Introduction to Risk Management in Agriculture

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Thedford, NE

What is RISK?

- **RISK:** The probability of an event occurring that can negatively impact your:
  - Current profit level
  - Financial situation (equity position)
  - Satisfaction and well-being

Origin of Word RISK

- **RISICARE**

Italian word
"TO DARE"

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Sources of Risk

- **Production** - yield/quality variability
- **Marketing** - changes in price/external conditions
- **Financial** - variability in debt/equity capital and ability to meet cash demands
- **Institutional** - responsibilities for contracts, statutory compliance, tort liability, and business structure
- **Human** - managing people and estate transfers

Feedlot: Sources of Risk

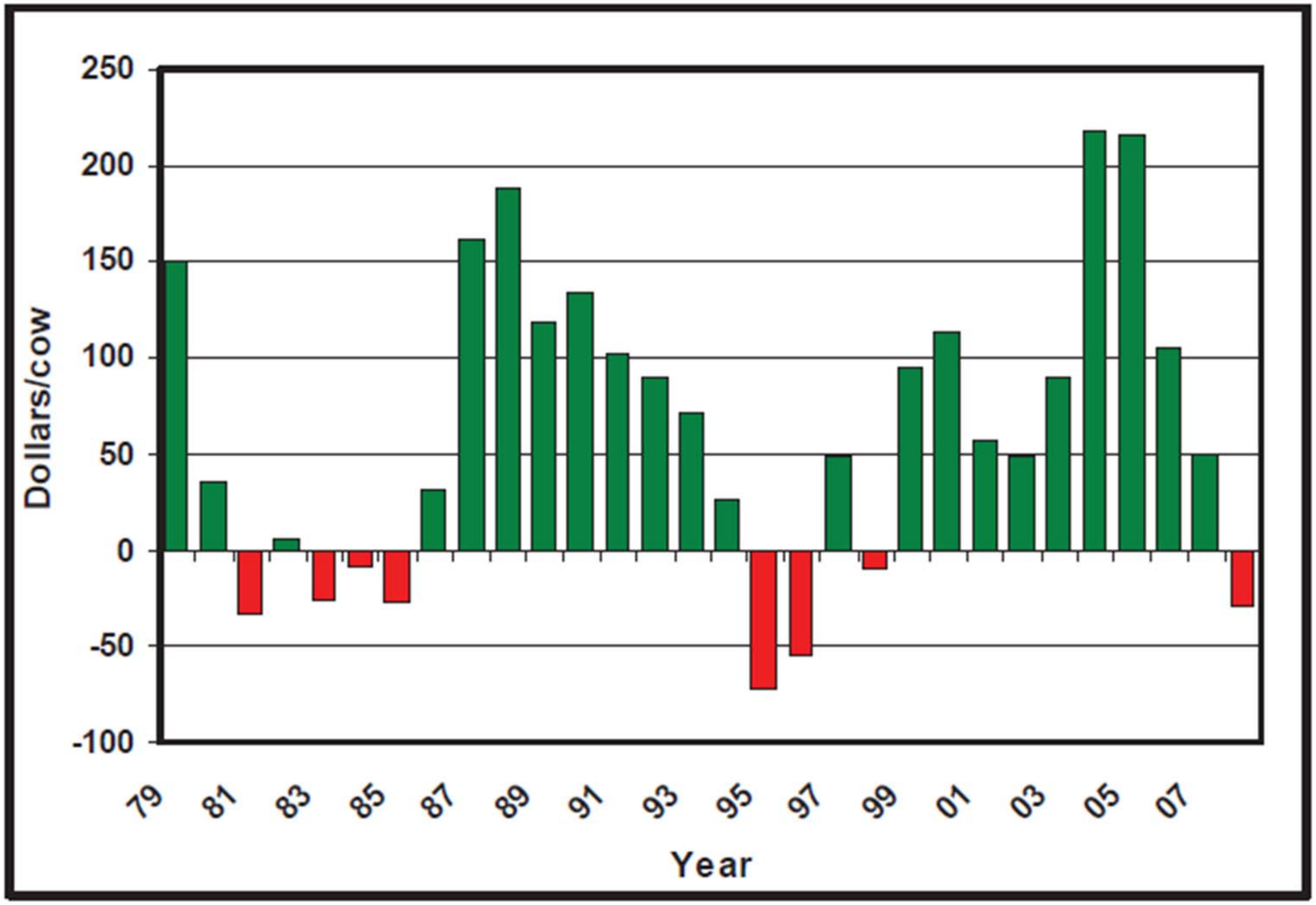
- Components of Profit Variability
  - 50% Fed Cattle Prices (output price)
  - 45% Feeder Cattle and Corn Prices

    (input price)
  - 5% Other Factors

    (interest rates, feed conversion, ADG)
- Cattle Prices (Fed and Feeder) explain 70% - 80% of profit variability for feedlots.

Cow/Calf Sector

Figure 1. Returns over Variable Cost for Cow-calf Enterprise, 1979-2008



Source: Kansas State University

Cow/Calf Sector

Table 1. Beef Cow-calf Enterprise Returns and Costs, 2004-2008 (minimum of three years)*

	All Farms	Profit Category: High 1/3 Head / $	Profit Category: Mid 1/3 Head / $	Profit Category: Low 1/3 Head / $	Difference between High 1/3 and Low 1/3: Absolute	Difference between High 1/3 and Low 1/3: %
Number of Farms	65	22	21	22		
Labor allocated to livestock, %	38.1	48.0	35.4	30.7		
Number of Cows in Herd	124	170	137	65	105	161%
Number of Calves Sold	114	156	129	58	97	168%
Weight of Calves Sold	583	591	584	573	18	3%
Calf Sales Price / Cwt	$109.12	$108.73	$109.99	$108.68	$0.05	0%
Gross Income	**$539.29**	**$573.90**	**$555.38**	**$489.33**	**$84.56**	**17%**
Feed	$312.02	$274.36	$316.05	$345.83	-$71.47	-21%
Interest	$117.00	$94.09	$117.00	$139.90	-$45.81	-33%
Vet Medicine / Drugs	$15.70	$15.85	$15.73	$15.54	$0.30	2%
Livestock Marketing / Breeding	$10.08	$8.15	$11.44	$10.72	-$2.56	-24%
Depreciation	$37.23	$26.36	$25.28	$59.51	-$33.16	-56%
Machinery	$66.73	$47.71	$63.34	$88.99	-$41.28	-46%
Labor	$92.87	$69.48	$84.90	$123.88	-$54.41	-44%
Other	$39.85	$22.85	$35.10	$61.38	-$38.53	-63%
Total Cost	**$691.49**	**$558.84**	**$668.84**	**$845.75**	**-$286.91**	**-34%**
Net Return to Management	**-$152.20**	**$15.05**	**-$113.46**	**-$356.42**	**$371.47**	

* Sorted by Net Return to Management (Returns over Total Costs) per Cow

Source: Kansas State University

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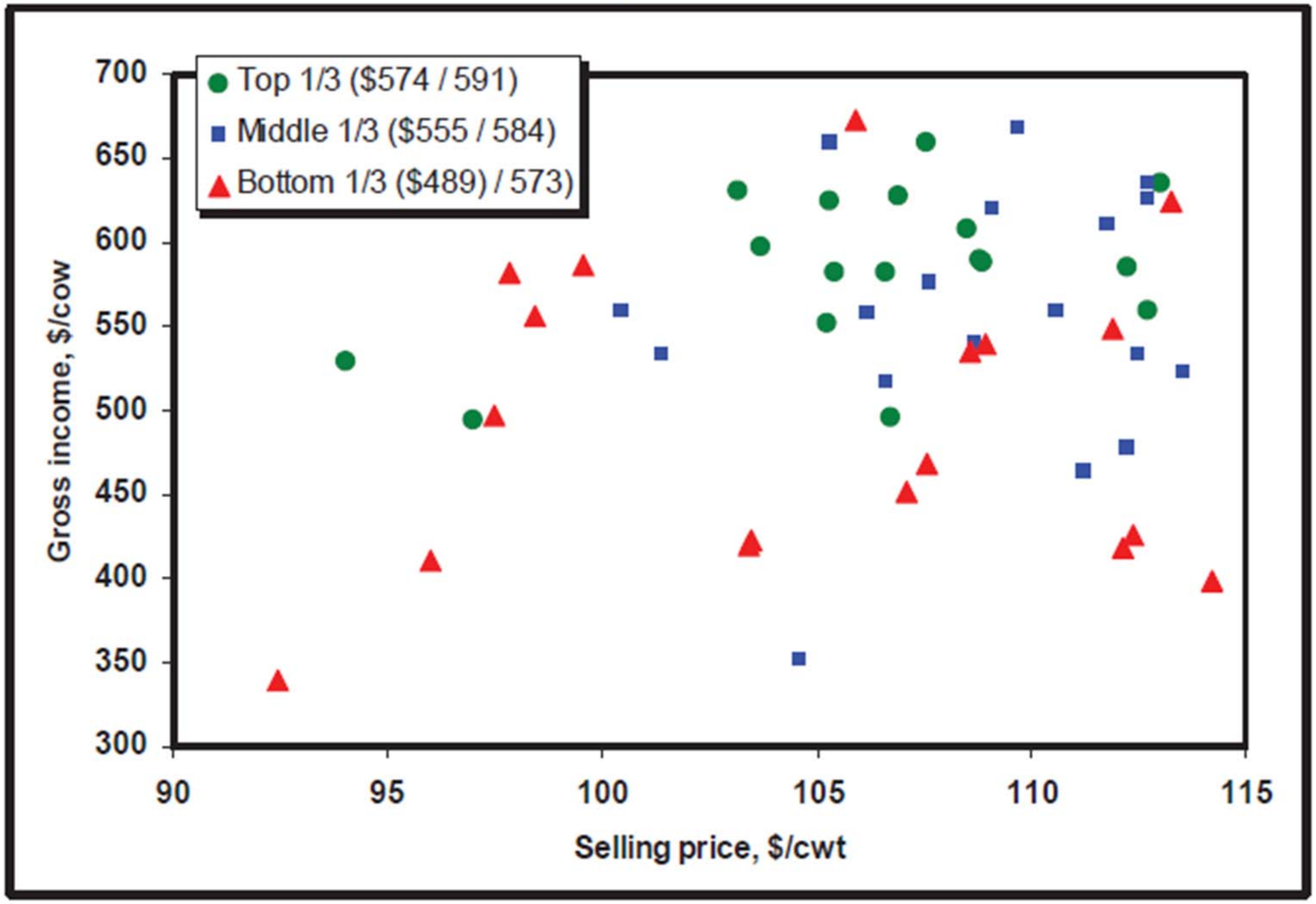
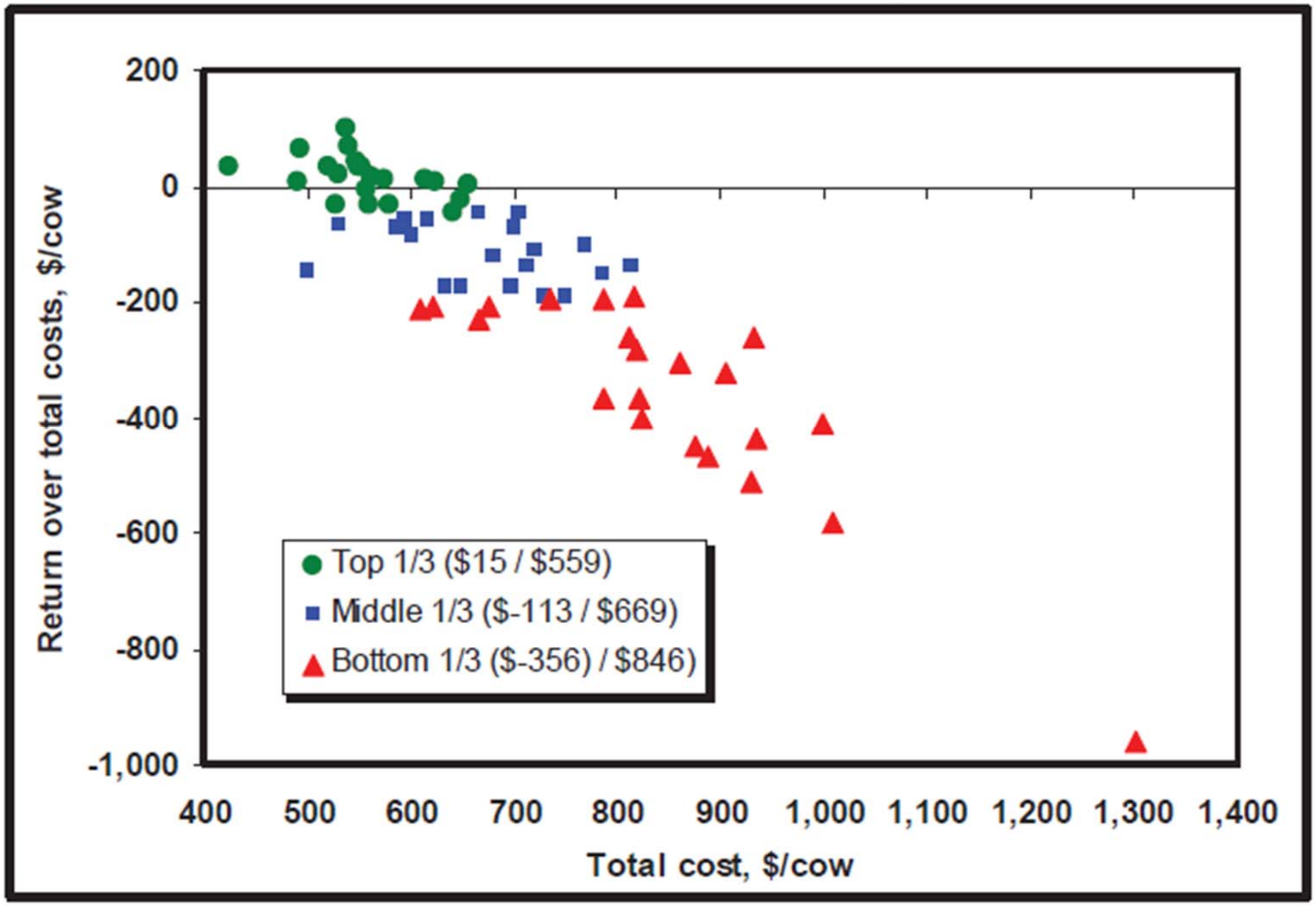
Figure A2. Gross Income versus Selling Price (correlation = 0.06)



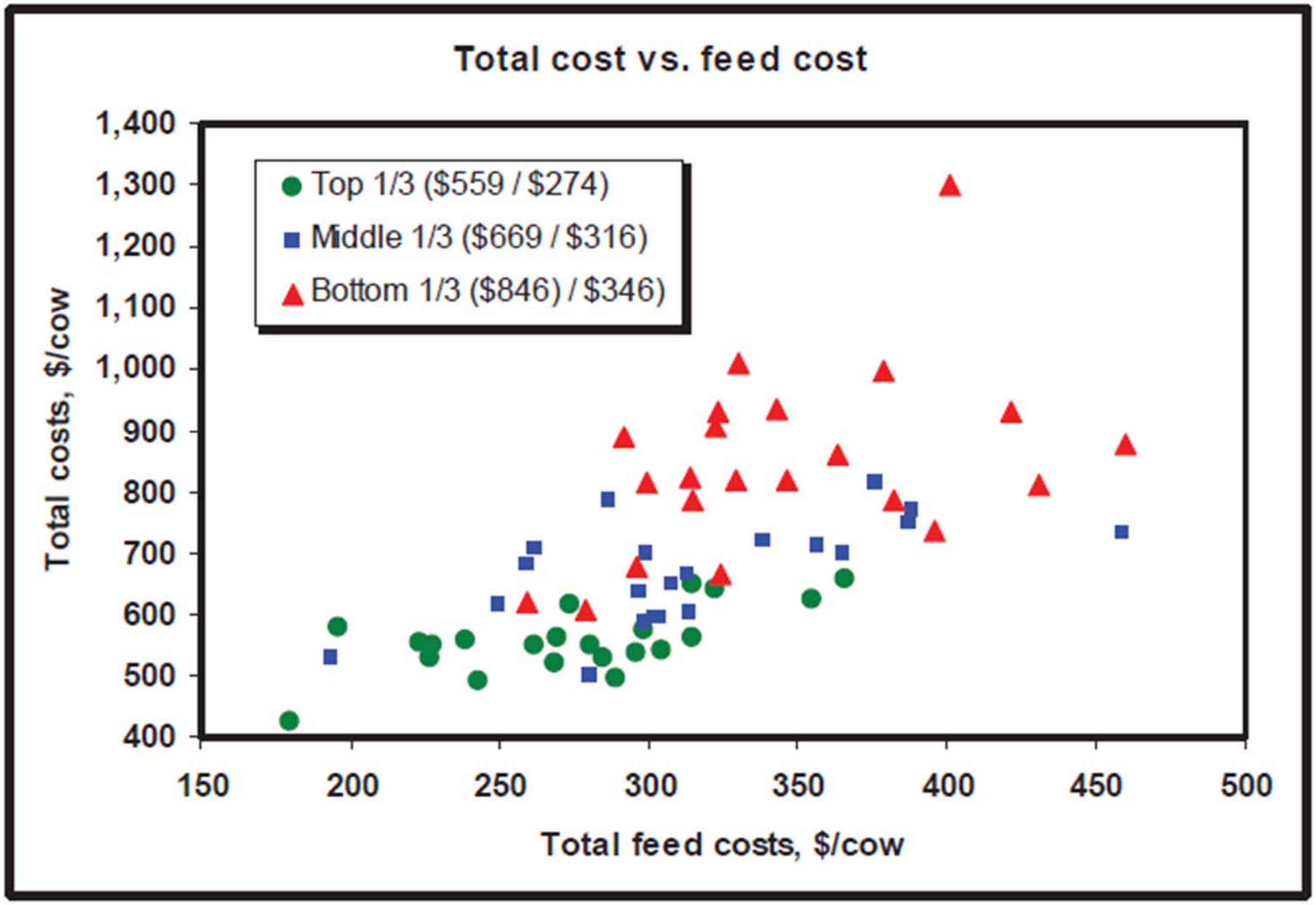
Source: Kansas State University

Figure A4. Profit versus Total Cost (correlation = -0. 90)



Source: Kansas State University

Figure A5. Total Cost versus Feed Costs (correlation = 0.64)



Source: Kansas State University

Ways to manage risks

- **Avoid**
- **Reduce the risks**
- **Shift the risk to others**
- **Increase ability to cope**
  - **Maintain flexibility**
  - **Keep Reserves**

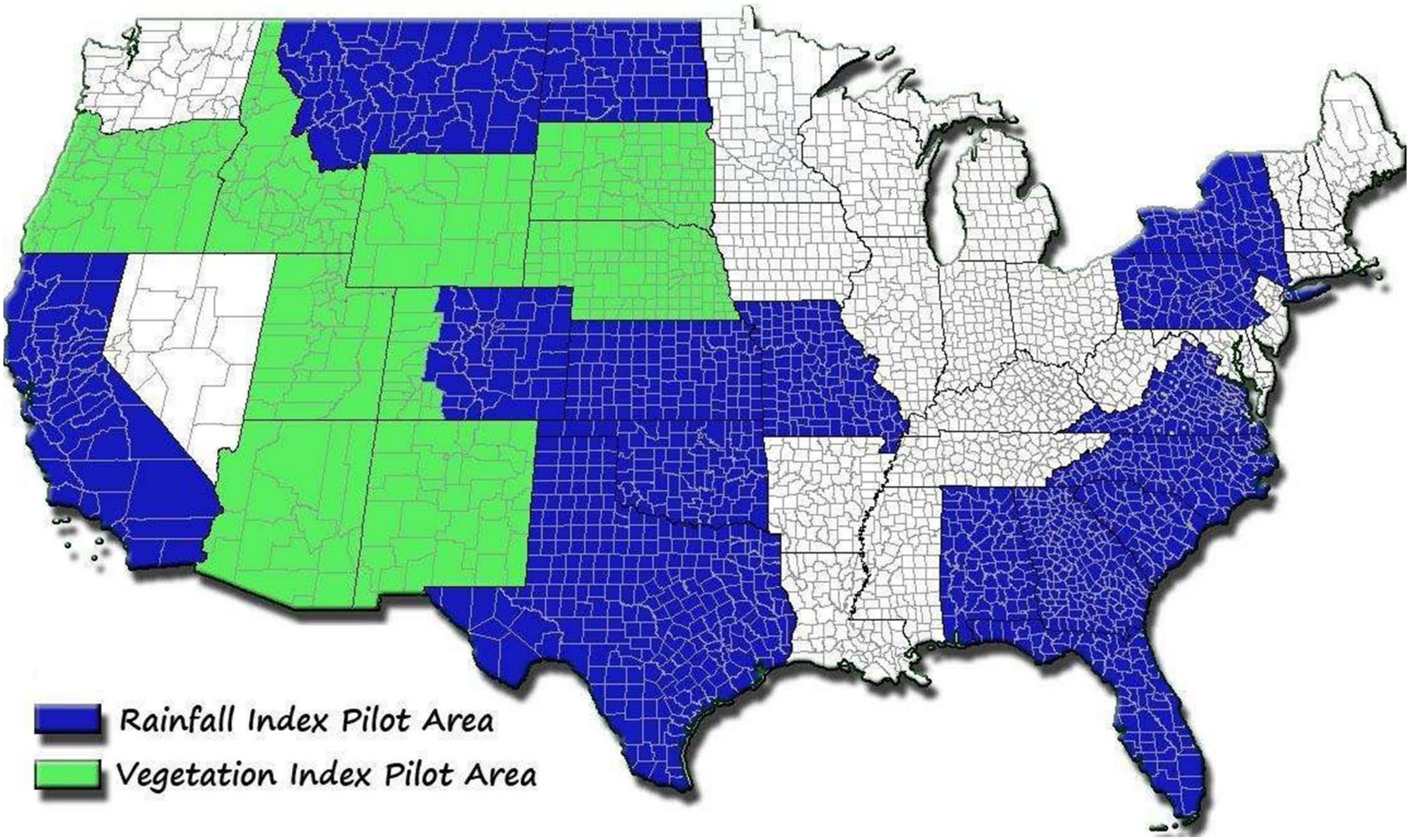
Cow/Calf Sector – Risk Controls

- Cash Forward Contracting
- Futures & Options Contracts
- Livestock Risk Protection (LRP) Insurance
- Pasture, Rangeland, and Forage (PRF) Insurance
  - Rainfall Index
  - Vegetation Index

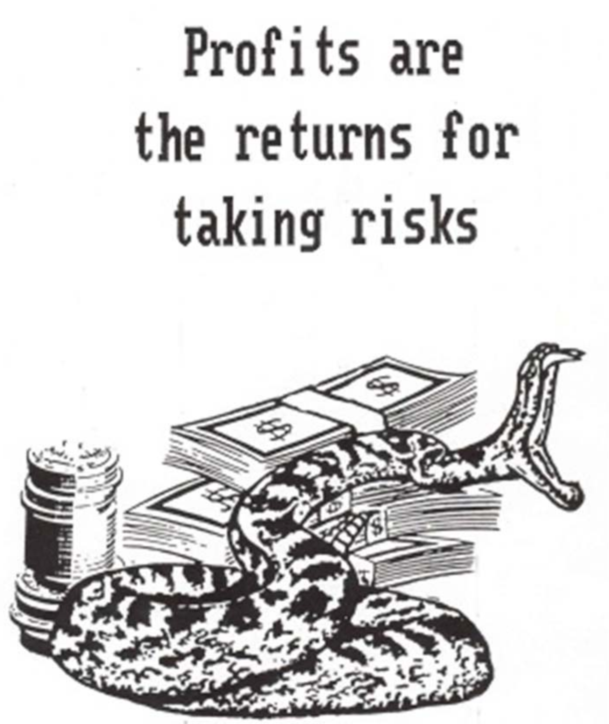
PASTURE, RANGELAND AND FORAGE (PRF)

Federally subsidized insurance program offered by RMA designed specifically for hay and livestock producers

Pasture, Rangeland Forage - 2011 Crop Year County Availability by Insurance Plan

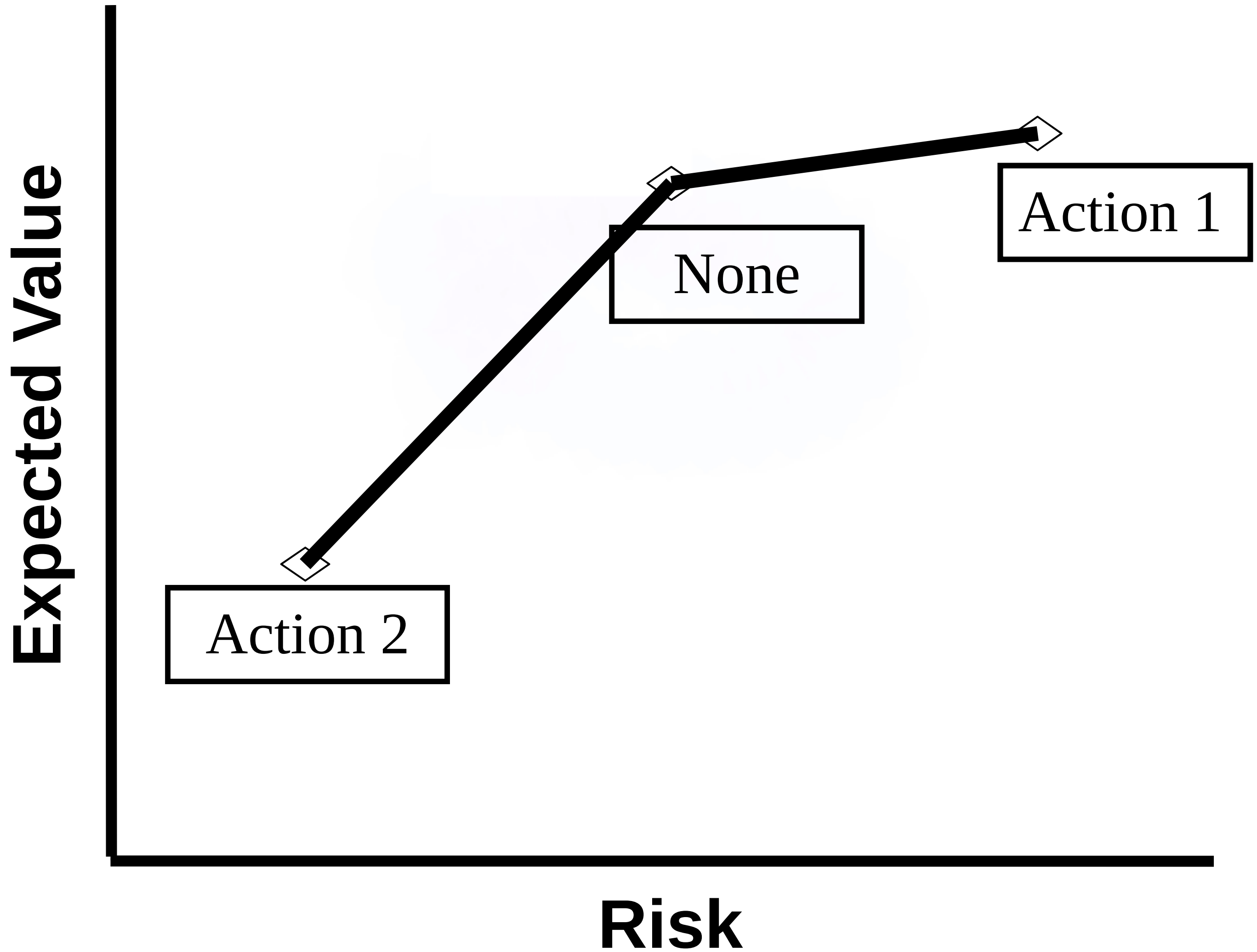


Some important principles



- You will never eliminate all risk
- Small risks => Small profits
- Managing risks are a matter of evaluating tradeoffs. That is, alternatives that may result in:
  - Higher returns without taking on much more risk.
  - Reducing risk without reducing profit very much.
- Seeking a comfortable tradeoff between risk and profit.

Risk-Return Tradeoff



Example: Hay Inventory

Actions

Buy More Hay	Do Nothing	Sell Some Hay

Possible Winter Weather

Severe

Normal

Mild

Hay Inventory Decision

Winter Weath		Actions		
		Buy		Sell Some Hay
Severe				$31,524
Normal				$51,997
Mild		$52,997	$53,997	$54,997

Which would you choose?

Hay Inventory Decision

Winter Weather	Prob.	Actions		
		Buy More Hay	Do Nothing	Sell Some Hay
Severe	1/6	$36,159	$34,365	$31,524
Normal	4/6	$50,997	$51,497	$51,997
Mild	1/6	$52,997	$53,997	$54,997

Hay Inventory Decision

Winter Weather	Pr	Actions		
		Buy		Sell Some Hay
Severe	1			$31,524
Normal	4/6	$50,997	97	$51,997
Mild	1/6	$52,997	$53,9	$54,997
Exp. Value		$48,857	$49,058	$49,085

Maximize Expected Value

Hay Inventory Decision

Winter Weather	Prob.	Actions		
		Buy More Hay	[illegible]	[illegible] Hay
Severe	1/6	$36,159	[illegible]365	$31,524
Normal	4/6	$50,997	[illegible]51,497	$51,997
Mild	1/6	$52,997	$53,997	$54,997
Min. Value		$36,159	$34,365	$31,524

Maximize Minimum Value

RightRisk™ RMA University of Nebraska Lincoln EXTENSION

Hay Inventory Decision

Winter Weather	Prob.	Actions		
		[illegible]	[illegible]	Sell Some Hay
Severe	1/6	$36,159	$3[illegible]5	$31,524
Normal	4/6	$50,997	$51,49[illegible]	$51,997
Mild	1/6	$52,997	$53,997	$54,997
Max. Value		$52,997	$53,997	$54,997

Maximize Maximum Value

Hay Inventory Decision

Most Likely Outcome

Winter Weather	Prob.	Buy More Hay	D Nothin	Sell Some Hay
Severe	1/6	$36,159	$34,365	$31,524
Normal	4/6	$50,997	$51,497	$51,997
Mild	1/6	$52,997	$53,997	$54,997

Hay Inventory Decision

Winter Weather	Prob.	Actions		
		Buy More Hay	Do Nothing	Sell Some Hay
Severe	1/6	$36,159	$34,365	$31,524
Normal	4/6	$50,997	$51,497	$51,997
Mild	1/6	$52,997	$53,997	$54,997
Max. Regret				

Hay Inventory Decision

Winter Weather	Prob.	Actions		
		Buy More Hay	Do Nothing	Sell Some Hay
Severe	1/6	$36,159	$34,365	$31,524
Normal	4/6	$50,997	$51,497	$51,997
Mild	1/6	$52,997	$53,997	$54,997
Max. Regret		$2,000		

Hay Inventory Decision

Winter Weather	Prob.	Actions		
		Buy More Hay	Do Nothing	Sell Some Hay
Severe	1/6	$36,159	$34,365	$31,524
Normal	4/6	$50,997	$51,497	$51,997
Mild	1/6	$52,997	$53,997	$54,997
Max. Regret		$2,000	$1,794	

Hay Inventory Decision

Minimize
Maximum Regret

Wi[illegible] Wea[illegible]	[illegible]	Actions		
		[illegible]	Do Nothing	Sell Some Hay
Severe	1/6	$[illegible]9	$34,365	$31,524
Normal	4/6	$50,9[illegible]	$51,497	$51,997
Mild	1/6	$52,997	$53,997	$54,997
Max. Regret		$2,000	$1,794	$4,635

Hay Inventory Decision

Winter Weather	Prob.	Actions		
		Buy More Hay	Do Nothing	Sell Some Hay
Severe	1/6	$36,159	$34,365	$31,524
Normal	4/6	$50,997	$51,497	$51,997
Mild	1/6	$52,997	$53,997	$54,997

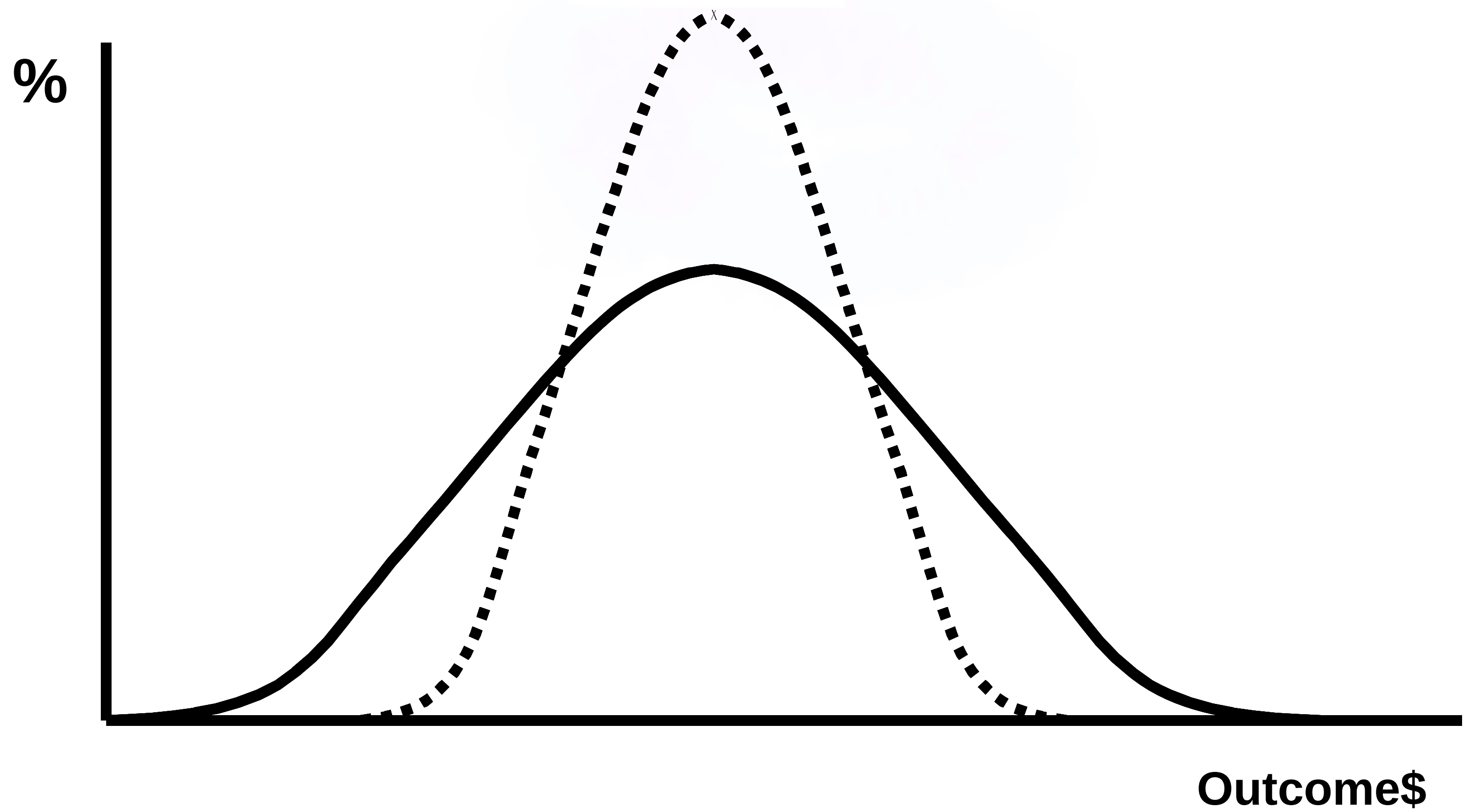
Insurance Decision

Drought	Prob.	Actions		
		High Coverage Insurance	Low Coverage Insurance	No Insurance
Severe	1/6	$41,159	$36,159	$31,524
Mild	1/6	$50,497	$50,997	$51,997
No Drought	4/6	$52,997	$53,997	$54,997

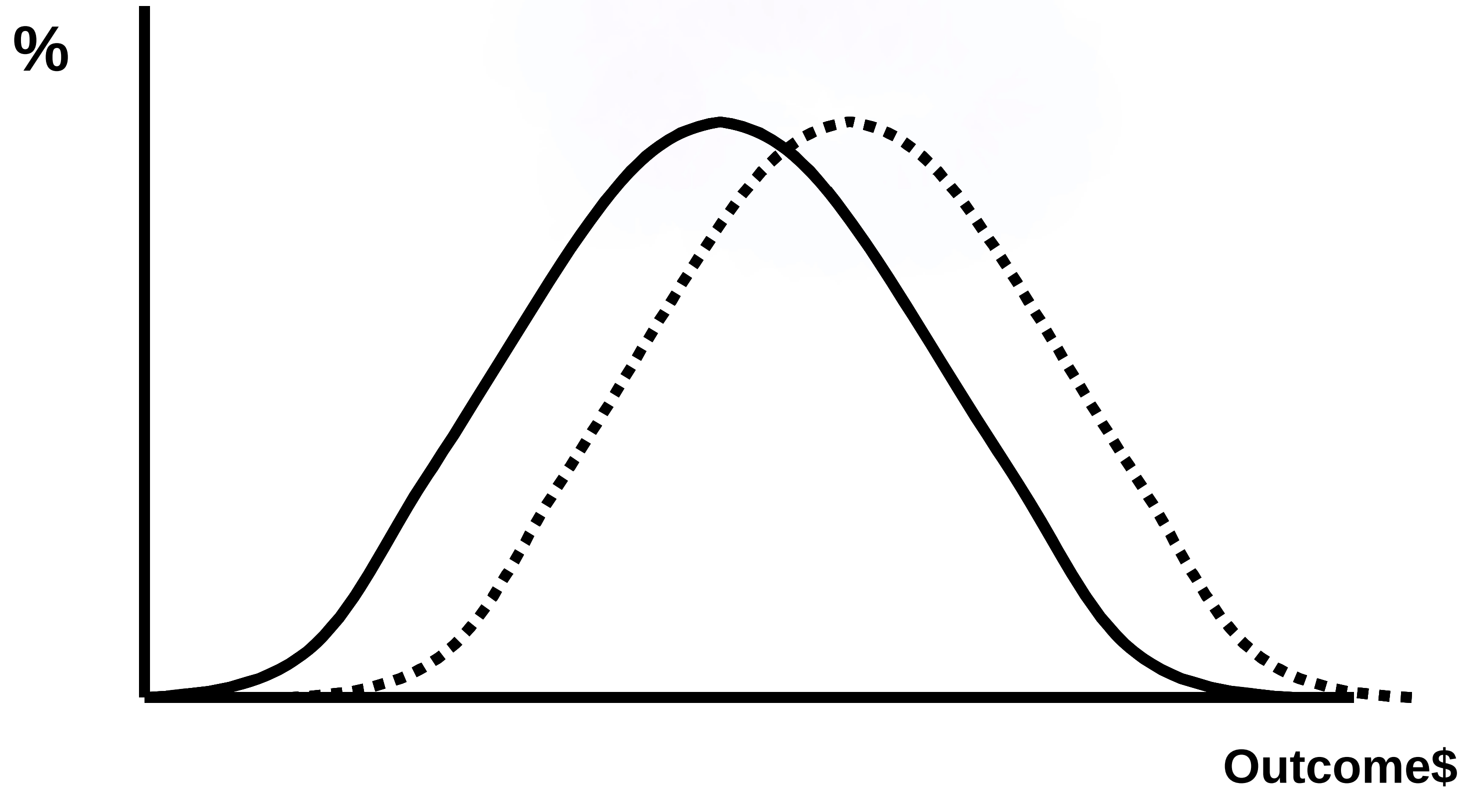
Key Point

- Risk management is an active learning process that involves considering tradeoffs and making decisions to alter or choose not alter the probability distribution for a future event.

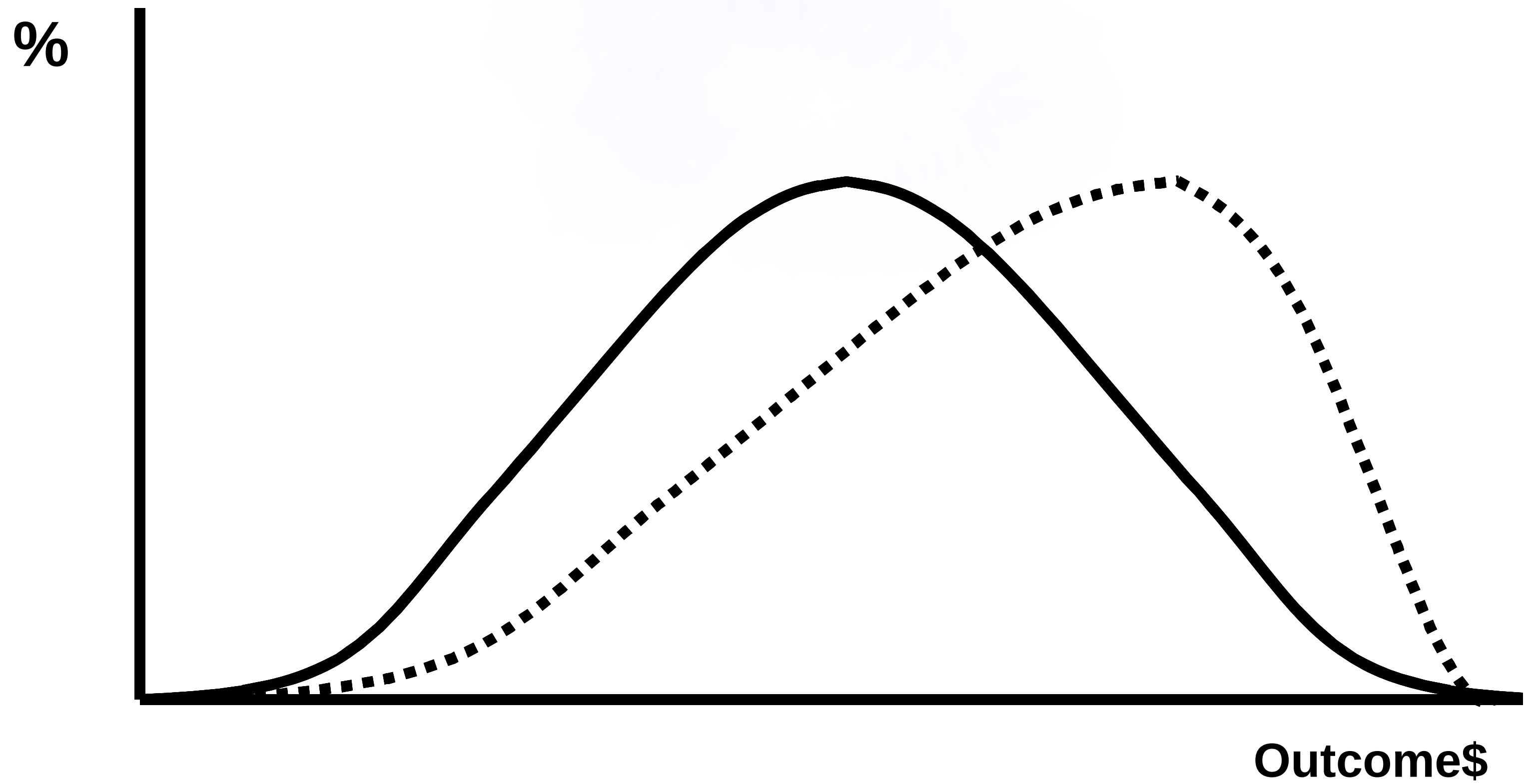
Panel 1: Same Mean, Less Dispersion



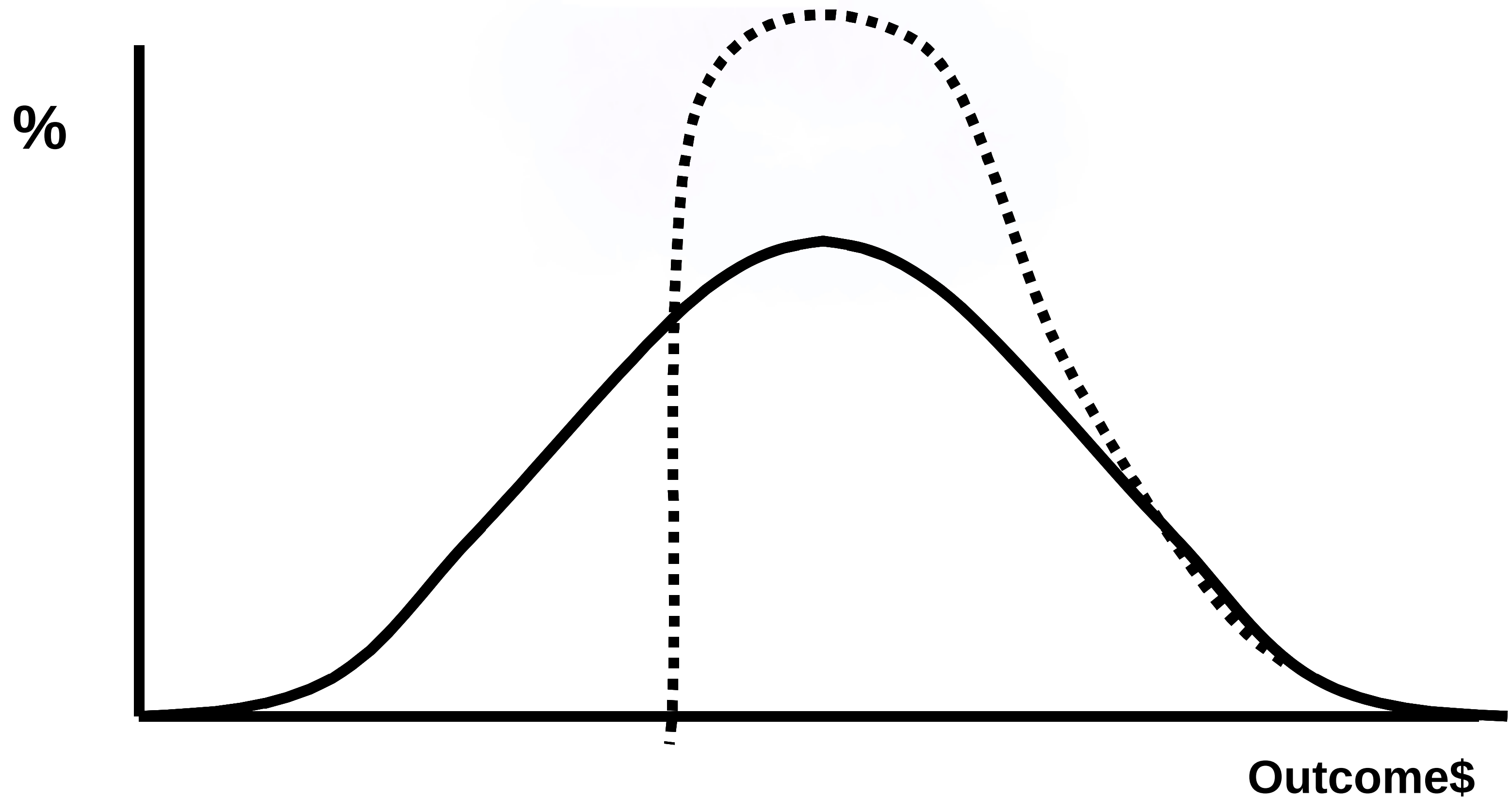
Panel 2: Same Dispersion, Higher Mean



Panel 3: Skewing the distribution



Panel 4: Truncating the Distribution



Questions?