#ENVECON8

Economics of Natural Resources and the Environment
8th Conference, 2 – 3 December 2022
HYBRID

Co-organized by:
Laboratory of Operations Research, UTH.
&
Research Unit of Environmental Communication and Education, UNIWA.

❑ SCOPE

Main issues that concern the Economics of Natural Resources and the Environment with emphasis on the various environmental problems and their management and solution policies.

❑ AIM

Highlight the interdisciplinary nature of environmental research through the exchange of views and experiences of researchers from different scientific fields and the finding of common components of research approaches.

- Sustainability
- R.E.S.
- Environmental Education
- Natural Hazards & Risks
- Mitigation & Adaptation
- Circular Economy

ENVECON

8th Conference Economics of Natural Resources & the Environment

Laboratory of Operations Research
School of Economics and Business

Department of Economics
University of Thessaly

Research Unit of Environmental Communication and Education
School of Public Health

Department of Public and Community Health
University of West Attica

2 – 3 December 2022

WELCOME

Dear,

Invited guests, Colleagues, and Students

On behalf of the Scientific and Organizing Committee, I welcome you to the 8th Conference on "Economics of Natural Resources and the Environment". The Laboratory of Operations Research in the Department of Economics of the School of Economics and Business at the University of Thessaly.

The 8th ENVECON Conference is held hybrid (online and physical meeting) on December 2nd – 3rd , 2022 and it is jointly organized by the Laboratory of Operations Research of the Department of Economics University of Thessaly and the Research Unit of Environmental Communication and Education of the Department of Public and Community Health of University of West Attica with emphasis to "Environmental Research Activities: Progress and Trends".

The conference aims to present the main issues that concern the Economics of Natural Resources and the Environment and the recent scientific research on the field. The main focus will be given on sustainability and effective environmental management, while research on the environmental and social impacts of the recent COVID-19 pandemic will also be presented. The conference aims to promote the exchange of views and experiences of researchers from different scientific fields and the finding of common components of research approaches, since the environment is governed from interdisciplinarity.

I would like to welcome and thank the keynote speakers of the conference, Professor Phoebe Kountouri, Dr. Panagiotis Grammelis, Professor Shunsuke Managi, and Professor Chrysi Laspidou who accepted the invitation to present their long-term remarkable research experience on topics relevant to the conference.

I would also like to thank the participants, not only of the current conference but of the previous ones as well. Their support to this scientific effort is significantly important and fosters even more our efforts to contribute to the development of Economics of Natural Resources and the Environment. Personally, I promise to continue the conference at the highest possible level at a time, continuing to promote important research findings regarding sustainable development, environmental protection and natural resources management, at both theoretical and applied levels.

I hope that all academics, researchers and students, who participate in the Conference and who either present their research results or learn and value the work of other researchers, have a pleasant and constructive experience of the attendance of the Conference.

Conference Scientific Coordinator
Professor George E. Halkos (PhD)
Laboratory of Operations Research
Department of Economics
School of Economics and Business
University of Thessaly, Volos, Greece

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Conference Committees

Scientific Committee

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- Laspidou Chrysi, Professor, University of Thessaly
- Löschel Andreas, Professor University of Münster
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Concise Conference Programme

Day 1

Concise Conference Schedule		
Day 1	**Time** (Greek Time)	**Sessions-Topics**
Friday 2/12/2022	9:30-9:45	OPENING – WELCOME
	9:45-11:30	Session 1: Research on rural development in Global South
	11:30-12:00	Keynote Speaker Professor Phoebe Kountouri
	12:00-14:00	Session 2: Environmental statistical challenges and applications
	14:00-14:30	Break
	14:30-16:15	Session 3: Energy Issues and Policies
	16:15-16:45	Keynote Speaker Dr Panagiotis Grammelis
	16:45-17:00	Break
	17:00-18:45	Session 4: Natural Resources Conservation
	18:45-20:45	Session 5: Education for Sustainability and the Environment

Concise Conference Programme
Day 2

Day 2	Time (Greek Time)	Sessions-Topics
Saturday 3/12/202	09:00-09:30	**Keynote Speaker** Professor Shunsuke Managi
	09:30-11:30	**Session 6:** Environmental performance
	09:30-11:30	**Session 7:** Corporate Social Responsibility
	11:30-11:45	Break
	11:45-13:05	**Session 8:** Circular economy
	11:45-13:05	**Session 9:** Sustainable Transport
	13:05-13:30	Break
	13:30-14:00	**Keynote Speaker** *Professor Chrysi Laspidou*
	14:00-15:40	**Session 10:** Environmental Pollution Modelling
	15:40-16:00	Break
	16:00-18:00	**Session 11 :** Sustainable Tourism
	16:00-18:00	**Session 12:** Environmental Education
	18:00-18:10	CLOSING & FINAL GIVEAWAYS

CONFERENCE SCHEDULE

2 – 3 December 2022

Friday 02 December 2022

Opening - Welcome **09:30-09:45**

1st Session **09:45-11:30**

Topic: **Research on rural development in global South**

Chairperson: **Assc Professor Trung Thanh Nguyen**

09:45-10:05	*Indebtedness and child well-being: Empirical evidence from Vietnam* Duy Linh Nguyen, Thanh Tung Nguyen, Trung Thanh Nguyen, Grote Ulrike
10:05-10:25	*Land Rental Markets as a Poverty Reduction Strategy: Evidence from Southeast Asia* Eva Seewald, Samantha Baerthel & Trung Thnah Nguyen
10:25-10:45	*Local infrastructure, households' resilience capacity, and vulnerability to poverty: Evidence from panel data for Southeast Asia* Tim Hartwig & Manh Hung Do
10:45-11:05	*Resilience against shocks and poverty in developing countries: Evidence from panel data for rural Southeast Asia* Manh Hung Do
11:05-11:25	*Trade-offs between remittance and agricultural productivity: Evidence from smallholder farming systems in Nepal* Gokul P. Paudel, Trung Thanh Nguyen, Ulrike Grote

Keynote Speaker **11:30-12:00**

Topic: "Decision Making under Deep Uncertainty:
A central challenge for Economic theory and Applications"
Professor Phoebe Koundouri
President of the European Association of
Environmental and Resource Economists (EAERE)
Athens University of Economics and Business, Director of ReSEES, Athens, Greece

2nd Session 12:00-14:40

Topic: Environmental statistical challenges and applications

Chairperson: Assc Professor Teresa Oliveira and Asst Professor Amílcar Oliveira

12:00-12:20	*Statistical and Probability Models for Environmental Risk AnalysisGreece* C. P. Kitsos & C.S. A. Nisiotis
12:20-12:40	*Estimating parameters in Extreme Value Theory: Application to environmental data* Dora Prata Gomes & Manuela Neves
12:40-13:00	*Analysis of Waste Management on Portuguese Subsurface Ships: A Possible Approach* M. Filomena Teodoro, Suzana P. Lampreia & Tomás Neves
13:00-13:20	*Multilevel modeling techniques to study the impact of environmental changes on human face development* Mónica Amorim, Joana Godinho & Teresa Oliveira
13:20-13:40	*Hazard Function of $N(\mu, \sigma^2;\gamma)$ Distribution for Environmental Pollutants* Christos P. Kitsos & Paula Camelia Trandafir
13:40-14:00	*Big Data Analytics in Control of Water* Amílcar Oliveira

3rd Session 14:30-16:15

Topic: **Energy Issues and Policies**

Chairperson: **Professor George Halkos**

14:30-14:50	*Energy poverty persistence and transition effects: Empirical evidence from Greek households* George Halkos & Ioannis Kostakis
14:50-15:10	*Regulatory Framework for the Participation of Demand Response in the new electricity markets* Angeliki Mourtzikou, Angeliki Anastopoulou & Athanasios Volikas
15:10-15:30	*Development of RES is the answer to the current energy cricis: The economic benefits from both RES and CHP support scheme and competitive procedures for RES via eAuctions in Greece."* Dionysios Papachristou
15:30-15:50	*Legal and Regulatory Framework for Storing Energy in Greece* George Loizos, Dionysios Spyropoulos
15:50-16:10	*Estimating the energy requirements of the Greek economy by the sraffian multiplier* Theodore Mariolis & Christos Tsirimokos

Keynote Speaker 16:15-16:45

Topic: "Sustainable pathways using Biofuels and Renewable Gases under a circular economy approach"

Dr Panagiotis Grammelis

Director of Research at Chemical Process & Energy Resources Institute (CPERI)
Centre for Research & Technology (CERTH)

4th Session 17:00-18:45

Topic:	**Natural Resources Conservation**
Chairperson:	**Professor G. Arabatzis and Assc Professor G. Papaspyropoulos**
17:00-17:20	*Dams and climate change: Socioeconomic approaches* Nikolaos Liagkouas, Georgios Kolkos, Garyfallos Arabatzis & Efthimios Zervas
17:20-17:40	*Assessment of the socio-economic impacts of the ForestLife Project on the governance of Natura 2000 Forests* Marina-Vasiliki Andreadou, Victoria Datsi, Giorgos Amaslidis, Petros Kakouros & Konstantinos G. Papaspyropoulos
17:40-18:00	*Fishing cultural heritage, local identity, and implications for maritime spatial planning* Mavra Stithou & Aris Tsantiropoulos
18:00-18:20	*Value Chain Finance in Agriculture: Empirical Evidence from Greece* Nikolaos Lathiras, Paraskevi Boufounou, Kanellos Toudas, & Chrisovalantis Malesios
18:20-18:40	*Ecosystem services supply by Agriculture: Using Choice Experiments to estimate trade-offs between monetary and non-monetary incentives* L. Madureira, A.F. Fonseca & C. P. Marques

5th Session 18:45-20:45

Topic:	**Education for Sustainability and the Environment**
Chairperson:	**Professor Steriani Matsiori**
18:45-19:05	*Smart city as a strategic improvement of the living conditions of citizens: Urban Forests* Elisavet Iannidou, Sofoklis Dritsas, Steriani Matsiori & Stavros Sakellariou
19:05-19:25	*Media and Environmental Information* Dorothea Kolindrini, Dritsas Sofoklis, Stefanos Paraskevopoulos, & Steriani Matsiori
19:25-19:45	*Public Awareness of Nature and the Environment During the COVID 19 Crisis* Pasintelis Kariofillis-Panagiotis, Georgios Meletiadis, Dritsas Sofoklis & Steriani Matsiori
19:45-20:05	*The role of environmental knowledge and environmental values in citizens' beliefs and consumer behaviour* Ilektra Skarpa, Dritsas Sofoklis & Steriani Matsiori
20:05-20:25	*Investigation of environmental literacy in a sample of primary school teachers* Chrysovalantis Kalessopoulos, Anastasia Gkargkavouzi & Steriani Matsiori
20:25-20:45	*Citizen Science and its use in Environmental Education/Education for Sustainability* Dimitrios S. Prampromis

Saturday 3 December 2022

Keynote Speaker **09:00-09:30**

Topic: "Inclusive Wealth Footprint: Cross-border Movement of Natural, Human and Produced Capital"
Professor Shunsuke Managi
Director of Urban Institute, Urban Engineering & Economics Laboratory.
Department of Civil Engineering, School of Engineering, Kyushu University.

6th Session **09:30-11:30 Lecture Room A**

Topic: **Environmental Performance**

Chairperson: **Professor Kostas Tsekouras and Assc Professor Kostas Kounetas**

09:30-09:50	*Innovation, Productive Performance and Undesirable Outputs across European Regions: Are there any missing links?* Eirini Stergiou, Kostas Kounetas & Kostas Tsekouras
09:50-10:10	*European firms' productivity growth and environmental regulation. Re-examining the Porter Hypothesis* Rigas Nikolaos, Tsekouras Konstantinos, Kounetas Konstantinos & Capasso Salvatore
10:10-10:30	*Environmental performance – Economic performance nexus in LCDs Agriculture; An empirical study* Eleni Zafeiriou, Athanasios Batzios, Spyros Galatsidas & Garyfallos Arabatzis
10:30-10:50	*A causal model of climate-induced psychological resilience* Anastasia Gkargkavouzi
10:50-11:10	*Environmental, Social and corporate Governance (ESG) factors in Healthcare Systems, in terms of Sustainable Finance* Fotios Rizos & Anastasios Sepetis

7th Session **09:30-11:30 Lecture Room B**

Topic: **Corporate Social Responsibility**

Chairperson: **Assc Professor Kon/os Evangelinos & Asst Professor Ant. Skouloudis**

09:30-09:50	*Corporate Social Responsibility Reporting and Health & Safety Strategies in the UK construction sector* Stefanos Fotiadis & Konstantinos Evangelinos
09:50-10:10	*Climate change and its effects in public health* Evangelos Kehagias and Panagiota Bobori
10:10-10:30	*The hotel business through the prism of sustainable development: Initial results of the program GREEN INNOVATIVE VALUE SERVICES (G.I.V.S)* Panagiotis Vouros, Panagiota Lambrou, Christos Mitsokapas, Petros Dallas, Konstantinos I Evangelinos, Panagiotis Grammelis
10:30-10:50	*Corporate Social Responsibility and Disability at Work: Evaluating Sustainability Reporting in Great Britain and Germany* Georgia Papadopoulou & Konstantinos I Evangelinos
10:50-11:10	*Factors influencing recycling intention for mobile phones: Evidence from Greece* Eirini Grigoraki & Iosif Botetzagias
11:10-11:30	*Antecedents and consequences of consumer satisfaction for bio-based products: Preliminary findings from Greece using structural equation modelling* Skouloudis Antonis, Malesios Chrysovalantis & Lekkas Demetris-Francis

8th Session **11:45-13:05 Lecture Room A**

Topic:	**Circular Economy**
Chairperson:	**Professor Christos Kitsos and Professor George Halkos**
11:45-12:05	*Do firms care about peers when choosing to go circular? Peer effect among Italian firms in the introduction of circular innovation* Davide Antonioli, Elisa Chioatto, Susanna Mancinelli & Francesco Nicolli
12:05-12:25	*Green Growth & Sustainability Transition through information. Are the greener better informed? Evidence from European SMEs* Nikos Chatzistamoulou, Emmanouil Tyllianakis
12:25-12:45	*Defining circular economy and sustainability* Vasilis Nikou, Eleni Sardianou, Konstantinos Evangelinos, & Ioannis Nikolaou
12:45-13:05	*Policy Review towards Circular Economy on Sustainable MSWM: Examining the Mediterranean Europe* George Halkos & Panagiotis – Stavros Aslanidis

9th Session **11:45-13:05 Lecture Room B**

Topic: **Sustainable Transport**

Chairperson: **Professor Vassilios Profillidis**

11:45-12:05	*The consequences of the COVID-19 pandemic on the habitual behaviors and the selection criteria of transport mode in Greece* Athanasios Galanis, Ioanna-Theodora Dioti, Christina Taso, George Botzoris & Panagiotis Lemonakis
12:05-12:25	*Micromobility as a reference element of urban sustainable mobility and environmental sustainability* Chrysa Vizmpa & George Botzoris
12:25-12:45	*The Effect of Road Transport Electrification on Energy Demand in Greece* Konstantinos Christidis, Vassilios Profillidis, George Botzoris
12:45-13:05	*Implementation of the rail trail practice in Greece as a sustainable tourism growth factor* Panagiotis Lemonakis, Spyridon Barkas, Athanasios Galanis & George Botzoris

Keynote Speaker **13:30-14:00**

Topic: “"Climate-resilient regions through systemic solutions and innovations: the ARSINOE project”

Professor Chrysi Laspidou

Civil Engineering Department, University of Thessaly, Greece

Vice-President of Research and Technology Water Europe, Brussels

10th Session 14:00-15:40

Topic: **Environmental Pollution Modelling**

Chairperson: **Professor George Halkos**

14:00-14:20	*Preliminary study for the deployment of low-cost sensors-based particulate matter (PM) monitors in a few cities in Senegal* B. Tchanche, I. Fall, D. Westervelt
14:20-14:40	*A comparative critical analysis of the major EFRAG, SEC and ISSB proposals, for climate disclosure* Benjamin Karatzoglou (PhD)
14:40-15:00	*The effects of climate change to weather-related environmental hazards: Interlinkages of economic factors and climate risk* George Halkos and Argyro Zisiadou
15:00-15:20	*Improving collaboration of actors involved in Risk and Resilience Assessment Centers using Serious Games* Anastasia Roukouni, Georgios Botzoris, Maria Giannopoulou, Alexandros Kokkalis & Ioannis Dokas
15:20-15:40	*Modeling counter pollution policies: Defensive or aggressive? Which one is more effective* George E. Halkos, George J. Papageorgiou, Emmanuel G. Halkos, Georgia G. Papageorgiou

11th Session **16:00-18:00 Lecture Room A**

Topic:	**Sustainable Tourism**
Chairperson:	**Professor Roido Mitoula and Assc Professor Eleni Sardianou**
16:00-16:20	*Searching for degrowth potential at the interface of tourism and the environment* George Ekonomou & George Halkos
16:20-16:40	*Determining factors that secure tourist excursions to Veria* Agisilaos Economou, Georgios Karagiannis, Roido Mitoula
16:40-17:00	*Sustainable tourism development of the former Tatoi Royal Estate in Athens* Georgios Tsimpoulis, Panagiota Karametou, Eleni Theodoropoulou
17:00-17:20	*Tourism and Corporate Social Responsibility. Case study: Tourism Businesses on the island of Lefkada.* Olga Eleni Astara, Englantina Toska, Panagiotis Kaldis, Roido Mitoula
17:20-17:40	*Barriers and drivers in implementing sustainability practices in Greek universities* Vasiliki Platitsa, Eleni Sardianou, Konstantinos Abeliotis & Roido Mitoula

12th Session **16:00-18:00 Lecture Room B**

Topic: **Environmental Education**

Chairperson: **Professor Constantina Skanavis**

16:00-16:20	*Perceptions of secondary school students about renewable energy sources* Konstantinos Kougias, Eleni Sardianou, Anna Saiti, & Konstantinos Tsagarakis
16:20-16:40	*Trash Art as an educational tool to protect the environment: The Case of Skyros Project* Ioannis Theodoulou, Athanasios-Foivos Papathanasiou, & Constantina Skanavis
16:40-17:00	*Awareness of teachers at Primary and Secondary Schools through Trash Art into environmental issues and actions* Ioannis Theodoulou, Athanasios-Foivos Papathanasiou & Constantina Skanavis
17:00-17:20	*The theoretical framework of Ecotherapy* Fotios Mylonas, Alexandros Lingos, Constantina Skanavis
17:20-17:40	*Environmental Educators' Personality Characteristics: A Psychometric Case Study at Environmental Educators' Academy, Skyros Island* Kalliopi Marini, Naoum Karaminas, Moriki Eirini, Charikleia Oursouzidou, & Constantina Skanavis
17:40-18:00	*Health promotion through Ecotherapy: Impact on young students* Fotios Mylonas, Constantina Skanavis

Closing **18:00-18:10**

Topic: Closing & Giveaways
Professor George Halkos
Department of Economics, School of Humanities and Social Sciences, University of Thessaly

CONFERENCE ABSTRACTS

2 – 3 December 2022

Session 1
Research on Rural Developmentin Global South

2 – 3 December 2022

Indebtedness and child well-being: Empirical evidence from Vietnam

Duy Linh Nguyen
Faculty of Accounting and Business Administration
Vietnam National University of Agriculture Hanoi –Vietnam
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Abstract
Over-indebtedness is an ongoing problem in emerging economies, but its effect on child wellbeing is unexplored. In this paper, we first investigate the determinants of household over-indebtedness in rural Vietnam and then examine the effect of over-indebtedness on education and growth standards of school-aged children. Our study finds that i) households with larger farmland, suffering from adult health shocks and weather shocks, and residing far from district center have a higher probability of over-indebtedness. Meanwhile, ethnic minority households and those with self-employment business have a lower probability of over-indebtedness; ii) Over-indebtedness is insignificantly associated with the probability of children dropping out their schools. However, it has a negative effect on children's height for age and increase the probability of stunting. The impacts are more pronounced on school girls and young children. Our findings suggest that facilitating self-employment development and promoting effective instruments to mitigate the impact of adverse shocks would prevent rural households to be over-indebted.

Keywords: Over-indebtedness; ethnic minority; school-aged children; health conditions

JEL Codes: O44; O53; Q15

Land Rental Markets as a Poverty Reduction Strategy: Evidence from Southeast Asia

Eva Seewald, Samantha Baerthel & Trung Thnah Nguyen
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Abstract
Rural poor households are particularly vulnerable to climate change. Understanding the impact of land rental market as an adaptation strategy important to support households in mitigating climate change impacts. This paper examines the interlinkage between the use of land rental markets as an adaptation strategy to climate change and land rental market participation's impact on poverty in Thailand and Vietnam. The econometric analysis from logit panel regressions show that land rental markets are used as a coping strategy and help to reduce the likelihood of multidimensional poverty. In order to understand the driving factors of successful mitigation strategies to climate change further research is necessary.

Keywords: Climate Change Mitigation; Land Rental Markets; Multidimensional Poverty; Panel Regression.

JEL Codes: O13; O44; O53; Q15; Q54.

Local infrastructure, households' resilience capacity, and vulnerability to poverty: Evidence from panel data for Southeast Asia

Tim Hartwig & Manh Hung Do
Institute for Environmental Economics and World Trade, Leibniz University Hanover (LUH)
tim.hartwig@stud.uni-hannover.de, hung@iuw.uni-hannover.de

Abstract
Infrastructure development is a topic of paramount interest because of its large-scale effects on economic growth at national, regional, and local levels. In developing countries, investments in infrastructure are expanding dramatically in order to boost economic growth and reduce poverty. Less attention in the literature has been paid to the role of infrastructure in improving households' resilience capacity. In this study, we examine the correlation of infrastructure with household's resilience capacity against shocks and the impacts of household's resilience capacity on households' consumption, poverty, and vulnerability to poverty. We use a panel data (collected in 2010, 2013, and 2016) of 1,698 households in Thailand and 1,701 households in Vietnam, the two emerging economies in Southeast Asia to address these research issues. Our results show that infrastructure in the forms of transportation and information and communication technology helps improve households' absorptive capacity in coping with shocks. Furthermore, this capacity can prevent households from reducing consumptions and falling into poverty. Therefore, we recommend that infrastructure development projects should pay more attention to increase transportation and ICT facilities and to improve households' economic capital.

Keywords: Infrastructure; resilience; absorptive capacity; multidimensional poverty; instrumental variable.

JEL Codes: O13; O53; Q15

Resilience against shocks and poverty in developing countries: Evidence from panel data for rural Southeast Asia

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Abstract
The question "How resilient are rural households?" is becoming an important research issue, especially in the context of more frequent and severe shocks in rural areas of developing countries. The resilience of rural households against shocks is placed at the top of the discussion agenda, along with fighting climate change, for sustainable development. In this study, we use a balanced panel data of 1698 identical households from Thailand and 1669 identical households from Vietnam collected in 2010, 2013, and 2016. We estimate the resilience capacity of rural households and examine the effects of resilience capacity on mitigating shocks' impacts and improving household welfare. We employ a generalized structural equation model (GSEM) to estimate a latent variable representing household resilience capacity. The results from the GSEM models show that households in Thailand have a higher resilience capacity than those in Vietnam. We use lagged resilience capacity to estimate their effects on shock losses in different terms, namely total losses from shocks, losses from covariate shocks, and losses from idiosyncratic shocks. The estimation results from fixed-effects, fixed-effects with control function, and fixed-effects with instrumental variable methods show that a better resilience capacity has a significant and negative effect on shock losses. This finding implies that higher resilience capacities help reduce the adverse impacts of shocks. Further, an improved resilience capacity can also prevent rural households from reducing their consumption to cope with shocks and help them to escape from poverty in absolute, relative, and multidimensional measure

Keywords: Resilience; shock; generalized structural equation model; fixed-effects; instrumental variable

JEL Codes: O13; O44; Q15

Trade-offs between remittance and agricultural productivity: Evidence from smallholder farming systems in Nepal

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Abstract
Remittance from labor out-migration plays a vital role for the upliftment of rural livelihoods in many developing economies. Yet, studies that assess the impacts of household labor out-migration on agricultural productivity, production costs, and profitability in the developing countries are scant. This study evaluates the impacts of household labor out-migration on wheat productivity, labor cost, total cost of production, farm returns, and off-farm income in smallholder's wheat-based farming systems in Nepal. We used an endogenous switching regression model to account the observed and unobserved sources of heterogeneity between labor out-migrating and non-migrating households. Our findings show that labor out-migration substantially improved the off-farm income of the labor out-migrating households, and the labor non-migrating households could have improved their income, had their any household member out-migrated. However, we also find that labor out-migrating households were paying significantly higher labor and wheat production costs with lower wheat productivity and farm profits compared to labor non-migrating households, reflecting the labor scarcity and rise in rural wages as associated issues of labor out-migration. Finally, our analysis signifies the existence of potential trade-offs between remittance and agricultural productivity and profitability that could lead to a serious problem of survival of smallholder farmers in Nepal.

Keywords: Remittance; wheat production; endogenous switching regression; heterogeneity

JEL Codes: O44; Q15; Q54.

Session 2
Environmental Statistical Challenges and Applications

2 – 3 December 2022

Statistical and Probability Models for Environmental Risk Analysis

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Abstract

The target of this paper is to investigate Statistical and Probability models acting on Environmental pollutants, so that first prediction for the future observation to be possible and second the level of the Environmental Risk to be estimated through appropriate hazard functions. For the present paper NO and NO_2 were chosen as pollutants under consideration, while for fitting the long run data we considered simple regression, AR(1) models and Cubic Splines. The analysis was concerning the Athens pollution levels and the comparison with other regions of Greece was investigated. The fit was performing for the whole data set, the last five years and the last five weeks to see the "martingale structure" of the data ie the next point depends only (mainly in practice) for the current situation and not from the "history" of the data set. For the probability models we introduce the analysis with probability models adopted from Risk Analysis.

Keywords:: Regression; AR(1), Splines; Risk Analysis.

JEL Codes: Q53; Q52.

Estimating parameters in Extreme Value Theory: Application to environmental data

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Abstract
Extreme Value Theory (EVT) aims to study and to predict the occurrence of extreme or even rare events, outside of the range of available data. These events are part of the real world but environmental extreme or rare events may have a massive impact on everyday life and may have catastrophic consequences for human activities. Most environmental datasets have a time-dependent variation and short-term clustering are typical phenomena for extreme value data, and it is crucial that both are properly accounted when making inferences. Here, an important parameter comes into play, the extremal index, θ, that characterizes the degree of local dependence in the extremes of a stationary sequence. It needs to be adequately estimated, not only by itself but because its influence on other relevant parameters, such as a high quantile. Several estimators of θ have appeared in the literature. However those estimators depend on tuning parameters that need to be adequately chosen. Computational procedures have been considered and present nice results. They will be revisited and some results will be shown in this work and applied in a real data set.

Keywords: Parameters of rare events, Extremal Index, Computacional procedures.

JEL Codes: C13; C14; C15.

Analysis of Waste Management on Portuguese Subsurface Ships: A Possible Approach

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Abstract
Management of marine waste is an important issue for of who uses the sea: the elimination of waste disposal at sea to protect the environment and people. When we consider ships, it implies a waste management that is complex and ongoing challenge, especially during long trips with no access to land or sea implies unload materials, other possible reason is the fact that some ports do not allow the disposal of solid and liquid waste. In particular, ships produce organic and non-organic waste but its Operation and maintenance generally produce residues depending on the kind of mission. The case is more demanding when we consider a subsurface ship due their specific characteristics. The national and international regulations on the environment that Portuguese warships can be find in MARPOL and the environmental policy of the Portuguese Navy. This study, restricted to the pollution contemplated in Annexes I, IV and V of Marpol 73/78 (namely hydrocarbons, sewage and all types of garbage), analyzed the methods and types of storage and disposal of ship waste to verify the existing equipment, operating conditions and on-board waste management plans.The evaluation of knowledge and cooperation of the staff on board and their contribution to the sustainability and environmental protection was also investigated.

Keywords: Waste Management; environment protection; submarine.

JEL Codes: C02; C13; C63; C80; D89; L99

Multilevel modeling techniques to study the impact of environmental changes on human face development

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Abstract
Environmental changes leading to different growth patterns of allergenic species, longer pollen seasons, deterioration of indoor and outdoor air quality have reportedly increased allergic rhinitis and viral infections in children which may lead to facial growth problems. The airway has a relevant role in the development of craniofacial structures, thus, in this work, we intended to model the mandibular inclination in growing individuals, considering sagittal pharyngeal characteristics and other craniofacial characteristics as predictors. Angular, linear and area measurements were performed concerning the maxilla, mandible, cranio-cervical posture and upper airway at pre-peak, peak and post-peak cephalograms, in a sample of 157 individuals with no history of orthodontic treatment. Mandibular inclination (ML/NSL) was adjusted as a function of other craniofacial variables using a longitudinal hierarchical linear model (MLH). Two relevant adjustments with random intercepts and slopes were obtained for the time variable. Modelling with MLH allowed for the estimation of fixed and random components at the individual level, the time level for ML/NSL and the influence of certain predictors on the rate of change of ML/NSL throughout growth were explored. The application of MLH is recommended to allow the incorporation of clinical and environmental variables during growth and to better clarify the role of the airway in the development of craniofacial structures

Keywords: Linear Hierarchical Model; Longitudinal Data, Cephalometry, Growth, Airway.

JEL codes: I19.

Hazard Function of N(μ, σ²;γ) Distribution for Environmental Pollutants

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Abstract

The target of this paper is to apply the γ-order Generalized Normal distribution, based on three parameters: location (mean) μ, scale (variance) σ ² and shape γ. When the shape parameter is γ=2, the classical Normal distribution is obtained. The hazard function is crucial to evaluate the relevant Risk. We are comparing the hazard function of the N(μ, σ² ; γ) with the hazard function of a rather simple distribution, but so useful in practice, the triangular distribution. Both the distributions are discussed and interpreted, while their hazard functions provide evidence and criteria, to which we can adopt, it depends on the nature of the application. Data sets for a number of air pollutants were adopted for the application, comparing the Normal distribution, as well as the "fat tail" distributions obtained with different than 2 for the shape parameter γ.

Keywords:: Hazard function; Generalized Normal; Triangular distribution.

JEL Codes: Q53; Q52.

Big Data Analytics in Control of Water

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Abstract
This work to approach the theme of analytics of large amounts of data (Big Data), its applicability in the universe of water management in a city, in the context of the Smart Cities paradigm and to present the appropriate tools for the process of analytics of large amounts of data. After a brief description of some important statistical concepts, the Big Data paradigm will be approached, as well as the concept of smart city (Smart City) in a perspective of use for the sustainability of a city as well as of life itself: urban water management. The concept of Big Data Analytics and some tools used are also introduced. Finally, the relationship of the technology most used by data analysts with a Big Data system is explained.

Keywords:: Statistics; Big Data; Water; Smart Cities.

JEL Codes: C1; Q25; Q55

Session 3
Energy Issues and Policies

Energy poverty persistence and transition effects: Empirical evidence from Greek households

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Abstract
The present paper uses four rounds of household panel data to investigate the persistence of poverty in Greece. Employing dynamic Probit random effects and Wooldridge Conditional Maximum Likelihood (WCML) estimators, we find evidence of genuine state dependence effects in consensual-based energy poverty among Greek households. Poverty persistence is around 10-12%, while transition effects are also evident in our data. Socioeconomic, demographic market, household, and climatic characteristics are essential predictors of energy poverty. Around 9% of the households are chronically energy poor, while education, income level, dwelling characteristics, migration background, and employment status affect the chances of suffering and exiting from energy poverty. Empirical results have significant policy implications that can reduce residential energy poverty.

Keywords: Energy poverty; Dynamic Probit; WCML; Persistence; Transition

JEL Codes: Q40; Q48; D63.

Regulatory Framework for the Participation of Demand Response in the new electricity markets

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Abstract

According to the Energy Efficiency Directive (2012/27/EU) and the EU Regulations (943/2019 and 944/2019), Member States shall promote access to and participation of demand response alongside supply within the wholesale, balancing, capacity markets and ancillary services to improve energy and cost efficiency and enhance system's adequacy. Therefore, all customer groups (industrial, commercial and households) should have access to the electricity markets to trade their flexibility and self-generated electricity. Market participants engaged in aggregation are likely to play an important role as intermediaries between customer groups and the market. Member States should be free to choose the appropriate implementation model and approach to governance for independent aggregation while respecting the general principles set out in this Directive.

To this aim, national regulatory authorities have a central role in developing the regulatory framework and defining the technical modalities as well as the contractual arrangements to encourage consumers' participation in electricity markets by offering their demand flexibility whether alone or through aggregation. In this context, the Regulatory Authority for Energy (RAE) will present the main developments within the last one year as well as the elements of the recently approved regulatory framework regarding the rules and procedures for demand response participation in the electricity markets in Greece. Several entities have been licensed by RAE to operate in the market as demand response aggregators and all the provisions regarding their participation in the electricity balancing market have been activated.

Keywords: Demand response; electricity markets; regulatory framework, energy; European Union.

JEL Codes: N74; Q41; Q43

Development of RES is the answer to the current energy crisis: The economic benefits from both RES and CHP support scheme and competitive procedures for RES via eAuctions in Greece."

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Abstract

The development of RES is the answer to the current energy crisis in Greece as it leads to a gradual de-dependance on Russian natural gas. The RES and CHP support scheme in Greece has been approved by the European Commission (EE[C(2016)7272final–SA44666 based on a sliding feed-in-premium concept for the majority of RES projects, where the premium is provided through competitive auctions, that can be technology-specific or neutral, national or regional. According to a Ministerial Decision, published in July 2022, a cumulative capacity of about 4000 MW will be auctioned in Greece for wind and PV power plants within the years 2022 to 2024, in order to achieve the RES deployment and CO2 reduction targets of the country for the next decade, while increasing the competition and reducing the cost of renewable energy for the consumers. This paper will describe and analyze the economic benefits of the development of RES to the consumers. More specifically the results of the first period (2016-2021) of RES auctions implemented in Greece and the design of the RES auctions the next period 2022-2024 will be presented. The Hellenic Regulatory Authority for Energy (RAE) has successfully introduced in the Greek market since 2016, innovative Competitive Procedures for Renewable Energy Sources (RES): tenders with the use of customized e-auctions. Seeking an efficient solution to facilitate the extremely complex process within limited time and great outcome, a number of 17 energy eAuctions have been conducted up currently, featuring as the most transparent and competent tool under the approval of SA 48143 of EU; their undisputable success has contributed to the smooth award of 1629,34MW solar and 1426,73MW wind plants, with significant low prices to the benefit of both the consumers and national economy. The implementation of RES support scheme drives to a great economic benefit to the consumers and it is estimated that a total amount of about 1,5 billion euro up to September 2022 returned to the consumers from the RES Special Account via the Energy Transition Fund.

Keywords: Energy crisis; RES; eAuctions; CHP support schemes

Legal and Regulatory Framework for Storing Energy in Greece

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Abstract
This paper presents the latest advances of the legal and regulatory framework for storing energy in Greece. It gives a review of the licensing regime for storage, the new grid connection priority rules, the electricity market, the system operation, as well as the grid technical requirements codes highlighting the gaps and challenges to assist a potential investor, understand the case in Greece and take decisions.

Keywords: Legislation; Regulatory framework; Storage.

JEL Codes: Q40; Q48

Estimating the energy requirements of the Greek economy by the sraffian multiplier

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Abstract
This research estimates the energy requirements of the Greek economy based on data from the National Symmetric Input-Output Table and the Environmental Accounts for the year 2014. Starting from an open linear single production model and based on the concept of sraffian multiplier, the total (direct and indirect) changes in energy use due to one unit change in (i) the autonomous final demand and (ii) the direct energy use of the commodities are estimated. Empirical findings can provide the basis for the development of a well-targeted energy policy program.

Keywords: Energy policy; input-output analysis; sraffian theory, energy multipliers; Greek economy.

JEL Codes: C67; E11; Q43; Q48.

Session 4
Natural Resources Conservation

Dams and climate change: Socioeconomic approaches

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Abstract

Dams are important structures for managing increasing water needs due to climate change and global population growth, while they have an important role in flood regulation, clean energy and balancing the energy system. Nevertheless, their role is disputed, due to their strong environmental footprint and social impact. Many new projects are often delayed or canceled due to severe social backlash. While the issue of social acceptance is widely discussed, the research on the social attitude of citizens around the construction and operation of dams is not enough. However, the social attitude of the citizens, their opinion, the role the dams have in the economy and the social balance of the local society can be a crucial aspect in maximizing their benefits. The aim of this research is to specify the social attitudes of the citizens of an area affected by the construction of a dam, in our case the Regional Unit of Arta, and explore the issues that concern its citizens such as security, the connection of economy with the operation of the dam, the water use, the protection against climate change, the residents' role in the decision-making process, and the acceptance of hydroelectric projects by the local community.

Keywords: dams; climate change; acceptance; conflicts; local community

JEL Codes: O44; O52; Q25; Q40; Q56; R11.

Assessment of the socio-economic impacts of the Forest Life Project on the governance of Natura 2000 Forests

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Abstract

This research aims to assess the socio-economic impacts of the LIFE ForestLife project, which aimed to strengthen forest governance in the Natura 2000 network areas and was completed in 2022. These impacts were grouped into three categories: a) capacity building of the staff of the competent services for the management of the forests that benefited from the project, b) improving the governance of the forest sector and c) increasing its contribution to the local economy or reducing the cost of forest management in Natura 2000 areas. The method of focus groups and in-depth interviews was used in a sample of stakeholders-experts and the above socio-economic benefits were assessed. Participants rated ForestLife's contribution to capacity building and governance positively. However, in terms of the contribution to the economy, they believe that more effort is needed and that despite the potentially positive contribution, this requires further analysis in the coming years to be quantified.

Keywords: Natura 2000, ForestLife, capacity building, focus groups, in-depth interviews, Forestry

JEL Codes: Q00, Q23, Z13

Fishing cultural heritage, local identity, and implications for maritime spatial planning

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Abstract
In maritime spatial planning, an informative and 'fair' representation of marine activities requires that sociocultural aspects have to be included along with economic considerations, in the battle of claiming marine space. This will allow for activities of sociocultural importance to become visible. Marine commercial fisheries in contemporary Greece offer an insight. Ethnographic research, in the subarea of Chalkidiki peninsula in Northern Greece, indicates that fishing shapes a strong individual and shared identity, which means that fishing is more than an economic activity. The paper will focus on fishing cultural heritage of the area and the need for its consideration in maritime spatial planning process and related plans.

Keywords: Fisheries; culture; heritage; identity; maritime spatial planning

JEL Codes: Z10; Z13; Z19; Q22; Q28. O20

Funding: This research is co-financed by Greece and the European Union (European Social Fund- ESF) through the Operational Programme «Human Resources Development, Education and Lifelong Learning» in the context of the project "Reinforcement of Postdoctoral Researchers - 2nd Cycle" (MIS-5033021), implemented by the State Scholarships Foundation (IKY)

8th Conference Economics of Natural Resources & the Environment

Value Chain Finance in Agriculture: Empirical Evidence from Greece

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Abstract
The primary sector is particularly important for the Greek economy, especially in light of the country's current financial crisis, which has lasted since 2010. The purpose of this research is to investigate the current state of agricultural financing across the value chain, as well as to investigate the potential of Contractual Agriculture and its needs and potential for expansion. The study presents the findings of a survey of 222 agricultural sector producers, some of whom had used the Contractual Agriculture financing tool. The main findings are that financed farmers are more positive than non-financed farmers about the importance and contribution of value chain finance in covering the cost of production, ensuring uninterrupted supply of agricultural inputs, improving the possibility of negotiating the purchase price of pesticides, achieving more satisfactory bank terms and conditions for agricultural product financing, as well as the possibility of negotiating the purchase price of pesticides. Finally, in line with previous research, the study found that younger age groups are more hesitant to use this innovative financial tool, whereas producers with a higher level of education are more likely to use it. The study's findings have significant practical and theoretical ramifications for how Contractual Agriculture will continue to contribute to the growth of Greece's primary sector.

Keywords: Value-Chain Finance; Contractual Agriculture; Economic Development; Primary Sector; Greece

JEL Codes: Q14; Q10; Q13

Ecosystem services supply by Agriculture: Using Choice Experiments to estimate trade-offs between monetary and non-monetary incentives

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Abstract

Payments for ecosystems services (ES) have been used worldwide to incentivize land managers to adopt more sustainable land uses and management practices. However, recent empirical evidence shows that land managers preferences towards monetary payments are probably overrated. Public funded access to farm advisory services (knowledge services) appear to be highly valued by farmers because the adoption of more sustainable land management practices to be successful requires intensive knowledge services. Climate change adds complexity to decision-making, due to trade-offs between ES. Hence, land managers, and farmers in particular, need knowledge to support their decisions. Non-market valuation methods, such as Choice Experiments (CE) have been applied to estimate farmers, and other type of land managers, willingness to accept (WTA) monetary compensation to adopt sustainable land managing practices, including conservation agriculture. This paper shows how this method can be used to assess trade-offs between the WTA monetary compensation and the public funded supply of advisory services, accounting additionally for subjective socio-psychologic variables, such as perceptions or emotions. Hence, the paper goals are twofold. It aims at showing that CE can be useful to measure trade-offs between different type of policy incentives and to identify the ones or the mix showing more effective to influence land managers decision-making towards sustainability transitions. Another goal is to provide empirical evidence for policy recommendations on European eco-schemes intended to enhance farmer's supply of ES. The survey was conducted in the Mediterranean Uplands in Portugal. These landscapes are extremely vulnerable to climate change entailing trade-offs between the supply of different ES. A questionnaire was designed to implement CE collecting also farmer's perceptions (latent variables). A total of 253 valid questionnaires were obtained. Data analysis showed farmers are willing to exchange monetary compensations for knowledge services, in particular when more demanding soil conservation practices ate at stage. Results also show farmer's perception of higher knowledge needs increases WTA, and that being socially acknowledged reduces WTA. Fire risk perception increases WTA and the perception of collective effort to reduce fire risk at landscape level reduces WTA. The results enable to produce recommendation on more effective incentives mixes beyond simpler ES payments.

Funding: This work is supported by national funds, through the FCT – Portuguese Foundation for Science andTechnology under the project UIDB/04011/2020.

Session 5
Education for Sustainability and the Environment

Smart city as a strategic improvement of the living conditions of citizens: Urban Forests

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Abstract

This dissertation attempts to present the dimensions, coefficients, and elements of people's quality of life that lead to well-being. The research focuses on the quality of life in cities and the indicators that define it, with special reference to environmental indicators. To investigate the contribution of the smart city to the improvement of people's quality of life, its components, complexity, and the need for an interdisciplinary approach based on participation and technology are presented. This paper focuses on the relationship of the city with green spaces and urban forests and the necessity of integrating urban forests and green spaces in smart city planning. The impact of urban greenery on improving living standards and its social role, its influence on the anthropogenic environment, and its interactivity with the city constructions and climatic conditions of the urban landscape are analyzed. The importance of the morphology and diversity of the urban forest for the maximum environmental and economic upgrading of the city is presented. To conclude, with the projection of the Goals of the 2030 Agenda for Sustainable Development, the contribution of urban and exurban forests to sustainable urbanization and the restoration of degraded ecosystems is confirmed.

Keywords: Smart city, Urban forests, Citizen well-being, Agenda 2030

JEL Codes: Q01, Q23, Q51, Q53, Q54, Q56

Media and Environmental Information

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Abstract

The object of our work is the Environmental information and the Citizens' Media, instead of the "Mass Media". Let me modify the acronym, because in every other case we adopt, as individuals, the role of a unit that together with the rest is a mass, a role that is by no means honorable and worthy of research. Environmental information is emerging as an escalating need today more than ever. Rapid climate change, rising weather, normal weather events, floods, tsunamis, fires, rising sea levels, pollution, melting ice, global warming, greenhouse effects, dioxin addiction, eutrophication, Acid rain, smog are some of the phenomena and events that overwhelm us either in the form of news or experiential. Therefore, the catalytic role of the citizen's media is as means of awareness, reflection, protection, and mainly information. Because the properly informed citizen is also the one who can contribute to the alleviation of any problems. The purpose of the research is to examine, through indexing of publications of the electronic local press in the depth of three years, the factors, causes, and in general the parameters that influence the channelling of environmental information to the public in the appropriate way for the same subject matter.

Keywords: Information, Electronic and print media, Environmental Awareness, Objectivity of Information, Public Opinion, Political Situation, Customer System

JEL Codes: Q01, Q51, Q54, Q56

Public Awareness of Nature and the Environment During the COVID 19 Crisis

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Abstract

The health crisis during the outbreak of the disease COVID-19 became the beginning of the awareness of the behavior of the public towards nature and the management of the environment. The present survey ware investigated the relationship of the public with the environment and nature as well as the practical environmental awareness during the period of the COVID-19 crisis in Greece. The survey was conducted using a self-administered questionnaire, which was distributed in a convenience sample, to 222 citizens. The examined questions concerned the public's contact with nature and the awakening of environmental interest alongside practical environmental awareness during the pandemic period. The analysis of the data was done in three parts: a) the analysis of the demographic characteristics of the sample, b) the analysis of the impact of the COVID-19 pandemic on contact with nature, and c) environmental awakening and practical environmental awareness. The results were obtained by analyzing the data through Descriptive and Inductive Statistics, highlighting a stronger feeling of personal environmental responsibility through the manifestation of ecological behaviors for most of the sample. The research subject should in the future target behavioural processes in sustainable contexts at the public level.

Keywords: Awareness, Public, Nature, Environment, Pandemic, COVID-19, Health crisis.

JEL Codes: C40, O44, Q01, Q51, Q54, Q56

The role of environmental knowledge and environmental values in citizens' beliefs and consumer behaviour citizens' beliefs and consumer behaviour

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Abstract

Without a doubt, climate change is the most central challenge that humanity will face in the rest of the 21st century. This problem has been highlighted for decades and we now seem to have entered the main phase of the crisis. In this context, it is imperative to take action to address climate change. The objective of the present survey was to explore the relationship between environmentally friendly consumption choices with environmental values and environmental knowledge. To examine these relationships, three relevant self-report questionnaires were administered. The measurements were carried out on a sample of 120 participants from the general population. A positive and statistically significant association between environmental knowledge and pro-environmental consumption choices was found in this study. Therefore, the higher the relevant knowledge, the higher the relevant choices. In contrast, no statistically significant correlation was found between environmental values and pro-environmental consumption choices. The concluding proposition of this research is to further enhance knowledge of environmental and climate change issues in impact the related consumer behaviour.

Keywords: Consumer behaviour; climate change; environment; environmental knowledge; environmental values

JEL Codes: Q01, Q51, Q54, Q56

Investigation of environmental literacy in a sample of primary school teachers

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Abstract
Core aim of Education for Sustainable Development is to foster pro-environmental behavior among students. Teachers are mainly responsible for promoting environmental attitudes, while they must have the necessary to qualifications support their students to adopt a more sustainable lifestyle. The purpose of this work is to study the multiple dimensions of environmental literacy and their interrelationships in a sample of primary school teachers. A total of 200 teachers completed an online questionnaire. Data analyses included Exploratory Factor Analysis, a series of non-parametric tests, and Multiple Linear Regression. The main findings suggest that higher levels of environmental knowledge and, in part, environmental attitudes, influence private environmental behavior, while only certain types of attitudes influence participatory behavior. Finally, it was shown that environmental behavior can predict environmental skills of teachers. These results may underpin the efforts of the Pedagogical Departments of Universities to substantially cultivate environmental literacy in their students, who will be called upon in the future to pass on these ideals to the student population.

Keywords: Environmental literacy; environmental behavior; environmental skills; causal relationships; primary school teachers.

JEL Codes: I20; C31; Q54.

Citizen Science and its use in Environmental Education/Education for Sustainability

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Abstract
The question "progress and development at any cost?" is answered by Environmental and Economical Policy which deals with the study of the interaction of the economy and the natural environment. The basic parameter is the optimal use of natural resources of the environment, which, if well managed, will not be diminished. Nature will not be burdened by any human activity and the future of the area that hosts us will not be in danger. Unfortunately, the absence of the adjective 'excellent' and its meaning haw the exact opposite effect: natural resources are diminishing, the environment is deteriorating, the planet is unable to cope and is seeking … allies.". Citizen Science attempts to give the planet the allies it needs. After all, its rapid growth shows that the planet's communication with its inhabitants, especially the younger generation has been... restored. Every citizen should take action, become a researcher, observe and record the changes around him/her. Once a citizen changes his or her behavior, he/she becomes environmentally conscious. The first step in protecting the planet has already been taken.

Keywords: Citizen science; school-classroom, Greece/European Union/USA; environment, environmental policy, environmental movement.

JEL Codes: Q3; Q30; Q31; Q35; Q36 Q39 O13; O44; F64.

Session 6
Environmental Performance

2 – 3 December 2022

Innovation, Productive Performance and Undesirable Outputs across European Regions: Are there any missing links?

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Abstract
Technological innovation has become a main driver of economic growth and plays an important role in regional development. It has also been recognized as an efficient way of addressing environmental problems. The present paper introduces an analytical methodological framework that links the efficiency of knowledge generation with the efficiency of economic activities and their environmental impact for 199 European regions in period 2000-2018, using a chain DDF approach. The results indicate a definite relationship between knowledge generation efficiency and productive performance while the overall efficiency is mainly driven by innovation activities. Therefore, European regions that exhibit high innovation efficiency exhibit higher overall performance. Moreover, the examination of convergence dynamics discloses high complexity patterns for both knowledge generation and production process and hence a steady state convergence is not confirmed.

Keywords: Regional Innovation; Environment; Undesirable outputs; Convergence; Two-stage DDF

JEL Codes: O13; O30; O44; Q55; C44

European firms' productivity growth and environmental regulation. Re-examining the Porter Hypothesis

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Abstract
The current energy crisis offsets governments' efforts to achieve carbon neutrality removing significant degrees of freedom in terms of firm's competitiveness and put significant pressure on European industries regarding their environmental performance and productivity growth. We use a detailed dataset derived from the European Pollutant Releases and Transfer Register (E-PRTR), consisting of 1610 European firms belonging to various industrial sectors in order to compute environmental productivity and its components and how it is affected from various economic indexes. We focus on three available pollutant groups (Greenhouse gases, heavy metals and other gases) for the period 2011-2017 and compute the regulatory costs of each firm based on comparison between an unregulated and a regulated scenario that holds as policy implementation. We also reveal the Total Factor Productivity (TFP) and its components having considered the existence of emissions using a meta-technology regime. Our results point out that industrial environmental productivity on average has deteriorated across Europe with best practice change being the main contributor. Moreover, the empirical evidence, robust to different specifications and estimation methods, supports the presence of win–win opportunities.

Keywords: Carbon emissions; decomposition analysis; growth; energy; European Union; Porter's Hypothesis.

JEL Codes: O44; O47; O52; Q43; Q56.

Environmental performance – Economic performance nexus in LCDs Agriculture; An empirical study

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Abstract

The environmental performance of agriculture has allured scientific interest within the last decade. That is because agriculture is a major source of environmental degradation. The carbon emissions of different activities in agriculture have become a novel strand of literature in terms of empirical studies through different econometric techniques. The present work focuses on least developed countries (LCDs}. Given that the LDCs are primarily agricultural economies with nearly 70% of the population engaged in agriculture these activities constitute the major source of income while food security alleviation is a requirement in those countries. With the assistance of three different methodologies namely FMOLS, DOLS, and ARDL/PMG models we tried to quantify the association of environmental degradation caused by energy, fertilizers, and enteric fermentation with per capita income with value-added generated by agriculture to be used as a proxy. Different results were derived by different estimation models. For the short-term coefficients and more specifically for the case of carbon emissions generated by the energy the impact on agricultural income seems to be decreasing with a diminishing trend validating the little effort made by farmers to limit carbon emissions along with the limited efficacy of the implementing policy. As far as pesticide use is concerned seems to be affected by energy use and more specifically renewable energy adoption in LCD agriculture can mitigate the effect of pesticide use on GHG emissions. Last but not least the achievement of sustainable development goals s limited.

Keywords: Energy fertilizers, Kuznets, livestock, Energy, Least Developed Countries, DOLS, FMOLS

JEL Codes: O44; O47; Q4; Q18; Q56.

A causal model of climate-induced psychological resilience

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Abstract
This study presents a causal model of psychological resilience to climate change that incorporates several intrapersonal constructs, including coping strategies, eco-emotions, well-being dimensions, mindfulness, self-efficacy, and perceived restorativeness of nature. Online- questionnaires were administered in a cross-sectional survey of Greek residents. Structural Equation Modeling (SEM) was used to test the proposed conceptual model. Data analysis also included tests for common method bias (CMB) using the Common Latent Factor (CLF) technique, and evaluation of reliability and construct validity indices. The findings showed an adequate overall fit for the measurement and structural models, while all latent variables established reliability and construct validity. The results suggest that dispositional mindfulness and self-efficacy beliefs positively affect climate – induced resilience, but perceived restorativeness has a non-significant influence on resilience. Perceived climate resilience has a significant positive influence on coping appraisals, life satisfaction and positive affects, but a negative impact on eco-emotions. Future research is essential to further investigate the strength and direction of the proposed psychological model of climate resilience. The study provides useful insights to policymakers for the design and implementation of informed interventions and programs aimed to increase psychological resilience, improve well-being, and eventually support climate crisis battle.

Keywords: Climate Change, Psychological Resilience, Mindfulness, Eco-emotions, Structural Equation Modeling.

JEL Codes: A14; C38; Q00; Q51; Q56; Q59.

Environmental, Social and corporate Governance (ESG) factors in Healthcare Systems, in terms of Sustainable Finance

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Abstract

Sustainable development is considered to be a main strategic issue for the entire business world, including the Healthcare sector. In addition, the concept of Sustainable Finance and the Environmental, Social and corporate Governance (ESG) factors is directly related to the theory of Sustainable Development Goals. This paper aims to present the current situation of the ESG factors in Healthcare Systems and the connection as well as the correlation with Sustainable Finance. More specific, ESG factors that concern healthcare sector with the respective proposed evaluation tools, are categorized and presented. Suggested key points and factors are demonstrated for the development of a model tool for the classification, evaluation, presentation and communication of the results of ESG factors, oriented to the particularities of Health Systems and the various stakeholders. Finally, a specialized methodology for the holistic approach to ESG is presented in conjunction with the specific actions for implementation, monitoring, measurement, evaluation and benchmarking in order to achieve a Sustainable Healthcare System.

Keywords: Sustainable Development, ESG factors; Sustainable finance in healthcare; Corporate Governance

JEL Codes: Q01; I18; G30

Session 7
Corporate Social Responsibility

Corporate Social Responsibility Reporting and Health & Safety Strategies in the UK construction sector

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Abstract
Constructions are among industries with high- risk for employees and severe working conditions, which in turn are addressed through a series of Occupational Health and Safety (OHS) accidents and work-related ill-health incidents. Managing and moderating such workplace risks in the construction industry is a top priority every day. As a result, because of the nature of their activities, the number of constructions that adopt with OHS tools or strategies are increasing. Further, the continuous rising focus on OHS topics, is also supported by the quantity and the quality of information disclosed in many CSR reports. Taking into account the poor safety record of the construction industry, this paper aims to assess the disclosure behavior regarding OHS issues by extracting information from CSR reports of UK construction companies. A benchmarking technique was designed by using the Global Reporting Initiative (GRI) Standards guidelines to detect and assess the OHS information in CSR Reports. Findings show that the sample demonstrate quite poor performance in relation to OHS issues.

Keywords: OHS disclosures, sustainability; compliance; accountability; construction

JEL Codes: J81; J89; Q01; M14.

Climate change and its effects in public health

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Abstract

One of the key variables of the environment is climate which affects our decisions, the food we eat, the air we breath and our all aspects of our health. The chaos theory dictates that non-linear dynamic systems are sensitive to even small changes in the initial conditions. One such system is climate; the current way of life results in changes leading to extreme weather events, a rise in the global temperatures, a reduction in air and water quality and overall degradation of the environment. This research aims to examine these direct and indirect impacts and attempts to identity the dependence of public health on climate change. If changes in the way of our life are changing climate the focus should be on changing back some habits. There is evidence that societies most affected by climate change are those least responsible.

Keywords: Climate Change; Public Health; Dependent Indexes; Raise of Temperature

'JEL Κωδικοί: Q01, Q54, I18, M14

The hotel business through the prism of sustainable development: Initial results of the program GREEN INNOVATIVE VALUE SERVICES (G.I.V.S)

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Abstract

The hotel industry can significantly contribute to economic, social and environmental goals. The sector makes a particularly significant contribution to economic development, employment and investment in Greece. It produces a stream of revenue some of which is reinvested in infrastructure and facilities used by visitors and inhabitants alike which in turn promotes the quality of touristic services in Greece. The PRAKSIS project, funded by the Regional Operational Program of Central Macedonia 2014-2020, promotes the benefits available fr om the adoption of Sustainable Development in the hotel sector. The aim of the project is to support entrepreneurship in the sector based on green strategies, sustainable tourist products and effective safeguarding of the sector from a variety of risks. The objectives are to provide circular economy strategies in the hotel industry and the development of a risk digital application. The initial results of the project are very promising with significant improvements in waste management and the implementation of strategies towards a circular economy model in the hotel industry.

Keywords: Sustainable Tourism; Circular Economy; Green Hotel; zero waste, zero emissions

JEL Codes: Q01, Q54, M14, Q53

Corporate Social Responsibility and Disability at Work: Evaluating Sustainability Reporting in Great Britain and Germany

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Abstract

People with disability are considered the largest minority in the world and face challenges in the workplace. Research on how disability considerations are integrated in Corporate Social Responsibility (CSR) strategies is very recent and rather limited. This research aims to explore how disability issues in the workplace are dealt with through CSR strategies in the UK and Germany. All 338 CSR reports available in the GRI database for UK and German companies with a reference year of 2018 were evaluated through content analysis on the basis of selected indexes. Results demonstrate that most of the reports from both countries made references to disability. However, there were significant differences both in relation to the type of disability referred to (primarily mental health issues in Great Britain and significant disability in Germany) and also in relation to the indexes focused on (commitment to non-discrimination and reasonable adjustments in the UK and number of employees with disability and participation of disabled employees in managerial positions in Germany.) These results highlight that CSR reporting is in line with the command and control requirements in each of the countries and confirm prior research that legislative requirements formulate CSR strategies for disability in the workplace.

Keywords: Corporate Social Responsibility; CSR reporting and disability

JEL Codes: Q01, I18, M14

Factors influencing recycling intention for mobile phones: Evidence from Greece

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Abstract
Improper management of waste electrical and electronic equipment (WEEE) entails serious risks for the environment and human health, while the constantly growing production of new electronic devices increases the demand for raw materials, making WEEE recycling imperative. The present study, recognizing the role played by the users, attempts to determine the habits of the Greek public in relation to the consumption and disposal of WEEE through the example of mobile phones. Furthermore, using the theoretical framework of the Theory of Planned Behavior (TPB), it seeks to understand the main factors that determine mobile phones recycling intention. Through the analysis of a sample of 361 people, data are presented on the number of mobile phones used per person, the average time and the reasons of replacement, as well as on how mobile phones are disposed of at the end of their life cycle. Individuals' attitude towards recycling, their subjective norms and their perceived behavioral control have a positive effect on the intention to recycle, while among these three factors, the effect of subjective norms appears to be the least strong. The results demonstrate the need of appropriate measures in order to strengthen the recycling of e-waste and achieve the goals that have been set at European level.

Keywords: E-waste recycling; mobile phones; Theory of Planned Behavior (TPB), Greece.

JEL Codes: D19; Q01; Q53; Q59.

Antecedents and consequences of consumer satisfaction for bio-based products: Preliminary findings from Greece using structural equation modelling

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Abstract

This study investigates structural linkages of perceived product quality, value, price, innovation, quality, risk, brand image, marketing awareness and labelling on customer satisfaction and loyalty towards bio-based products usage. The study employs the structural equation modelling technique for data analysis across a sample of 100 Greek consumers and in terms of three products: (i) bio-based interior wall paint/colour, (ii) bio-based household cleaning detergent and (iii) a kitchen chair/furniture made from biocomposite (wood fibres). The analysis reveals that consumers' perceived product value followed by perceived quality affected customer satisfaction derived from all three bio-based products. Moreover, in all three sub-studies consumer (green) satisfaction has a significant positive association with customer loyalty (i.e. repeated repurchase intention of the product). The study demonstrates the importance of key antecedents in shaping consumer satisfaction and inducing repurchase likelihood (loyalty). It provide insights for effective marketing strategies that widen domestic marketers' understanding of consumer behaviour toward bio-based products with regard to their satisfaction and loyalty levels. Based on the SEM results, we offer academic contributions to the existing body of knowledge of consumer (green) behaviour with regard to potential structural linkages describing bio-based product usage in Greece.

Keywords: Bio-based products, consumer satisfaction, customer loyalty, structural equation modelling, Greece.

JEL Codes: D19; Q01; Q57; Q59.

Session 8
Circular Economy

2 – 3 December 2022

Do firms care about peers when choosing to go circular? Peer effect among Italian firms in the introduction of circular innovation

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Abstract

The challenges posed by the achievement of the circular economy require the adoption of new innovative practices that are not simply green but specifically related to closing, narrowing, and extending resources cycles (Bocken et al., 2016). Understanding the relationship between eco-innovation and circular innovation and what factors favour their implementation is, therefore, pivotal. This paper offers new pieces of evidence on the role of social norms in increasing firms' propensity to adopt circular innovation. In doing this we will try to move a step further the analysis on traditional market-pull and regulatory push-pull effect that might contribute to the adoption of innovation. Drawing upon the literature corpus confirming the influence of the social context on firms' decision to innovate and enriching this analysis with recent evidence on the effect of peers in firm decision-making, the present study relies on panel data from 2.305 Italian Small and Medium Enterprises, observed for the biennium 2017-2018 and 2019-2020. The analysis will examine whether considering peers having increased their investments in CI is a driving factor for CI adoption. These results, therefore, offer a relevant starting point for the design of policy guidelines and organisational strategies in favour of the circular economy. Social norm information and comparison can be indeed complementary tools to the traditional market and regulatory levers for circular innovation adoption.

Keywords: Circular Economy; Circular Innovation; Eco-Innovation, Peer Effect; Social norm.

JEL Codes: Q5; O31; O36; D91

Green Growth & Sustainability Transition through information. Are the greener better informed? Evidence from European SMEs

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Abstract
The European Green Deal along with directives promoting Circular Economy support sustainability transition and foster green growth through developing appropriate funding. However, information on how to access such funding affects firms' decision to expand their business strategy. This paper investigates the effect of information about financing tools on the adoption of Circular Economy business activities by exploring whether the better-informed firms are 'greener' and what influences such decision through a switching endogenous regressor model to account for endogeneity and selectivity bias. Data on European SMEs is combined with country-specific characteristics and econometric results indicate that better informed firms are by 65 percentage points more likely to adopt an activity promoting Circular Economy, highlighting that awareness about funding tools is crucial for sustainability transition. Evidence advocates for mainstreaming information regarding funding sources to pave the way towards green growth. A rebound effect regarding the use of renewables is observed whilst evidence points towards the rejection of Porter Hypothesis. Policy makers should target in fostering a greener business environment for the firms that engage in Circular Economy practices through increased information on funding options. Findings are also pertinent to the ongoing discussion and policy agenda around acceleration of the transition to a greener European Economy.

Keywords: Green Growth, Circular Economy, European Green Deal, Awareness & Information, Switching with binary endogenous regressors

JEL Codes: B41, C13, C51, C54, D22, D83, M21, Q56

8th Conference Economics of Natural Resources & the Environment

Defining circular economy and sustainability

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Abstract

The concept of Circular Economy (CE) blossomed in recent years in response to the development pressures, economic concerns and energy deficits. From the very beginning, the CE has appeared to be a great opportunity to foster economic growth without being mortgaged the ability to fulfill the needs of future generations (WCED, 1987).The improvident use of scarce resources, the destruction of biosphere and the failure to comply with the ecological laws are some of the reasons that deepen the need for the immediate adoption and implementation of a self-sustaining process. Therefore, it is necessary to consider the earth as a circular-flow system in which both the environment and the economy will not be defined by linear interconnections but by a circular relationship (Boulding, 1966). The present study aims to provide a comprehensive overview of research efforts documented by entities and researchers in CE through indexing 136 definitions. Specifically, a thematic and content analysis is performed employing Leximancer™ software in order to delineate the relationships emerged among concepts. The goal is to present the possible ways of adopting the CE principles reflecting the targets laid down in Union legislative acts.

Keywords: Circular economy, sustainable development, content analysis.

JEL Codes: Q01; Q53; Q56.

Policy Review towards Circular Economy on Sustainable MSWM: Examining the Mediterranean Europe

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Abstract
Aim of the present study is the critique of waste hierarchy (WI) and policy review on circular economy (CE) and sustainable development goal (SDG) 12 of the United Nations (UN): responsible consumption and production. WI introduced in Directive 2008/98/EC has plenty of potential aspects on the scope of CE and sustainable municipal solid waste management (MSWM) in the European Union (UN). Moreover, the review of the European progress on achieving circularity based on SDG 12 is a matter of utmost importance for bringing the – potent and feeble – policies on light. Especially the present study would examine some Mediterranean European countries (Spain, France, Italy, Malta, Slovenia, Croatia, Greece, and Cyprus). The total factor productivity (TFP), efficiency changes, and technological changes are going to be examined in order to distinguish possible interconnections between the incorporation or not of municipal waste generation as an undesirable output. Specific goals of the study are the salience of barriers in WI, the proposal of best management practices (BMPs), the comparison between Malmquist (MPI) and Malmquist – Luenberger (MLPI) productivity indices, and the notion of a potential room of improvement of the examined countries. Greece (1,9%) and Cyprus (1,6%) have the greatest TFP based on MPI, while Malta (2,2%) and Greece (1,9%) have the higher scores in terms of MLPI (by incorporating waste generation in the model). To recapitulate, the sustainable MSWM would be an important parameter of the European Green Deal (EGD) as long as the sub-goals of SDG 12 are implemented, and the central ideas of CE are followed.

Keywords: waste hierarchy; best management practices; sustainable development goal 12; Malmquist productivity index; Malquist-Luenberger productivity index; European green deal.

JEL Codes: O01; O53; O56.

Session 9
Sustainable Transport

2 – 3 December 2022

The consequences of the COVID-19 pandemic on the habitual behaviors and the selection criteria of transport mode in Greece

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Abstract

This study examines the possible effects and changes in the transport habits of citizens in Greece, due to the COVID-19 pandemic, through a questionnaire survey with 250 participants. The questionnaire is divided into six sections and was distributed electronically in Spring 2021 using Google Forms. The research focuses on the transport habits, the frequency and the reasons of citizens' trips with specific transport modes before the pandemic, as well as on the change of citizens' transport conditions for two time periods (1rst period: spring 2020, and 2nd period: autumn 2020 to spring 2021) after the start of the pandemic. Additionally, this research focuses on the use, effectiveness and impact of tele-education on students and teleworking on employees.

The results of this research mainly indicate a significant change in the transport habits of citizens before and after the COVID-19 pandemic. Particularly, with the start of the pandemic, a significant increase in walking and decrease in public transport use were observed, while tele-education and teleworking were implemented to a large extent.

Keywords: Transportation, Transport habits, COVID-19, Greece.

JEL Codes: L91, O18, R41.

Micromobility as a reference element of urban sustainable mobility and environmental sustainability

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Abstract
Achieving a sustainable urban transportation system has been of interest for several years at European and international transport policy. The ultimate goal is to achieve an integrated and well-connected transportation network that promotes seamless travel, facilitates non-motorized travel, reducing at the same time traffic congestion, noise and air pollution. Despite the thorough planning and implementation of such relative policies, the development and rapid spread of micro-mobility vehicles (electric scooters, electric bicycles, rollers, skateboards, etc.) is unexpectedly the latest successful achievement in the transportation urban sector. Millions of users worldwide enjoy using shared micro mobility options with electric scooters and bicycles being the most popular of them. The present paper investigates the prospects of the rapid spread and increasing use of these vehicles, their effects on accelerating the transition to more sustainable and human-oriented cities, the expected benefits in improving the quality of life and the protection and maintenance of urban environment.

Keywords: Micromobility, urban planning, sustainable development.

JEL Codes: O39, R41

The Effect of Road Transport Electrification on Energy Demand in Greece

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Abstract

Governments within the European Union push for the electrification of road transport as a means to reduce road-transport-related greenhouse gas emissions. This means that the energy required for road transport shifts from the gas pump to the plug and hydrogen. Forecasting the energy demand of the shifting vehicle fleet is important in planning the power generation system of tomorrow. The case of Greece is examined with the use of previously developed forecasting models using machine learning techniques and projected regulatory changes to identify the increase in electricity and hydrogen demand in the near, medium, and long term. It is found that this future demand is strongly correlated with macroeconomic conditions and that in scenarios that lead to strength growth of the EV sector may necessitate a significant expansion of electricity and hydrogen production.

Keywords: Road Transport, Electrification, Forecasting, Machine Learning
JEL Codes: R41, R48, Q41, Q42, Q47

Implementation of the rail trail practice in Greece as a sustainable tourism growth factor

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Abstract

One of the basic transport infrastructures of any country is the railway. However, the new specifications and technological development lead to the abandonment of older lines if they are deemed incompatible. While keeping sustainability as well as environmental protection in mind, it is proposed to exploit the abandoned railway tracks through "rail trails". Due to their physical characteristics, abandoned railway tracks are the preferred types of infrastructure for the implementation of rail trails. This conversion grants access exclusively to non-motorized users, thus contributing to the sustainable infrastructure but also to the tourist attractiveness of an area. They are friendly to people with reduced mobility. Physical activities in nature adds an extra dimension to the visitor's experience, which often evokes a sense of well-being. The most important factor in the success of a rail trail is its environmental sustainability. In addition, it is possible to preserve old railway architectural monuments, such as infrastructure and auxiliary buildings, elements of great historical value, that can help preserve the historical memory of the railway. This article will describe the methodology of implementing the rail trails standards of other countries in Greece and will identify the obstacles in the implementation process, but also mention examples from urban areas in Greece.

Keywords: Railway; Sustainability; Rail trail; Tourism; Trails.

JEL Codes: O0, O52, R42, Q56.

Session 10
Environmental Pollution Modelling

2 – 3 December 2022

Preliminary study for the deployment of low-cost sensors-based particulate matter (PM) monitors in a few cities in Senegal

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Abstract
As Africa develops, more Africans are living in populated areas, where atmospheric pollution reaches high levels and put their lives at risk. Exposure to air pollution can lead to a wide range of diseases, which includes headaches, stroke, lung cancers, etc. More generally, chronic exposure can affect every organ in the body. Particulate matter, in particular $PM_{2.5}$, has been recognized as a leading cause of cancer. Atmospheric pollution not only impacts health, neurodevelopment and cognitive ability, but has a high economic cost – around 1% of GDP in African countries. However, data on atmospheric pollution are scarce in Africa due to lack of monitors in almost all African cities, one of the reasons being the high upfront cost of high-grade monitors. Low-cost sensors-based monitors owing to their features are bringing hope. They are easy to deploy and maintain, flexible and cheap. Here, we evaluate the conditions for the deployment of low-cost monitors in Senegal, a country located in West Africa. In a couple of cities, we identify polluted areas and sources of pollutants, and assess the proper way to deploy air quality monitors. Investigation methods include sites selection, sensors market survey, sensors intercomparison, and calibration.

Keywords: African cities; air sensors; calibration; air quality.

JEL Codes: I15; O29; R00

A comparative critical analysis of the major EFRAG, SEC and ISSB proposals, for climate disclosure

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Abstract
The climate disasters of the last decade have made it imperative that corporations provide climate-related risk information and ratings to investors and stakeholders alike. Lack of a consistent methodology for pertinent data disclosure, measurement, and interpretation of the physical and financial risks integral in corporate operations urged companies to devise their own appropriate guidelines and frameworks. The proliferation of emerging initiatives and their voluntary nature limited their effective implementation, credibility and, consequently, usefulness. A gradual change from the belief that disclosure requirements and reporting content should be established on a voluntary, market-determined basis to the explicit recognition that the formation and enforcement of such standards should be dictated by authority regulators is recently gaining momentum. The need to encourage the development of globally consistent standards, promote comparable metrics and narratives, and coordinate across approaches became evident as one that can be served only by international or State-backed regulators who have the executive authority to impose their decisions. This paper presents the major initiatives in the climate reporting field being developed in 2022 in the EU via the European Commission-EFRAG proposal, in the USA via the Securities and Exchange Commission (SEC) proposal, and globally via the International Sustainability Standards Board (ISSB) proposal. It goes on to compare these three major proposals in terms of jurisdiction, prescriptiveness, materiality, scope, compliance timeline, metrics employed, cost, assurance, and alignment with pre-existing standards. The paper concludes by critically evaluating the consequences of the introduction of the proposals for the climate cause, the reporting entities and the wider stakeholders, and by commenting on the impact of their adoption by the Greek corporate reality.

Keywords: Non-financial reporting, Climate reporting, SEC proposal, EFRAG proposal, ISSB proposal

JEL Classification: G11; G32; Q51; M4.

The effects of climate change to weather-related environmental hazards: Interlinkages of economic factors and climate risk

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Abstract
The global phenomenon of climate change has become increasingly intense in recent years due to the cumulative nature of environments. The effects of this phenomenon are now felt across the globe throughout the year. Environmental science is characterized by interdisciplinarity and the aforementioned phenomenon attracts more and more researchers to investigate it. A great number of researchers support the idea that climate change is strongly connected to some environmental hazards, and specifically, those correlated to extreme weather events. Following the Paris Agreement, and due to the increased concern regarding climate change impacts, several indices have been established. Climate Change Performance Index (CCPI) includes 59 countries and EU, which cumulatively emit 92% of global greenhouse gases, while Global Climate Risk Index (CRI) analyses to what extend countries have been affected by impacts of weather-related loss events. Both indices provide annual scores to each country and rank them based on those scores indicating the existing environmental situation. In our analysis we provide evidence regarding the connection of CCPI and CRI by using graphs, mapping visualization as well as econometric estimations in order to draw lines between indices. Moreover, we examine the interlinkages and we estimate the influence caused by socio-economic factors and emissions levels per country. We provide evidence regarding the high-ranked and low-ranked countries and how they perform not only to an environmental base but also to an economic base. Our main attempt is to testify whether economic growth is a great contributor to country's environmental performance and as a result to climate risk.

Keywords: Climate change; climate risk index; extreme weather events; socio-economic factors, emissions.

JEL Codes: O11, O40, Q20, Q30, Q43, Q54.

8th Conference Economics of Natural Resources & the Environment

Improving collaboration of actors involved in Risk and Resilience Assessment Centers using Serious Games

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Abstract
Assessing the consequences of the occurrence of natural and technological hazards is critical and it should take place effectively and in a timely manner, so that key knowledge can be offered to the involved entities, as well as to businesses and citizens. This way, they will be able to adapt in time to possible disturbances and the associated mitigation practices and policies can reach their maximum potential. The Research Program "Risk & Resilience Assessment Center (KEDIAK)" aims to create innovative infrastructure that will make it possible to perform rapid and effective data analysis of the evolution of a potential natural and/or technological risk and to evaluate the related consequences, assisting this way the decision-making process at the Prefecture of Eastern Macedonia and Thrace in Greece and providing at the same time timely information to businesses and citizens. The successful implementation of the Program requires the cooperation of a large number of people from different interdisciplinary groups who interact with each other, a fact that makes the process particularly dynamic and complex. A method for understanding, analyzing and interpreting complex problems is the so-called Serious Games, the design and use of which is an increasingly popular research field worldwide. The objective of the present paper is to explore the role of serious games in promoting the smooth and efficient collaboration of interdisciplinary teams and social partners in the field of resilience, using KEDIAK as a case study.

Keywords: Resilience, Risk, Natural and Technological hazards, Serious Games, Interdisciplinarity.

JEL Codes: D81, D91, O32, O44, Q01, Q55, Q56

We acknowledge support of this work by the project "Risk and Resilience Assessment Center –Prefecture of East Macedonia and Thrace-Greece" (MIS 5047293) which is implemented under the Action "Reinforcement of the Research and Innovation Infrastructure", funded by the Operational Programme "Competitiveness, Entrepreneurship and Innovation" (NSRF 2014-2020) and co-financed by Greece and the European Union (European Regional Development Fund).

Modeling counter pollution policies: Defensive or aggressive? Which one is more effective

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Abstract
This work examines how the increment (or decrement) in the volume of the pollutants in a country is influenced by counter–pollution operations. The research takes place using an optimal control model, where the state variable is the volume of the pollutants and the control variables are two types of counter–pollution actions, the one is that which encourages the entrance of new polluting firms, therefore incrementing the volume, (defensive) and the other that doesn't increment the volume of pollutants (aggressive). The proposed model is nonlinear and doesn't find analytical solutions, but the sensitivity analysis takes place with the use of numerical implementation of Pontryagin's maximum principle. In general, the proposed model admits two steady states (two different volumes of pollutants), one in which the volume of pollutants vanishes and the second in which there is a high volume of pollutants in a country. Whereas the defensive strategy is used at any time, it is not optimal not to use aggressive strategies if the volume of pollutants is below a certain limit.

Keywords: Optimal dynamic control; Counter-pollution; Pollution modeling

JEL Codes: C61; C68; Q52

Session 11
Sustainable Tourism

2 – 3 December 2022

Searching for degrowth potential at the interface of tourism and the environment

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Abstract
The research purpose of the present study lies in investigating degrowth potential and identifying causality relationships at the interface of tourism and the environment among member states of the eurozone economic space from 1996 to 2019. It is explored if and how environmental degradation in terms of greenhouse gas emissions (GHGs) and a wide range of tourism-related variables are influenced. We also take into consideration the energy efficiency factor in the context of primary energy consumption. Based on unit root tests all variables under research are stationary. The Environmental Kuznets Curve Hypothesis was verified for all regression models suggesting that degrowth can be achieved at the interface of tourism and environmental quality. Research findings evidence four feedback hypotheses and one uni-directional relationship running from business tourism spending to GHGs. Specifically, a two-way relationship between internal travel and tourism consumption and GHGs confirms the first feedback hypothesis. Further, a reciprocal causality relationship running from leisure tourism spending to GHGs confirmed by research results providing the second bi-directional causality relationship. The third feedback hypothesis indicates that capital investment spending Granger causes GHGs and vice versa offering evidence for the third hypothesis. Additionally, research results show that primary energy consumption impacts GHGs and vice versa disclosing the fourth feedback hypothesis. Practical implications call for effective environmental management to reduce environmental degradation levels and experience sustainable tourism growth with a long-run perspective.

Keywords: degrowth; Environmental Kuznets Curve; tourism, energy;

JEL Codes: Q50; Q56; Z3; Q43

Determining factors that secure tourist excursions to Veria

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Abstract
The object of this paper is to investigate the determining factors that secure tourist excursions in the city of Veria. Three international and national cultural resources are chosen as a case study: the archaeological site of Vergina, the Altar of Paul the Apostle and the Church of Panagia Soumela. The aim and basic questions of the research are to investigate the visitation of excursion tourists in these areas and whether they are factors that contribute to the development of tourist excursions in the area. Initially, the mapping of the historical, cultural and religious attendance of the city and its wider area is attempted, as well as the description of its cultural heritage. The cultural concepts are clarified and the geographical data necessary for the realization of tourist excursions to these three "local emblematic monuments" are analyzed. For the needs of the study, an on-site survey was carried out with questionnaires, which were gathered on-site in accommodation and catering businesses in Veria, during the period of the months of July and August 2022. The results obtained from the statistical analysis answer the initial questions and concerns of the study. The main conclusion of both the theoretical and the empirical part of the research is that the archaeological site of Vergina, the Altar of Paul the Apostle and Panagia Soumela are a factor in the development of historical-cultural excursions in the wider area of the city of Veria and create, at the same time, an endogenous factor for development, with business and employment opportunities.

Keywords: Tourism, tourist excursion, Veria

JEL Codes: Z32; O44; O47; O52; Q56

Sustainable tourism development of the former Tatoi Royal Estate in Athens

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Abstract
In its long history, the Tatoi estate and its owners have played a catalytic role in the history of modern Greece. Today, the estate is a special development challenge as it brings together valuable natural resources, important building stock and remarkable architectural and cultural monuments, and their exploitation and promotion should be in accordance with the principles and objectives of sustainable development. A common feature of both foreign palace complexes and the Tatoi palace complex is the promotion of alternative tourism through activities within the site, which makes a significant contribution to operating costs. For instance, the estate has the necessary specifications for the holistic development of wine tourism and agritourism, through the vineyards and agricultural activities that will be revived during the redevelopment of the estate. The development of health and wellness tourism and conference tourism is also promoted, as both the large and spacious building stock and the surrounding area are conducive to such activities, as reflected in the framework of the redevelopment by the Greek Ministry of Culture. The aim is for the Tatoi estate to be transformed into an international tourist destination and to become an example of sustainable tourism development in Attica, which needs alternative models of attracting visitors, as it could be a very important route in ensuring the self-sufficiency of the estate. According to current research results, through a questionnaire answered by 132 people, when asked about the extent to which the Tatoi estate will contribute as a landmark to the tourist development of the country, 33.3% (N = 44) of the sample considered that the redevelopment project will bring significant tourism development, while 17.4% considered that it will contribute "Very much" (N = 23). In other words, almost one in two responded that the redevelopment will have an extremely positive impact on the tourist development of the area, while 71.2% of the sample intends to visit the estate more often after the completion of the redevelopment, which demonstrates the potential of the estate to offer both to a visitor from abroad, as well as to Athenians citizens.

Keywords: Tatoi; Athens; Sustainable tourism; Sustainable Development

JEL Codes: Z32; O44; O47; O52; Q56

Tourism and Corporate Social Responsibility. Case study: Tourism Businesses on the island of Lefkada.

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Abstract
The present paper aims to investigate the relationship between tourism and Corporate Social Responsibility. The island of Lefkada was chosen as a case study.Lefkada is located on the western side of Greece, belongs to the Ionian Islands Region and is a developed tourist island. Its tourist development has the characteristics of coastal summer tourism and shows increased tourist traffic during the summer months. However, it also maintains many permanent residents during the winter. A special feature of Lefkada is that it is connected by land to the rest of mainland Greece, therefore, the results of the research do not only concern the island areas, but can be representative for all coastal tourist areas as well. The paper is divided into 5 distinct chapters, where the theoretical framework of Corporate Social Responsibility (CSR) is presented. Then the relationship between CSR and Greek tourism businesses is explored. In addition, it is investigated whether CSR is considered important by tourism businesses and whether they choose to integrate it into their overall development strategy. For the needs of the research, a questionnaire was shared to 130 tourist businesses on the island of Lefkada. The results showed that Corporate Social Responsibility is considered quite important for the businesses of Lefkada, which are willing to adopt it.

Keywords: Corporate Social Responsibility, Tourism, Tourism Enterprises, Lefkada, Tourism Product

JEL Codes: Z32; O44; O47; O52; Q56

Barriers and drivers in implementing sustainability practices in Greek universities

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Abstract
The implementation of sustainability practices is set as a priority for Greek universities according to the Charter of Greek Universities for Sustainability. The success of any organization's objectives and in particular the achievement of sustainability objectives is strongly related to the administration's perspectives. However, limited research has been done regarding members of the university administration's perception towards the adoption of sustainable practices in Greek universities. This study aims to examine the administration's perceptions towards the adoption of sustainable development practices and the factors that affect their implementation. The barriers and drivers towards implementing sustainability practices in university institutions are also examined. The analysis is based both on sampling, addressing questionnaires to the rectorates of Greek universities, and on the collection of secondary data on the sustainability practices performed by the institutions. Results suggest that the most popular initiatives are energy savings and recycling in the environmental sector. The adoption of actions is mainly affected by the leadership capacity of the university's management on sustainability issues. Lack of financial resources and malfunction of the administration are the main barriers to the adoption of analogous practices. Finally, the motives that could boost sustainability in universities are a combination of financial support, and awareness raising towards sustainability.

Keywords: Barriers; drivers; university administration, sustainable development

JEL Codes: M14, M19, Q01, Q56

Session 12
Environmental Education

2 – 3 December 2022

Perceptions of secondary school students about renewable energy sources

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Abstract

Renewable energy sources have been introduced in the past twenty years in Greek education in the context of environmental education and education for sustainability. As the geopolitical developments of the last year affected the countries' energy planning, it became clear that renewable energy sources can serve a dual role, on the one hand, their exploitation can contribute to the protection of the environment and on the other hand to lead a society towards energy autonomy and sufficiency. The purpose of this work is the empirical analysis of high school students' opinions, attitudes and knowledge about renewable energy sources. The analysis is based on quantitative analysis of 4500 questionnaires filled in person by junior high school students of Attica, Greece. The preliminary findings indicate that, to a significant extent, Greek students have a lack of basic knowledge about renewable energy sources. It is concluded that students are positive about the exploitation of renewable forms of energy in relation to the protection of the environment.

Keywords: Renewable energy awareness, secondary school students

JEL Codes: I20; Q20; O30; O40

Trash Art as an educational tool to protect the environment: The Case of Skyros Project

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Abstract

Trash art is a new art form made from waste materials. These objects are collected and transformed into art. It is a modern artists' way to express themselves and to come across the value of recycling and environmental awareness in a cheerful, innovative, and entertaining way. Art is a tool that is reinforced through environmental education. This literature review aims to investigate how trash art affects people's behavior toward the environment. The case study is the Skyros Project, where 8 mosaics from trash art have been completed as part of this program. Skyros Project is a novel program of the Department of Public and Community Health of the University of West Attica that takes place at Skyros Port. Art as a tool cultivates and aware people of the environment. People that participated in Skyros Project adopted awareness and an active role in environmental issues.

Keywords: Education for Sustainability; Environmental Education; Skyros Project; Trash art.

JEL Codes: A29; Q53

Awareness of teachers at Primary and Secondary Schools through Trash Art into environmental issues and actions

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Abstract
An artwork reveals concerns and aspects of environmental ethical issues, environmental philosophy, social ecology, evolved technology, environmental degradation, and social alienation. Teachers learn how to develop environmental education and encourage students and citizens to respect environmental behavior, through Trash Art and ecological thinking. This study aims to investigate the connection between Trash Art and nature through a literature review and quantitative research. The environmental awareness of teachers at Primary and Secondary Schools and to which degree the development of environmental awareness drives to respect environmental behavior has been examined. The connection between art and nature, using natural and artificial materials for art, results in the revaluation of human presence in the environment.

Keywords: Actions; Ecology; Environmental Education; Environmental Communication; Trash art.

JEL Codes: A29; Q53

The theoretical framework of Ecotherapy

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Abstract
Ecotherapy is a relatively new concept, but its roots can be traced in the past. It is process that aims at human contact to and interaction with nature. This interaction sets the foundation for mutual benefits to both humans and the natural environment. Ecotherapy is based on several theoretical models, such as the "Biophilia Hypothesis", the "Psychophysiological Stress Recovery Theory", the "Attentional Restoration Theory" and the "Extension of the Attentional Restoration Theory". Additionally, there have been developed various methods of Ecotherapy that promote the interaction between human and nature, such as gardening, contact with animals, exercise in green environments or even a simple walk by the sea or in a forest, can be considered Ecotherapy.

Keywords: Ecotherapy, theoretical models of Ecotherapy, methods of Ecotherapy

JEL Codes: Q56; Q57

8th Conference Economics of Natural Resources & the Environment

Environmental Educators' Personality Characteristics
A Psychometric Case Study at Environmental Educators' Academy, Skyros Island

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Abstract

Over the last decades, there's been considerable scientific interest in the psychological and personality correlates of pro - environmental behavior. Environmentalism has begun to be examined from the perspective of its association with personality traits, using the Big Five Personality model. This study innovates by attempting a measurement of the personality traits of a sample of environmental educator trainees, using a psychometric tool that can also measure sub factors of the main 5 traits. Testing was conducted during a team-building workshop, as part of the Environmental Education Summer School program, in Skyros- Greece, during the 2016 to 2020 period. Results showed that the Environmental Educator group scored significantly lower than the General Population on Emotional Stability ($t=-4.46$, $p<0.001$) and its subscales Emotional Control ($t=-4.20$, $p<0.001$) and Impulsiveness Control ($t=-3.93$, $p<0.001$), while scoring significantly higher on Openness ($t=4.72$, $p<0.001$) and its subscales Openness to Knowledge ($t=2.68$, $p<0.01$) and Openness to Experiences ($t=5.83$, $p<0.001$). The article highlights the personality traits that seem to describe people with the sensitivity, concern, and motivation, as well as the activation necessary for disseminating promotive information on environmental issues. The findings may be helpful in the design of environmental education programs, in the recruitment and professional development of environmental educators, and in the building of efficient environmental educator teams

Keywords: Environmental Educators, Personality, Big 5

JEL Codes: A29

Health promotion through Ecotherapy: Impact on young students

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Abstract
In recent years, humans' contact with natural environment has been decreased, while they experience at the same time nature's change and destruction. This disconnection from nature, affects them negatively and in different ways. However, a growing body of research shows the positive effects to people from their connection to nature. Ecotherapy is a process that aims at human interaction with nature. This interaction improves human health and development on many levels, as well as the healing process. Meanwhile, Ecotherapy operates as a treatment for planet's destruction, since its approaches affect people's perceptions, resulting in nature friendly behavior change. Finally, applying methods of Ecotherapy to young students is very beneficial to them. These benefits concern students' health, but also their cognitive development and their school performance.

Keywords: Environmental hazards, natural environment, human health, Ecotherapy, students, benefits, school performance

JEL Codes: Q56; Q57

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5	Aristotle University of Thessaloniki	Department of Forestry and Natural Environment
6	Athens University of Economics and Business	Department of International & European Economic Studies
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37	Regulatory Authority for Energy	-
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51	University of the Aegean	Department of Environment
52	University of Thessaly	Department of Economics
53	University of Thessaly	Department of Civil Engineering
54	University of Thessaly	Department of Planning and Regional Development
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57	University of Thessaly	Department of Agriculture Crop Production and Rural Environment
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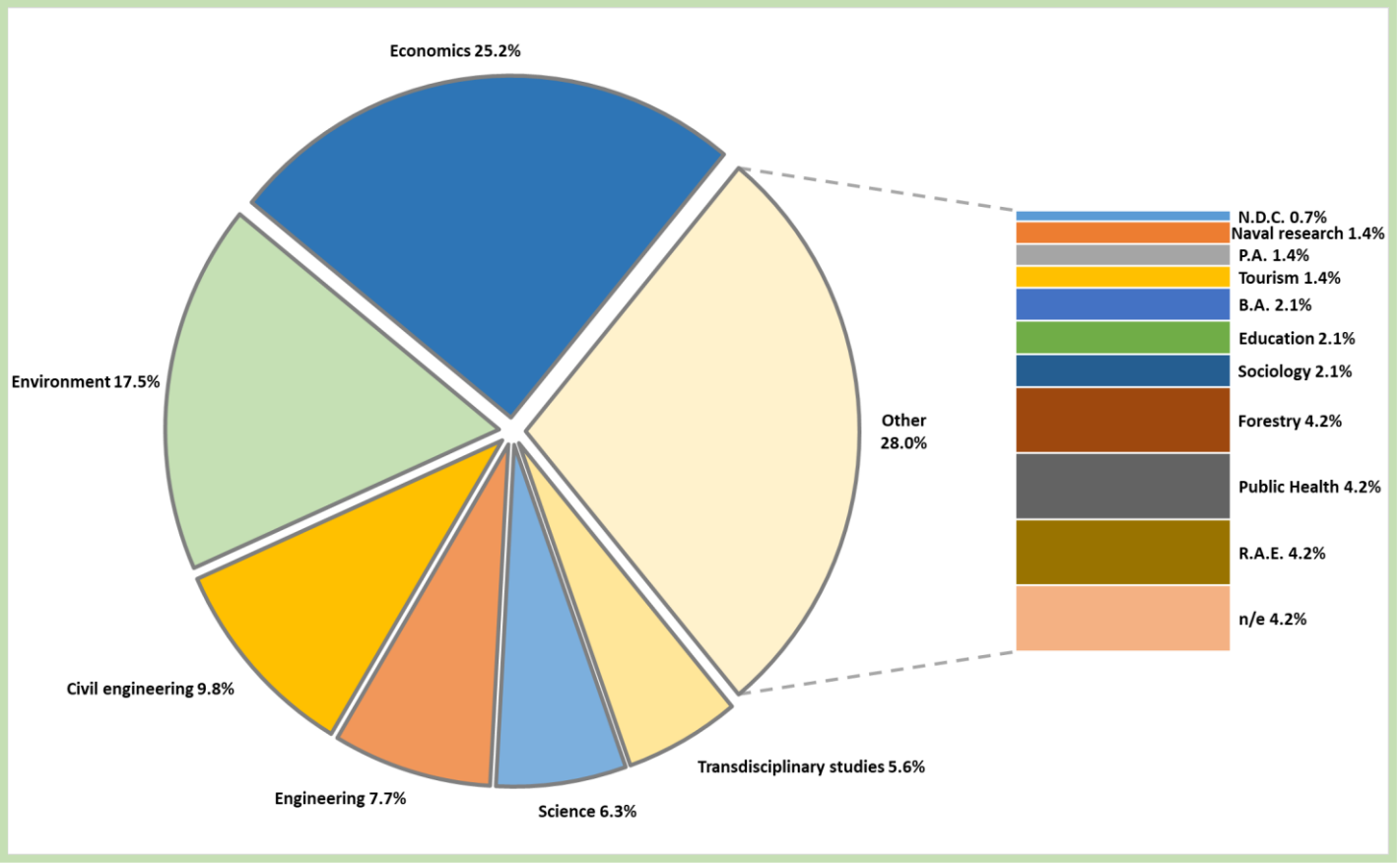

Note: N.D.C.: National Documentation Center; P.A.: Public Administration; B.A.: Business Administration.