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**Doctoral Dissertation Summary**

**A model of the System of National Accounts, including natural capital.**

The relationship between the economy and the environment is two-way, while economic and environmental accounting systems operate separately. This makes it difficult to carry out reliable analyses as the effects of economic events and policies studied should consider their impact on the environment, and, in turn, analyses of natural disasters should include estimates of their impact on the economy. Hence, the need for studies that deepen and broaden the analytical capabilities of economic research tools to consider better the impact of economic policy actions on the environment and vice versa can be seen through in the current scientific discourse. This dissertation contributes to this gap by creating and testing an improved tool for analysing the feedbacks occurring between the economy and the environment by incorporating natural capital into the current System of National Accounts model and applying it empirically to general equilibrium models. In this paper, two types of analyses were carried out using the new tool for Poland. The first study is an ex-post estimation of the economic impact of a catastrophic natural event, while the second study is an ex-ante estimation of the environmental impact (in the form of a decrease in greenhouse gas emissions) of the implementation of the EU energy policy.

The study begins by systematising the role of natural resources in economic processes, the possibility of their valorisation and the principles and standards of their integration into economic accounts represented by the System of National Accounts. The next step is to build a database that considers economic and environmental information, i.e. information on standing timber stocks, basic minerals (including coal), water, fish, agricultural land and information on greenhouse gas emissions. This allows the costs of environmental loss or degradation to be taken into account and thus makes the effects of economic events and policies more realistic.

In the empirical part of the study, using the constructed database and general equilibrium (CGE) models, the effects of a natural disaster in Poland, i.e. the hurricane of August 2017, and the objectives of the “Energy Policy of Poland until 2040” are analysed. The analysis of this energy policy examined scenarios for achieving the indicators contained in it. These included: (i) reducing the use of coal in the national economy (by reducing the share of coal in electricity generation up to 56% in 2030 and moving away from coal-burning in rural households by 2040 and in urban households by 2030) and (ii) reducing greenhouse gas emissions by about 30% by 2030 (compared to 1990).

The results obtained from the effects of the natural disaster indicate that the results without accounting for natural capital are overestimated and may therefore cause the misinterpretation of the cases/policies analysed, as they do not take into account the loss of natural resources, i.e. the value of the timber lost, as it does not appear in traditional economic accounting tables. In other words, the lack of natural capital accounting in the System of National Accounts may lead to the economic results based on which economic development could occur at the expense of natural resources while undermining the directions set by the Sustainable Development Goals.

On the basis of the results of the second problem analysed, i.e. the goals set by the “Energy Policy of Poland until 2040”, it can be concluded that it is possible to achieve them, but this will cause a significant economic slowdown. A reversal of this trend and an increase in GDP is possible with an increase in electricity generation from alternative sources (renewable energy and nuclear energy) of around 120%. Despite this, macroeconomic aggregates such as employment, wages, average return on capital, and many others continue to decline at this growth level. Therefore, to avoid this, the use of alternative energy sources in the economy would have to be increased multiple times over compared to current levels.