ABACUSBIO LIMITED

Making a difference to food production internationally using science & technology

EFFICIENCY OF BREEDING:
COW MATURE WEIGHT

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EAAP
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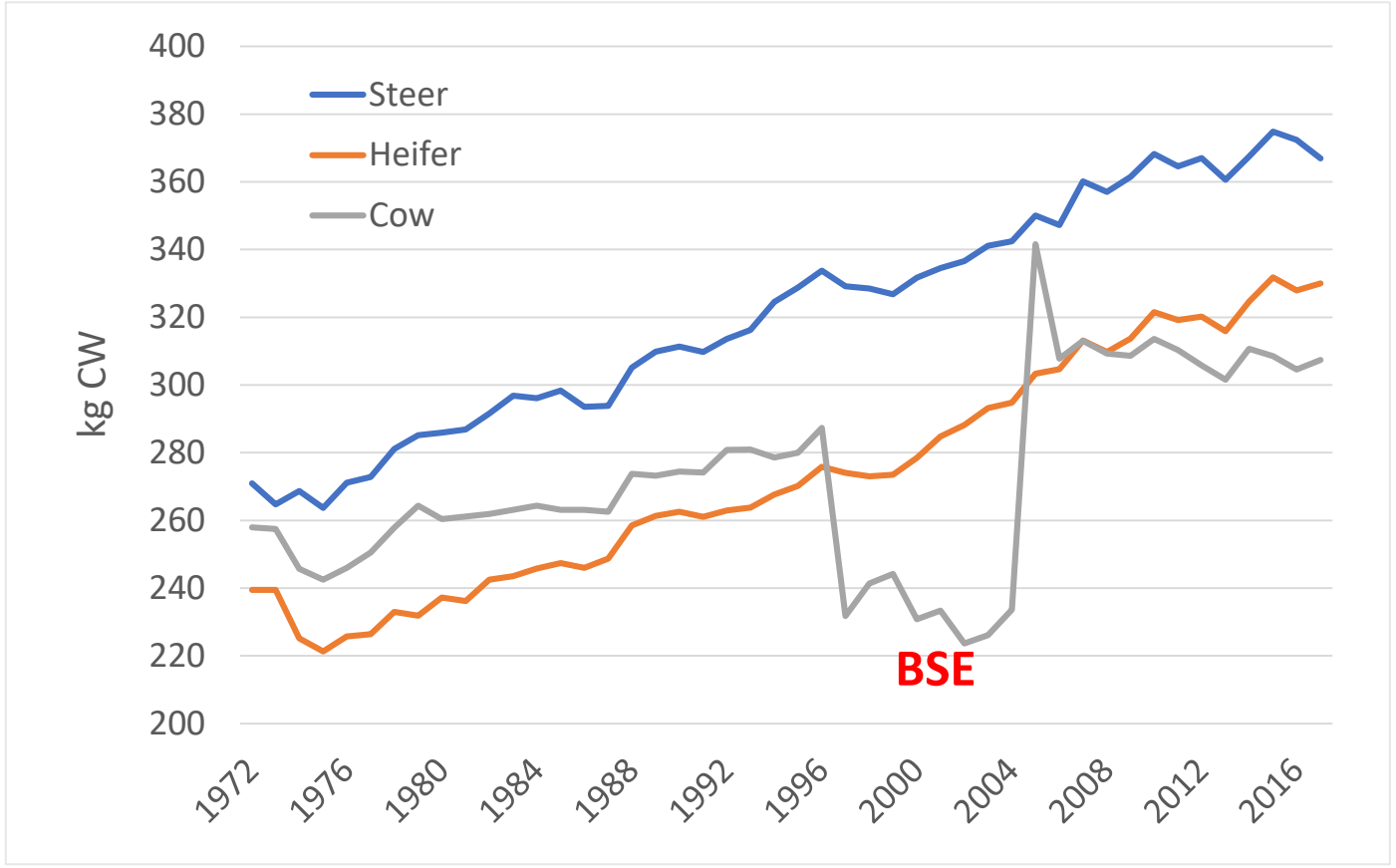
Context – UK beef weight trends



Source: EUROSTAT

Context

- What does this increase, and any future increase, mean for profitability?
- What tools are there to manage mature weight (genetic and non-genetic)
- What is the clear messaging to industry

Concept

- Change MWT ➔ What traits change?
- How do those traits effect costs & revenue?
- Measure outcomes based on margin over feed costs
- Is there an "optimum" mature size?

Concept

- Set up an underlying farm system model
- With a “base” current average UK cow mature weight (651kg)

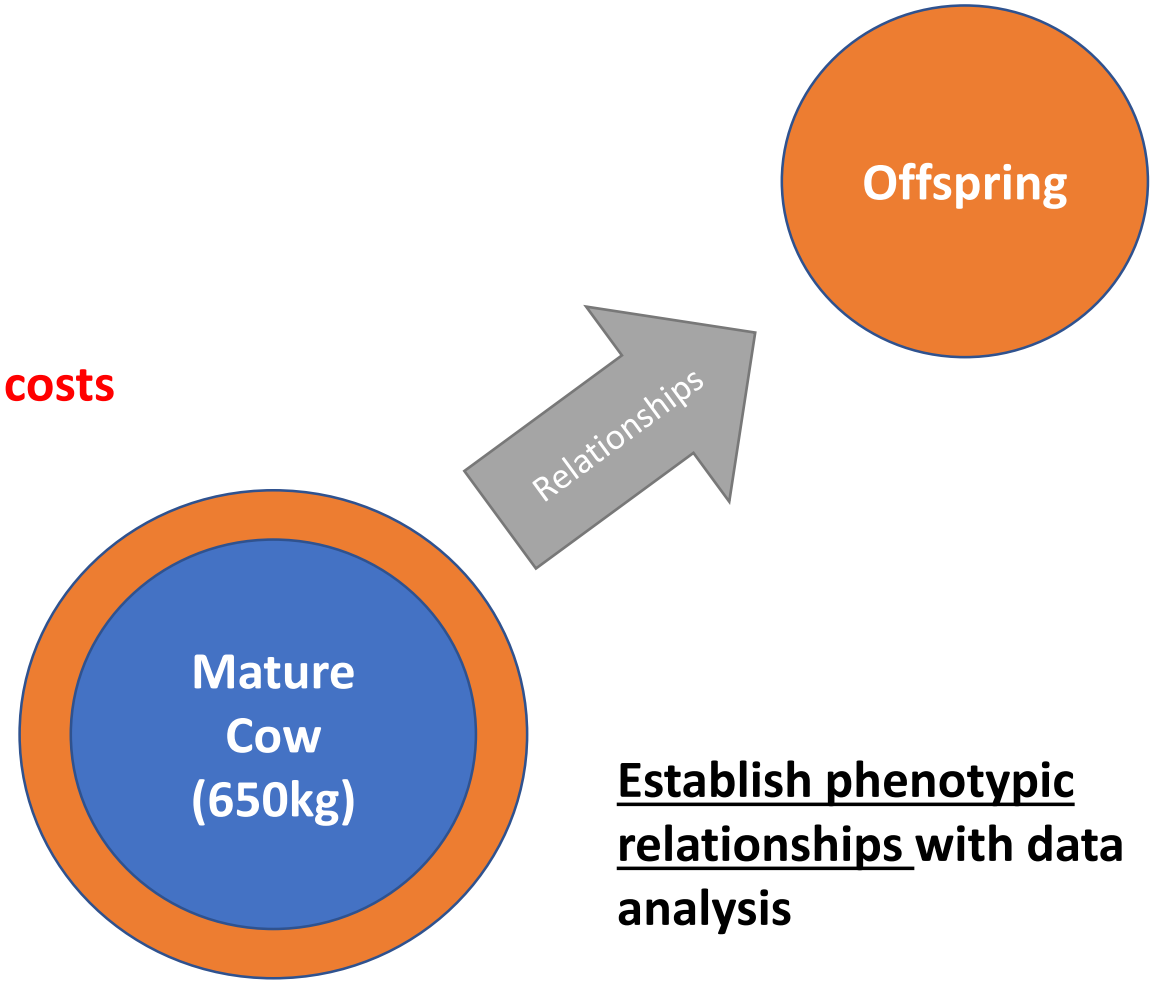
- Start by modelling a 100kg increase
- Expand across the full mature weight range

Farm model

- Single farm
  - 100 breeding females
  - 16 replacements
  - 86% calving rate
- Finished animals
  - Steer (25 months)
  - Heifer (24 months)
  - Bull (15 months)

	Month	Bulls	Steers	Heifers	Cow
-	March	Weaning (60% milk + 30% grass + 10% concentrate)			...
1	April				...
2	May				...
3	June				...
4	July				...
5	August				...
6	September				...
7	October				...
8	November	80% Conc., 10% Straw, 10% Silage	40% Concentrate & 60% Silage		100% Silage
9	December				
10	January				
11	February				25% Conc., 75% Silage
12	March	85% Conc., 15% Straw,			
13	April				
14	May		Grass 100%		Grass 100%
15	June				
16	July				
17	August				
18	September				
19	October				
20	November		40% Concentrate & 60% Silage	40% Concentrate & 60% Silage	...
21	December				...
22	January				...
23	February				...
24	March				...
25	April				...

Concept – trait changes



Direct

+ Maintenance feed costs

+ Cull revenue

+ Replacement cost

Establish phenotypic relationships with data analysis

Indirect

1) Fertility

- Revenue from number of progeny slaughtered

2) Growth rate

+ Feed costs

+ Carcase revenue

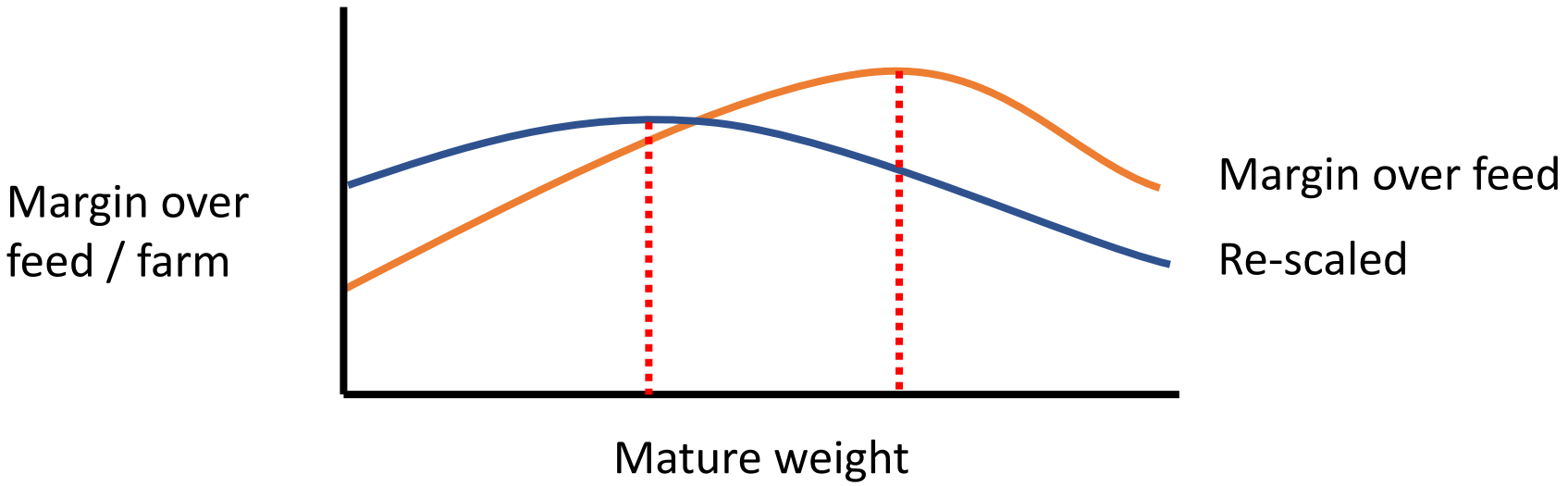
3) Carcase quality

+ Conformation score premium

+ Fat score premium

Concept - Rescaling

- Incorporate a limiting factor e.g. land
  - adjust number of animals/stocking rate



Example – Maintenance feed

Trait	Mature weight		Δ/100kg MW
	651kg	751kg	
Daily energy required for maintenance (MJME)	83.8	93.3	9.5
Average feed price (£/ MJME)	0.0038	0.0064	0.0025
Annual maintenance and BCS feed cost (£)	**117**	**216**	**98.8**

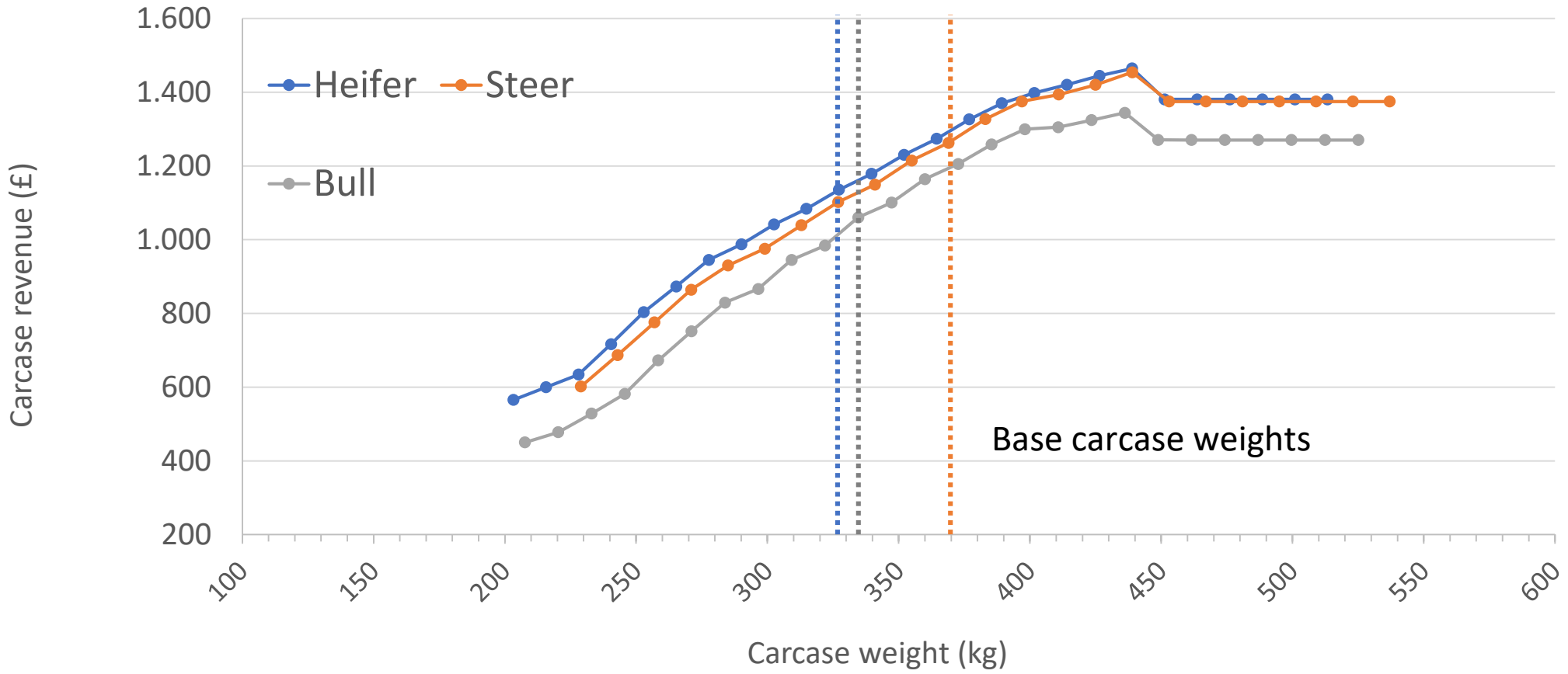
Example – Growth rate

- Increasing MW = change progeny growth rate
- **More feed** + **Heavier carcase** (constant age)

- **Less feed** + **Same carcase weight** (constant weight)

- **Key factor**: $\Delta CW_{progeny}$ per ΔMW_{dam}
  - Adjusted for relationship between progeny type (bull, steer, heifer) & MW

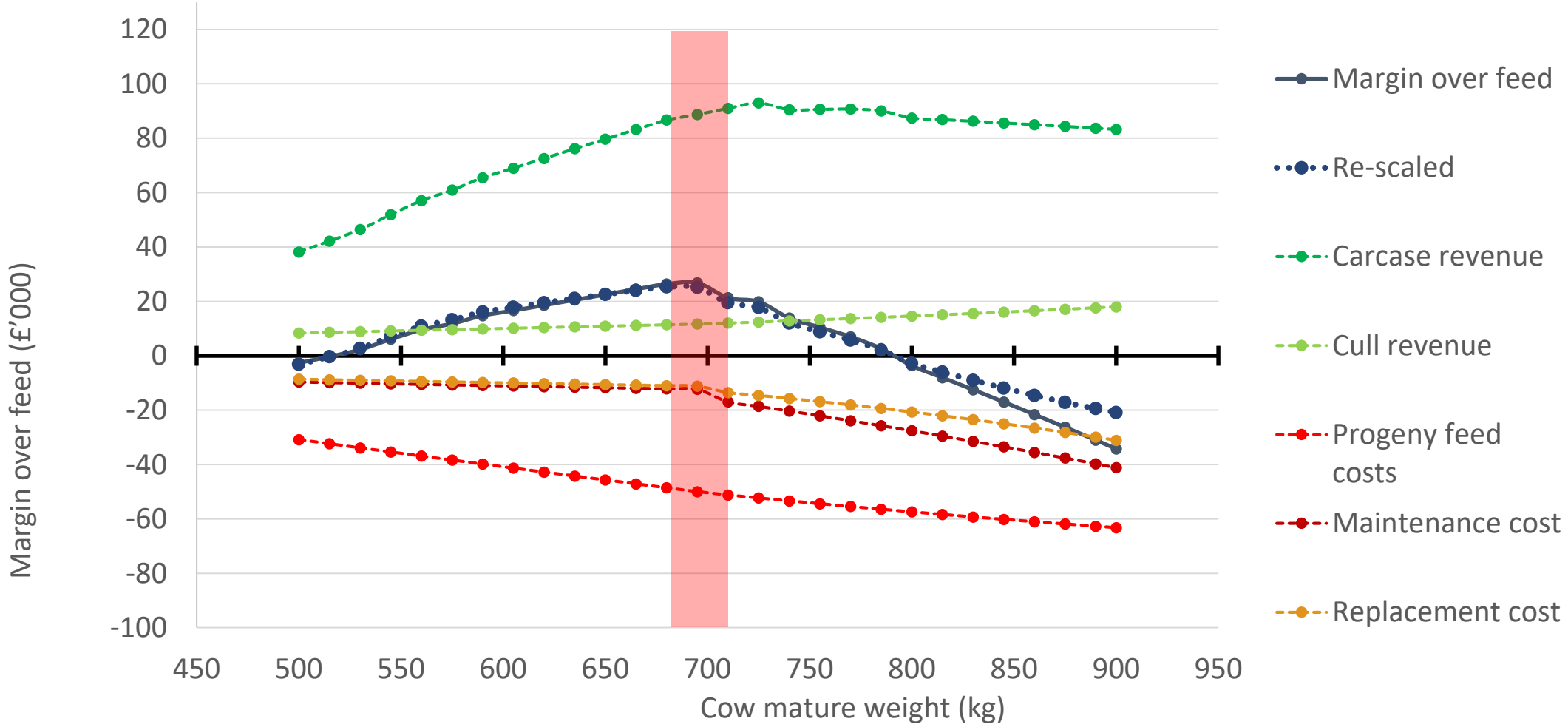
Carcase revenue



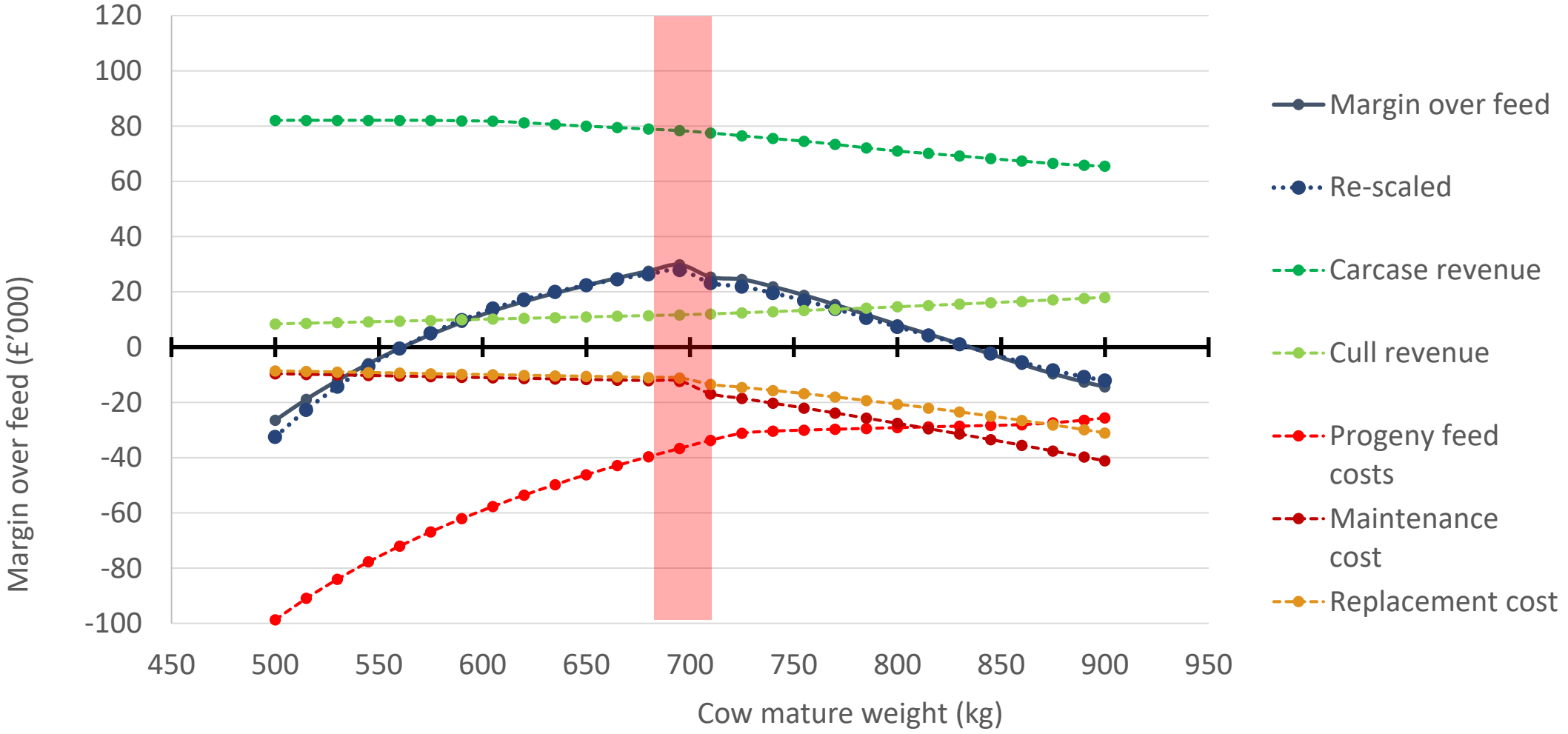
Herd margin over feed (£)

Animal	Mature Weight			
	651kg		751kg	
	Cost	Revenue	Cost	Revenue
Maintenance feed	11,771	-	21,655	-
Cull cow	-	10,924	-	13,144
Replacement growth	10,620	-	16,588	-
Heifer carcase value	15,834	28,906	18,278	34,292
Steer carcase value	24,522	42,920	29,296	46,175
Bull carcase value	5,465	8,120	6,602	9,948
Total	68,213	90,872	92,420	103,561
Margin over feed	**22,658**		**11,140**	

Revenue / cost components by MW constant age at slaughter



Revenue / cost components by MW constant weight at slaughter



Summary

- Optimum around 680kg (725kg if assume no higher marginal feed cost at MWT >700kg)
- Drivers:
  - Penalties (and losses) for overweight carcases (kick in at 725kg MW)
  - Higher cost/ unit of feed for cows >700kg
  - Reduced fertility @second mating for cows >700kg
- There are economic implications to ever increasing mature weights of cows in the UK

Acknowledgement

AHDB
AGRICULTURE & HORTICULTURE DEVELOPMENT BOARD

QMS
QUALITY MEAT SCOTLAND

HYBU CIG CYMRU
MEAT PROMOTION WALES