Quantitative *ex-ante* assessment of animal welfare practices: Challenges and solutions

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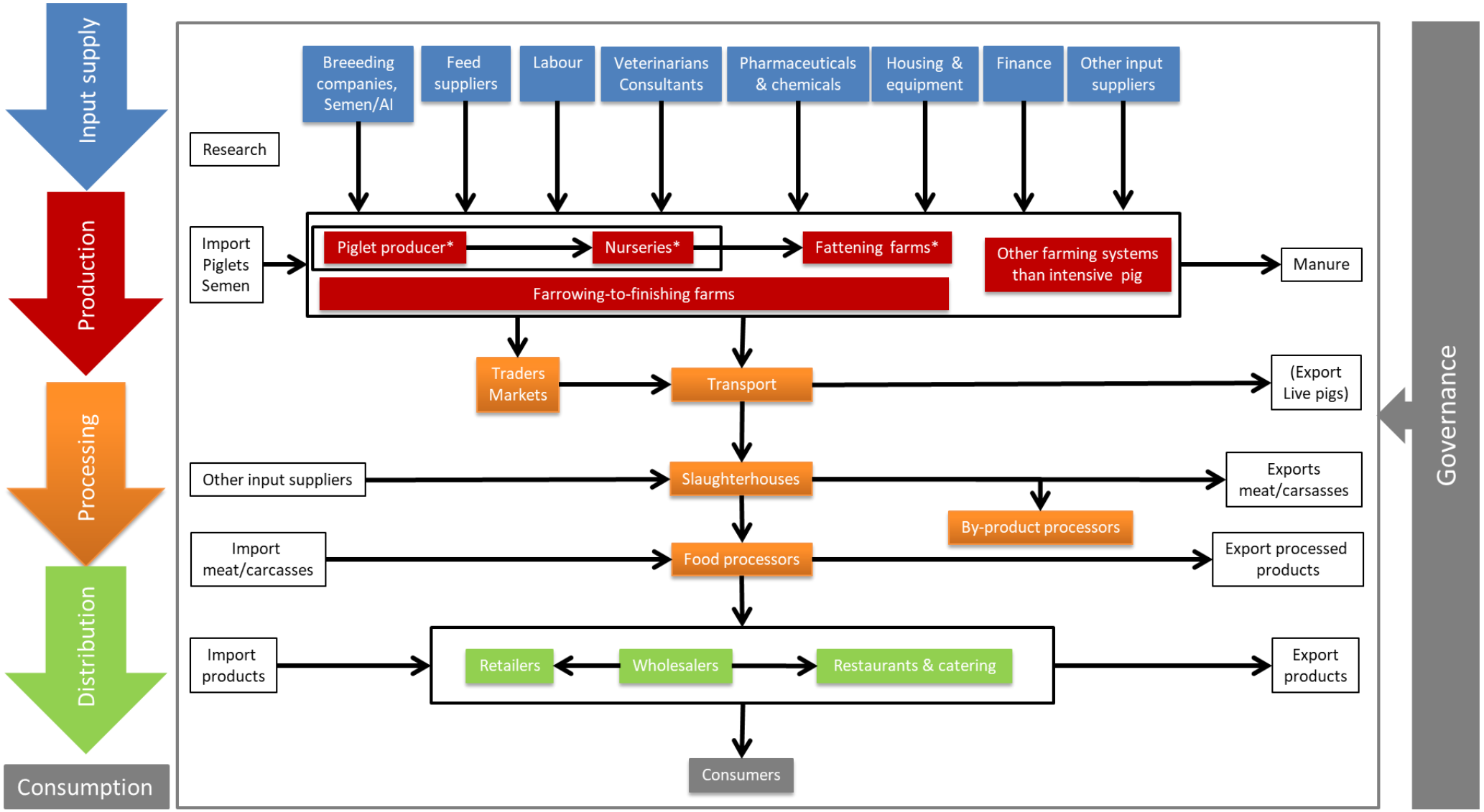
Photo: Roy Buri / Pixabay

EAAE Organised Session "Challenges For Evidence-Based Farm Animal Welfare Policies In The EU"

Introduction

- It is becoming increasingly important to assess the impacts of novel animal welfare policy and business initiatives on actors who may be affected by the implementation of these initiatives.
- Assessments can help to make informed policy and business decisions
- Reliable impact assessments require methods and specific data that are suitable for the assessment
- The quantification of economic impacts of changes in animal welfare practices is often challenged by limited availability of applicable, consistently reported and complete data.
- This presentation will discuss how existing data can be used in modelling to arrive at meaningful impact estimates.

A policy change may affect all participants of a value chain



Niemi et al. (2020). PLOS ONE https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0231338

How does a new practice affect costs and revenues?

- At the firm-level, the main focus is usually on how revenues and production costs are affected by the adoption of new practices?
- The average production costs and product price may change
- Adopting a new practice may shift the firm away from the current profit-maximising point.

➔ What is the new optimal production decision for a firm

➔ Sunk costs? Adjustment costs? Policy incentives?

➔ How it affects firm's profit?

Data needs for farm-level impacts

Possible impacts on **variable inputs**, such as

- Veterinary care, medicines, services, feed
- Replacement animals and their longevity
- Labour

Possible effects on **fixed inputs**, such as

- Housing and equiment
- Maintenance and repairs
- Investments vs. how the current use of production capacity is changed

Possible impacts on **revenues**, such as

- Quality-adjusted prices
- Output quantity
- Changes in market prics

Market adjustments

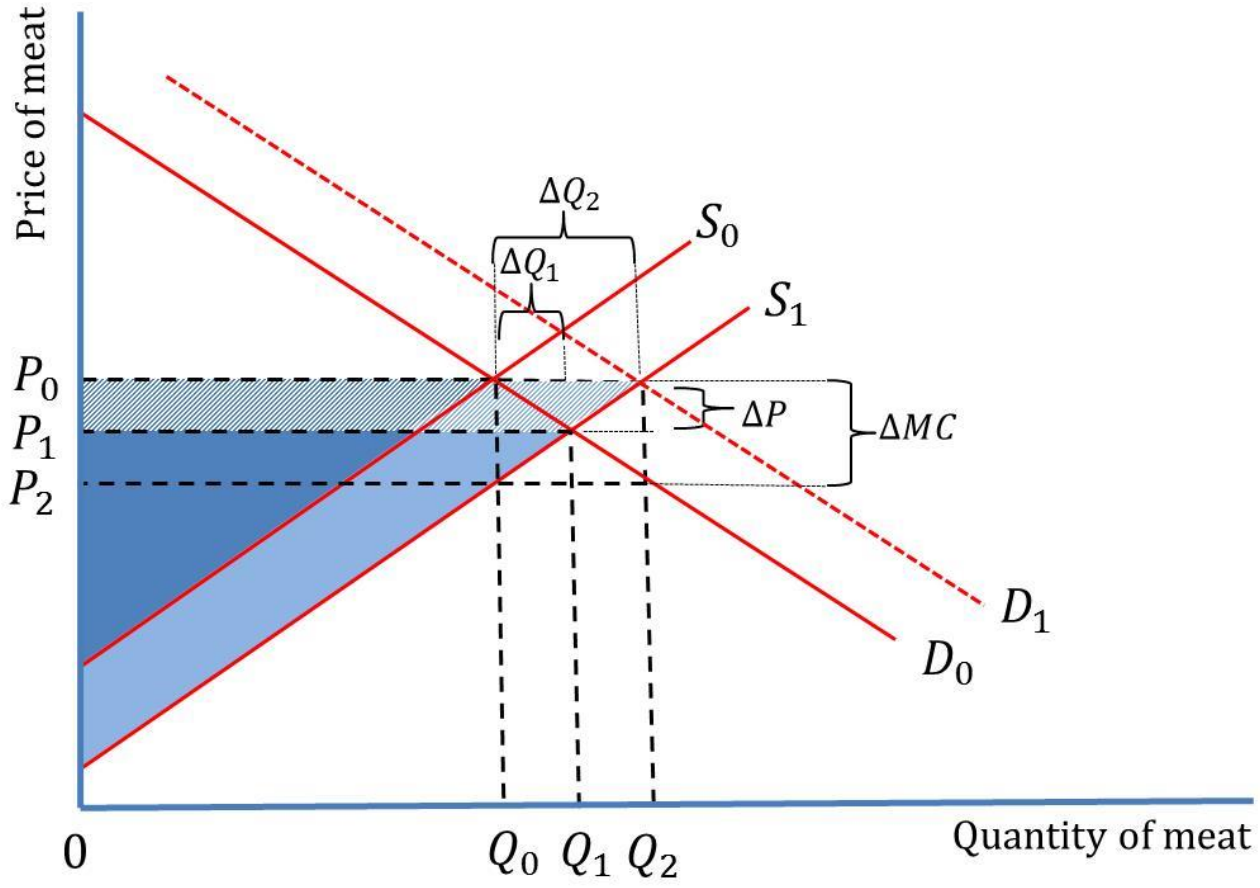
- Adjustments in supply and demand must be quantified

➔ Changes in production costs

➔ Changes in consumer preferences

➔ How are costs and prices transmitted along the supply chain?

➔ Adjustments along the demand and supply curves (e.g. elasticity estimates of demand for food; granularity of estimates)



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Which farming system can produce welfare most efficiently?

➔ What are the cost of increased welfare and how are they compensated?
➔ For example, the relationship between welfare and production costs in four Dutch broiler production systems (Gocsik et al., 2016).
➔ Data availability varies by system!

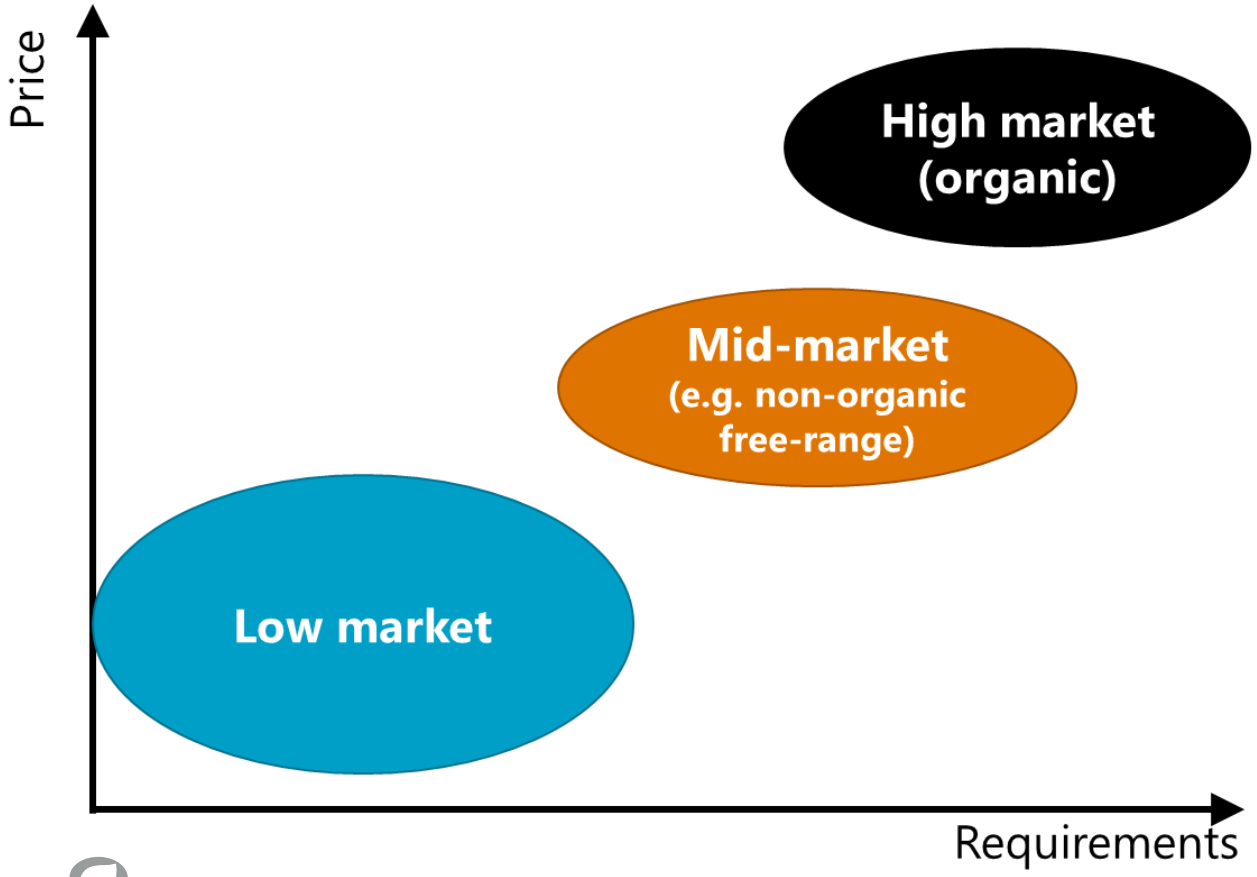


Photo: Roy Buri / Pixabay

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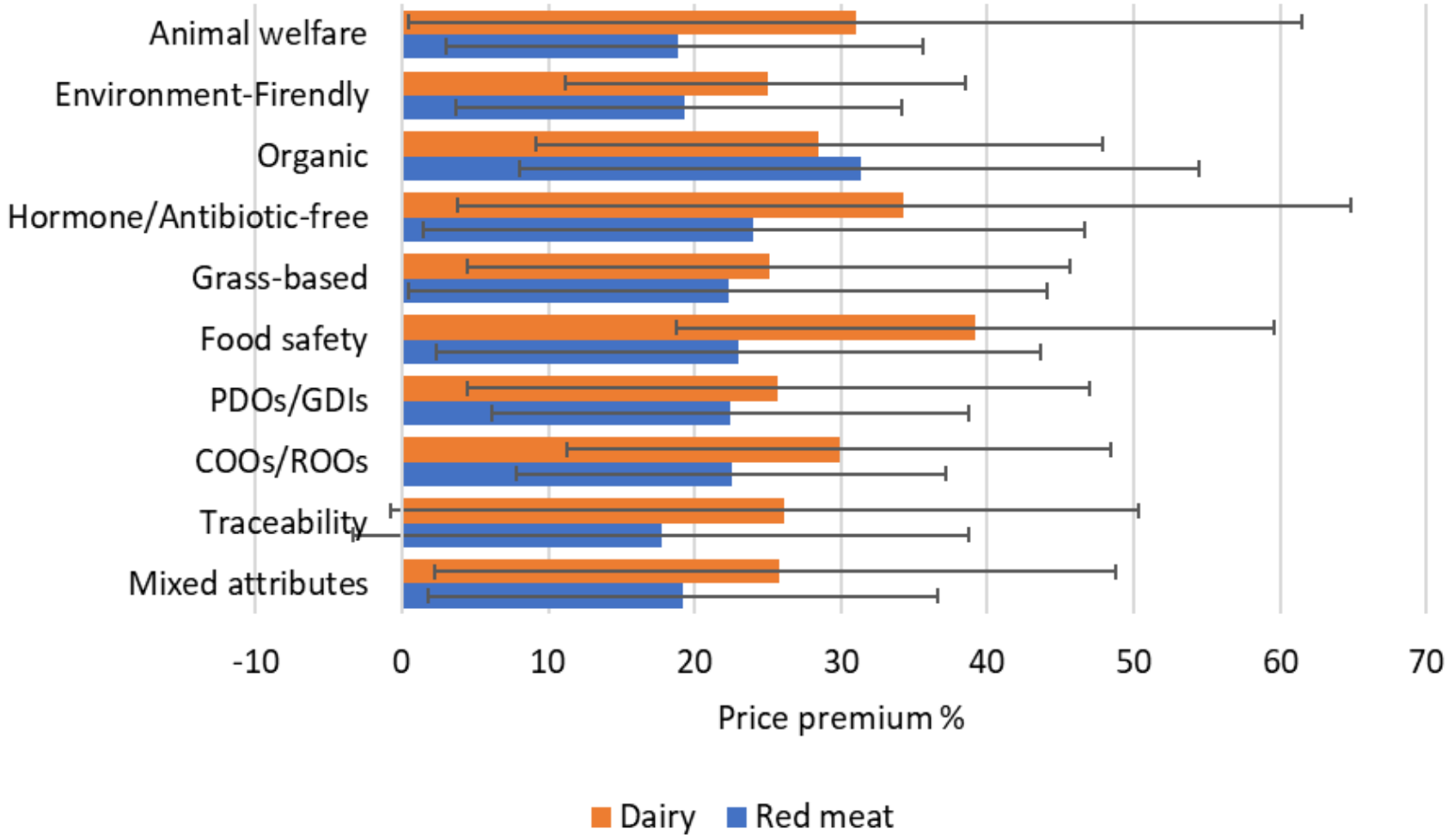
Acknowledging additional value obtainable from the market

According to meta-analyses, the range of WTP for animal welfare is ~14% … 30%.

The WTP *is* or *is not* associated with specific welfare improvements.

➔ Applicability to specific assessment questions?

Consumer willingness to pay for credence attributes (Yang & Renwick 2019)



Empirical evidence on the costs and benefits of compliance with animal welfare standards is limited

- The economic cost of adopting a higher animal welfare standard often involves a tradeoff: the sacrifice in farm productivity ⇔ improvement in animal welfare – However, higher costs are not necessary an obstacle for improving animal welfare
- Menghi et al. (2011): costs of animal welfare regulations plus several directives to combat animal diseases and food-borne pathogens, contributing partly to animal welfare; were less than 2 % of the total production cost of dairy milk and beef in the EU member states, up to 3 % in sheep, up to 8 % in pigs and up to 4 % in broilers.
- Grethe (2007): the cost of compliance with year 2007 EU standards was 6 % (at maximum) of production cost in pigs, up to 20 % in egg, and about a 10 % in broiler production.
- Spiller et al. (2015): The costs of elevating welfare standards in Germany were 2-5 % of the total production costs for cow's milk, 1-18 % for eggs, 9-22 % for chicken,18-27 % for beef and 28-41 % for pigs.
- Bornett et al. (2003): when the space allowance of fattening pigs was increased by 60 % the rearing costs per kg pigmeat were unchanged for the free-range system but rose by 5 % for the fully-slatted floor system.

Empirical evidence on the costs and benefits of compliance with animal welfare standards is limited

- Herva et al. (2015) found that increasing space allowance for fattening bulls in Finland reduced fattening farm's profit. The potential of animal welfare improvements to generate additional revenue was therefore important when considering whether to reduce stocking density.
- Henningsen et al (2017): large variations in both gross margin and animal welfare indicators in Danish pig farms. A weak but slightly positive relationship between these indicators.
- Sampolahti (2013): Welfare Quality scores and gross margins of Finnish pig farms tended to correlate positively. Labour input correlated with both the financial results and animal welfare.
- Heise et al. (2018): no significant effect of participation in an animal welfare programme on perceived economic success of farmer.
- Odermatt et al. (2019): farms participating in program providing a compensation for group-housed dairy with a comfortable lying area separated from the feeding area or for cows receiving regular exercise outdoors in the winter and pasture during summer ➔Farms in the latter program tended to reduce their veterinary costs by 2 %, and in both programs by 10 %.

Challenges and solutions related to data

- A clear narrative on how welfare improvements are implemented supports also quantitative assessments
- Production costs and prices observed in the past may not correspond current and future levels because of technological change, consumer preferences, policies.. ➔ Use data from different sources
- Spatially sparse data: parameter values (e.g. prices, productivity) may vary by country ➔ If studies are lacking from certain countries, results from other countries & primal approach calculations may help
- Lack of granularity and clarity of published data and results ➔ May require clarifications from studies.
- Availability of current and future adoption rates ➔ Statistics, trends, development of national regulations
- How measured are implemented in practice? ➔ For example, if space allowance is increased, does it mean investments in addition pen space or just taking out animals from the current facility
- Transition period is essential for the magnitude of sunk costs (e.g. housing capacity)
- Uncertainty about future ➔ Rely on multiple sources, use stochastic approaches (e.g. D'Eath et al. 2016)

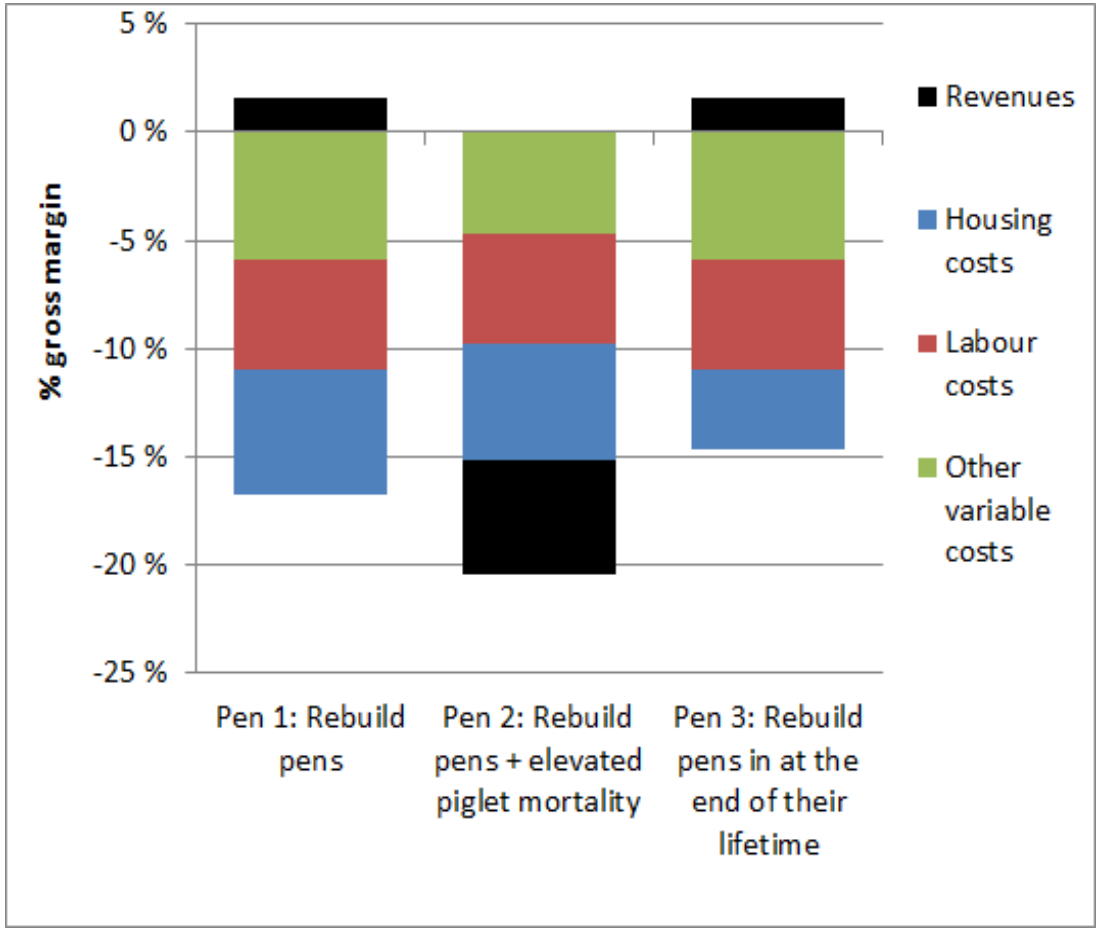
Implementation matters: An example of farm-level impacts of switching to free-farrowing in piglet production

The case of prohibiting farrowing pens in Finland

- Standard cost calculations for pig production
- Productivity parameters & prices were collected
- Different implementation options were considered
- Is piglet mortality affected and how?
- When the change is implemented?

➔ Both the timing of change and piglet mortality affected the results

➔ As the financial margin of the farm is obtained by subtracting the costs from the revenues, relatively small cost increase can have substantial effects on the gross/net margin of the farm



Source: Niemi (2020) Animal welfare and farm economics: an analysis of costs and benefits

Concluding remarks

- Improving animal welfare tends to increase production costs, but that is not necesssarily a barrier for improving animal welfare.e
- While literature often reports positive economic effects for improvements in animal health, measures that require investments, additional labour input or lead to idle production capacity are often economically more challenging.
- Quantitative data available for evaluations is limited, inapplicable, inconsistently reported or otherwise sparse.
- Inconsistencies in data can result in uncertainties in economic impact estimates.

➔ Increased granularity and transparency of published studies, and multipurposing of previous studies would enhance impact assessments.

➔ Biological studies on animal welfare often do not record/report input and outpur parameters

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