Summary

- Study by Alfons Oude Lansink derives dynamic eco-efficiency, though dynamic aspects concern adjustment costs in the presence of quasi-fixed inputs, rather than cumulative effect of pollution.
- Two other studies aim to measure EATFP:
  - Aggregate data at the province level (Chang-Gil Kim)
  - FADN farm-level data (Silvia Coderoni)
- All three studies: single (aggregated) by-product (GHG emissions/Carbon footprint)
- Estimation of directional distance function (Chambers, Chang and Färe, 1996): Alfons and Chang-Gil
- Both studies employ non-parametric framework
Two major methods used

- Distance function approach (Chung, Färe and Grosskopf, 1997) and Directional Distance Function (Färe, Grosskopf and Pasurka, 2001) with weak disposability of by-products – bad outputs cannot be reduced without reducing production of good outputs
- Separate modeling of two sub-technologies: an intended production technology and a by-production technology (Murty, Russell and Levkoff, 2012)

- Study by Chang-Gil assumes weak disposability
- Alfons applies a model based on the Murty et al. 2012’s approach
Risk and Technological Innovations

- Risk and technological innovations will significantly influence farm economic and environmental performance in upcoming decades and should be accounted for in models.


- However, an implicit assumption of no technical change has to be introduced when applying this methodology to empirical data such as FADN data.

- At the same time, innovation in green technologies shall enable a cost effective abatement of pollution. This requires consideration of technical change when evaluating farm environmental performance.