

GDP has become synonymous with welfare despite its shortcomings.
Our solution: Estimate a Danish **Green NNP** since 1990.

MOTIVATION

Contrary to Simon Kuznets' warning back in the 1930s where he was in charge of developing the concept of GDP, GDP has largely become synonymous with welfare - which has led to criticism of its shortcomings, and thus, a search for alternative measures.

- The EU Commission motivates their "Beyond GDP initiative" as being "about developing indicators that are as clear and appealing as GDP, but more inclusive of environmental and social aspects of progress. Economic indicators such as GDP were never designed to be comprehensive measures of prosperity and well-being."

OUR SOLUTION is to estimate a Danish Green GDP since 1990.

- which in the literature is known as the **Green NNP**.

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RESEARCH FRAMEWORK

$$\begin{aligned} \text{GNNP} = & \text{GDP} - \text{depreciation of fixed capital assets} \\ & + \text{net foreign factor income} \\ & + \text{benefit of the environmental quality} \\ & + \text{net growth in the environmental quality} \end{aligned}$$

2021-12-14

Green GDP: The Water Environment

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The Green NNP can be defined like this:

(the first part is the) NNP (before accounting for the environment)
+current marginal benefit of the environmental quality
+present value of net growth in environmental quality

[Only if asked - in more general terms:]

$$\begin{aligned} \text{GNNP} = & \text{NNI} \\ & + \text{value of consumption of environmental services} \\ & + \text{value of saving in environmental assets} \end{aligned}$$

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Contributions are twofold:

- 1 Impute complete panels of ecological status for 1990-2020.
- 2 Shadow prices measured by the marginal current benefit (marginal willingness to pay) using stated preferences.

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CONTRIBUTIONS

1. (...) for every Danish waterbody

- I.e. for all streams, lakes, fjords, coastal waters and groundwater bodies.
- The reason is that data isn't representative but has a systematic overrepresentation of larger waterbodies and those of special concern for the ecological quality.

2. Apply (...)

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RESULTS AND DISCUSSION

If $\Delta\text{GNNP} > \Delta\text{NNP} \Rightarrow$ GDP underestimated growth since 1990.

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PRELIMINARY RESULTS AND DISCUSSION

Overall, the quality of ecosystem services has improved since 1990.
That is likely to be offset by the costs of GHG emissions and the depletion of exhaustable natural resources
- but if it should turn out that $\Delta\text{GNNP} > \Delta\text{NNP}$

\Rightarrow then it would indicate that GDP growth has not been at the expense of the environment.

That is, with reservations that we don't fully live up to our international commitment such as the EU Water Framework Directive and the GHG reduction path implied by the Paris Agreement DESPITE outsourcing of our most polluting factories during the period.