THE COST OF BATCH VARIABILITY AS A COMPONENT OF ECONOMIC VALUES FOR ROBUSTNESS TRAITS

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EAAP– Nantes – August 2013

Acknowledgements

Background

- Selection for growth, feed efficiency and leanness key to pig genetic improvement

- May not be sustainable long term?

- Modern genotypes much more sensitive to the environment
  - Heat
  - Cold
  - Disease
  - Feed quality

Focus on the mean

- Genetic evaluation focus is on the mean of traits
- Reducing variability of performance implies robustness
- But what is in it for the commercial pig farmer?
- Clear economic drivers = change in breeding programs
- Reduced variability of performance
  - Short term profit
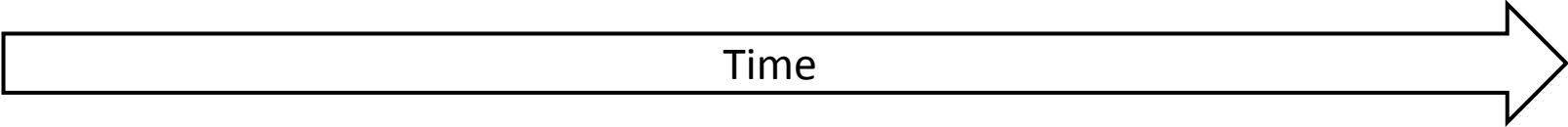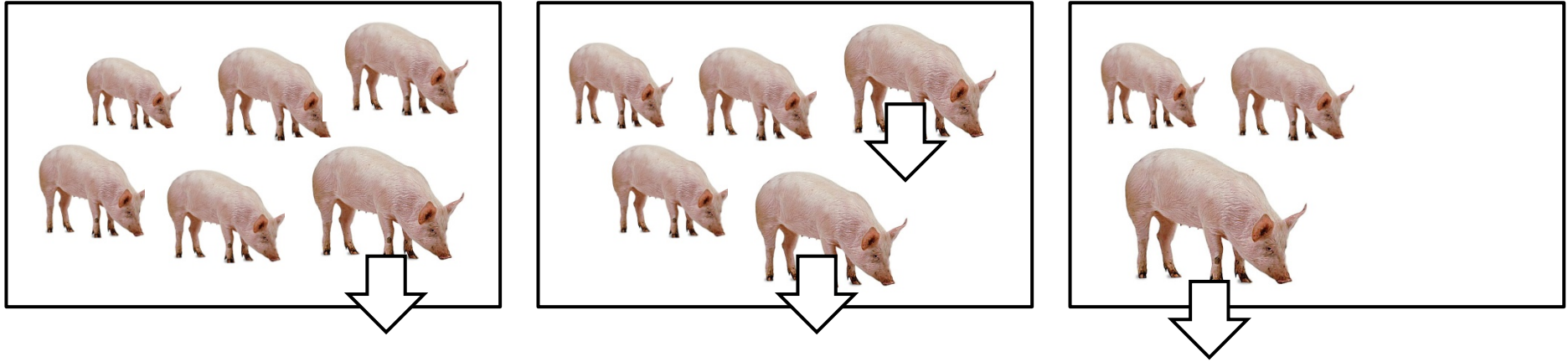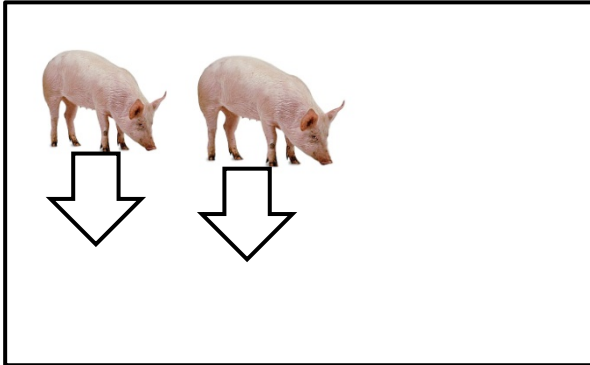 - Long term sustainability

Batch variability

Consistent
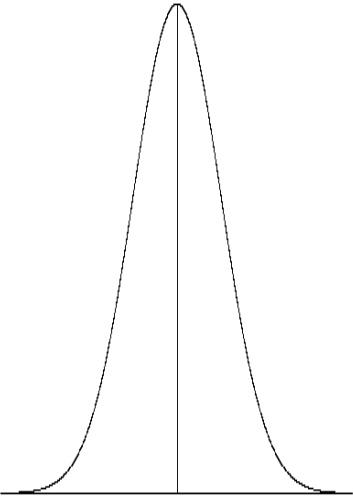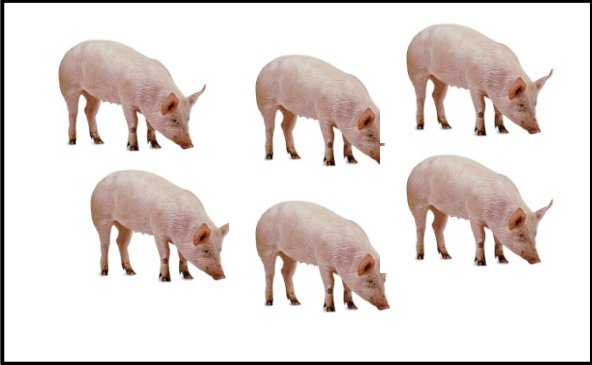
Variable

Batch finishing system

Time
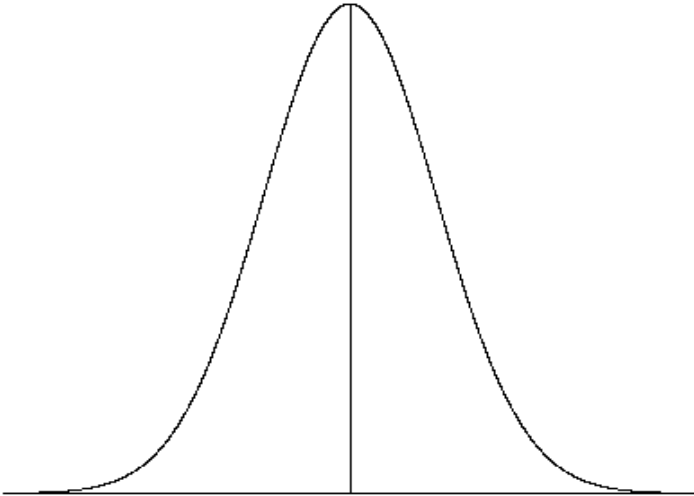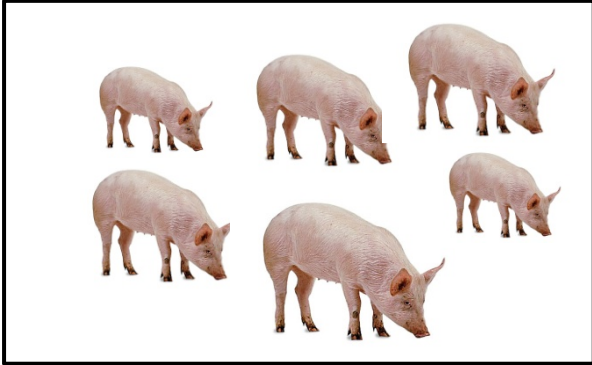
Batch finishing system

- □ Need to refill the pen
- □ Not profitable to keep partly filled pen
- □ Underweight pigs are penalised
- □ More variable pen = more underweight pigs

Optimisation

- Tradeoff

- How long before the pen is cleared?

- Keep longer
  - Less penalties for underweight pigs
  - Higher opportunity cost of unused facilities

- Example calculations for Australia

Penalties for underweight carcases/pigs

Dressed carcase weight band	Moderate threshold	Severe threshold	Moderate step	Severe step
60-70kg	0	0	-0.10	-0.20
50-60kg	0	0	-0.20	-0.40
<50kg	-1.00	-2.85	-0.30	-0.60

Other assumptions

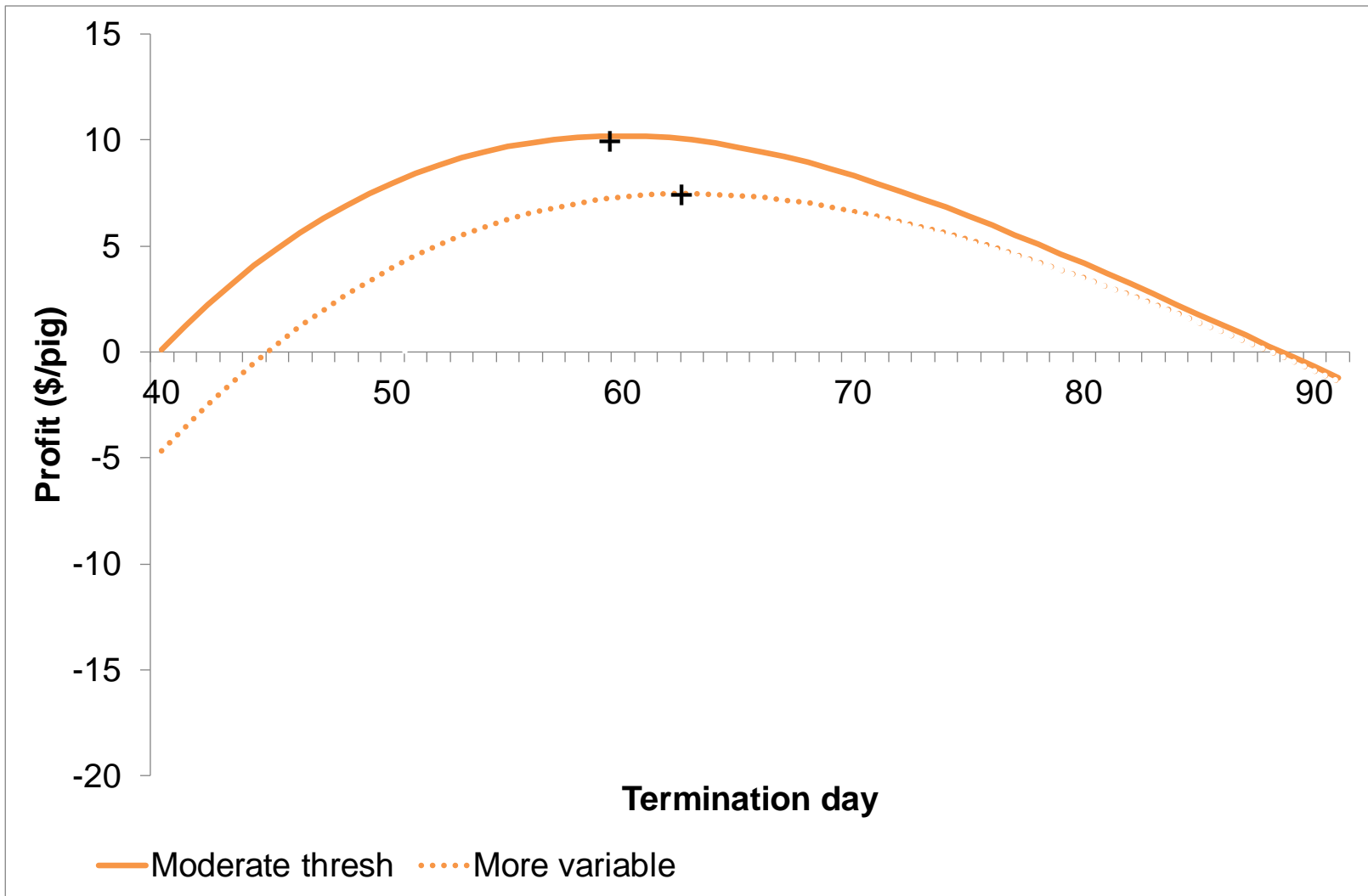| Parameter name	Values used
Feed price ($ fresh weight/tonne)	230
Daily dressed carcase weight gain (kg/day)	0.6
Target dressed carcase weight (kg)	70
Base carcase price ($/kg *dw*)	2.85
Opportunity cost per pig per pen per day ($)	0.20, 0.50, and 0.80

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Optimisation

Optimisation

Keep the more variable batch longer to minimise loss

Optimisation

Penalties for underweight carcases/pigs

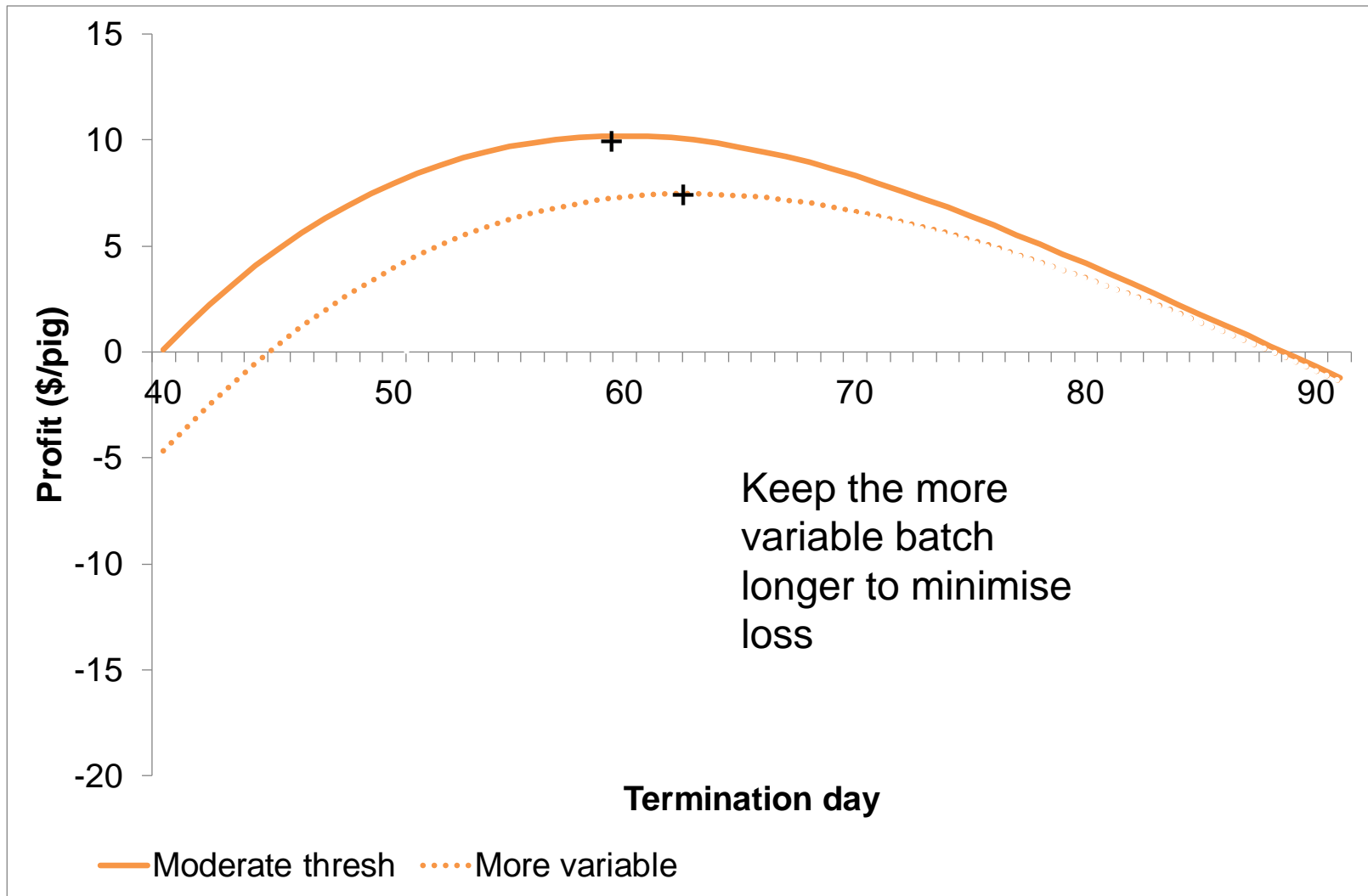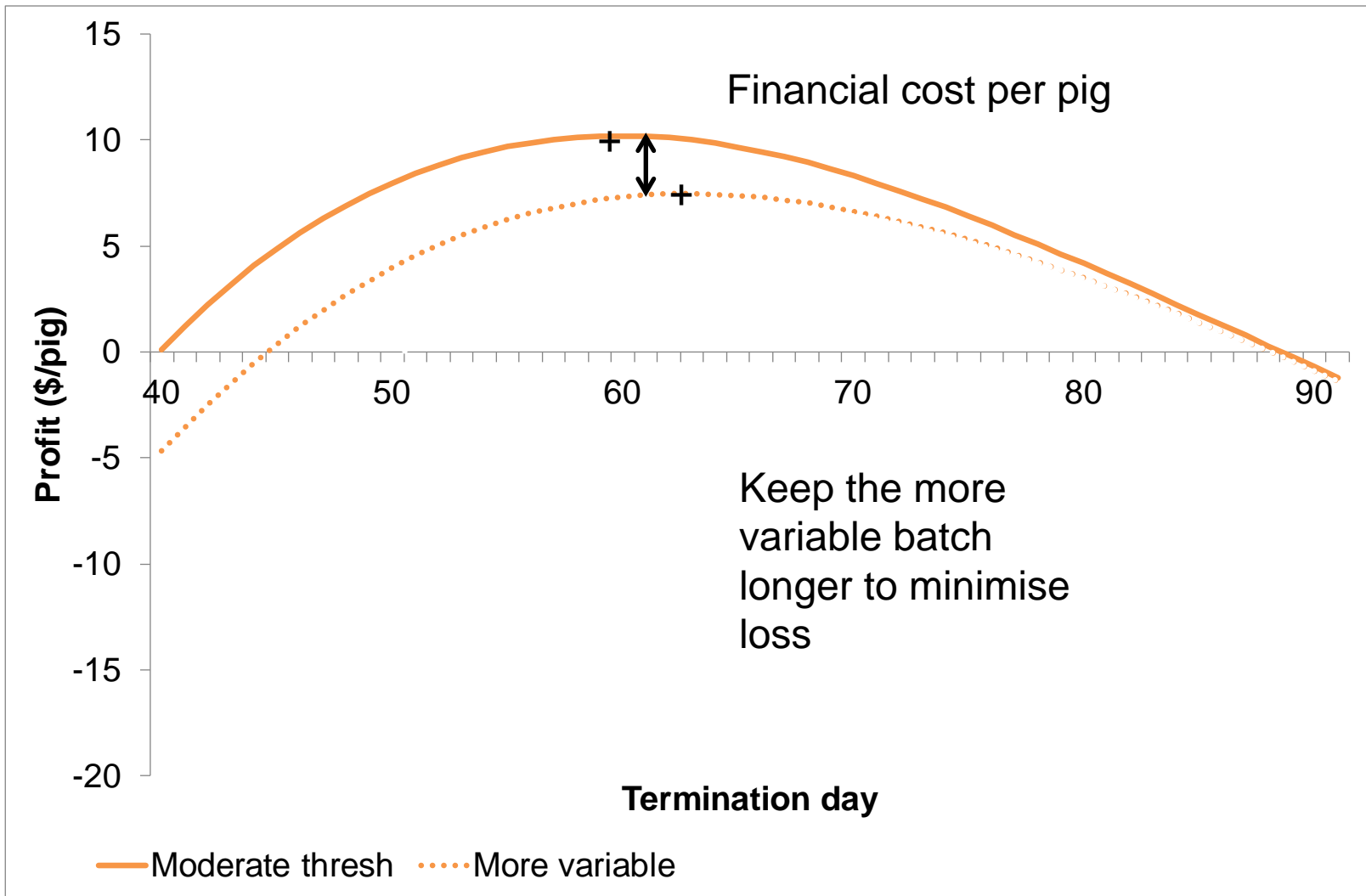| Dressed carcase weight band	Moderate threshold	Severe threshold	Moderate step	Severe step
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Optimisation

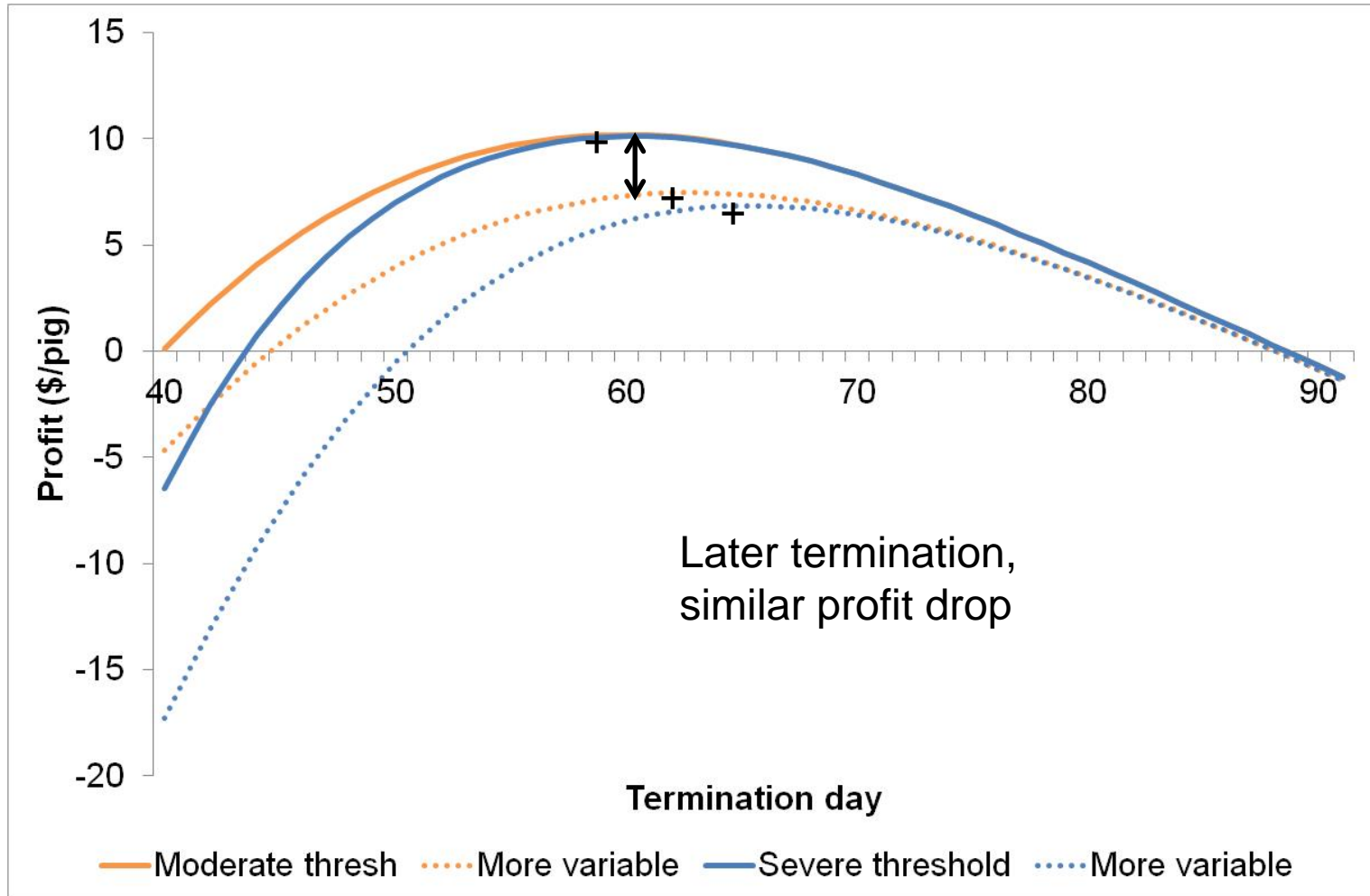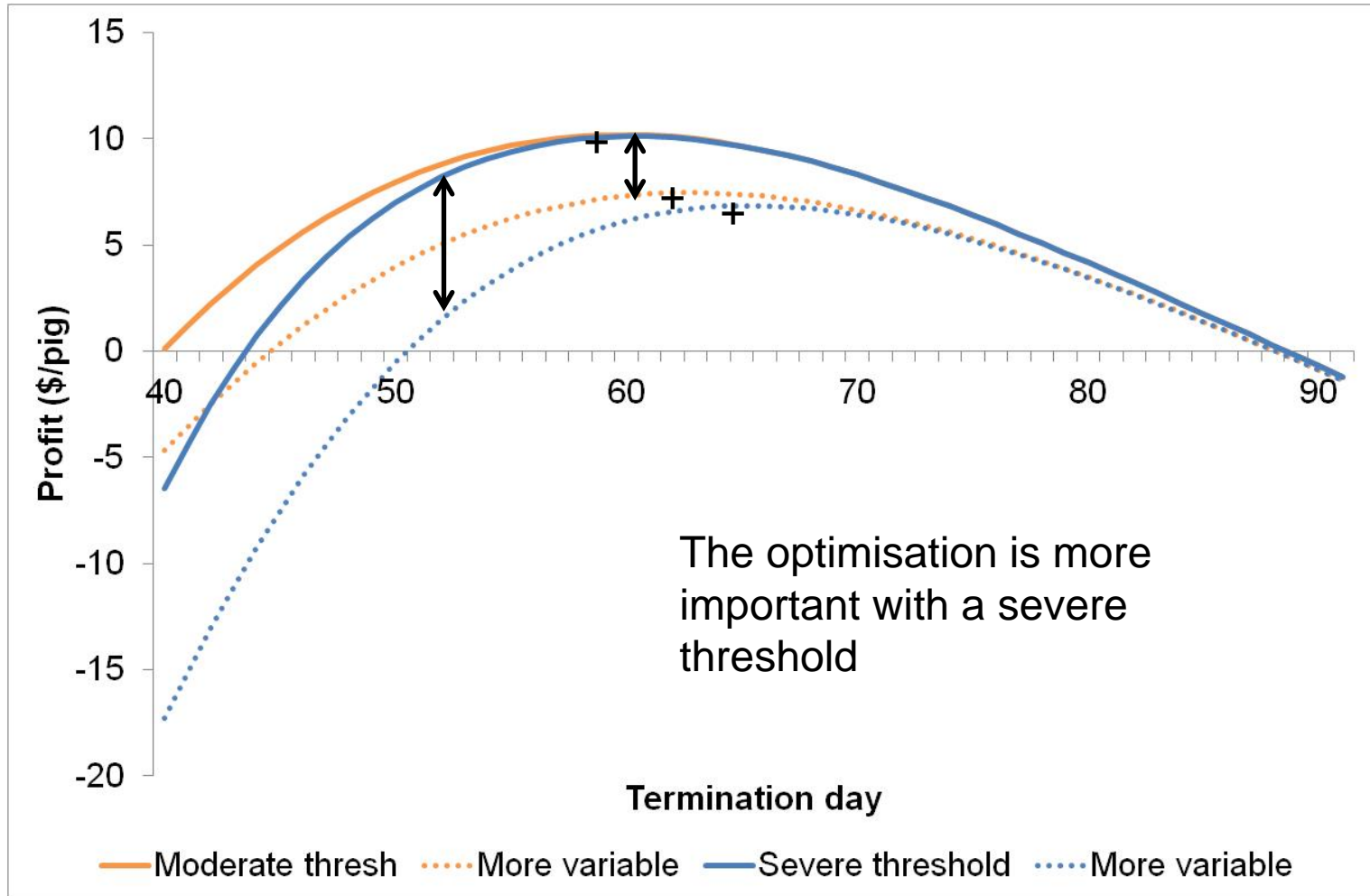Later termination, similar profit drop

Optimisation

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Econ. Val. vs Pen Cost
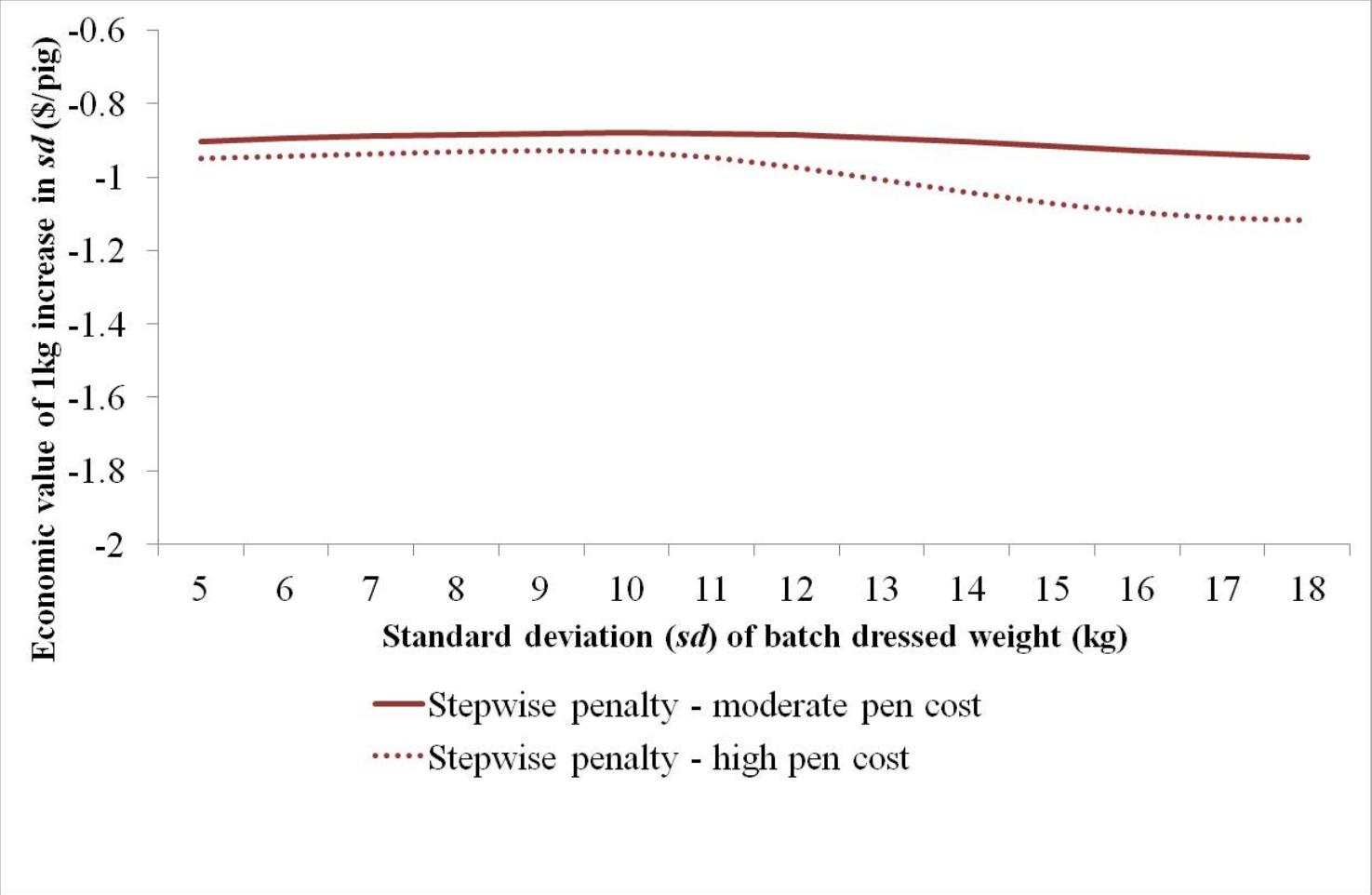
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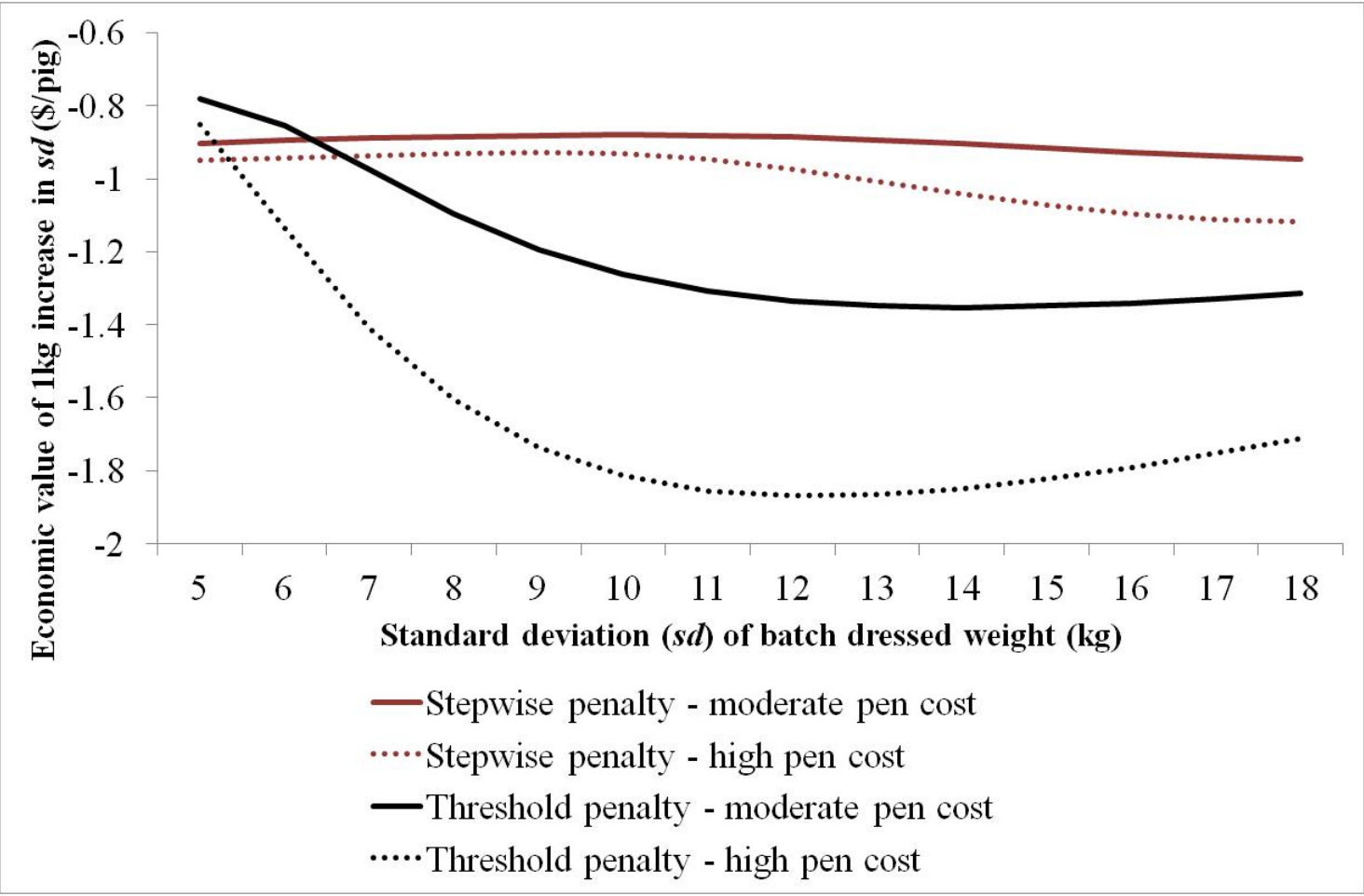
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Econ. Val. vs Pen Cost

Economic value of 1kg increase in *sd* ($/pig) vs Standard deviation (*sd*) of batch dressed weight (kg)

Stepwise penalty - moderate pen cost
Stepwise penalty - high pen cost
Threshold penalty - moderate pen cost
Threshold penalty - high pen cost

Implications

- There is a clear rationale for economic cost of batch variability in finishing pigs
- Economic impact depends on (interacting)
  - Penalties for underweight pigs
  - Opportunity cost of growing facility (Pen Cost)
- High batch variability driven by
  - Very high lean growth potential
  - Variation in weaning weight within and across litters
- Need EBVs for variability in growth rate

Implications

- Economic penalty on other traits that increase batch variability
  - Increased weaning weight variability with increased litter size
  - Low sow survival equals more weaned pigs from gilts with lighter and more variable weaning weights
  - Disease susceptibility/tolerance traits