Vessel level productivity in Commonwealth fisheries

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Objectives

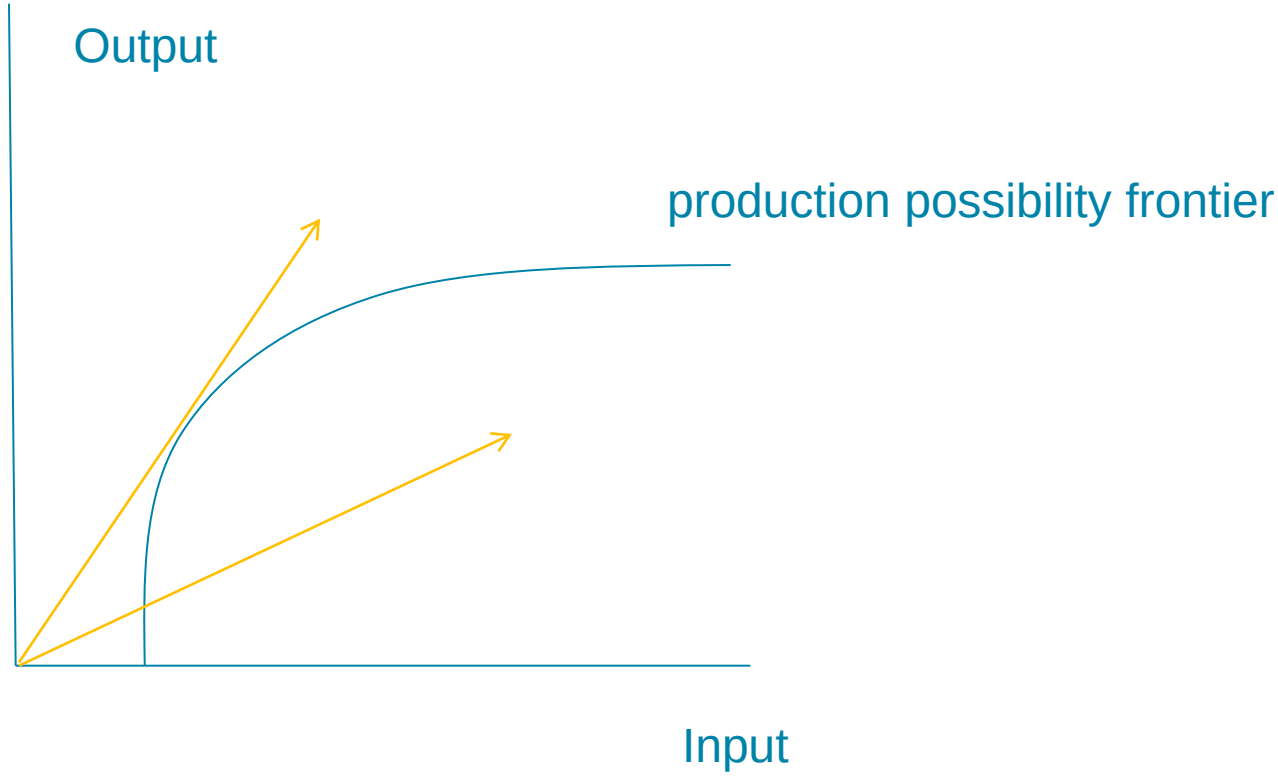
In this presentation, I will endeavour to

- outline productivity in the context of fisheries,
- detail the method used to construct vessel level productivity indexes in Commonwealth fisheries,
- present preliminary results for the Commonwealth trawl sector,
- argue that the presented productivity index is a simple alternative to more complex models.
- future directions

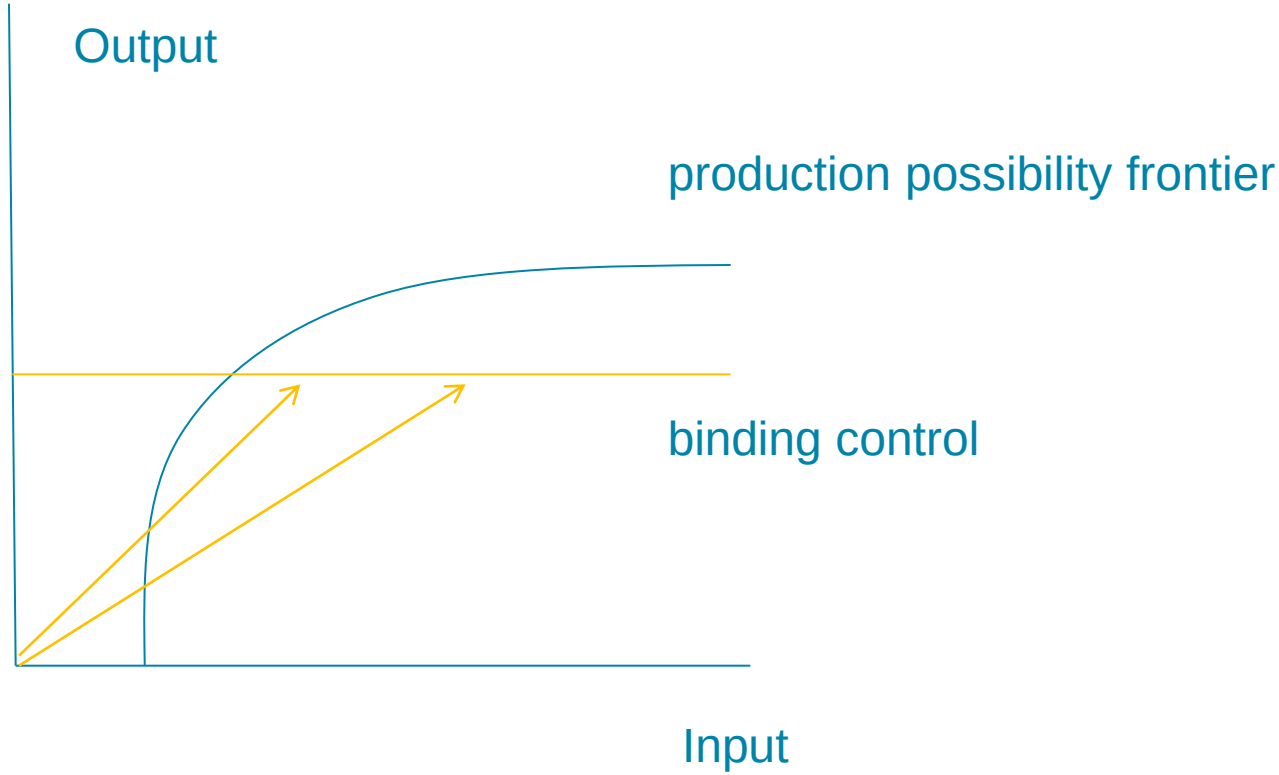
Key Messages

- There are key differences between the concept of productivity in agricultural production and in fisheries production.
- Preliminary measures suggest increases in productivity in the Commonwealth trawl sector since the structural adjustment package.
- Fishery managers should have MEY harvest targets as their primary objective.

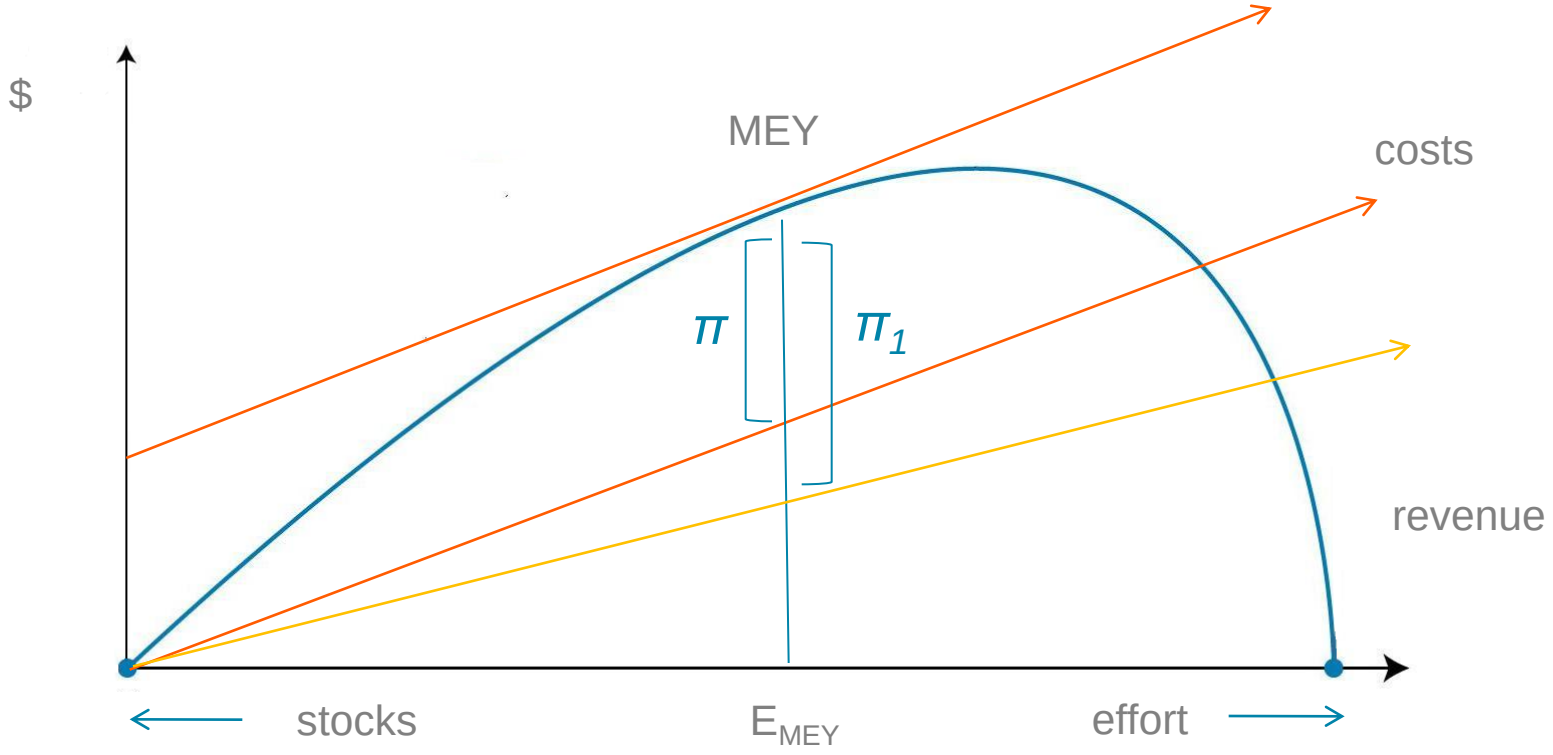
What is productivity?



Productivity in the fisheries context

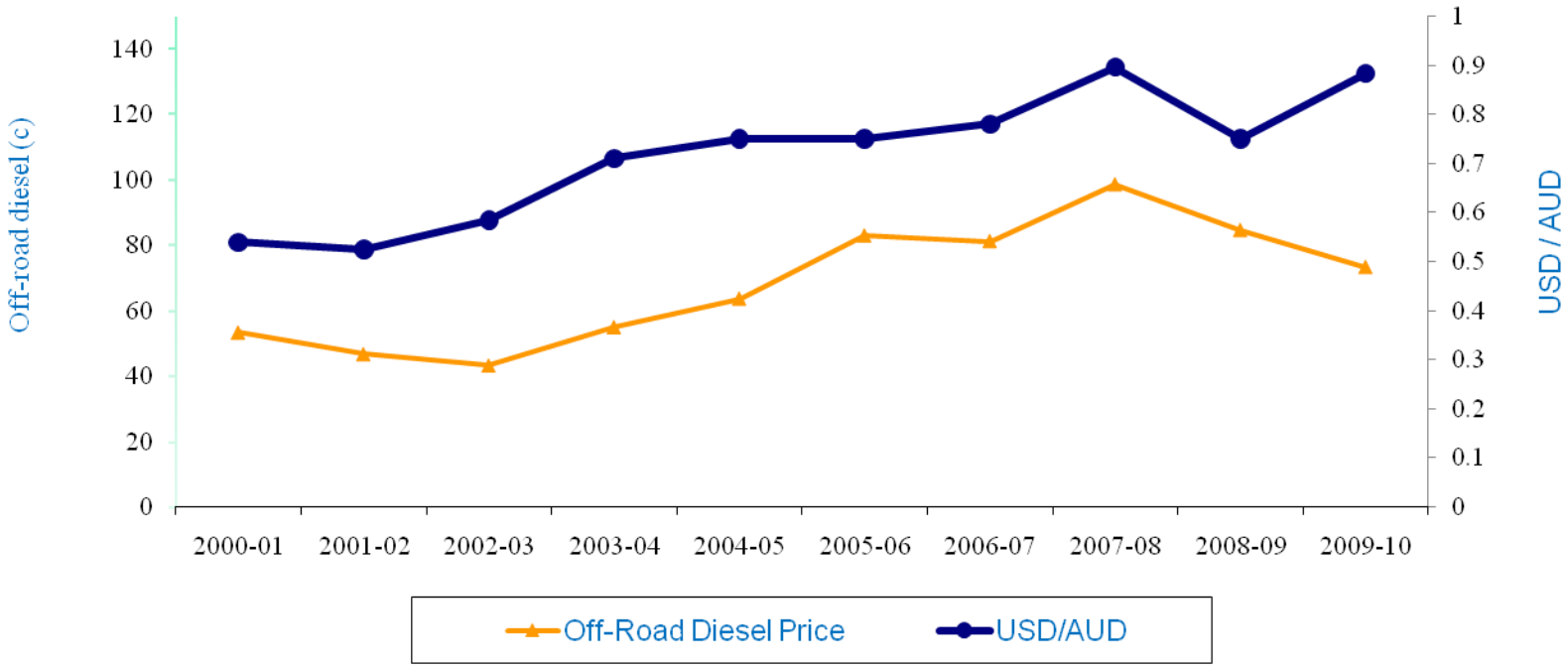


Productivity and profitability



Is Productivity Important?

Recent market conditions have not been kind to local fishers.



Productivity growth can partially mitigate these conditions.

Attributes of this Index

- Vessel-level.
- Conventional focus on inputs and outputs.
- Replicable and easy to update.
- Together with analysis of terms of trade, provides much of the information INPD offers.

Methodology

Laspeyres Index:

$$Q_{0t}^{L} = \frac{\sum_{i=1}^{N} p_{i0} q_{it}}{\sum_{i=1}^{N} p_{i0} q_{i0}} = \sum_{i=1}^{N} W_{i0} \frac{q_{it}}{q_{i0}}$$

where:

$$W_{i0} = \frac{p_{i0} q_{i0}}{\sum_{i=1}^{N} p_{i0} q_{i0}}$$

Methodology

Paasche Index:

$$Q_{0t}^{P} = \frac{\sum_{i=1}^{N} p_{it} q_{it}}{\sum_{i=1}^{N} p_{it} q_{i0}} = \left\{ \sum_{i=1}^{N} W_{it} \left(\frac{q_{i0}}{q_{it}} \right) \right\}^{-1}$$

where:

$$W_{it} = \frac{p_{it} q_{it}}{\sum_{i=1}^{N} p_{it} q_{it}}$$

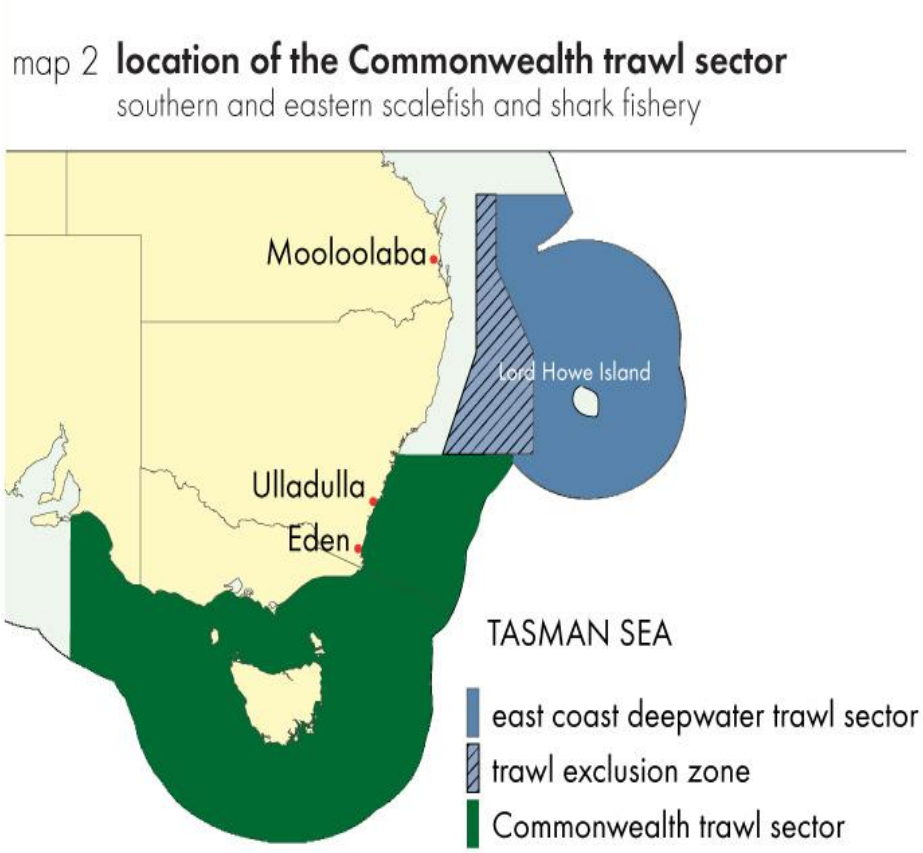
Fisher Index and the Elteto-Kovacs Extension

$$Q_{0t}^{F} = \sqrt{Q_{0t}^{L} Q_{0t}^{P}}$$

But what about the transitivity axiom?

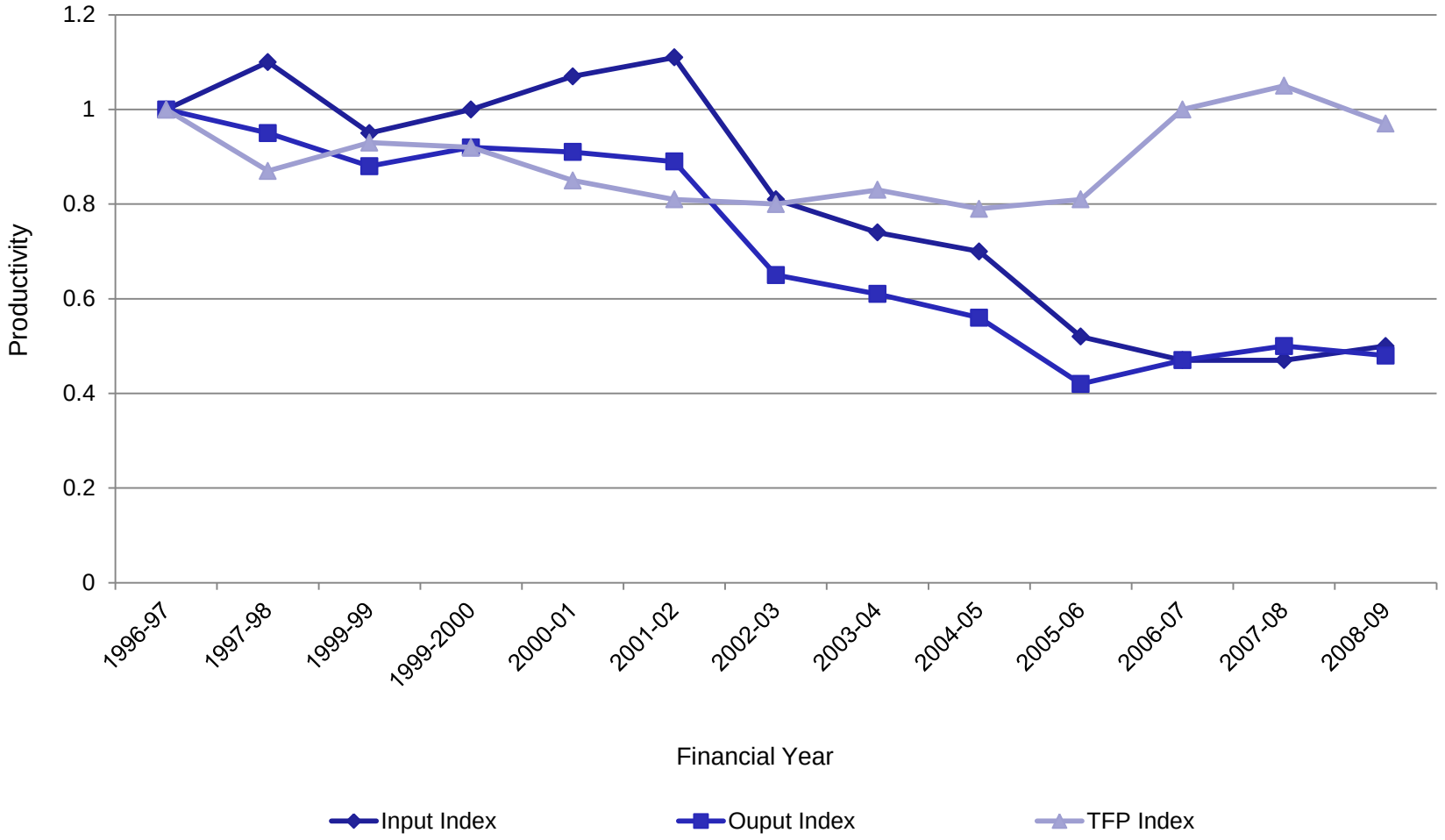
$$Q_{st}^{EKS} = \left(\prod_{r=1}^{N} Q_{sr}^{F} Q_{rt}^{F} \right)^{1/N}$$

Commonwealth trawl sector



Year	Population	Sample
1996–97	109	41
1997–98	109	46
1998–99	103	36
1999–2000	101	37
2000–01	106	38
2001–02	97	39
2002–03	100	20
2003–04	97	25
2004–05	91	27
2005–06	81	23
2006–07	73	19
2007–08	50	14
2008–09	52	15

Vessel-level Productivity



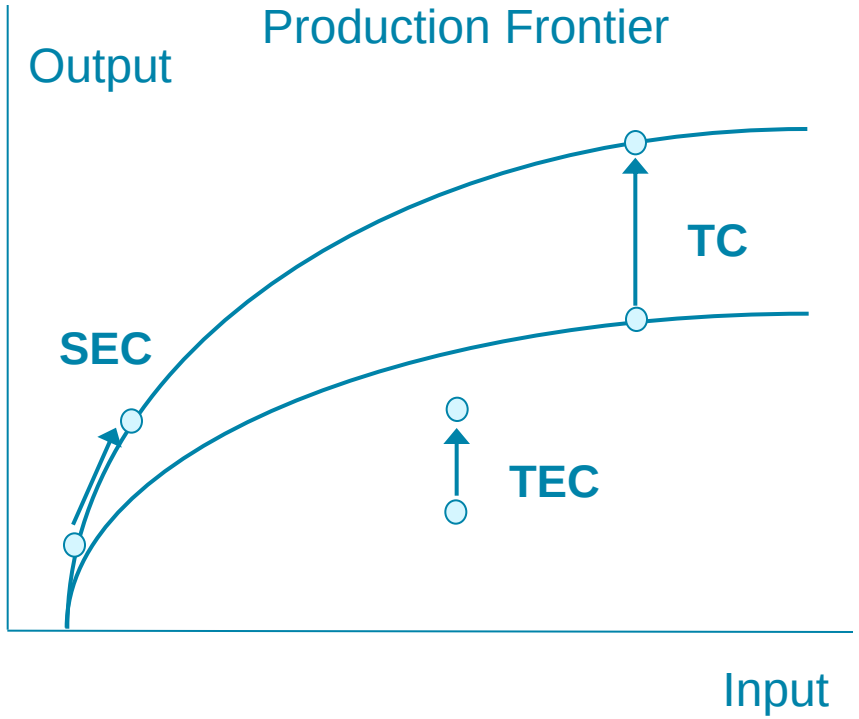
Sources of Productivity Growth

- technological changes
- implementation of existing technologies
- changes in the fleet structure
- increased abundance of fish stocks

Decomposition of Productivity

TFP decomposed into:

- technical change (TC)
- technical efficiency gains (TEC)
- changes in the vessel's scale of operations and input mix (SEC).



Does this Index Add Information?

- measures productivity
- illustrates the drivers of productivity changes
- give an indication of the effect of productivity changes on profitability.

Conclusions

The Fisher index with an Elteto Kovacs Extension

- is an alternative.
- shows the effect on costs of changes in productivity.

But,

- it is important for fishery managers to pursue maximum economic yield (MEY) harvest targets.

Future Directions

- stock adjustment
- index by fishing method
- disaggregate the indexes into output and input category indexes
- incorporate terms of trade effect
- further econometric analysis





Thank you

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