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PhD program "Economics"

Copyright of the manuscript

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Impact of environmental results on public wellbeing in Georgia

An abbreviated version (autoreferat) of the dissertation submitted for the
academic degree of Doctor of Economics

Tbilisi, 2024

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The defense of the dissertation will take place on: June 26th, 2024 at 15:00

at the session of the dissertation defense commission of the Faculty of Economics and Business at Ivane Javakhishvili Tbilisi State University.

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Relevance of the dissertation topic

Issues related to environmental protection are becoming more and more relevant due to the environmental challenges in the world. Against the background of these global trends and in accordance with the agenda of sustainable development, the importance of the environmental sphere is increasing in Georgia, both at the level of the country as a whole, as well as at the level of individual citizens, organizations and businesses. However, there are still significant social challenges in the country, and this is one of the reasons why addressing economic issues is a higher priority than environmental issues for a large part of society. At the same time, the fact that economic incomes do not sufficiently reflect the level of development and well-being of society is not new. However, the role and importance of environmental aspects in people's well-being is still not sufficiently studied, especially for Georgia.

Environmental impacts are often neglected due to the difficulty of assigning them an economic value. This leads to underestimating the importance of aspects of the environment such as, for example, clean air, clean water and soil, peace and less noise, biodiversity, landscapes and

views. All these aspects, in turn, directly affect human health, well-being, life and quality of life, and ultimately the economic development of society. The ecological challenges of the 21st century and global development trends reveal that the well-being of societies is closely dependent not only on the social and economic aspects of life, but also on environmental protection, the vitality of the earth's ecosystem, and the maintenance of a healthy natural environment for living organisms.

Economic valuations of environmental impacts and their application are important not only to facilitate the evidence-based decision-making process, but also to raise public awareness of the vital importance of environmental resources. With the economic analysis of the environmental impact, we convince the interested parties, the general public, that the environmental resources are of vital importance and this is substantiated, supported by arguments and economically evaluated. Economic analysis of the data makes the essence of the issue more visible to the interested groups of the society, which is expected to lead to positive behavioral changes in the population and these changes will have a positive impact on the general well-being. In this paper, "environmental results" and "environmental impacts" are synonymous and refer to various types of environmental factors and indicators that are used to describe the general state of the environment or its specific aspects. Given the availability of data, a number of the environmental indicators were selected for the purposes of this thesis, they are discussed in detail in the paper and used as variables in the econometric analysis.

Impact assessment and economic valuation are related to welfare economics, the concepts of efficiency and utility. These concepts have been actively developed in economic theories since the 19th century, and since the 20th century they have already been practically reflected in public policies and private initiatives/projects. The models for assessing the economic value of the impact are still constantly evolving. The role and importance of environmental impact assessment as one of the key aspects within sustainable development is growing in such models.

Consideration of environmental outcomes is becoming a priority in wellbeing assessments for developed countries, and this is reflected in the fact that coverage of environmental

components, along with social and economic ones, is gradually increasing in many international and national wellbeing models and indices.

Research goal, tasks, hypotheses

While working on the dissertation, two research goals were established:

I. Assessment of the effect of environmental impacts on public welfare.

II. Assessing the role of economic value analysis of environmental impacts in the process of creating policies based on welfare economics.

In order to achieve these goals, the research sets out relevant tasks:

- Studying the theoretical-methodological approaches in the direction of economic analysis of environmental protection;
- Studying the relationship between environmental protection and economic development.
- Studying the connection between environmental protection and well-being;
- Determining the role of environmental protection and economic development in wellbeing assessment models;
- Studying the practice of economic analysis of the environmental field and identifying its main characteristics;
- Assessing the research and academic development prospects in the environmental field;
- Assessing public knowledge and attitudes in the field of environmental protection.

Against the backdrop of growing environmental challenges in the world, it is expected that environmental results will have a significant impact on the well-being of individual people and the country as a whole. Based on the above, relevant research hypotheses were formed within the scope of the study:

Hypothesis 1. The determining factor of the well-being of societies is not economic development alone, but sustainable development, which also includes social and environmental aspects of life.

Hypothesis 2. Economic factors play a major role in today's established practice of wellbeing assessments.

Hypothesis 3. Prioritization of the environmental sphere in wellbeing models is positively influenced by the development of economic value assessments of environmental field.

Object and subject of research

The object of the research is environmental results and well-being in Georgia. The subject of research is the connection between environmental results and well-being in Georgia.

Research methodology and empirical base

Various research methods, theoretical-methodological tools, analysis, synthesis, comparison and others have been used to achieve the goals and objectives of the research set for this doctoral dissertation. The paper presents the results of both primary and secondary research. The latter relies on a wide range of sources, including data produced by official statistical services, data from a number of public agencies, as well as databases and assessments of international organizations.

The desk research was conducted in the form of a detailed theoretical framework and literature review. Its purpose is to analyze the relevant scientific books, articles, studies and assessments that describe the relationship of environmental impacts with the well-being of society and the importance of economic analysis of these results. Additionally, the paper analyzes relevant legislative and regulatory documents for Georgia, policy and strategy directions, international and national framework agreements, reports of a number of public and private organizations, and research results. The above-mentioned Georgian and international databases are processed in detail in the thesis, on the basis of which the relevant statistical analysis is made.

Primary research was conducted in several directions, using both qualitative and quantitative research methods. The primary data collection process was carried out from December 2022 to February 2023. The first part of the qualitative research, specifically in-depth interviews, was conducted with key stakeholders. For this, communication was made with dozens of organizations from various sectors, including the public sector, businesses and associations, research and academic institutions. Based on the responses, finally, interviews were conducted with representatives of 12 organizations. The average duration of the interviews was 33 minutes. The second part of the qualitative research was conducted in the form of a focus group with the students of the final semester of the master's degree in Economics of the Ivane Javakishvili Tbilisi State University, Faculty of Economics and Business, who had taken the subject "Cost-Benefit Analysis". The meeting was attended by 7 people, including the author/moderator of the study. The participants of the group were women and one man, the average age of the participants was 25 years. The meeting lasted about 50 minutes. As for the quantitative research, an online public survey was conducted and citizens interested in environmental issues participated in the survey. The survey has been open for 10 days. The corresponding questionnaire included 25 detailed questions (including 3 open questions and the rest - closed ones) around environmental issues. The average time spent on filling out the questionnaire was 24 minutes. Finally, 318 people were registered as participants in the survey, and 110 of them filled out the questionnaire completely.

At the end of the dissertation, the results of the econometric analysis conducted to determine the relationship between environmental, economic and well-being indicators for Georgia are presented. Depending on how much data was available in the time frame required for analysis, a number of the above indicators were selected as variables to be used in the study. In particular, the state budget expenditures for environmental protection, the amount of greenhouse gas emissions in the country, and the "ecological footprint" and "biological capacity" indicators developed by the "Global Footprint Network" were selected as environmental variables. The indicators of gross domestic product and gross national income are used as economic variables in the research. The average life expectancy index, human development index and the happiness index reflected in the world happiness reports are presented as well-being variables in the study.

In the econometric analysis, wellbeing indicators are presented as dependent variables, and selected environmental and economic indicators are presented as independent variables. Correlation between variables and regression analysis were performed using Eviews software.

Scientific novelty of the dissertation

The main scientific innovations of the research presented in the thesis are the following:

- On the basis of bibliographic research and primary (quantitative and qualitative) research, the need to consider environmental factors in national or international wellbeing indicators is substantiated;
- Through the theoretical-methodological analysis of the concepts of welfare economy, natural capital and total economic value, direct connections between the effective use of environmental resources and the well-being of society have been identified;
- On the basis of qualitative research and study of practical cases, the challenges of economic analysis of the environmental field in Georgia have been identified;
- On the basis of quantitative research, the main characteristics of the population's knowledge and attitudes towards various aspects of environmental protection have been identified;
- On the basis of linear regression, the relationship between environmental results and well-being in Georgia, as well as between economic factors and well-being is estimated;
- Correlation of environmental variables with wellbeing indicators is established;
- The need to develop a national index of well-being for Georgia is substantiated and a guiding practical framework for the development of the country's national well-being model is proposed.

Practical and theoretical significance of the work

The topics discussed in the paper can be evaluated in terms of both practical and theoretical applications. On the one hand, in order to present the conceptual importance of environmental consequences and to further develop the theoretical direction, it is necessary to analyze the beginnings of welfare economics, its main principles and approaches, which gave rise to cost-benefit analysis at the beginning of the 20th century. Considering these economic theories, the paper presents the importance of economic analysis of environmental impact in wellbeing assessments. On the other hand, in order to monitor the scale of environmental impacts, it is necessary to share, develop and put into practice modern and latest approaches of economic value estimation methods. In this regard, in order to develop value assessments, the paper presents the need and necessity of researches necessary for obtaining objective data as well as subjective data. Additionally, the thesis presents the essence and importance of natural and environmental resources as natural capital. It can be said that the improvement of accounting of natural capital and its practical implementation in national accounting systems is the main challenge and task of development of environmental economics today. Also, it is important for researchers and economists to pay more attention to wellbeing assessments and the role of sustainable development aspects (including environmental outcomes) in these assessments. The paper also focuses on the importance of environmental economics as a scientific and research field.

The paper presents a guiding practical framework for the development of a country's national welfare model. The results of the research proved once again that it is not appropriate to evaluate the well-being of the society only by economic development indicators. Moreover, the data shows that in parallel with economic progress there is an overuse of environmental resources, which, in turn, poses a threat to people's well-being and quality of life in the long term. The existence of a national wellbeing model based on the principles of sustainable development will assess the development of society with a new perspective and, it is expected, will lead to positive behavioral changes both directly among citizens, as well as among state policy decision-makers and businesses and at the level of the general public.

The paper can be used:

- By Economists and researchers to study the relationship between environmental protection and well-being;
- To share, develop and put into practice the modern and latest approaches to economic valuation methods of environmental impact;
- For the development of the country's national wellbeing model;
- For students in study courses of higher educational institutions.

Approval of the dissertation thesis

The main results of the thesis have been published in the conference proceedings and scientific journals in Georgia and abroad (see page 19).

The work has passed the final approval in its completed form at the Department of Microeconomics of the Faculty of Economics and Business of Ivane Javakhishvili Tbilisi State University (excerpt from the protocol #10 of the chair meeting of the department on January 24, 2024). The dissertation is recommended for public defense.

The structure and volume of the thesis

The volume of the work is 204 pages printed on a computer. The document consists of the following parts: introduction, 3 chapters, 10 sub-chapters, 30 diagrams, 21 tables, 3 schemes, 4 annexes, conclusions and recommendations, list of references (223 sources) and list of works published by the doctoral student.

Content of the Paper:

List of tables, diagrams and other illustrations

List of abbreviations

Introduction

Chapter 1. Theoretical-methodological approaches to the analysis of the economic value of environmental results

1.1. Welfare economics and cost-benefit analysis

1.2. Natural capital and the problem of "market failure" in environmental resource management

1.3. Total economic value (TEV) in the environment field

Chapter 2. Environmental protection and well-being: overview of the current situation, basic data and statistics

2.1. Analysis of global trends in environmental protection and well-being

2.2. Environmental protection and sustainability in Georgia: the main directions of the state's development

2.3. Analysis of key environmental and wellbeing indicators in Georgia

2.4. The practice of economic analysis of the environmental field in Georgia

Chapter 3. Assessment of environmental consequences as factors affecting well-being in Georgia

3.1. Analysis of public knowledge and attitudes research results

3.2. Assessing the relationship between environmental and wellbeing indicators

3.3. Developing a wellbeing model for Georgia

Conclusions and recommendations

References

Scientific works published by the doctoral student

Annexes

Content of Dissertation

The first chapter of the dissertation presents an analysis of the theoretical framework in the context of welfare economics, and reviews the concepts and models developed by well-known

economists in this field. In this part of the study, such economic issues as utility, effectiveness and cost-benefit analysis are analyzed; The essence of natural capital is described and the challenges related to the management of natural and environmental resources as common pool resources and public goods are shown; This section then reviews the concept of total economic value and methods of value estimation; Such methods and approaches to economic value assessment established in international practice, such as "stated preference", "revealed preference", "subjective well-being" are analyzed in detail here.

The second chapter of the work is devoted to the overview of the current situation and basic data in the field of environmental protection and well-being. This section presents an analysis of global trends, key data and statistics that show the link between environmental protection, the economy and well-being; The role of economy and environmental protection in the assessment of society's well-being is presented by a detailed analysis of a number of international indices (including the human development index and the happiness index); In this part, the cases of "Easterlin Paradox" and "Environmental Kuznets Curve" are also discussed on the example of different countries; Issues of consideration of environmental impact and sustainable development in the public policy of economically highly developed countries are evaluated. Then, this section continues with an overview of the current situation in Georgia in several areas: environmental policies and regulations, results of surveys of public knowledge and attitudes, and environmental impact assessment practices. A detailed analysis of selected environmental, economic and wellbeing indicators for Georgia is presented here.

The third chapter of the work is devoted, on the one hand, to the discussion of the data obtained on the basis of the primary research (both qualitative and quantitative methods) for Georgia, and on the other hand, to the results of the econometric analysis. The results of the qualitative research are presented in two directions: in-depth interviews with key stakeholders and a focus group with students. As for quantitative research, the results of an online survey conducted with the public are presented. The econometric analysis subsection describes the results of the study of the relationship between environmental and wellbeing indicators for Georgia.

Selected indicators of well-being are presented as dependent variables in the econometric analysis: happiness index based on world happiness reports; human development index (hdi) and life expectancy index. In the econometric analysis, selected environmental and economic indicators are presented as independent variables: "ecological footprint" per capita; "biological capacity" per capita; greenhouse gas emissions per capita; state budget expenses in the direction of environmental protection; gross domestic product (gdp) per capita and gross national income (gni) per capita.

In the first stage, the impact of selected economic indicators on wellbeing indicators was studied. According to the results, both the happiness index and the human development index (hdi) are correlated with economic development (gdp and gni), and this is not surprising. The presented indicators of well-being, among other factors, also take into account economic determinants: the happiness index includes gdp, and the human development index - gni. The results of the regression analysis show that for Georgia, a change in gdp by one unit changes the happiness index by 0.4 units, and a change in gni by one unit changes the human development index by 0.2 units. In both cases, the correlation between the variables is very high (the coefficient of determination (R²) is 0.87 and 0.94, respectively). The analysis shows that the influence of economic indicators on the average life expectancy is positive, although with significantly lower coefficients and the explanatory power of the strength of the relationship between the variables (R²) in this case is relatively small (0.63 in the case of gdp and 0.40 in the case of gni).

In the second stage, an econometric analysis was conducted to assess the relationship between environmental indicators and wellbeing indicators, the results of which are important in several directions:

- There is a strong correlation of environmental variables with all three indicators of well-being. Only "biological capacity" shows a relatively low correlation, which is probably due to the fact that the indicator of "biological capacity" has not changed for decades, and the model reflected this accordingly.

- Environmental variables show stronger correlations with life expectancy and hdi indicators than with the happiness index.
- Environmental factors as independent variables in regression analysis generally have little explanatory power to well-being indicators as dependent variables. In particular, the impact of changes in environmental aspects in relation to happiness index, human development index and average life expectancy was evaluated with coefficients of determination (R²) at 0.21, 0.63 and 0.37 levels, respectively.
- In the regression analysis, a small, but still negative relationship can be seen between environmental state expenditures and selected wellbeing indicators.
- Indicators of both "ecological footprint" and greenhouse gas emissions show a positive relationship with selected indicators of well-being in regression analysis. Despite the fact that the above-mentioned environmental indicators show the deterioration of the ecological situation (which directly or indirectly affects the health and well-being of the society), the selected indicators of well-being do not actually measure and take this into account.

The results of the study show the need to develop a national index for the assessment of well-being, where, along with economic and social aspects, significant environmental effects will be integrated.

Conclusions and recommendations

Based on the results of the bibliographic analysis, theoretical-methodological review, qualitative and quantitative research, econometric model, conducted in order to assess the impact of environmental results on the well-being of the society, the hypotheses formulated within the research were confirmed: (a) the well-being of the society is determined not only by economic determinants, but also by sustainable development, which combines economic, social and environmental directions; (b) in the established practice of assessing well-being reflected by international indices, the role of environmental components is increasing recently, however, economic factors still play a decisive role in them; (c) On the example of developed countries, it

can be seen that the development of economic value assessments of environmental impact has a positive effect on the consideration of the environmental sphere in wellbeing models.

Based on the research results, the main conclusions are presented and recommendations are developed:

- The ecological challenges facing the world today are important not only from the environmental and social points of view, but also directly from the economic perspective. A study of existing practices shows that the "Environmental Kuznets Curve" does not always work even in already developed, high-income countries. Therefore, it is necessary to integrate ecological components in the country's development processes, regardless of the stage of development. The damage that the world, including Georgia, receives as a result of ecological degradation is significantly high and growing. A number of international assessments (including environmental performance index (epi) and ecological footprint (ef)) measure the environmental sustainability of countries, and according to both of them, Georgia ranks low.
- A review of international practice reveals that environmental damage has a direct impact on human physical and mental health and quality of life in general; Environmental pollution is directly related to the deterioration of human health and well-being, and conversely, living in a healthy environment and a sustainable ecosystem is of great importance in the form of a number of positive effects on human health and well-being.
- An economic view of environmental impact can change public attitudes towards this area. It is often heard not only from the society as a whole, but also from the professional circles that a number of issues of economic and social development of the society are a higher priority than the protection of the environment. This opinion can only be related to preconceived notions, since the results of a thorough and economic analysis of the field give us a different picture: the low priority of environmental issues, in the light of today's challenges, may lead to the aggravation of social and economic problems and the impoverishment of the poor population.

- In Georgia, as a developing country facing a number of social challenges, it is generally preferable for society to solve economic issues, compared to issues of environmental protection, which is confirmed by the results of the survey conducted within the framework of the dissertation research. In addition, today it is clear that the interests in the country are often separated both at the level of society as a whole and directly at the level of policy makers, business and environmental organizations. Parties focused on economic growth and environmental protection stand out with radical positions. Therefore, there is no clear vision of the real close connection between these two areas. The paper presents the importance of balanced, well-being-oriented decisions and in this regard, it can become an important document for raising the knowledge of the opposing parties and changing the practice.
- The field of environmental protection in Georgia today is less the object and subject of the analysis of the evidence-based approach. Care for ecology in the country often takes place only within the framework of activism, which causes even more confrontation between opposing parties and reduces the possibility of mutual understanding between them. It is important to raise environmental knowledge in society, including, especially at the preschool and school education level, as well as the academic development of environmental economics at the level of higher education. It is necessary to interest more economists and students in this field, to develop relevant statistical and econometric models, so that the environmental debate becomes more substantiated and argumentative.
- Economic analysis of environmental protection, even among researchers and economists, is associated with significant challenges, since the market price for environmental and natural resources is often not determined, and it is necessary to conduct important and complex studies and use "revealed preference", "stated preference" and other similar methods. In order for the total economic value and other similar methods to be more widely used for the assessment of ecosystem services, it is important to regularly conduct relevant national surveys, to study the preferences, subjective perceptions and attitudes of

the population in relation to well-being and environmental resources, which will create an important basis for further economic studies in this field.

- So far, even at the global level, ecosystem accounting in national accounting systems is less common, and its implementation is associated with many challenges, especially in developing countries, including Georgia. Nevertheless, it is important to gradually activate the inclusion of natural capital in Georgia in the national accounting system, so that the value of environmental resources is clear to the public, all interested parties and professionals. This will help to recognize the importance of nature and ecosystem services as key drivers of well-being and to seek sustainable solutions for future development.
- Within the framework of the study, the practice of economic analysis of the environmental field was studied in Georgia on the example of three main documents: (a) assessment of investment projects; (b) regulatory impact assessment; (c) environmental impact assessment. All three documents are methodologically based on welfare economics principles and cost-benefit analysis. The study of the existing practice reveals that these assessments are still at the initial stage in the country, especially in the direction of economic analysis of the environmental field. It is important to make ecosystem value assessments part of such analysis processes.
- The study demonstrated the importance of the close relationship between environmental protection and the economy in the context of welfare economics. Specifically for Georgia, the relationship between environmental aspects and selected indicators of well-being was studied. The econometric analysis shows that, on the one hand, the correlation between the selected environmental and well-being variables is mostly strong, and on the other hand, environmental factors as independent variables in the regression analysis generally have little explanatory power to well-being indicators as dependent variables. Indicators of both "ecological footprint" and greenhouse gas emissions show a positive relationship with selected indicators of well-being in regression analysis. In other words, although the above-mentioned environmental indicators show the deterioration of the ecological situation (which directly or indirectly affects the health and well-being of people in

reality), the selected indicators of well-being do not actually measure and take this into account. Since the existing environmental and wellbeing data for Georgia are not available for a sufficiently long period of time, this is a limitation for the econometric analysis of the issue. However, the problem set in the thesis and the obtained results will be important for future studies in this direction.

- Taking into account the international practice and based on the results of the research, it is recommended to develop a national wellbeing index/model for Georgia, in which economic, social and environmental aspects will be equally taken into account. In developed countries, where similar national models exist, the importance of environmental protection and corresponding value assessments are also highly developed. In addition, the existence of a similar model in the country will be useful, as it will contribute to raising the knowledge of different groups of society (population, businesses, the state) in the field of sustainable development and welfare economy. Additionally, periodic work on obtaining and processing the data needed to evaluate this index will improve the quality and quantity of environmental indicators (both subjective and objective data) in the country. This, in turn, will be especially valuable for economic analysis of the field and future research in the field.

Published scientific papers

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