Breeding strategies for early maturity in beef cattle

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Content

- Present Master Thesis
- Material and Method to get first Results
- First Results
- Outlook

Master Thesis

- Predicting: Which strategy is suitable to breed for early maturity in beef cattle?

Definition

- How early ready for slaughter.

Relevance

- Increased performance in early maturity –> decreased costs.

Master Thesis

Four Strategies with increasing complexity:

1. Carcass fat as auxilliary trait.
2. Index over carcass traits.
3. "Deviation in age at slaughter" from Berry, Cromie, and Judge (2017).
4. Growth models.

Starting with Strategies one and two.

Master Thesis

- Index as selection criterion
- Selecting for most economic animal
- Main result until this stage of master thesis

Index

$$I = a^T u$$

where

a is the vector of economic weights –> not available,

u is the vector of estimated breeding values –> available.

- Carcass conformation, carcass weight and carcass fat for calves and adults
  - Six economic weights

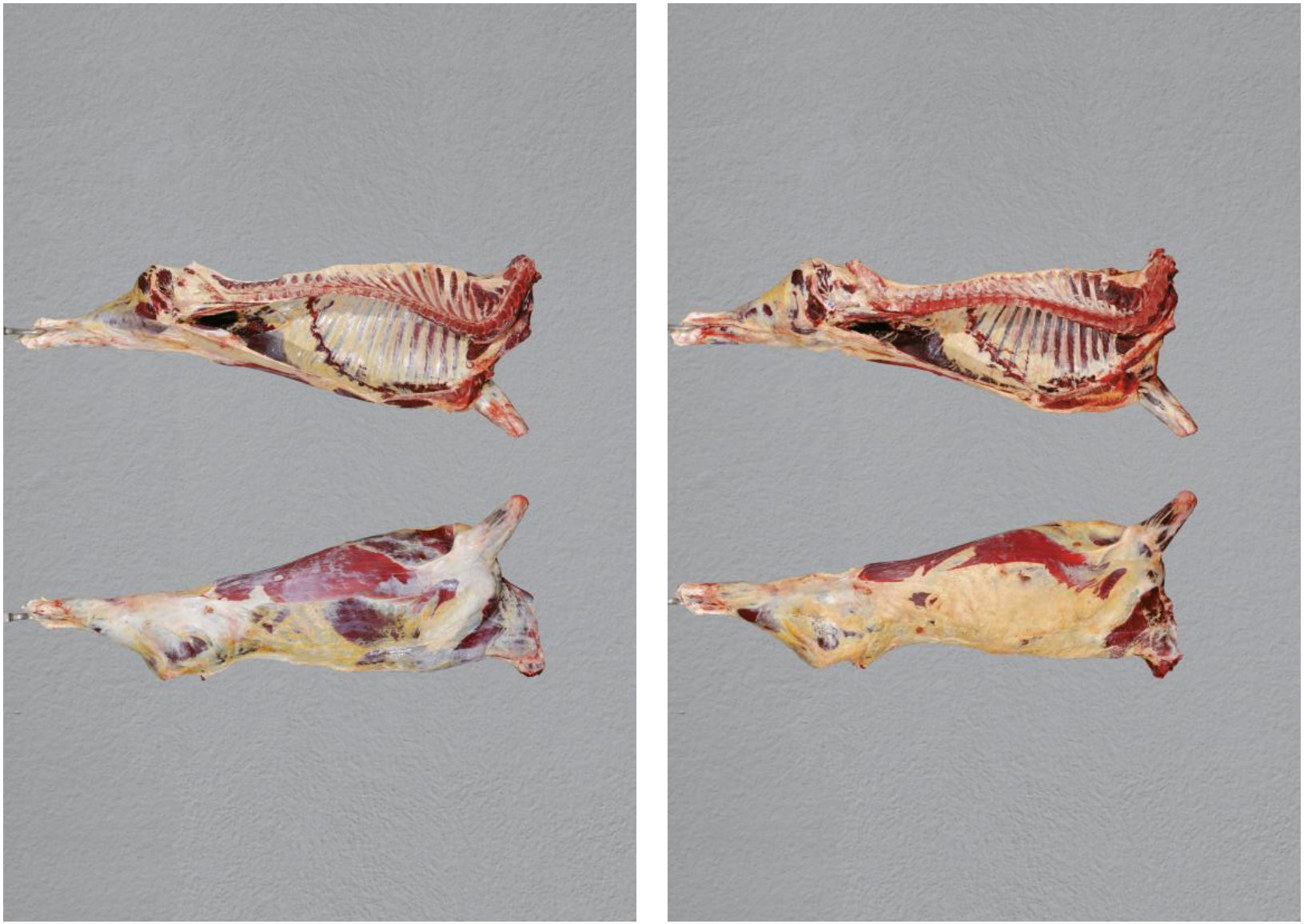
Economic Weights

- Definition: Change in profit per change in carcass trait.
- Simplification:
  - Costs constant
  - Price per kg carcass weight as Profit
- Prices from August 2018.

Traits

- Carcass fat -> Visual fat coverage
- Carcass conformation -> Visual meat
- Carcass weight -> How heavy?

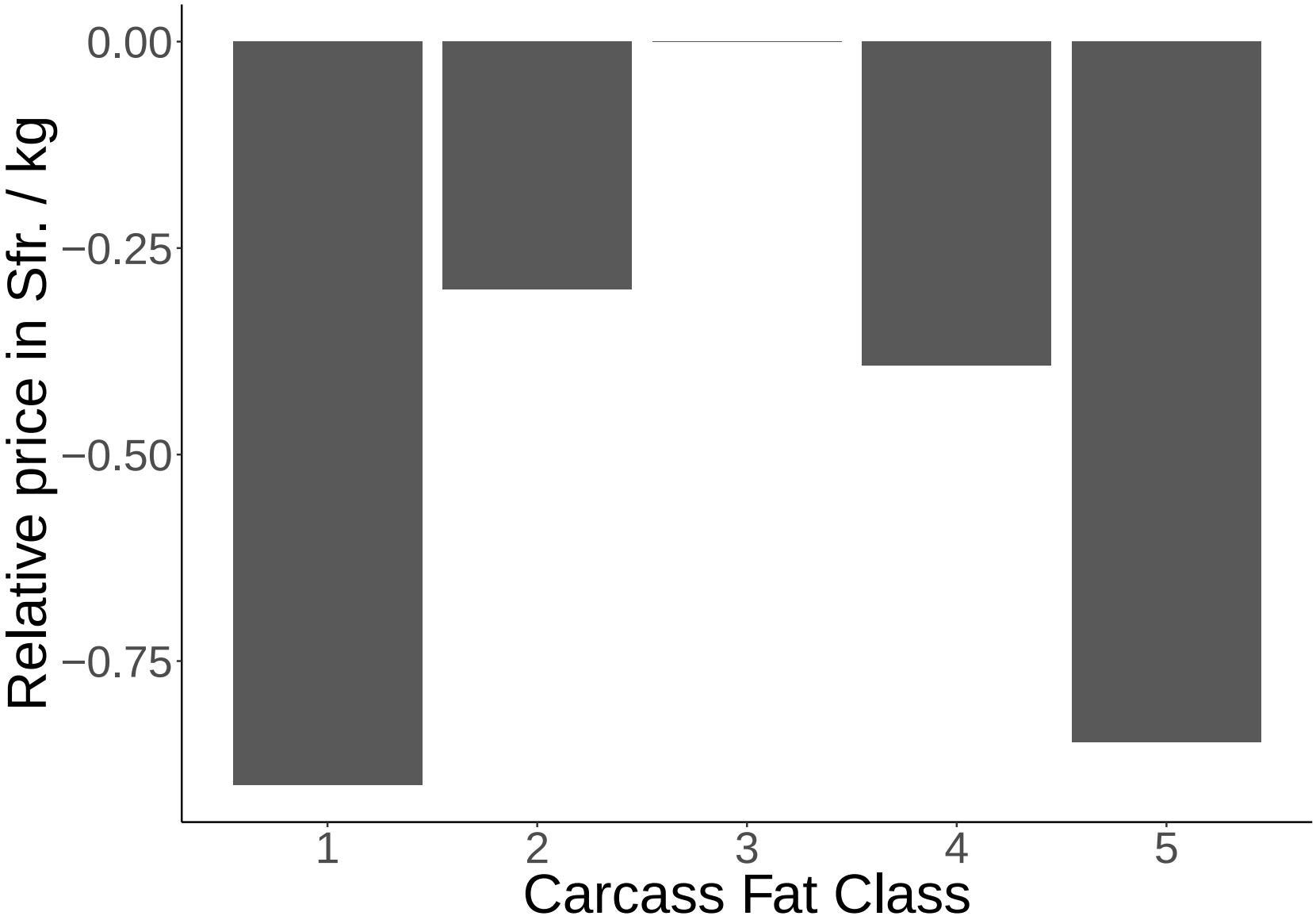
Carcass Fat



Carcass Fat Classes 1 and 4

Image source: Proviande

Carcass Fat

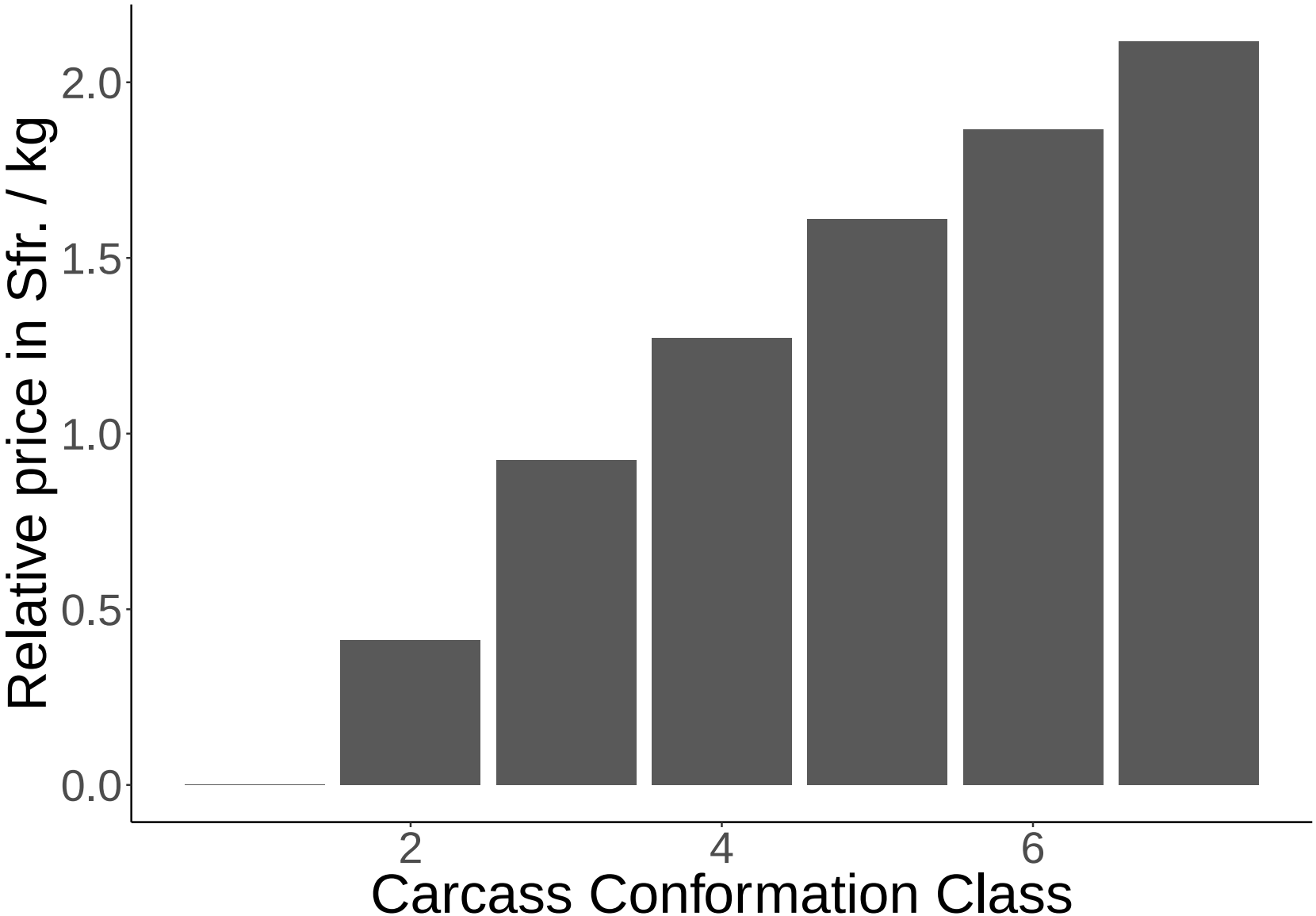

0.00
−0.25
−0.50
−0.75
Relative price in Sfr. / kg
1
2
3
4
5
Carcass Fat Class

Carcass conformation

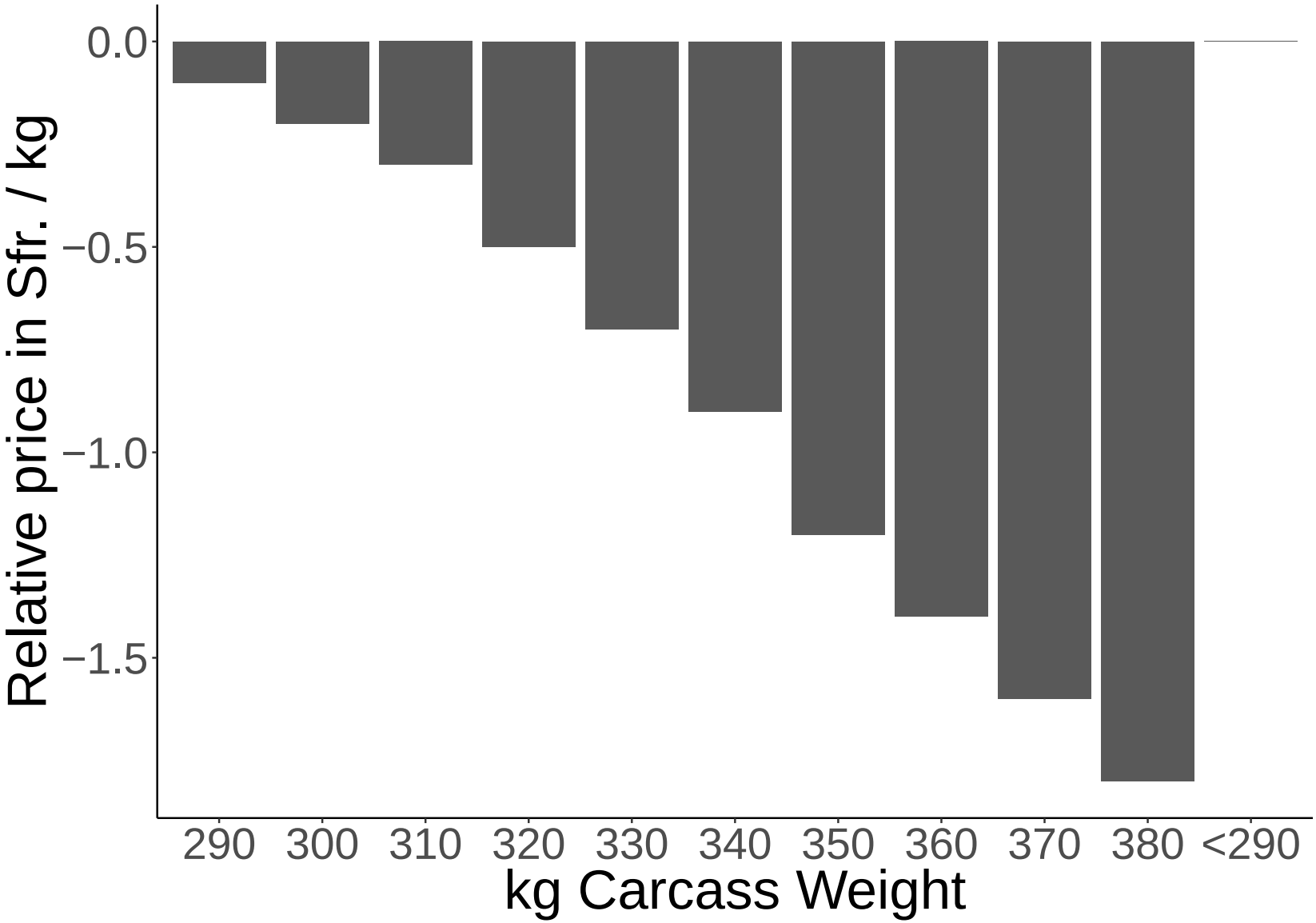
From left to right decreasing carcass conformation.

Image source: Proviande

Carcass conformation



Carcass weight

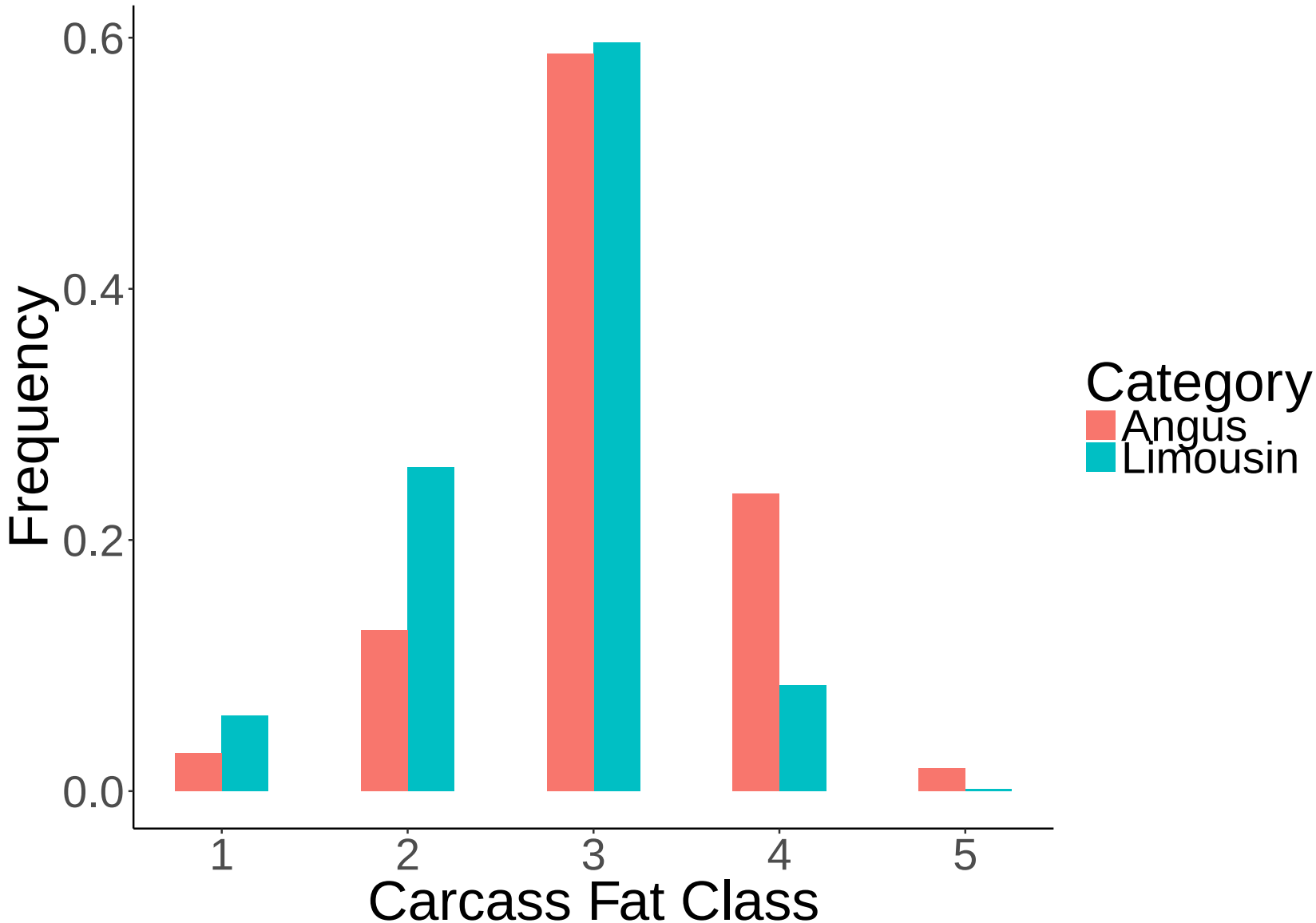


Material Groups

- Calves are less than 180 d old
- Adults are between 180 and 701 d old
- Different prices and distributions

Material Breeds

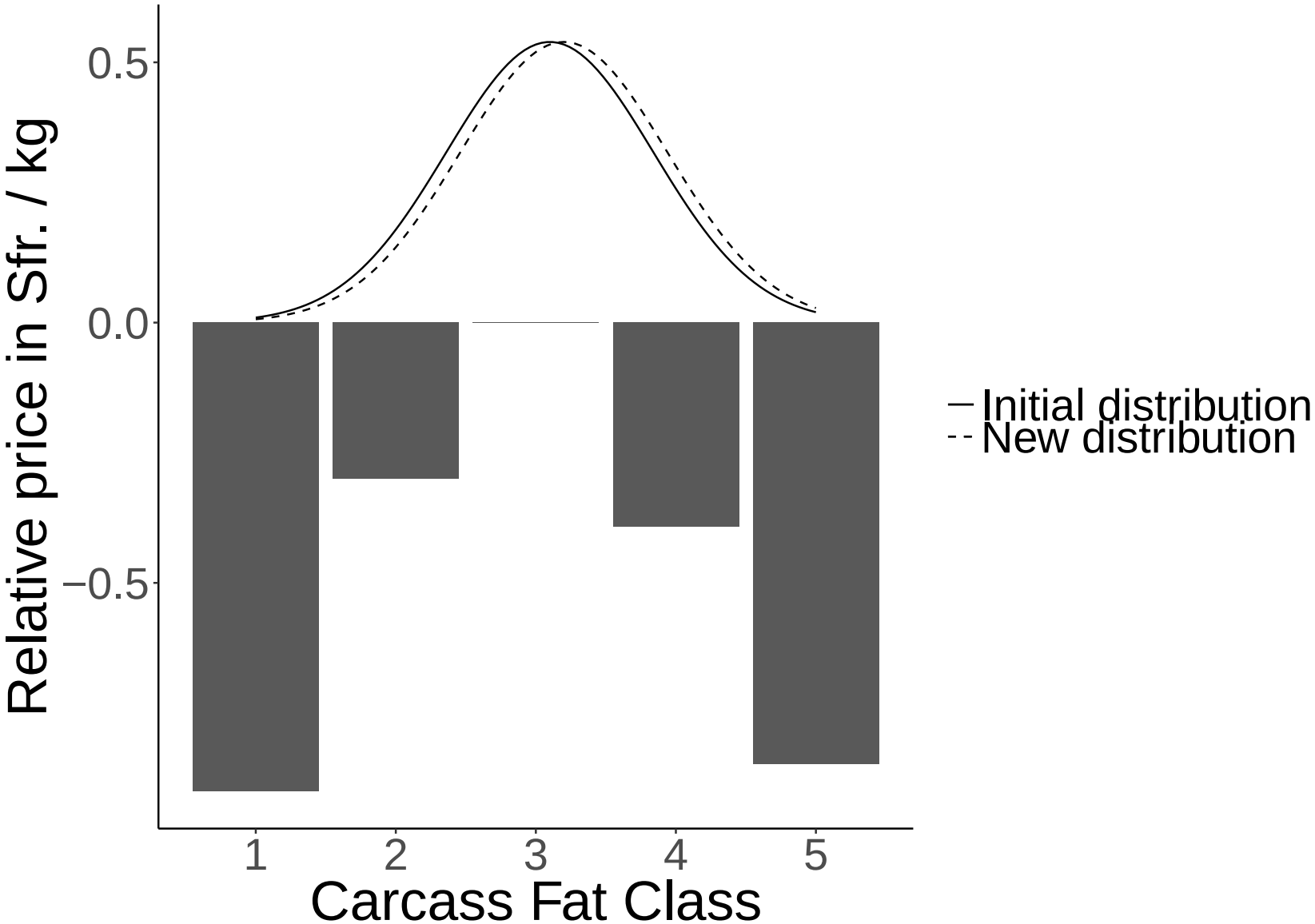
- Same prices, different distributions –> animals from 2010 - 2015



Method

- Programm R using own functions
- Mean difference in price per difference in trait
- Model potential increase in population mean -> scaling up to one unit
- Prices from August 2018.

Method


0.5
0.0
−0.5
Relative price in Sfr. / kg
1
2
3
4
5
Carcass Fat Class
Initial distribution
New distribution

Results

Trait	Angus	Limousin
Calves Conformation	0.47	0.31
Adults Conformation	0.26	0.14
Calves Fat	0.32	0.45
Adults Fat	-0.05	0.10
Calves Weight	-1.23	-2.13
Adults Weight	-0.12	-0.10

- Negative economic weights for carcass weight
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Discussion

Outlook

- Evaluation of Strategies
- Tool: Genetic Gain
- Genetic Gain –> Improvement of carcass traits per year
- Characterization of 2 other Strategies

Thank you

References

Berry, D. P., A. R. Cromie, and M. M. Judge. 2017. "Rapid communication: Large exploitable genetic variability exists to shorten age at slaughter in cattle." *Journal of Animal Science* 95 (10): 4526–32. doi:10.2527/jas2017.2016.