

# Green GDP

Valuation of the water environment since 1990

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PhD Lunch Seminar, 15 December 2021

The research project '*Developing and Implementing Green National Accounts and the Green GDP*' is funded by KR Foundation and the Carlsberg Foundation.

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## Green GDP: The Water Environment

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### └ Outline

- 1 Motivation and framework
- 2 Contributions
- 3 Preliminary results and discussion

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# Why calculate a Green GDP?

GDP has become synonymous with welfare despite not capturing:

- 1 The value of the consumption of ecosystem services.
- 2 The value of social factors.

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## MOTIVATION (1)

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 in not capturing either (1) or (2).

Therefore, there is a widespread search for alternative measures:

- e.g. 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."

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Our estimation of a **Danish Green GDP** serves a dual purpose:

- Analyze whether the development from 1990-2020 meets the criterion of "strong" sustainability?
- Provide a measure that is directly comparable to the GDP.

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## MOTIVATION (2)

As a solution to the first point, we estimate a Danish Green GDP with a dual purpose:

- (...) i.e. a positive net growth in the environmental quality.
- using a measure that is directly comparable to the familiar concept of the GDP. The concept of Genuine Saving is less known but still included as a component of the GNNP - which moreover includes the current benefit of the environmental quality.

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

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## RESEARCH FRAMEWORK

In the literature, the Green NNP is the preferred measure, while one can deduct the Green GDP from it.

The **Green NNP** can be defined as:

(...) which 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:]

$$\text{GNNP} = \text{NNI}$$

+ value of consumption of environmental services  
+ value of saving in environmental assets

Contributions are twofold:

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

## 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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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 according to the definition of "strong" sustainability.

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.