the breeding herd

1. Much less important today
2. Less important today
3. Equally important
4. More important today
5. Much more important today

Importance Rating	Percentage
Much less important...	0%
Less important...	14%
Equally important...	48%
More important...	29%
Much more important...	10%

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Relative to 2000, rate the importance of managing: Weaned pig quality

1. Much less important today
2. Less important today
3. Equally important
4. More important today
5. Much more important today

Importance Rating	Percentage
Much less important...	0%
Less important...	0%
Equally important...	20%
More important...	20%
Much more important...	60%

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Under the old paradigm producers were rewarded for focusing on throughput

- Measured by
 - PSY
 - lbs. of pork marketed per sow per year, etc.
- Higher throughput means fixed costs are spread over more pigs or pounds of pork sold
- Throughput is still important, but relatively less so

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When diet costs rise, the rewards are shifting towards producing a healthy, high-quality weaned pig

- Specifically, a "high-quality" weaned pig that converts feed efficiently

- Consider the tradeoff between
 - Reduced throughput via higher pre-wean mortality (PWM) and...
 - Producing a healthy, high-quality group of wean pigs that have an improvement in the average feed conversion ratio (FCR)

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The tradeoff between PWM and FCR for alternative diet costs is evaluated with a budgeting model using annual profitability as the outcome

- Changes in profitability resulting from simultaneous increase in both
 1. PWM (worse)
 2. Wean-to-finish FCR (better)
- Evaluated for two scenarios:
 1. "Low" diet costs
 2. "High" diet costs (50% higher than "low" diet costs)
 - Includes lactation, gestation, gilt and wean-to-finish diets

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About the budgeting model used

- A breed-to-finish budgeting model for a 1000 sow herd was used

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The model accounts for all costs and revenues

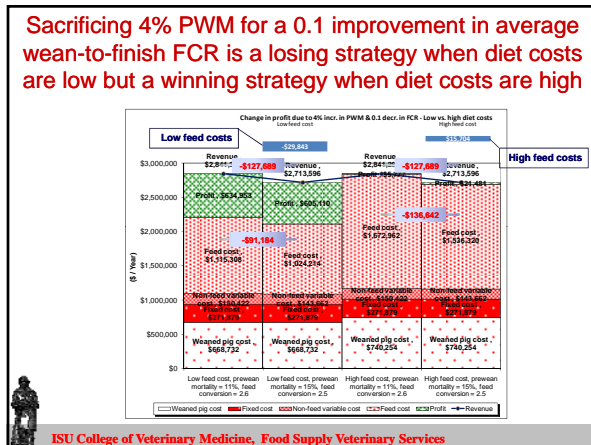
How Costs Accrue in Breeding Herd Model			
	Fixed	Per sow inventoried	Per pig born alive
Fixed Costs	X		
Non-feed variable costs		X	X
Feed costs		X	

How Costs Accrue in Wean-to-Finish Model			
	Fixed	Per pig placed	Per lb. of gain
Fixed Costs	X		
Wean pig costs		X	
Non-feed variable costs		X	X
Feed costs			X
Revenue			X

← Cost is transferred from breeding herd model

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- ### Assumption for prewean mortality and feed conversion scenarios
- Prewean mortality increase from 11% to 15%
 - Wean-to-finish feed conversion increases from 2.50 to 2.60 pounds of feed/pound of gain
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- ### Take-homes
- Our old conventional wisdom is no longer valid
 - The relative contribution of variation in diet costs to profit risk has increased substantially since 2005
 - The contribution of diet costs is now on par with that of variability in hog prices
 - Manage the margin
 - Reevaluate marketing contracts
 - Focus more resources and time on feed ingredient acquisition and pricing
 - Diversity is still a good risk management strategy
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- ### Take-homes
- Focus on throughput is relatively **less** rewarding as diet costs rise -- placing a healthy, high-quality wean pig that will convert feed efficiently is relatively **more** rewarding as diet costs rise
 - Reevaluate SOP's for managing substandard pigs
 - We debated what to do with substandard wean pigs when corn was \$2.50 and SBM was \$150 – the decision gets easier as diet costs rise
 - » Best option is still to prevent them, but if not possible remove them early
 - Reevaluate agreements and employee bonus programs that provide incentives for maximizing the number of pigs (and not quality) weaned
 - Reevaluate weaning age (with our without remodeling or adding to existing facilities)
 - As diet costs rise, improvements in feed conversion, ADG and mortality may offset the reduction in the number of pigs weaned or cost of remodeling or construction?
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- ### Take-homes
- As diet costs rise, managing diseases that reduce feed conversion become much more important
 - Shift money spent on disease intervention (vaccines, pharmaceuticals and management)
 - Spend **more** for diseases with relatively large impact on feed efficiency
 - Spend **less** for diseases with relatively large impact on ADG and mortality
 - Make better measurements!
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