Laboratory of Operations Research
Department of Economics
School of Economics and Business
University of Thessaly

Department of Economics &
Sustainable Development
School of Environment, Geography
and Applied Economics
Harokopio University

6th Conference

"Economics of Natural Resources & the Environment"

Friday 11 - Saturday 12 June 2021

http://envecon.econ.uth.gr/main/

University of Thessaly – Department of Economics

Harokopio University -Department of Economics and Sustainable Development

List of Contents

Introduction

Dear,

Invited guests, Participants, Colleagues and Students,

On behalf of the Scientific and Organizing Committee, I welcome you to the 6th Conference on "Economics of Natural Resources and the Environment". The Laboratory of Operations Research in the Department of Economics of the School of Humanities and Social Sciences at the University of Thessaly organized successfully under the research project COOPERATION 2011 and the project entitled "Greenhouse Gas Emission Scenarios and Policies to Combat them by the year 2030, of Energy, Transport and Industry in Greece" the first two Pan-Hellenic Conferences on the Economics of Natural Resources and the Environment: Climate change on 26-27th March 2014 and October 31st and November 1st , 2014. Then the successful organization of the 3rd & 4th Pan-Hellenic Conference on Economics of Natural Resources and the Environment followed, on October 30-31st, 2015 and on November 4-5th, 2016. Continuing this effort, the 5th ENVECON Conference was organized on November 1st-3rd, 2018 in the Department of Economics of the University of Thessaly at Volos.

This year, the 6th ENVECON Conference is held online, due to the COVID-19 pandemic, on June 11-12th, 2021 and it is jointly organized by the Laboratory of Operations Research of the Department of Economics University of Thessaly and the Department of Economy and Sustainable Development of the Harokopio University.

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.

The conference schedule consists of 10 Sessions that include the following fields of research: *environmental performance, COVID-19: environmental and social effects, issues in biodiversity, energy issues and policies, renewable energy sources, sustainable consumption, sustainable development, quantitative methods in environmental and resource economics, circular economy-sustainable entrepreneurship and environmental policies and assessment.*

These 10 sessions will provide us the opportunity to learn about the scientific research and the scientific outcomes of the academic and research institutes that are participating in the conference. Due to the multidimensional nature of the environment and the interdisciplinarity that is governing the field, the conference will cover a lot of the areas associated with the environment, showing once more the importance of the cooperation of different scientific fields when studying about environmental protection and management.

I would like to welcome and thank the keynote speakers of the conference, Professors Phoebe Koundouri, Walter Leal, Thomas Sterner and Patrik Thollander 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)

Director of Laboratory of Operations Research
Department of Economics
School of Economics and Business
University of Thessaly, Volos, Greece

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Concise Conference Schedule		
Day	**Time (Greek Time)**	**Sessions-Topics**
Friday 11/06/2021	**09:00-09:30**	**OPENING – WELCOME**
	09:30-11:00	**Session 1:** **Environmental Performance**
	11:00-11:30	**Keynote Speaker** *Professor Phoebe Koundouri*
	11:30-13:00	**Session 2:** **COVID-19: Environmental and social effects**
	13:00-14:00	Break
	14:00-15:30	**Session 3:** **Issues in Biodiversity**
	15:30-16:00	**Keynote Speaker** *Professor Patrik Thollander*
	16:00-17:30	**Session 4:** **Energy Issues & Policies**
	17:30-17:45	Break
	17:45-19:15	**Session 5:** **Renewable Energy Sources**
	19:15-21:00	**Session 6:** **Sustainable Consumption**

Saturday 12/06/2021	**09:15-10:45**	**Session 7:** **Sustainable Development**
	10:45-11:15	**Keynote Speaker** *Professor Walter Leal*
	11:15-12:45	**Session 8:** **Quantitative Methods in Environmental & Resource Economics**
	12:45-13:30	Break
	13:30-15:00	**Session 9:** **Circular Economy – Sustainable Entrepreneurship**
	15:00-15:30	**Keynote Speaker** *Professor Thomas Sterner*
	15:30-17:15	**Session 10:** **Environmental Policies and Assessment**
	17:15-17:30	**CLOSING & FINAL GIVEAWAYS**

CONFERENCE SCHEDULE

Friday 11 June 2021

Opening - Welcome **09:00-09:30**

1st Session **09:30-11:00**

Topic: **Environmental Performance**

Chairperson: **Professor George Halkos**

09:30-9:45	*Green Growth through Resource Efficiency and Absorptive Capacity under Technology Inequality. Blood Brothers or Distant Relatives?* Nikos Chatzistamoulou & Phoebe Koundouri
09:45-10:00	*Technological hierarchies and learning: spillovers, complexity, relatedness and the moderative role of absorptive capacity* Nikos Chatzistamoulou, Kostas Tsekouras & Kostas Kounetas
10:00-10:15	*Assessing the impact of undesirable outputs on industrial productivity growth: A Metafrontier Malmquist - Luenberger index approach across Europe* Eirini Stergiou, Nikos Rigas & Konstantinos Kounetas
10:15-10:30	*The Impact of CO2 Emissions and Climate on Economic Growth and Productivity: International Evidence* Nikos Rigas & Konstantinos Kounetas
10:30-10:45	*A comparative analysis of the world's regional green performance: an application of the GIP index* Jaime Moll de Alba & Valentin Todorov
10:45-11:00	Discussion

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

Topic: "Sustainable recovery from COVID-19:
Co-Developing the Future Vision for a Sustainable Europe
Co-Designing the Pathways via Research-Innovation-Policy Interface"

Professor Phoebe Koundouri
Athens University of Economics and Business,
President-Elect, European Association of Environmental and Resource Economist,
Director of ReSEES Research Laboratory,
Director of Sustainable Development Unit, ATHENA RC,
Fellow, World Academy of Art and Science.

2nd Session **11:30-13:00**

Topic: **COVID-19: Environmental and social effects**
Chairperson: **Professor George Hondroyiannis**

11:30-11:45	*Fear of COVID-19 reinforces climate change beliefs. Evidence from 28 European countries* Ádám Stefkovics & Olivér Hortay
11:45-12:00	*On the relationship among corporate philanthropy, corporate social responsibility and COVID-19: Evidence from the virus' first wave in Greece* Eleni I. Stathi & Konstantinos G. Papaspyropoulos
12:00-12:15	*The relationships between pollution, economic growth and Covid-19: A literature review* Athanasios Tsadiras
12:15-12:30	*Internet use, natural resource extraction and poverty reduction in rural Thailand* Trung Thanh Nguyen & Thanh Tung Nguyen
12:30-12:45	*A conceptual model of psychological resilience to climate change, psychological adjustment, and subjective well-being* Anastasia Gkargkavouzi
12:45-13:00	Discussion

3rd Session **14:00-15:30**

Topic:	**Issues in Biodiversity**
Chairperson:	**Associate Professor Steriani Matsiori**
14:00-14:15	*Biodiversity reporting: A literature review* Anastasia Naxaki & Konstantinos G. Papaspyropoulos
14:15-14:30	*What is Biodiversity and How Does Climate Change Affect It?* Sophocles E. Dritsas, Steriani Matsiori & Anastasia Gkargkavouzi
14:30-14:45	*Comparison of National Strategies for Biodiversity and Forests using the text mining method* Hariklia Liakou & Konstantinos G. Papaspyropoulos
14:45-15:00	*People and special protected areas: The influence of special protected areas on local communities* George Halkos, Anastasia Gkargkavouzi, Sophocles E. Dritsas & Steriani Matsiori
15:00-15:15	*The challenges of using Material Flow Cost Accounting in the fish-farming sector* Christos Danatskos & Konstantinos G. Papaspyropoulos
15:15-15:30	Discussion

Keynote Speaker **15:30-16:00**

Topic: "Energy management in industry, current status and ways forward"

Professor Patrik Thollander

Department of Management and Engineering (IEI),
Linkoping University & University of Gavle
Energy Systems (ENSYS)

4th Session 16:00-17:30

Topic:	**Energy Issues & Policies**
Chairperson:	**Dr. Jaime Moll de Alba**
16:00-16:15	*Exploration of energy use in EU 28: Dynamics, patterns, policies* George Halkos & Kyriaki Tsilika
16:15-16:30	*Proposals for transition of the Western Macedonia to the post-lignite era* Eftimios Zervas & Leonidas Vatikiotis
16:30-16:45	*Interventions in Existing Buildings and their Environment. Case Study: Environmental - Bioclimatic Upgrade of a School Building* Vasileia Maragkaki & Agisilaos Economou
16:45-17:00	*Factors determining the intention of citizens to participate and invest in local energy initiatives* Spyridon Karytsas & Eleni Theodoropoulou
17:00-17:15	*The MOF4AIR European project: Examining the determinants of social acceptance of carbon capture, transport and storage (CCS)* Spyridon Karytsas, Olympia Polyzou, Theoni Oikonomou & Constantine Karytsas
17:15-17:30	*Discussion*

5th Session 17:45-19:15

Topic:	**Renewable Energy Sources**
Chairperson:	**Dr. Trung Thanh Nguyen**
17:45-18:00	*Optimal sustainability solutions for the location of a floating wind energy farm in the Aegean Sea with the incorporation of wave energy hybrid systems.* Leonidas Tsipouras, George Spiliotopoulos & Vanessa Katsardi
18:00-18:15	*Renewable biogas energy production from forest biomass accumulated adjacent to forest roads* Vasileios Diamantis, Alexandros Eftaxias, Christodoulos Daoutis, Apostolos Kantartzis & Garyfallos Arabatzis
18:15-18:30	*Critical Parameters for the positioning of off-shore wind farms in Greece* Evangelos Ch. Asprogerakas
18:30-18:45	*The GEORISK European project: Establishing risk mitigation schemes for geothermal projects* Spyridon Karytsas, Ioannis Choropanitis, Theoni Oikonomou & Constantine Karytsas
18:45-19:00	*A review of biofuels' social acceptance* Spyridon Karytsas
19:00-19:15	Discussion

6th Session 19:15-21:00

Topic:	**Sustainable Consumption**
Chairperson:	**Associate Professor Eleni Sardianou**
19:15-19:30	*Tracing the effects of the plastic bag levy on consumer behaviour in the case of Greece* Georgios Maroulis, Charalampos Mentis, Dionysis Latinopoulos & Kostas Bithas
19:30-19:45	*Consumers' preferences toward green bonds: Empirical Evidence from the U.K.* Dimitrios Paparas, Ioannis Kostakis, Eleni Sardianou, Sofia Provatari & Anna Saiti
19:45-20:00	*Aspects of environmental policies in Athens in Classical times under an economics perspective* George Halkos, Emmanouil M.L. Economou & Nicholas C. Kyriazis
20:00-20:15	*Food cycle economy: challenges and prospects* Maria Michmizou & Paschalis Arvanitidis
20:15-20:30	*The socioeconomic determinants of residential water consumption in Athens. Preliminary results from a micro-econometric analysis* Ioannis Kostakis & Eleni Sardianou
20:30-20:45	*Recycling of "Waste of Electrical and Electronic Equipment": an Exploratory Data Analysis* Christos Liotiris & Zacharoula Andreopoulou
20:45-21:00	Discussion

Saturday 12 June 2021

7th Session **09:15-10:45**

Topic: **Sustainable Development**
Chairperson: **Professor Vassilios Profillidis**

09:15-09:30	*Mega Infrastructure Projects and their contribution to Sustainable Development The case of the Athens Metro* Roido Mitoula & Angelos Papavasileiou
09:30-09:45	*Opinion of citizens about infrastructure privatization* Emmanouil Vougioukalakis, Zoe Gareiou, Leonidas Vatikiotis & Efthimios Zervas
09:45-10:00	*Comparative assessment of environmental effects of railways with regard to other transport modes* Vassilios Profillidis & George Botzoris
10:00-10:15	*The road to sustainability through the education of professionals in the field of construction* Sofia Giannarou, Efthimios Zervas & Michael Tsatiris
10:15-10:30	*Brand Architecture and brand portfolio in tourism destinations: the case of Empordà* Jacinta Gutiérrez Olesti
10:30-10:45	Discussion

Keynote Speaker **10:45-11:15**

Topic: "Challenges in Adapting to a Changing Climate"
Professor Walter Leal
Manchester Metropolitan University
Department of Natural Sciences

8th Session 11:15-12:45

Topic: **Quantitative Methods in Environmental & Resource Economics**
Chairperson: **Professor Christos Kitsos**

11:15-11:30	*Non-farm employment, natural resource extraction, and rural household's welfare: Evidence from Vietnam* Manh Hung Do, Trung Thanh Nguyen, George Halkos & Ulrike Grote
11:30-11:45	*Kriging Analysis for Atmosphere Pollutants and House Prices: The case of Athens* Polixeni Iliopoulou & Christos Kitsos
11:45-12:00	*Revisiting the socioeconomic and environmental determinants of health care utilization in European countries* Athina Economou & George Halkos
12:00-12:15	*The future response of the pollutant adopting Tolerance Regions under different coding systems* Christos Kitsos & Constantinos-Symeon Nisiotis
12:15-12:30	*Shocks, livelihood diversification, and household consumption: A Comparative evidence from panel data in Thailand and Vietnam* Duy Linh Nguyen, Trung Thanh Nguyen & Ulrike Grote
12:30-12:45	Discussion

9th Session 13:30-15:00

Topic:	**Circular Economy-Sustainable Entrepreneurship**
Chairperson:	**Associate Professor Konstantinos Evangelinos**
13:30-13:45	*Flood resilience capacity: a structural equation model for Greek small and mid-sized enterprises* Antonis Skouloudis, Konstantinos Evangelinos, Panagiotis Vouros, Ioannis Nikolaou & Thomas Tsalis
13:45-14:00	*A study for corporate environmental strategy. The interaction between environmental legislation, innovation and intellectual capital* Nikolaos S. Trevlopoulos & Ioannis E. Nikolaou
14:00-14:15	*Workplace human rights assessment in sustainability reports: An overview of the United Kingdom market* Stefanos Fotiadis & Konstantinos Evangelinos
14:15-14:30	*Determinants for the withdrawal of companies in the tourism and leisure industry from the UN Global Compact programme* Martin Thomas Falk & Gudrun Helgadottir
14:30-14:45	*Enriching the "social" in circular economy: the commons perspective* Dionysia Evgenia Paraschi & Paschalis Arvanitidis
14:45-15:00	Discussion

Keynote Speaker 15:00-15:30

Topic: "Carbon pricing and social acceptability"
Professor Thomas Sterner
Dept of Economics, University of Gothenburg

10th Session **15:30-17:15**

Topic:	**Environmental Policies and Assessment**
Chairperson:	**Professor Roido Mitoula**
15:30-15:45	*Economic Valuation of Honeybee Pollination Services* Simeon Marnasidis, Garyfallos Arabatzis, Chrisovalantis Malesios, Fani Hatjina, Apostolos Kantartzis & Efstathia Verikouki
15:45-16:00	*Applying Factor Analysis and Structural Equation Models for urban parks in Greece: The relationship between motives and perceived characteristics, satisfaction and future visit* George Halkos, Aikaterini Leonti & Eleni Sardianou
16:00-16:15	*Hunting Economics as a subdiscipline of Forest Economics* Konstantinos G. Papaspyropoulos
16:15-16:30	*Modelling the transition dynamics of the socio-technical urban mobility system* Vasiliki V. Georgatzi & Yeoryios Stamboulis
16:30-16:45	*Methodology approach for the development of an online tourism app: CULSTAGE* Zacharoula Andreopoulou, Konstantinos Ioannou, Christiana Koliouska, Evangelia Karasmanaki, Georgios Tsantopoulos & Kleanthis Xenitidis
16:45-17:00	*Vulnerability Assessment to Desertification in Greece Using Composite Indicators.* Demetrios E. Tsesmelis, Efthimios Zervas & Christos A. Karavitis
17:00-17:15	Discussion

Closing **17:15-17:30**

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

ABSTRACTS

Green Growth through Resource Efficiency and Absorptive Capacity under Technology Inequality. Blood Brothers or Distant Relatives?

Nikos Chatzistamoulou[1] **& Phoebe Koundouri** [1,2,3]

[1]*School of Economics and Research Laboratory on Socio-Economic and Environmental Sustainability – ReSEES, Athens University of Economics and Business*

[2]*Director, Sustainable Development Unit, ATHENA Research Center,*

[3]*Co-Chair, UN SDSN Europe*

chatzist@upatras.gr (ή @aueb.gr), pkoundouri@aueb.gr

Abstract

The European Green Deal as the new growth strategy of Europe considers resource efficiency as the workhorse towards sustainability paving the way for further investigation on the mechanisms of resource efficiency measures. The latter remains an unexplored area. We explore the drivers of energy and environmental efficiency through feedback loops, absorptive capacity and technological inequality factors by devising a unique balanced panel for the EU-28 from 2010 through 2014. We adopt a production function framework by employing the Data Envelopment Analysis and a Directional Distance Function to estimate productive performance, energy and environmental efficiency of each country. Due to endogeneity concerns and unobserved mechanisms affecting performance measures, we adopt the identification through heteroskedasticity estimator to investigate the drivers of resource efficiency measures. Findings indicate that resource efficiency measures intertwined though feedback loops while productive performance and absorptive capacity exert a significant influence on both. Technological inequality factors exert a differential effect on resource efficiency measures. A rebound effect is documented only for the case of energy efficiency. This is particularly relevant for policy design indicating that there is not a one-size-fits-all policy as green efficiency measures operate through alternative channels responding in an asymmetric manner to candidate drivers.

Keywords: Green Growth & Resource Efficiency, Environmental & Energy Efficiency, Productive Performance, Eco-Innovation Index, Data Envelopment Analysis

JEL Codes: O44, D2, P18, C50, C60.

Technological hierarchies and learning: spillovers, complexity, relatedness and the moderative role of absorptive capacity

Nikos Chatzistamoulou[1,2], Kostas Tsekouras[1] & Kostas Kounetas[1]

[1] *Department of Economics, University of Patras, Greece*

[2] *School of Economics and Research Laboratory on Socio-Economic and Environmental Sustainability (ReSEES), Athens University of Economics and Business*

chatzist@upatras.gr, tsekour@econ.upatras.gr, kounetas@upatras.gr

Abstract

We develop a theoretical framework which facilitates the investigation of spillover effects on productive performance under the lens of technological relatedness, variety, and complexity, which are encompassed in heterogeneous, yet hierarchical, frontier-metafrontier structures. Spillovers are differentiated in terms of the knowledge pool from which they are originated, and the knowledge density of the production space in which they unfold, forming distinct knowledge grids. Concurrently, the counter effects of path dependence on productive performance, and the moderating role of absorptive capacity are in interplay. The theoretical framework is operationalized employing a panel dataset from country specific industrial structures of thirteen manufacturing and transportation industries in seventeen EU countries over an eight-year period. Empirical findings indicate that productive performance path dependence is dominant and catholic for all the examined frontier structures. Technological relatedness proves to be the most influential characteristic on which knowledge exchange is realized and absorptive capacity frames different patterns related to technological complexity and sectoral idiosyncrasies grounded on localization and lumpiness of the employed technology.

Keywords: Spillovers & Learning, Technological Complexity, Relatedness & Variety, Absorptive Capacity, Hierarchical structures, Metafrontier & Heterogeneity

JEL Codes: C51, D24, L6, L9.

Assessing the impact of undesirable outputs on industrial productivity growth: A Metafrontier Malmquist - Luenberger index approach across Europe

Eirini Stergiou, Nikos Rigas & Konstantinos Kounetas

Department of Economics, University of Patras, University Campus Rio, 26504, Patras, Greece

e.stergiou@upnet.gr, nrigas@upatras.gr, kounetas@upatras.gr

Abstract

The EU Green Deal sets climate protection and sustainable energy transition on the top of the Agenda for countries and industries creating economic opportunities and strengthening the European economy and resources security. This paper adopts the, environmentally-related, Metafrontier Malmquist–Luenberger productivity growth index (MML) examining the presence of heterogeneity. We incorporate a non-radial approach of the index that is further decomposed into three substantial attributes, namely efficiency change, best practice change and technological gap change. In that endeavor, we integrate undesirable outputs with productivity index on a panel dataset concerning 14 European industries, from 27 countries accounting for years 1995-2014. Our results reveal different levels of environmental productivity across Europe. More specifically, we discover the existence of champions, followers and laggards among European industries and countries. Finally, our results support the non-convergence hypothesis among industries and the creation of discrete clubs with uneven characteristics.

Keywords: CO_2 emissions, Malmquist–Luenberger productivity growth index, European industries, Metafrontier.

JEL Codes: O44, O47, O52, Q56, C61.

The Impact of CO2 Emissions and Climate on Economic Growth and Productivity: International Evidence

Nikos Rigas & Konstantinos Kounetas

Department of Economics, University of Patras, University Campus Rio, 26504, Patras, Greece

nrigas@upatras.gr, kounetas@upatras.gr

Abstract

The world's climate has already changed measurably in response to accumulated greenhouse gas emissions. These changes, as well as projected future disruptions, such as increase of temperature, have prompted intense research. A significant body of literature on climate change and economic growth signifies a negative relationship between the two. However, considerable uncertainty surrounds the effect of increasing temperatures combined with releases of anthropogenic emissions to the atmosphere. By applying detailed country level data in the 1961-2013 period this paper documents the relationship between weather variables, CO2 emissions, share of renewable energy sources, gross domestic product and total factor productivity in a standard Cobb-Douglas production function by using an instrumental variable approach. Our findings suggest that economic growth has been positively affected by temperature and CO2 emissions, while climate vulnerability varies significantly between rich and poor countries. Furthermore, as soon as we take into account renewable sources as an instrument, the negative effect on CO2 emissions demonstrates its impact for optimal environmental policies design. Finally, our results provide evidence for the existence of an inverted U-shaped relationship for temperature and emissions.

Keywords: Countries' TFP; CO2 emissions; Renewable Energy Sources.

JEL Codes: Q54, C26, O44.

A comparative analysis of the world's regional green performance: an application of the GIP index

Jaime Moll de Alba & Valentin Todorov
United Nations Industrial Development Organization (UNIDO), Vienna, Austria
J.Moll-de-Alba@unido.org, Valentin@Todorov.at

Abstract
Bearing in mind the multiple calls for a transition to a green economy and the leading role of the industrial sector in terms of economic growth and environmental sustainability, this paper undertakes a comparative analysis of the green industrial performance of eight world's regions. For that purpose, the paper introduces the latest version of UNIDO's Green Industrial Performance index, which serves to analyse and compare the performance of economies in terms of green manufacturing over time. A unique database derived exclusively from international data sources such as UNIDO's industrial statistics database (INDSTAT) and UN COMTRADE is constructed. The GIP database is then used to compute the GIP composite index and then rank and analyse the green industrial performance of a set of more than 110 countries for the period 2000-2018. The paper then estimates, analyses and compares the relative green industrial performance of the world's regions over time. The paper concludes by putting forward recommendations for future research and analysis of the green performance of the manufacturing sector, with particular emphasis on regional performance.

Keywords: Industrial development, Sustainable Development Goals, Green Economy, Composite index.

JEL Codes: F63, F64, L60, N60, O25.

Fear of COVID-19 reinforces climate change beliefs. Evidence from 28 European countries

Ádám Stefkovics & Olivér Hortay
Faculty of Social Sciences, Eötvös Loránd University, Hungary
Department of Social Research Methodology
adam.stefkovics@tatk.elte.hu

Abstract
The long-term nature of climate policy measures requires stable social legitimacy, which other types of crises may jeopardize. This article examines the impact of the COVID-19 fear on climate change beliefs based on an autumn 2020 population survey in the Member States of the European Union and the United Kingdom. The results show that deep COVID-19 concerns increase climate change concerns, awareness, and perceived negative impacts of climate change. These effects are more robust among the lower educated Europeans. On the country level, strict governmental measures are also linked to deep climate change concerns. In contrast to the experience following the 2008 recession, the findings show that a secondary crisis can positively impact climate attitudes, which is a promising result for policy actions.

Keywords: COVID-19, Climate change beliefs, European Union, Multilevel regression, Survey.

JEL Codes: I1, Q54, Q58.

On the relationship among corporate philanthropy, corporate social responsibility and COVID-19: Evidence from the virus' first wave in Greece

Eleni I. Stathi & Konstantinos G. Papaspyropoulos

MSc Natural Resources: Monitoring, Technology and Bio-economy, Department of Forestry and Natural Environment, Aristotle University of Thessaloniki, 54124

elenistathi@for.auth.gr, kodafype@for.auth.gr

Abstract

The present research explores the relationship between corporate social responsibility (CSR) and corporate philanthropy (CP) given the presence of the COVID-19 pandemic. Taking into account the Greek Fortune 100 corporations that responded or not to the call for help against the first wave of the virus existence, two hypotheses are tested: i) history of CSR practices is a determinant of CP, and ii) history of CP in the proCOVID-19 period is a determinant of CP in the postCOVID-19 period. The findings confirm the first and reject the second hypothesis. The paper is among the first exploring CP in the COVID-19 period and reveals that it presents attributes about the behaviour of corporations that have been already proved in the natural disaster literature, thus they react in a similar way.

Keywords: Pandemic, GRI, donations, health system, sustainability reporting.

JEL Codes: Q56, M14, Q01, A13, I18.

The relationships between pollution, economic growth and Covid-19: A literature review

Athanasios Tsadiras
Laboratory of Informatics in Economic Sciences, School of Economics,
Aristotle University of Thessaloniki, Greece
tsadiras@econ.auth.gr

Abstract
In the era of Covid-19, one of the main scientific questions regards the relationships that exist between pollution, economic growth and Covid-19. For example, the role that the concentrations of atmospheric Particulate Matter (PM_{10} and $PM_{2.5}$) played in the spread of the virus is examined in various studies, with the correlations to be justified both directly and indirectly. The direct connection can be justified by the fact that the atmospheric particulate could play the role of the virus carrier. The indirect connection can be justified by the fact the effects of respiratory viruses like Covid-19 on humans would be more severe in patients that live and breathe in polluted environment. Moreover, the relationship between economic growth and environmental sustainability in another topic discussed in several studies. In this paper we present the conclusions that we draw from making a survey on the relevant literature that regards the relationships between pollution, economic growth and Covid-19. The paper accumulates the results coming from numerous scientific studies that in most of the cases present findings coming only from regional level (e.g. cities/ regions in China or Italy).

Keywords: Pollution, economic growth, Covid-19.

JEL Codes: Q53, O44, O47, I18.

Internet use, natural resource extraction and poverty reduction in rural Thailand

Trung Thanh Nguyen & Thanh Tung Nguyen
Institute for Environmental Economics & World Trade, School of Economics & Management, Leibniz University Hannover, Germany
thanh.nguyen@iuw.uni-hannover.de, tung.nguyen@iuw.uni-hannover.de

Abstract
Understanding the impact of internet use by rural households is useful in facilitating digitalization in rural areas of developing countries. This study uses the data of around 1,912 and 1,815 rural households surveyed in 2016 and 2017 respectively in three provinces of Thailand to examine the impact of internet use on natural resource extraction and poverty reduction. A heteroscedasticity-based instrumental variable regression approach is employed to account for endogeneity concerns. Results show that internet use increases household income, promotes development of non-farm sectors, and reduces the extraction of and reliance on natural resource extraction. However, better-off households are found to benefit relatively more than worse-off households. These findings thus suggest that rural digitalization to be more focused on the rural poor for more inclusive economic growth.

Keywords: Rural household, instrumental variable regression, poverty, natural resource extraction, Thailand.

JEL Codes: Q12, C25, D13, M15, M12.

A conceptual model of psychological resilience to climate change, psychological adjustment, and subjective well-being

Anastasia Gkargkavouzi

University of Thessaly, Department of Ichthyology and Aquatic Environment, School of Agricultural Sciences, Volos, Nea Ionia 38446, Greece.

agkargkavouzi@uth.gr

Abstract

This study proposes a causal model of climate-induced psychological resilience, psychological adjustment, and subjective well-being. Based on a literature synthesis, the effect of a series of predictive constructs was considered including climate change coping strategies, subjective well-being, dispositional mindfulness, self-efficacy beliefs, and perceived restorativeness of nature. An online survey with self-complete questionnaire was conducted among Greek adults (n= 552). Data analysis included Confirmatory Factor Analysis and Structural Equation Modeling (SEM). We tested for common method bias (CMB) based on the Common Latent Factor (CLF) technique. The results showed an acceptable fit for the measurement and structural models, while all latent constructs established reliability and construct validity. The main findings showed that mindfulness and self-efficacy positively influence resilience, and the latter has a positive impact on coping appraisals. Resilience has a negative influence on psychological adjustment, and perceived restorativeness has a non-significant effect on resilience. Psychological resilience has a significant positive effect on coping appraisal and subjective well-being as measured by life satisfaction and positive affects, but a negative impact on psychological adjustment. Further research is essential to reassess these relationships and develop an integrative psychological model of climate resilience. Policymakers can draw on relevant research to design and implement informed strategic plans and support sector-specific interventions to increase psychological resilience and improve mental health in the era of climate change.

Keywords: Psychological Resilience, Subjective Well-being, Psychological Adjustment, Climate Change, Structural Equation Modeling.

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

Biodiversity reporting: A literature review

Anastasia Naxaki & Konstantinos G. Papaspyropoulos

MSc. Natural Resources: Monitoring, Technology and Bioeconomy, Department of Forestry and Natural Environment, Aristotle University of Thessaloniki, 54124

anaxaki96@gmail.com, kodafype@for.auth.gr

Abstract

Biodiversity is declining in a rather fast rate, being under threat due to climate change, unsustainable use of natural resources and expanding population. Thus, the concept of biodiversity has evolved in recent years, being an important issue for both businesses and society. Today, there are several efforts for the provision of frameworks for companies to understand how they can incorporate biodiversity loss into their business models. However, many firms seem to be quite reticent to report on the effects that their activities have on biodiversity. Nowadays, under the scope of an ecologically sustainable society, academia is investigating the role of biodiversity accounting and reporting in communicating performance and enhancing accountability towards relevant stakeholders. Under the environmental stewardship theory, business and organizations are accountable to society for protecting and contributing to environmental balance. Thus, the objective of the present research is to explore in detail biodiversity reporting through a literature review and it aims to contribute to the development of a broader theoretical knowledge, as biodiversity reporting and accounting represent issues that need to be explored in more detail. In order to do so, the present research explores five main issues: a) definition of, b) theories for, c) protocols for, d) drivers for, and e) content of existing biodiversity reporting.

Keywords: Biodiversity accounting, sustainability, reporting protocols, corporate responsibility, extinction accounting.

JEL Codes: L22, M41, O50, Q56, Q57.

What is Biodiversity and How Does Climate Change Affect It?

Sophocles E. Dritsas, Steriani Matsiori & Anastasia Gkargkavouzi
University of Thessaly, Department of Ichthyology and Aquatic Environment, School of Agricultural Sciences, Volos, Nea Ionia 38446, Greece.
dritsas@uth.gr, steriani@uth.gr, agkargkavouzi@uth.gr

Abstract
The need to adopt marine biodiversity conservation policies and adapt them to the needs posed by the effects of climate change has emerged as has emerged as a central and unresolved challenge. People are an important factor in the adoption of the above policies. This paper presents the results of research using a structured questionnaire to capture the views of research participants on the importance of biodiversity and the effects of climate change. A total of 737 were collected to help identify a variety of issues on a range of issues: the economic value of biodiversity and the consequences of its loss, climate change, its consequences, and its causes. In particular, the research findings reveal citizens' concerns about biodiversity conservation and how they relate to their knowledge and attitudes in relation to climate change. The results of the research are analysed both in relation to: (a) the provision of information on the policy adaptation process in the context of biodiversity conservation and (b) the identification of future research needs.

Keywords: Marine, ocean, biodiversity, climate change, biodiversity and people.

JEL Codes: Q57, Q54, Q56, Q50.

Comparison of National Strategies for Biodiversity and Forests using the text mining method

Hariklia Liakou & Konstantinos G. Papaspyropoulos
University of West Attica,
M.Sc. Applied Environmental Protection Policies and Techniques,
University Campus 2, Egaleo 122 44
hara.laikou@gmail.com, kodafype@yahoo.gr

Abstract
In order sustainability to be achieved in the management and protection of natural resources in Greece, national strategies for Biodiversity and Forests with a long-term horizon have been developed in recent years. The Greek Ministry of Environment issued the National Strategy for Biodiversity in 2014 and the Strategic Plan for Forestry Development (National Strategy for Forests) in 2018. Although there is a global distinction between Biodiversity and Forests, there may exist or not differences among the policies described in the texts, since biodiversity among others includes the diversity of forest species, while forest ecosystems protect a significant part of global biodiversity. In order to determine the possible differences, similarities and overlaps of the two texts, in the present research they were compared using the modern tool of text mining. Through the R programming language, the appropriate packages that have developed commands for text mining were used and the two strategies were analyzed in terms of sentiment analysis, word frequency, word relationship and topic modeling. The results show that there are both differences and similarities, and that in the National Strategy for Biodiversity the word biodiversity is related mainly to the word protection, while in the National Strategy for Forests the word forest is related mainly to management.

Keywords: Natural resource financing, natural resource policy, content analysis, sentiment analysis, topic modeling, language R.

JEL Codes: Q57, Q28, Q23, C55, C38.

People and special protected areas: The influence of special protected areas on local communities

Georgios Halkos[1], Anastasia Gkargkavouzi[2], Sophocles E. Dritsas[2] & Steriani Matsiori[2]

[1] *Laboratory of Operations Research, Department of Economics, University of Thessaly, Korai 43 Volos 38333, Greece.*

[2] *University of Thessaly, Department of Ichthyology and Aquatic Environment, School of Agricultural Sciences, Volos, Nea Ionia 38446, Greece.*

halkos@uth.gr, agkargkavouzi@uth.gr, dritsas@uth.gr, steriani@uth.gr

Abstract

Protected areas are vital for biodiversity conservation although some have been criticized for not providing adequate socio-economic benefits to local people. The present study examines the social, economic, and political effects of environmental conservation projects as they are manifested in protected areas. More specific examine the impacts of Lake Karla's surrounding area (welfare, ecological balance, biodiversity conservation, etc). For this reason, a face-to-face survey of 650 respondents randomly selected was carried out. We used descriptive statistics to summarize the demographic and socioeconomic statuses of the households. Then, we estimated the effects of the protected area on the welfare of the households using multicriteria analysis. According to the results of the research, people are interested in the reconstruction of Lake Karla because of its contribution to ecological balance an economic impact on local community.

Keywords: Protected Areas, local economies, socio-economic benefits, eco-tourism, ecological balance.

JEL Codes: Q28, Q34, Q50, Q57.

The challenges of using Material Flow Cost Accounting in the fish-farming sector

Christos Danatskos & Konstantinos G. Papaspyropoulos

MSc. Natural Resources: Monitoring, Technology and Bioeconomy, Department of Forestry and Natural Environment, Aristotle University of Thessaloniki

chrisdanat@gmail.com, kodafype@for.auth.gr

Abstract

Animal-source food production industry has developed new intensive farming techniques in order to respond to the growing demand for high protein food, following the population increase. This has resulted in an increased production performance and, sequentially, in environmental impacts and pollution issues. Consequently, environmental accountability is now established by laws and is demanded by various stakeholders, forcing polluting companies to adopt environmentally friendly production processes to avoid high taxes and fines. As a result, various business-level Environmental Management Accounting (EMA) approaches have been developed by academia to address the effects that factors like high environmental cost techniques and usage of polluting materials can have on the financial position and profitability of a company. An EMA method that tracks and analyzes the material and energy flows in a production process, to reveal cost reducing opportunities, both environmental and financial, is Material Flow Cost Accounting-MFCA. Aquaculture industry, as an animal-source food production industry, faces issues regarding environmental impacts, although it is generally considered as a sustainable farming technique. Since aquaculture production process demonstrates material and energy flows, MFCA can be implemented to analyze the production stages and assist an aquaculture company in taking the required management decisions. However, the various aquaculture techniques, regarding the farmed species, the geographical position, and the use of either fresh water or sea, present certain challenges in MFCA application, some of which the current study will attempt to highlight.

Keywords: Aquaculture, Environmental Management Accounting, sustainable farming, Material Flow Cost Accounting, environmental cost.

JEL Codes: Q22, Q56, Q53, Q51, Q57.

Exploration of energy use in EU 28: Dynamics, patterns, policies

George Halkos & Kyriaki Tsilika
Laboratory of Operations Research, School of Economics and Business, Department of Economics, University of Thessaly
halkos@uth.gr, ktsilika@uth.gr

Abstract
Sustainable energy use has become the most critical challenge of the world today. The relationship between consumption and use of different energy resources is an important topic in the regulatory and environmental literature. The paper places emphasis on primary energy resources, their covariation and correlation and aims to provide a systematic analysis of their development over time. The analysis uses evidence from EU country-level data. Different results from same territories show that energy consumption does not always reflect or is due to climatological or meteorological conditions.

Data is adopted from World Bank, in which 28 European countries from 4 geographical regions are included. Data include valid measurements of direct and sustainable energy use per country and per geographical region, according to the geographical clustering proposed by the UN. While geographical clustering is proposed by the UN, cluster analysis partitions countries into clusters, where countries within each cluster are more similar to one another than they are to countries in other clusters. In Europe district we identify four clusters of countries which classify (a) average energy use pc, (b) average fossil fuel pc, (c) average renewable energy pc.

Our visual exploration includes plotting energy variables with layering information on graphics (concerning geographical zones, GDP levels faceting grouped data, selected energy-use clusters) in order to produce effective comparative plots. We produce visual summaries of data on graphs such as bubble charts, scatterplot matrices, boxplots and we visualize confidence intervals for means of energy use; we create maps and correlation matrices. All these for country – or cluster of countries – level data.

Keywords: Energy use, exploratory data analysis, correlation analysis, trends, European Union.

JEL Codes: C63, Q40, Q42, Q48, C83, C88.

Proposals for the transition of the Western Macedonia to the post-lignite era

Eftimios Zervas[1] & Leonidas Vatikiotis[2]

[1] *Hellenic Open University Parodos Aristotelous 18, 26335, Patra, Greece*

[2] *Small Enterprises of GSEVEE, Aristotelous 46, 10433 Athens, Greece*

zervas@eap.gr, leonidasvatikiotis@gmail.com

Abstract

This research text attempts to formulate a coherent and realistic proposal for Western Macedonia, concerning the after de-lignification period. The aim of this proposal is to avoid the economic decline and poverty of the Region. The first part presents the proposals for the necessary environmental restoration of mine lands. Based on the international literature and the best practices, methods and solutions for the restoration of the environment, which has suffered from severe damages, and the development of activities that will not affect the environmental balance, are proposed. Concerning the economic rehabilitation of the Region, a mix of actions referring to the whole production chain: from the primary to the tertiary sector of the economy, is proposed. The action that is expected to ≪unlock≫ the production potential of this region is the creation of branded products, under a single brand name, which will voluntarily bring together, in the context of synergies, the agri-food and manufacturing activities.

Keywords: De-lignitization, Green transition, Just transition, Sustainable growth, Renewable Energy Sources.

JEL Codes: Q01, Q26, Q28, Q50, Q56.

Interventions in Existing Buildings and their Environment. Case Study: Environmental - Bioclimatic Upgrade of a School Building

Vasileia Maragkaki[1] & Agisilaos Economou[1,2]

[1] *School of Science and Technology, Hellenic Open University, 26335, Patras, Greece*

[2] *School of Applied Mathematical and Physical Sciences, National Technical University of Athens, 15780, Athens, Greece*

vamaragaki@gmail.com, aghs@mail.ntua.gr

Abstract

The high energy consumption of conventional school units and at the same time the important role of bioclimatic design of school buildings in upgrading the educational process makes the need for interventions in the school space in order to upgrade it environmentally and bioclimatically.

The present research refers to the possibilities of upgrading the school units taking into account the Building Energy Efficiency Regulation and the bioclimatic design. Then, the survey focuses on a conventional school unit (Leontio Lyceum in the Patissia area). Research in situ and a method of personal interviews with the teachers of the school unit took place in order to identify the problems of the school unit.

In the end, we propose interventions in the school unit, in order to environmentally and bioclimatically upgrade it, preserve its architecture and improve the conditions of thermal and visual comfort of the students. During the intervention plan, we take into account the characteristics of two bioclimatic school units of the German School in Marousi (Athens). In order to evaluate the interventions in the school unit we use the energy consumption calculation program "Easykenak", the design program "Autocad", as well as the 3D design and photorealism programs "Archicad" and "Lumion" to highlight the interventions.

Keywords: Bioclimatic design, sustainability, environment, school building upgrade.

JEL Codes: Q42, Q43, Q56, Q58.

Factors determining the intention of citizens to participate and invest in local energy initiatives

Spyridon Karytsas & Eleni Theodoropoulou

Department of Economics and Sustainable Development, School of Environment, Geography and Applied Economics, Harokopio University, 17671 Kallithea, Greece

skaryts@hua.gr, etheodo@hua.gr

Abstract

Collective action is necessary to achieve the restructuring of societies into sustainable production and consumption models. Local energy initiatives can assist the achievement of this goal; however, their success requires citizens' acceptance, support, and participation.

The present paper is part of research that examines the institution of Energy Communities in Greece. Specifically, the research examines the level of information of the citizens and their intention to participate and invest in the Energy Communities, while at the same time examining issues such as the relevant structures, benefits, barriers, and motives. The present paper demonstrates the results of the literature review and the assessment of the aforementioned issues.

The findings of the present work will be further utilized for the definition and examination - through quantitative and qualitative analyses - of research questions targeting the Greek Energy Communities.

Keywords: Energy community, participation, investment, barriers, motives.

JEL Codes: P18, Q42, Q48.

The MOF4AIR European project: Examining the determinants of social acceptance of carbon capture, transport and storage (CCS)

Spyridon Karytsas, Olympia Polyzou, Theoni Oikonomou & Constantine Karytsas
Geothermal Energy Department, Division of Renewable Energy Sources, Centre for Renewable Energy Sources and Saving (CRES), 19009 Pikermi, Greece
spkary@cres.gr, pololi@cres.gr, thoikonomou@cres.gr, kkari@cres.gr

Abstract
Carbon Capture and Storage (CCS) is the method of capturing CO2 generated by power plants or heavy industry processes and transferring it to long-term geological storage systems. However, it is a divisive technology that often experiences public opposition when it comes to accepting individual projects. Thus, it should not be ignored that social acceptance of CCS is a requirement for its further development. In this sense, the MOF4AIR European project, which aims to illustrate the efficiency of CO2 capture technologies focused on MOFs (Metal Organic Frameworks), involves relevant activities examining social issues related to CCS.
The findings of the initial stages of these activities are presented in this work. The determinants of social acceptance of CCS, as well as the relationships between them, were defined based on a literature review. Several factors have been identified to affect social acceptance, with perceived costs and benefits, trust in stakeholders, and knowledge of relevant subjects being the most frequently reported. Following the literature review, and based on the identification of relevant research gaps, a questionnaire has been developed for a quantitative social survey that will be performed in seven European countries.
The findings of the social survey, along with the results from interviews with targeted stakeholders, will be used to create public engagement scenarios.

Keywords: Carbon dioxide, carbon capture and storage, CCS, social acceptance.

JEL Codes: P18, Q49.

Optimal sustainability solutions for the location of a floating wind energy farm in the Aegean Sea with the incorporation of wave energy hybrid systems.

Leonidas Tsipouras, George Spiliotopoulos & Vanessa Katsardi
Department of Civil Engineering, University of Thessaly, Volos
ltsipouras@uth.gr, gspiliotop@uth.gr, vkatsardi@civ.uth.gr

Abstract
Wind power is an excellent alternative source of energy by being inexhaustible and with zero emissions but until today no wind power is produced offshore in the Mediterranean. However, offshore energy benefits from increased wind energy potential and therefore constitutes the backbone of the Blue Energy at the Blue Economy Sector. Featured in this paper is a methodology for calculating the total life-cycle cost of a floating offshore wind farm. A floating solution is more viable in the deep waters of the Aegean Sea avoiding significant social backlash that is observed against land installations. In addition, using the software "RETScreen Expert", several economic indices are calculated, based on which the economic viability of a floating offshore wind farm is assessed. A hybrid solution combining the use of wave power is also examined. Three potential areas for installation are investigated (offshore Lemnos, Mykonos and Crete), coming to the conclusion that the most cost-effective solution is presented in the area of Eastern Crete. The proposed methodology can be used for the calculation of the economic indices of a floating offshore wind farm in any location.

Keywords: Blue Economy, Blue Energy, Floating Offshore Wind Farms, Hybrid Systems, Aegean Sea.

JEL Codes: Q01, Q20, Q25, Q28, Q42, Q47, Q48, Q51, Q55.

Renewable biogas energy production from forest biomass accumulated adjacent to forest roads

Vasileios Diamantis[1], Alexandros Eftaxias[1], Christodoulos Daoutis[2], Apostolos Kantartzis[2] & Garyfallos Arabatzis[2]

[1] *Department of Environmental Engineering, Democritus University of Thrace, Xanthi, Greece*

[2] *Department of Forestry and Management of the Environment and Natural Resources, Democritus University of Thrace, Orestiada, Greece*

bdiamant@env.duth.gr, apkantar@fmenr.duth.gr

Abstract

Regular removal of forest biomass adjacent to forest roads is essential for the prevention of wildfires. In this study we evaluated the quantity of pine needles accumulated onto the forest carpet (litter) and fresh needles collected during pine-tree pruning operations, of a low-altitude Mediterranean *Pinus* forest. Pine needle samples were digested under mesophilic conditions, in batch reactors in order to evaluate the biogas production potential. The pine needle litter was characterized by an average height between 3 and 7 cm, apparent density 400 and 600 g/m^2 and low moisture content (12%). The pine needles recovered during tree pruning operations were equal to 2-4 kg/tree having a moisture content between 44 and 54%. Fresh pine needles revealed similar biogas production potential compared to the pine needle litter (140 and 120 L/kg volatile solids, respectively). The data from this study demonstrate that it is possible to recover around 500 m^3 of biogas per km of forest road when the collected biomass is disposed of to an anaerobic digestion facility. Under these conditions, the overall economic benefit from electricity introduction to the grid was calculated around 250 € / km forest road that can be used for biomass collection and transportation.

Keywords: Forest roads, biogas, forestry solid wastes, anaerobic digestion, environmental economics.

JEL Codes: Q53, Q23, Q42.

Critical Parameters for the positioning of off-shore wind farms in Greece

Evangelos Ch. Asprogerakas
Department of Planning & Regional Development
School of Engineering, University of Thessaly
asprogerakas@uth.gr

Abstract
The development of the offshore wind farm sector has contributed positively to the replacement of electricity generated by fossil fuels and to the related emission reduction. Nowadays the interest of the offshore wind energy markets is focused on the exploitation of the strong wind potential located in offshore areas with greater water depths by utilising innovative technology. However, prevention in relation to possible collisions with other marine activities remains a precondition, as well as the protection of sensitive marine ecosystems. The purpose of this paper is to explore the existing framework for the positioning of offshore wind farms and to identify priorities in relation to possible criteria and appropriate mechanisms for the allocation of related investments. In this effort, reference is made to the scientific dialogue and the relevant international experience. The spatial parameters for the development of the activity in Greece are examined as mainly arising from the existing spatial planning framework and the evaluation of other relevant proposals with specific criteria.

Key words: Maritime Spatial Planning, Off-shore wind farms, Renewable resources, Spatial policy.

JEL Codes: O21, Q28, Q42, Q48.

The GEORISK European project: Establishing risk mitigation schemes for geothermal projects

Spyridon Karytsas, Ioannis Choropanitis, Theoni Oikonomou & Constantine Karytsas
Geothermal Energy Department, Division of Renewable Energy Sources, Centre for Renewable Energy Sources and Saving (CRES), 19009 Pikermi, Greece
spkary@cres.gr, jchoro@cres.gr, thoikonomou@cres.gr, kkari@cres.gr

Abstract
Developing geothermal projects contains numerous elements of risk, with the most significant one being the geological resource risk, affecting primarily deep geothermal projects. Beyond the exploration phase, the performance and profitability of a geothermal project are threatened by this risk, which includes: (a) the short-term risk of not finding an economically viable geothermal resource and (b) the long-term risk of natural depletion of the geothermal resource.
Up till the drilling of the first borehole, project developers cannot be definite of the exact parameters of the planned geothermal project. After the first drilling has been carried out, tests and measurements reduce the geological risk and make it possible to attract external capital.
Geological risk is a common issue around Europe, with relevant insurance funds existing in a handful of countries. The GEORISK European project works on the establishment of risk mitigation schemes throughout Europe, focusing on covering the exploration phase and the first drilling. Hence, it deals with activities to be financed before the involvement of financial institutions and energy producers, which participate in the financing of the boreholes and surface systems that follow. The scheme that will limit the potential financial risk must be designed according to the degree of maturity of the market in question.

Keywords: Geothermal energy, geological resource risk, risk mitigation schemes.

JEL Codes: G32, Q42.

A review of biofuels' social acceptance

Spyridon Karytsas[1,2]

[1]*Geothermal Energy Department, Division of Renewable Energy Sources, Centre for Renewable Energy Sources and Saving (CRES), 19009 Pikermi, Greece*

[2]*Department of Economics and Sustainable Development, School of Environment, Geography and Applied Economics, Harokopio University, 17671 Kallithea, Greece*

spkary@cres.gr, skaryts@hua.gr

Abstract

Social acceptance is a crucial aspect related to the successful development of the biofuels market. Besides, the lack of social acceptance can create a significant barrier, hindering the technology's development. Achieving social acceptance strengthens trust between consumers, local communities, and enterprises, thus enhancing project acceptance while preventing time delays and reactions that could lead to increased costs.

The present paper aims to present the different dimensions of social acceptance of biofuels, i.e. acceptance in the socio-political dimension, the local dimension, and the market dimension (including consumer attitudes). In this context, the relevant stakeholders and factors affecting acceptance, the level of public awareness and information, consumers' willingness to pay for and to adopt the technology, the cases of support and opposition towards biofuel applications, the importance of local community engagement, as well as the best practices performed by public authorities and private actors, related to each dimension of social acceptance are investigated and assessed.

Keywords: Biofuels, social acceptance.

JEL Codes: P18, Q42.

Tracing the effects of the plastic bag levy on consumer behaviour in the case of Greece

Georgios Maroulis[1], Charalampos Mentis[1], Dionysis Latinopoulos[2] & Kostas Bithas[1]

[1] *Research Team on Economics of the Environment and Sustainable Development, Institute of Urban Environment and Human Resources (UEHR), Department of Economic and Regional Development, Panteion University of Social and Political Sciences, Kallithea*

[2] *School of Urban-Regional Planning and Development Engineering, Aristotle University of Thessaloniki, University Campus, 54124, Thessaloniki*

georgios_maroulis@eesd.gr, x.mentis@eesd.gr, dlatinop@plandevel.auth.gr, kbithas@eesd.gr

Abstract

Plastic bags are consumed at an alarming rate on a global level while they also currently pose a significant environmental threat, especially concerning marine and coastal ecosystems, characterized by adverse implications for human health. The purpose of this study is to examine the effects of the plastic bag levy, introduced on January 1st, 2018 and further increasing as of January 1st, 2019, in Greece on the consumer behaviour. In this regard, a web-based survey was conducted on a national level resulting in 841 useful questionnaires in total. Our analysis results suggest that plastic bag consumption has diminished since the environmental levy took effect, though this decrease is mainly attributed to a shift towards pro-environmental behaviour on behalf of Greek citizens and less due to the environmental levy increase. In addition, the majority of consumers replaced plastic bags with more sustainable alternatives, whilst plastic bag demand considerably decreased by comparison of before and after the environmental levy implementation. This suggests that the use of both economic and non-economic measures can prove to be effective in drastically reducing plastic bag consumption along with its deleterious effects on the marine environment.

Keywords: Plastic bags, Plastic reduction, Plastic bag charge, Consumer behaviour, Behavior change intervention.

JEL Codes: D10, D80, Q50, Q58.

Consumers' preferences toward green bonds: Empirical Evidence from the U.K.

Dimitrios Paparas[1], Ioannis Kostakis[2], Eleni Sardianou[2], Sofia Provatari[2] & Anna Saiti[3]

[1] *Department of Land, Farm and Agribusiness Management, Harper Adams University*

[2] *Department of Economics and Sustainable Development, School of Environment, Geography and Applied Economics, Harokopio University*

[3] *Department of Early Childhood Education and Care, University of West Attika*

dpaparas@harper-adams.ac.uk, ikostakis@hua.gr, esardianou@hua.gr, sprovatari@gmail.com, asaiti@uniwa.gr

Abstract

Investing in green bonds is a relatively new form of investment. The philosophy of green bond issuance by corporations is based on the fact that businesses, in addition to their profit-making character, desire to show citizens that they also have an environmental and social dimension. Indeed, corporations' awareness of environmental and social problems greatly influences their corporate policies; it helps to maximize their corporate value and thus their sustainability. Investing in green bonds is certainly a step in this direction, since the money that corporations borrow from such bonds is earmarked for more sensitive environmental and social activities. Those who tend to invest in a more "ethic of the mean" type of investment, invest in businesses that offer a balance between corporate goals and public good. For the purpose of our study sampling has been conducted in UK that attempts to investigate and identify investors' readiness to invest in recent innovations such as green bonds and the impact of their characteristics on making these types of investment. In view of the above, this study aims to investigate whether or not the psychological characteristics and attitudes of potential investors on green bonds have any impact on their degree of readiness for making this type of investment. Additionally, we want to identify the factors that determine the investors' readiness to invest in green bonds and thus shape their characteristics towards investing in them. Finally, we opt to provide suggestions for corporate policies that would boost the level of investment in green bonds.

Keywords: Green bonds, socially responsible investing, consumer preferences.

JEL Codes: D19, E22, Q01, E29.

Aspects of environmental policies in Athens in Classical times under an economics perspective

George Halkos[1], Emmanouil M.L. Economou[2] and Nicholas C. Kyriazis[2]

[1]*Operations Research Laboratory, Department of Economics, University of Thessaly*

[2]*Laboratory of Economic Policy and Strategic Planning (L.E.P.S.PLAN), Department of Economics, University of Thessaly*

halkos@uth.gr, emmoikon@uth.gr, nkyr@ergoman.net

Abstract

In this paper we present a series of environmental policies that were implemented in the city-state of Athens during the Classical times (508-323 BCE) under an economics perspective. We link these environmental policies to the provision of public goods and we argue that such goods proved to have been beneficial for the Athenian society as a whole. They basically included an efficient water management policy, the implementation of hygiene practices through a system of public baths in both a personal basis and as a collective opportunity for all the residents of the Athenian state, and furthermore, the implementation of a recycling process regarding animal manor and a waste management policy. Using a game theoretical approach we provide an economic assessment regarding the functioning of these institutions. Our results show that the success of these environmental institutions should be attributed to their effectiveness but also, and equally important, to the willingness of the people themselves to accept and adopt them through a spirit of a developing a consistent environmental awareness mentality.

Keywords: Environmental public goods, water management and hygiene, recycling and waste management policy, game theory, Classical Athens.

JEL Codes: H41, I18, K32, N13, N53, Q53, Q58.

Food cycle economy: challenges and prospects

Maria Michmizou & Paschalis Arvanitidis
Laboratory of Economic Policy and Strategic Planning, Department of Economics, University of Thessaly, 28th Oktovriou 78, 38333, Volos
mairamichmizou@gmail.com, parvanit@uth.gr

Abstract
Food and Agriculture Organization of the United Nations estimates that about one third of the world's annual food production is lost, discarded and wasted. This loss not only has enormous opportunity costs for humanity, as it could support 12.5% of the malnourished world population, but also has substantial environmental costs, due to the waste of energy and resources but also the degradation of the environment in general. In addition, this chain of waste leads to increased production costs and reduced profitability on the part of companies, exerting upward pressure on the prices of products that reach the final consumer.
A large, and increasing, part of this waste comes from the food industry, giving rise to a growing discussion on the part of the scientific community. Food catering units (restaurants) are considered to be one of the most important factors in the food waste chain that could dynamically intervene to reverse this situation by changing both business and consumer patterns. In this context we can distinguish two ways of dealing with the problem: one is the change of the process of production and management of food "in situ", while the other is the rational disposal of waste.
However, despite the growing interest of researchers, the subject is at an early stage of study and analysis with most research focusing on case studies of specific restaurants, failing to highlight the general attitudes, trends and dynamics in the sector. In this context, the present work attempts to make a presentation of the existing scientific discussion, in an attempt to classify the literature, to identify possible gaps and to highlight potential fields and directions for further research.

Keywords: Circular economy, food industry, food waste, food management, waste disposal.

JEL Codes: O13, O44, O47, Q18, Q56.

The socioeconomic determinants of residential water consumption in Athens. Preliminary results from a micro-econometric analysis

Ioannis Kostakis & Eleni Sardianou

Department of Economics and Sustainable Development, School of Environment, Geography and Applied Economics, Harokopio University, El. Venizelou 70, 17671 Athens, Greece

ikostakis@hua.gr, esardianou@hua.gr

Abstract

This paper provides empirical evidence on the effects of socioeconomic characteristics on residential water consumption. The case of Athens is taken as an example for the empirical investigation, using data from the 2019 Household Budget Survey. Employing ordinary, two and three stages least squares, seemingly unrelated regression equations and simultaneous quantile specifications, we found that residential water demand is highly price inelastic. Furthermore, empirical results show that water consumption is positively related to household age while more educated households and unemployed persons seem to follow a more environmentally friendly behavior with respect to water demand. Income, gender, house ownership and population density seem to affect insignificantly residential water demand. The identification of the characteristics of intensive consumers can be a useful tool for policies to achieve sustainability in water consumption amid households. Our empirical findings might also have important national and regional policy implications in the design of sustainable water demand management.

Keywords: Residential water demand, sustainability, price elasticity, income elasticity, Greece.

JEL Codes: D10, Q25, Q56.

Recycling of "Waste of Electrical and Electronic Equipment": an Exploratory Data Analysis

Christos Liotiris & Zacharoula Andreopoulou
Forest Informatics Laboratory of the Department of Forestry and Natural Environment, Aristotle University of Thessaloniki
liotiris@for.auth.gr, randreop@for.auth.gr

Abstract
Given the pace and scale of Waste of Electrical and Electronic Equipment (WEEE) generation globally, countries are called upon to tackle their management as drastically as possible in order to maintain the viability of ecosystems. Proper implementation, application and enforcement of EU waste legislation are among the key priorities of EU environmental legislation and policy. In their support, the European Commission has carried out, compliance promotion initiatives to assist Member States with the implementation of EU waste legislation. The complexity of dismantling and recycling, as well as the various hazardous substances in WEEE, constitute a frightful threat to the environment and human health. Subsequently, the EU revised its WEEE legislation to address these challenges more adequately. As a result, Directive 2012/19/EU (WEEE2 Directive) repealed the first WEEE Directive and entered into force in 2012. This paper deals with the screening of WEEE management operations in EU, in terms of technical content and ability to reach the targets of the WEEE2. In addition, a more detailed report on recycling indicators published by the Eurostat, will be based on an Exploratory Data Analysis. Finally, the overall aim of this study is to gain maximum insight into the data and understanding its underlying structure through graphical representation.

Keywords: Waste of Electrical and Electronic Equipment, Recycling, European Union (EU), Eurostat, Exploratory Data Analysis.

JEL Codes: Q00, Q53.

Mega Infrastructure Projects and their contribution to Sustainable Development The case of the Athens Metro

Roido Mitoula & Angelos Papavasileiou
Department of Economics and Sustainable Development,
School of Environment, Geography and Applied Economics
Harokopio University of Athens
mitoula@hua.gr, apapavasileiou@hua.gr

Abstract
Public transport provides services that allow society to function and economies to thrive. At the same time, infrastructure projects play a crucial role in all three dimensions of sustainable development: the economy, the environment and society.
The present paper investigates the critical role of significant infrastructure projects in sustainable urban and suburban development by presenting a Sustainable Infrastructure serum analysis supported by primary field research.
In the case study of the Athens Metro, we examined the influence of the project on sustainable development through the users' opinion of the project. The Athens Metro provides a case study to improve our understanding of the concept of Sustainable Infrastructure as a framework for Green Growth.
For the needs of the paper, a survey was conducted with questionnaires during the period of October to December 2020. The sample consisted of 270 citizens of the Attica Region. Given the restrictions on movement at the time due to the COVID-19 pandemic, questionnaires were sent and collected online. The organization and processing of the research results were done through the open free program Microsoft forms.
From the data analysis, conclusions emerged, which are summarized at the end of the paper. The research results highlighted the acceptance and necessity of the project by directly correlating the results with sustainable development, the economy, society, and the environment.

Keywords: Mega Infrastructure Projects, Sustainable Development, Sustainable Infrastructure, Public Transport, Athens Metro, Greece.

JEL Codes: Q01, Q50, Q56, R11, R40, R42.

Opinion of citizens about infrastructure privatization

Emmanouil Vougioukalakis, Zoe Gareiou, Leonidas Vatikiotis & Efthimios Zervas
School of Science and Technology, Hellenic Open University, 26335, Patras
zervas@eap.gr

Abstract
Nowadays, there is a huge demand on public infrastructure and services worldwide, while the government budget of any country is usually limited. In addition, the public sector often lacks the technologies and expertise required for efficient infrastructure development. As a result, many countries are turning to infrastructure privatization. This study investigates the opinion of the inhabitants of Athens, about infrastructure privatization, on the main sectors: transport, education, health, energy, water supply, telecommunications, public administration and municipal services.
The survey was conducted from January to March 2020 in Athens. The data were collected using a structured questionnaire and the responses were analyzed. For the statistical analysis of the data, simple descriptive statistics, chi-square test and Principal Component Analysis (PCA) were conducted.
The results showed that the majority of respondents want public management in terms of transport, water supply, education, health, energy, public administration and municipal services. On the contrary, the majority of respondents are in favor of the private sector in terms of media, telecommunications and large industries, while maintaining a neutral stance in the case of banks.
Finally, the majority of respondents consider that the quality of infrastructure, which has already become private, has improved, while the cost has deteriorated.

Keywords: Privatization, Infrastructure, Opinion of citizens.

JEL Codes: Z0

Comparative assessment of environmental effects of railways with regard to other transport modes

Vassilios Profillidis & George Botzoris

Laboratory of Transportation and Spatial Planning, Department of Civil Engineering, Democritus University of Thrace, Kimmeria Campus, 67100 Xanthi, Greece

vprofill@civil.duth.gr, gbotzori@civil.duth.gr

Abstract

In the present paper it is examined haw can railways contribute to reduce CO_2 emissions so as to keep increase of global temperature of the earth below 1.5-2.0 degrees C. First, contribution of the transport sector in CO_2 emissions is examined. A causal correlation between GDP and individual consumption for transport is attempted. Specific CO_2 emissions from railways and other transport modes are assessed, and other (than CO_2) air pollutants are also examined. The energy efficiency of rail transport in comparison with other transport modes is presented. The paper addresses also noise emissions from railways and suggests specific measures and the related costs for the reduction of noise provoked by railway traffic.

Keywords: Transportation, CO_2 emissions, growth, energy efficiency, noise.

JEL Codes: O44, R41, Q53, Q56.

The road to sustainability through the education of professionals in the field of construction

Sofia Giannarou[1], Efthimios Zervas[1] & Michael Tsatiris[2]

[1] *Hellenic Open University, School of Science and Technology, Laboratory of Technology and Policy of Energy and Environment, Parodos Aristotelous 18, 26335 Patras, Greece*

[2] *Democritus University of Thrace, School of Agricultural and Forest Sciences, Department of Forestry and Management of the Environment & Natural Resources, 193 Pantazidou Street, 68 200, Orestiada, Greece*

giannarou.sofia@ac.eap.gr, zervas@eap.gr, tsatiris@fmenr.duth.gr

Abstract

The bioclimatic design of buildings is an urgent need that begins with the acceptance of the facts of the reckless use of energy resources, the destruction of the environment and the deterioration of the quality of life of animals and humans and continues with the realization that this is a socio-political rather than a technical issue which requires mainly a change of mentality and a redefinition of the social priorities and goals of humanity.

Therefore, today's society demands the environmental awareness of all citizens and the bioclimatic architectural training of the engineers of the future. To date, ignorance of the goals and benefits of climate-based construction, academic inaction, and rigid curricula in educational institutions, combined with limited expertise, non-social compliance, and a lack of inspiring standards have led to unsustainable ways life and a future doubtful for humanity.

The purpose of this research using structured questionnaires is to investigate the knowledge of professionals in the field of building construction in Greece on bioclimatic design and the causes of the lack of environmental awareness of Greek citizens until recently, which led to a building stock with small number of bioclimatic buildings.

Keywords: Bioclimatic design, sustainability, engineering education, environmental education.

JEL Codes: O44, O33, Q43, Q52.

Brand Architecture and brand portfolio in tourism destinations: the case of Empordà

Dr. Jacinta Gutiérrez Olesti

Insetur - Institut de Recerca en Turisme, Universitat de Girona, Girona

cintagutierrez@telefonica.net

Abstract

There is no doubt that we live in a world of brands. Brands are more or less well known, more or less visible. Graphic images, logos and slogans have significant impacts on our daily lives. The brand portfolios of tourist destinations have been growing in the last years. The objective of this paper is to spell out the factors that determine the strategy of the brand portfolio and the brand architecture in tourist destinations. To achieve this goal, it is important to understand the concept of brand and how Place Branding has been applied to countries and territories, as well as Destination Branding in destinations.

Understanding the organization of this portfolio and the relationships which different entities or brands establish among and outside themselves, constitutes a focus of analysis for destinations. Destinations, particularly in terms of the human factor, constitute study entities with specific peculiarities that move away from the rigidity and the parameters of a company. For the latter, the concept of brand is well developed. In destinations, brands are born and evolve in different ways and have to reflect all realities. The results of this research include issues related to policy, resources, understanding of the concept of brand, and incapacity to forge alliances between brands and stakeholders.

Keywords: Brand, place branding, destination branding, brand architecture, brand portfolio, Empordà.

JEL Codes: M31, R11, R58, A13, D04.

Non-farm employment, natural resource extraction, and rural household's welfare: Evidence from panel data for Vietnam

Manh Hung Do[1], Trung Thanh Nguyen[1], George Halkos[2] & Ulrike Grote[1]

[1] *Institute for Environmental Economics and World Trade, Leibniz University Hannover, Königsworther Platz 1, 30167 Hannover, Germany*

[2] *Department of Economics, University of Thessaly, Volos 38333, Greece*

hung@iuw.uni-hannover.de, thanh.nguyen@iuw.uni-hannover.de, halkos@econ.uth.gr, grote@iuw.uni-hannover.de

Abstract

Natural resource extraction plays an important role in generating income as a major livelihood strategy of rural households in many developing countries. However, over-exploitation is causing an alarming depletion of natural resources in these countries and posing a major threat to the local environment and ecosystem. Given this problem, we use a panel data of 1780 identical households in 2010, 2013, and 2016 (collected from a country in a hot spot of natural resource degradation) to identify the determinants of rural households' participation in non-farm activities, examine the inter-correlation between non-farm employment and natural extraction, and investigate the impacts of non-farm income on rural households' welfare. Our findings reveal that access to internet or higher quality of roads positively affect households' decision on non-farm employment and non-farm income. The results from the simultaneous equation model show that non-farm income and natural extraction income have a negative inter-correlation. More importantly, non-farm income is significantly contributing to poverty reduction in both relative and absolute terms. Our results have important practical implications for stimulating rural development policies on providing non-farm opportunities, investment in infrastructure and telecommunication to help increase income, improve welfare, and reduce natural resource exploitation of rural households in developing countries.

Keywords: Non-farm employment, natural resource extraction, poverty reduction, rural livelihood, rural development.

JEL Codes: Q57, Q12, R20.

Kriging Analysis for Atmosphere Pollutants and House Prices: The case of Athens

Polixeni Iliopoulou & Christos Kitsos
University of West Attica
piliop@uniwa.gr, xkitsos@uniwa.gr

Abstract
In this paper the effect of air pollutants on housing prices in the Greater Athens region is examined employing kriging analysis. Data concerning air pollution in Attica are provided for a network of stations in a time series. Several methods of spatial interpolation can be used in order to create an air pollution surface for the study region, such as polynomials and splines.
These methods are not considered when the measurement depends on time in the sense that $y_i = y(t_i)$, as the Atmosphere Pollution indexes, the prices in any market etc. In such stochastic oriented data, not only Explanatory Dada Analysis (EDA) is needed, but a structural model is required, providing the best estimates, by kriging, as well as the variance of the estimated error.
In this paper the air pollutant surfaces resulting from kriging analysis are used in order to assign air pollution values to houses for sale, employing GIS techniques. The effect of selected air pollutants on housing prices is examined and the results indicate that although structural characteristics of houses, i.e. size, are more important, the effect of air pollutants is not negligible.

Keywords: Interpolation, Regression, Kriging, Prediction.

JEL Codes: Q00, Q53.

Revisiting the socioeconomic and environmental determinants of health care utilization in European countries

Athina Economou & George Halkos
Laboratory of Operations Research,
Department of Economics, University of Thessaly
aeconomou@econ.uth.gr, halkos@econ.uth.gr

Abstract
The purpose of the study is to examine the determinants of health care utilization among respondents in selected European countries, by utilizing available information from the SHARE (Survey of Health, Aging and Retirement in Europe). The variable of interest is the number of doctor visits during the past year based on respondents' information linked with the individual demographic, health and socioeconomic characteristics of the respondents. In addition, the country-level environmental effect upon health care utilization is assessed, with the use of the green house emissions annual index, since the environmental burden is found to affect population health in relevant research. Due to the count nature of the dependent indicator, Poisson models are estimated with bootstrapped standard errors. Instrumental variable models with the use of the Control Function Approach are also used to disentangle the endogenous nature between health care and economic position. The evidence supports previous findings regarding the socioeconomic gradient in health care utilization and underline the need to address socioeconomic inequalities that hamper health care treatment. The environmental factor is also found to exert a burden upon health care utilization, mainly in the case of Germany which is the country with the highest greenhouse emissions in Europe.

Keywords: Health care utilization, socioeconomic characteristics, greenhouse emissions, European countries.

JEL Codes: I11, I12, I14, Q51, Q53.

The future response of the pollutant adopting Tolerance Regions under different coding systems

Christos Kitsos & Constantinos-Symeon Nisiotis
University of West Attica
xkitsos@uniwa.gr, cnisiotis@uniwa.gr

Abstract
When the future response is needed to be estimated in a chronological data set of pollutants, there is a number of available techniques. In this paper the simple linear regression model is used to fit the data in a given time interval $[T_1, T_2]$, which can represent a 20, say, year time interval. The coding system adopted to represent the input variable "years" influences the predicted value. We prove that there exists a linear transformation related the coding systems. The 95% of the future responses is asked to lie within an interval with probability .90 or .95. That is a Tolerance Region (TR) is asked to be constructed. The problem that if the TR is influenced by the assumed coding system describing the data, is examined also in this paper.

Keywords: Regression, Linear Transformation, Tolerance Region, Affine Tolerance Region.

JEL Codes: Q0, Q53.

Shocks, livelihood diversification, and household consumption: A comparative evidence from panel data in Thailand and Vietnam

Duy Linh Nguyen, Trung Thanh Nguyen & Ulrike Grote

Institute for Environmental Economics and World Trade, School of Economics and Management, Leibniz University Hannover

linh.nguyen@iuw.uni-hannover.de, thanh.nguyen@iuw.uni-hannover.de, grote@iuw.ini-hannover.de

Abstract

In this paper, we use a unique panel data set of around 4,000 households collected in five survey waves from Thailand- and Vietnam during 2007-2016 to investigate the impacts of covariate and idiosyncratic shock on consumption and the mitigating role of land and labor diversification. We employ the System-Generalized Method of Moments estimator to overcome the concerns in controlling for endogeneity. Our results reveal that: (i) rural households in Thailand and Vietnam are able to smooth consumption when facing idiosyncratic shock. However, this is not the case when covariate shock strikes; (ii) livelihood diversification has no significant effect in improving consumption in both countries in general. The higher level of land diversification even negatively affects household consumption in Thailand; (iii) among household with shocks, higher land diversification in Thailand and higher labor diversification in Vietnam helps rural households partially mitigate the negative impacts of covariate and idiosyncratic shocks; and (iv) labor diversification in Thailand and land diversification in Vietnam are ex-post coping strategies to covariate shock but their mitigating role is not statistically significant.

Keywords: Livelihood diversification, shocks, household consumption, Thailand, Vietnam.

JEL Codes: I310, O120, O130, Q120.

Flood resilience capacity: a structural equation model for Greek small and mid-sized enterprises

Antonis Skouloudis[1], Konstantinos Evangelinos[1], Panagiotis Vouros[1], Ioannis Nikolaou[2] & Thomas Tsalis[2]

[1] *Department of Environment, University of the Aegean, Lesvos*

[2] *Department of Environmental Engineering, Democritus University of Thrace, Xanthi*

skouloudis@aegean.gr, kevag@aegean.gr, pvour@env.aegean.gr, inikol@env.duth.gr, ttsalis@env.duth.gr

Abstract

Floods pose unprecedented threats to modern societies and remain a much-debated issue strongly interlinked with current development policies. Small and Medium-sized Enterprises (SMEs) that constitute a driving force of economic growth, employment and total value-added, are highly vulnerable to and ill-prepared for such environmental perturbations. In this study, a model that comprises of factors linked to the resilience capacity of SMEs to flooding is tested. A sample of 343 enterprises from flood-prone areas in Greece was administered a structured questionnaire on cognitive, managerial and contextual factors that influence the ability to shape effective responses to flood challenges. Structural Equation Modeling is employed to identify associations between the various observed items forming the individual latent sub-constructs, as well as the associations between these individual latent sub-constructs with the flood resilience capacity construct (FRCI). By identifying major internal and external attributes explaining resilience capacity, an analytical framework is set forth that could help standardize such assessments, with the overarching aim of reducing SMEs' vulnerability to flooding. Studies such as ours seek to provide essential research findings for practitioners on SME management in relation to flood preparedness and set forth linkages with current mechanisms for policy interventions at regional, national and European levels towards an appropriate flood resilience agenda for SMEs.

Keywords: Small & mid-sized enterprises, floods, organizational resilience capacity, structural equation modeling, extreme weather events.

JEL Codes: Q01, Q50, Q54, Q56, Q59.

A study for corporate environmental strategy. The interaction between environmental legislation, innovation and intellectual capital

Nikolaos S. Trevlopoulos & Ioannis E. Nikolaou

Business Economics and Environmental Technology Lab, Department of Environmental Engineering, Democritus University of Thrace, Vas. Sofias, 12, Xanthi, Greece

ntrevlop@env.duth.gr, inikol@env.duth.gr

Abstract

Today more than ever, industries are called to comply with domestic, community and international environmental legislation to ensure sustainable development. In order to achieve these objectives, firms follow a specific strategy that is sometimes accompanied by costs and sometimes by benefits such as new innovations and intellectual capital development. The purpose of this article is to study the interactions between environmental legislation, environmental innovation and green intellectual capital. To do this, a questionnaire-based survey is carried out in a sample of 62 chemical enterprises. The results show that environmental legislation positively affects environmental innovation and green intellectual capital, while green intellectual capital positively affects environmental innovation.

Keywords: Corporate environmental strategy, corporate environmental management, environmental innovation, green intellectual capital.

JEL Codes: K32, O31, O34, Q50.

Workplace human rights assessment in sustainability reports: An overview of the United Kingdom market

Stefanos Fotiadis & Konstantinos Evangelinos

Centre for Environmental Policy & Strategic Environmental Management, Department of Environment, University of the Aegean, Mytilene

sfotiadis@env.aegean.gr, kevag@aegean.gr

Abstract

Organizations are responsible for their impacts on human rights directly, through their own actions and operations. They can also impact human rights indirectly, through their interactions and relationships with others, including governments, local communities and suppliers, and their investments. The aim of this study is to assess the level of accountability of Organizations - based in the United Kingdom (UK) - on issues of human rights at work, expressed by nine suggested disclosures of the Global Reporting Initiative (GRI) manual. Our sample consists of all types of Organizations, whose Corporate Social Responsibility (CSR) reports for 2019 were accessed from the GRI database. To date, just over half of the reports have been examined. So far, results show that the sample reveals a very low level of sensitivity to human rights topics at work. At the end of the evaluation, all reports will need a full review.

Keywords: CSR, GRI Standards, rights and principles at work, accountability.

JEL Codes: G34, M14, O16, Q01, Q56.

Determinants for the withdrawal of companies in the tourism and leisure industry from the UN Global Compact programme

Martin Thomas Falk & Guðrún Helgadóttir
Department of Business and IT, USN School of Business, University of Southeastern Norway
Martin.falk@usn.no, Gudrun.helgadottir@usn.no

Abstract
Between 2000 and 2020, 818 companies from the tourism and leisure industry signed up to the UN Global Compact guidelines, which cover ten principles in the field of labour, human rights, environment and anti-corruption. Three out of the ten principles refer to the environment (Principle 7: Businesses should support a precautionary approach to environmental challenges; Principle 8: undertake initiatives to promote greater environmental responsibility; and Principle 9: encourage the development and diffusion of environmentally friendly technologies). Over the sample period, 60 per cent of the tourism and leisure businesses are de-listed from the programme. The aim of this paper is to examine to stay active in the UN Global Compact programme. Factors include company-specific factors such as size, ownership (private vs public) and country-specific factors (indicators on CO2 emissions, air pollution, tree cover loss). Other control variables include components that measure various dimensions of the political environment faced by companies operating in a country (political stability and absence of violence, stability of government and control of corruption) as well as GDP per capita as a measure of economic development. This work builds on Rasche et al. (2020) who analyzed delisting status using a survival model. The main contribution is that country-specific factors related to environmental performance and institutional and political factors are included. Estimation results using a Cox proportional hazard model show that the rate of losing the active UN global compact status depends on firm characteristics and environmental performance indicators. Public companies, foundations and NGOS in the tourism sector have a 35 percent lower rate of being delisted, while listed companies have a 64 percent lower rate. The latter is related to the fact that there is more pressure on these companies from investors to do their part in solving societal challenges. The environmental performance indicators are highly important in determining UN Global Compact status. The results imply that tourism businesses in countries that have made progress in decoupling emissions and economic growth are more likely to remain in the UN Global Compact programme. The air quality index indicator is significant at the 1 per cent level. The findings that environmental progress at the country level is the main driver for the decision to join or leave the UN Global Compact programme shows that the commitment of society and government to corporate environmental sustainability goals is of great importance. Three out of ten UN Global Compact goals relate to the environment, and here it is difficult to make progress at the corporate level if there is no general commitment. The findings that institutional and political factors such as levels of corruption and economic development do not matter is a surprising result. This might indicate that this is not the main obstacle to staying in the programme.

Keywords: Sustainability, Sustainability reporting, united national global compact programme, Carbon emissions, Air quality.

JEL Codes: Q50, Q56, Q01, D22.

Enriching the "social" in circular economy: the commons perspective

Dionysia Evgenia Paraschi[1] & Paschalis Arvanitidis[2]

[1] *MSc Social and Solidarity Economy, Hellenic Open University*

[2]*Department of Economics, University of Thessaly, Hellenic Open University*

deniaparaschi@hotmail.com, parvanit@uth.gr

Abstract

The mainstream approach to the issue of circular economy places particular emphasis on the environmental and the economic dimensions disregarding key aspects of social significance, such as collective action, community participation and solidarity building. Yet, these aspects constitute not only desired outcomes of adopting circular practices, but determinants of a truly sustainable circular society, that is a society that embraces in full all circularity dimensions and principles. This transition indicates a movement towards a different lifestyle, consumption sculture and economic behaviour that is based on values of collectivity, cooperation and sharing, all of which are critical elements of the commons as an institution. The commons, which constitutes an alternative, community-based, model of governance and socioeconomic behavior, embraces in full this rich social spectrum of circular economy and therefore is a more appropriate theoretical and analytical concept to explore and assess circular economy initiatives and actions.

With all these under account, the current research draws on the commons in order to explore the social character of a specific sector of circular economy, that of the second-hand clothing. In particular it employs Ostrom's design principles to analyze and evaluate a collectivity that is engaged in the reuse of used clothing in Greece. The research finds that the examined initiative satisfies the Ostromian principles and constitutes a successful commons. It has adopted a governance structure that is prescribed by collective, bottom-up representation, democratic decision-making processes and organizational flexibility, showing a degree of adaptability and continuity that enables it to thrive even during the testing times of COVID crisis.

Keywords: Circular economy, commons, reuse, clothing, solidarity economy.

JEL Codes: B52, B55, D02, L31, O17, O35, Q56.

Economic Valuation of Honeybee Pollination Services

Simeon Marnasidis[1], Garyfallos Arabatzis[1], Chrisovalantis Malesios[2], Fani Hatjina[3], Apostolos Kantartzis[1] & Efstathia Verikouki[4]

[1] *Department of Forestry and Management of the Environment and Natural Resources, Democritus University of Thrace, 193 Pantazidou St., 68200 Orestiada, Greece*

[2] *Department of Agricultural Economics and Rural Development, Agricultural University of Athens, 75 Iera odos St., 11855 Athens, Greece*

[3] *Dep. of Apiculture, Institute of Animal Science—National Agricultural Organization DEMETER, 63200 Nea Moudania, Greece*

[4] *Faculty of Agriculture, Vocational School (EPAL) of Edessa, Melinas Merkouri 28, 58200 Edessa, Greece*

marnasidis@pella.gr, garamp@fmenr.duth.gr, malesios@aua.gr, fhatjina@instmelissocomias.gr, apkantar@fmenr.duth.gr, verikouki@sch.gr

Abstract

Honeybees are closely linked with natural and agricultural ecosystems, due to their ability to pollinate many food crops and native plants worldwide, particularly in intensively cultivated areas. Greece is a country where pollination services are hardly developed. Using data from the Regional Unit of Pella in Greece, as well as a number of measurable indicators, the current paper investigates, for the first time in this country the economic valuation and the adequacy of crop pollination services by honeybees. Our results demonstrate that for the 28 insect pollinated crops examined in the study, the commercial value of pollination services was estimated at €89.34 million by means of the net income method; in addition, the economic value of pollination services for the year 2018, that could be attributed to honeybees based on the available number of hives, was found to be equal to €26.9 million. From our analysis it also emerged that apples and kiwifruit plants were the crops with the highest value of pollination services per hectare, which amounted to €10,350.24 and €9,059.23, respectively. Another important finding of the research is that the total hive stocks available are insufficient to cover even half of the demand for honeybee pollinated crops. Especially as sweet cherry trees frequently fail to set fruit, the total hives available at a Regional Unit level were found to be sufficient enough to cover only 66.5% of pollination needs.

Key words: Apiculture, honeybees, pollination services, agricultural development.

JEL Codes: Q00, Q01, Q50, Q57, Q58.

Applying Factor Analysis and Structural Equation Models for urban parks in Greece: The relationship between motives and perceived characteristics, satisfaction and future visit

George Halkos[1], Aikaterini Leonti[2] & Eleni Sardianou[2]

[1] *Laboratory of Operations Research, Department of Economics, University of Thessaly, 28hs Octovriou 78, 38333 Volos, Greece*

[2]*Department of Economics and Sustainable Development, School of Environment, Geography and Applied Economics, Harokopio University, El. Venizelou 70, 17671 Athens, Greece*

halkos@econ.uth.gr, aleonti@hua.gr, esardianou@hua.gr

Abstract

Understanding the motivations for moving to specific locations is a complex process. This article examines the possible relationships between the satisfaction of visitors to two urban parks in Greece and the motivation to visit, as well as their perceptions of the parks. The relationship between visitor satisfaction and future visit is also studied. The total sample consisted of 761 urban parks visitors in Attica. For the purposes of the research, *Exploratory Factor Analysis*, *Confirmatory Factor Analysis* and *Structural Equation Models* were applied. According to the results, three factors were extracted for the motivation to visit the urban parks and five factors for the perceived characteristics of the parks. Motives for the visit were found to affect visitor satisfaction, which statistically significantly affects the probability of revisiting urban parks. It is also interesting the fact that the perceived security provided in the urban parks that were studied as well as the improvements that could be made in the parks have a positive effect on the degree of visitor satisfaction. On the contrary, the perceived negative effects that come from the parks negatively affect the satisfaction.

Keywords: Motives, Perceived characteristics, Urban Parks, Factor analysis, SEM.

JEL Codes: Q01, Q51, Q58, Z30.

Hunting Economics as a subdiscipline of Forest Economics

Konstantinos G. Papaspyropoulos
Laboratory of Forest Economics, Department of Forestry and Natural Environment, Aristotle University of Thessaloniki, 54124
kodafype@for.auth.gr

Abstract
The classic forest economics discipline has emerged from Germany's Martin Faustmann who in 1849 presented the Faustmann Formula (FF). But it was until 1970's that the methodology started to become popular when Samuelson presented that Faustmann's Land Expectation Value (LEV) is the unique correct method for finding the optimal rotation age in a forest stand. Forest economics golden rule (FF) says that the optimal rotation age for a forest stand is when LEV is maximized, and the Marginal Revenue Product and Marginal Cost are equal. This approach is timber oriented as it assumes that profit maximization for the forest owner is only derived from the management of wood resources. Thus, other forest values have been usually neglected, although researchers like Hartmann have enhanced FF with non-timber forest products (NTFP), where there is a consumption value (excluding forest ecosystem services without a market price). The consumption of hunted species, as a NTFP and a provisional ecosystem service, can add value to the landowner through hunting activity. This activity may be, sometimes, the only product that can be profitable in forest land where timber is not managed, or non-existent, like areas in the Mediterranean region. Therefore, the purpose of the present research is to find out how hunting has been included and used in the FF, which other approaches of hunting economics have been used in the literature, and to propose further research in the so called in the literature Post-Faustmann Forest Resource Economics.

Keywords: Forest resource economics, hunting, Land Expectation Value, optimal rotation age, Faustmann Formula.

JEL Codes: Q23, Q57, Q21, Q24.

Modelling the transition dynamics of the socio-technical urban mobility system

Vasiliki V. Georgatzi & Yeoryios Stamboulis
Department of Economics, University of Thessaly, Volos, Greece
vageorgatzi@uth.gr, ystambou@uth.gr

Abstract
Urban Mobility (UM) is in a state of transition, in an era of digitalization and climate change. Several researchers have analyzed the transition of UM through qualitative and quantitative approaches, focusing mostly on technological change and, less on changes of the mode of mobility. Digitalization and business model disruption have attracted less attention. In this paper, we aim to view change in UM adopting the holistic multi-level perspective of socio-technical transition in combination with a triple helix analysis. More specifically, we present a model of the transition from the current state of the dominant regime based on internal combustion engine technology and private car to a new one where new modes of mobility (ride hailing, car sharing) challenge incumbent ones (private car, taxi, public transport), and new technologies arise as niche-innovations (electric vehicles, ICTs) in the UM system, so as to lead to sustainability. We present a system dynamics model of the transition, based on stock and flow diagrams, facilitating the exploration of different scenarios and policy mixes.

Keywords: System dynamics, transition, urban mobility modes, helices, sustainability.

JEL Codes: O33, Q56, R40.

Methodology approach for the development of an online tourism app: CULSTAGE

Zacharoula Andreopoulou[1], Konstantinos Ioannou[2], Christiana Koliouska[1], Evangelia Karasmanaki[3], Georgios Tsantopoulos[3] & Kleanthis Xenitidis[3]

Department of Forestry and Management of the Environment and Natural Resources, Democritus University of Thrace, Pantazidou 193, Orestiada, 68200, Greece

kleodrama@gmail.com, randreop@for.auth.gr, ioannou.konstantinos@gmail.com, ckolious@for.auth.gr, evagkara2@fmenr.duth.gr, tsantopo@fmenr.duth.gr

[1] *Laboratory of Forest Informatics, School of Forestry and Natural Environment, Aristotle University of Thessaloniki, Box 247, 54124, Greece*

[2] *National Agricultural Organization –"DEMETER", Forest Research Institute, Vasilika, Thessaloniki, 57006, Greece*

[3] *Department of Forestry and Management of the Environment and Natural Resources, Democritus University of Thrace, Pantazidou 193, Orestiada, 68200, Greece*

Abstract

The project "Stage for Cross Border Culture – CULSTAGE" highlights the importance of alternative tourism development in the area of Paggaion Municipality, which is near the Cross Border (CB) area of Greece and Bulgaria. The area is mostly famous among tourists for its natural resources while it possesses a big potential to expand tourism into alternative forms. Many, century old monasteries are located in the region which have visitors on daily basis. The project introduces a well-structured and standardized methodology for promoting effective and sustainable usage of cultural and natural heritage and upgrading tourism in the area. This is achieved through an innovative approach which incorporates religious tourism development including the following activities: improvement of cultural infrastructure (by means of restoration works in monasteries both in Greece and Bulgaria), popularization of religious destinations and development of a Decision Support System (DSS) in the form of a Web application and a Smart Phone application which can help visitors in navigating throughout the region while at the same time it can help the local authorities to improve the offered regions' tourist product. For the investigation of both residents' and visitors' perceptions regarding local development, questionnaires were distributed to the population of the Paggaio municipality as well as the areas' visitors during the summer of 2020. The web application includes detailed statistics regarding the data gathered from the questionnaires as well as real time data created by the application users. The project results include, among other, detailed information regarding tourist behavior, visitor priorities, identification of visitor preferences regarding locations as well as a comprehensive tourist management tool.

Keywords: CULSTAGE, alternative tourism, Decision Support System, web application, local development.

JEL Codes: O3, Z32, O2.

Vulnerability Assessment to Desertification in Greece Using Composite Indicators.

Demetrios E. Tsesmelis[1,2], Efthimios Zervas[1] & Christos A. Karavitis[2]

[1] *Hellenic Open University, Laboratory of Technology and Policy of Energy and Environment, Parodos Aristotelous 18, 26335, Patra, Greece*

[2] *Agricultural University of Athens, Laboratory of agricultural hydraulics, Iera Odos 75, 11855 Athens*

tsesmelis@aua.gr, zervas@eap.gr, ckaravitis@aua.gr

Abstract

The Environmentally Sensitive Areas (ESA) composite index estimates a region's vulnerability to desertification through the analysis of various parameters, such as soil, geology, vegetation, climate, and man-made activities. Each of these parameters is categorized and each factor has weightings for each category. ESAI is divided into four categories: soil quality, climate quality, vegetation quality and management quality. After calculating the four indicators for each quality, vulnerability to desertification is assessed. The Greek area appears degraded with several areas facing significant risk. The period considered for implementation in Greece is from 1971 to 2004. This period, in which there have been various changes, such as the increase in cultivated land in the agricultural distribution, was noted as the driest period of the last 100 years (mainly between 1988 and 1993). in addition, there has been an increase in agricultural water demand due to crop growth and the intensification of agriculture.

Keywords: Desertification Vulnerability, Composite Indicators, Spatial Analysis; Natural Resources Management, Environmental Management.

JEL Codes: O13, P28, P48, Q24, Q25.

LISTS OF PARTICIPANTS

PARTICIPATING BODIES Academic and Research Institutions & Organizations	
1	Agricultural University of Athens
2	Aristotle University of Thessaloniki
3	Athens University of Economics and Business
4	ATHENA Research Center
5	Centre for Renewable Energy Sources and Savings
6	Democritus University of Thrace
7	Eötvös Loránd University
8	Harokopio University
9	Harper Adams University
10	Hellenic Open University
11	Leibniz University Hannover
12	Linkoping University
13	Manchester Metropolitan University
14	National Agricultural Organization DEMETER
15	National Technical University of Athens
16	Panteion University of Social and Political Sciences
17	Small Enterprises of GSEVEE
18	UN SDSN
19	UNIDO
20	Universitat de Girona
21	University of Gavle
22	University of Gothenburg
23	University of Patras
24	University of Southeastern Norway

25	University of the Aegean
26	University of Thessaly
27	University of West Attica
28	Vocational School (EPAL) of Edessa

Academic and Research Participants		
No	**Full Name**	**University/Organization**
1	Andreopoulou Zacharoula	Aristotle University of Thessaloniki
2	Arabatzis Garyfallos	Democritus University of Thrace
3	Arvanitidis Paschalis	University of Thessaly, Hellenic Open University
4	Asprogerakas Evangelos Ch.	University of Thessaly
5	Bithas Kostas	Panteion University of Social and Political Sciences
6	Botzoris George	Democritus University of Thrace
7	Chatzistamoulou Nikos	Athens University of Economics and Business, University of Patras
8	Choropanitis Ioannis	Centre for Renewable Energy Sources and Saving
9	Danatskos Christos	Aristotle University of Thessaloniki
10	Daoutis Christodoulos	Democritus University of Thrace
11	Diamantis Vasileios	Democritus University of Thrace
12	Do Manh Hung	Leibniz University Hannover
13	Dritsas Sophocles E.	University of Thessaly
14	Economou Agisilaos	Hellenic Open University, National Technical University of Athens
15	Economou Athina	University of Thessaly
16	Economou Emmanouil M.L.	University of Thessaly
17	Eftaxias Alexandros	Democritus University of Thrace
18	Evangelinos Konstantinos	University of the Aegean
19	Falk Martin Thomas	University of Southeastern Norway
20	Fotiadis Stefanos	University of the Aegean
21	Gareiou Zoe	Hellenic Open University
22	Georgatzi Vasiliki V.	University of Thessaly
23	Giannarou Sofia	Hellenic Open University
24	Gkargkavouzi Anastasia	University of Thessaly
25	Grote Ulrike	Leibniz University Hannover
26	Gutiérrez Olesti Jacinta	Universitat de Girona
27	Halkos George	University of Thessaly

28	Hatjina Fani	National Agricultural Organization DEMETER
29	Helgadóttir Guðrún	University of Southeastern Norway
30	Hortay Olivér	Eötvös Loránd University
31	Iliopoulou Polixeni	University of West Attica
32	Ioannou Konstantinos	National Agricultural Organization DEMETER
33	Kantartzis Apostolos	Democritus University of Thrace
34	Karasmanaki Evangelia	Democritus University of Thrace
35	Karavitis Christos A.	Agricultural University of Athens
36	Karytsas Constantine	Centre for Renewable Energy Sources and Saving
37	Karytsas Spyridon	Harokopio University, Centre for Renewable Energy Sources and Saving
38	Katsardi Vanessa	University of Thessaly
39	Kitsos Christos	University of West Attica
40	Koliouska Christiana	Aristotle University of Thessaloniki
41	Kostakis Ioannis	Harokopio University
42	Koundouri Phoebe	Athens University of Economics and Business, ATHENA Research Center, UN SDSN
43	Kounetas Kostas	University of Patras
44	Kyriazis Nicholas C.	University of Thessaly
45	Latinopoulos Dionysis	Aristotle University of Thessaloniki
46	Leal Walter	Manchester Metropolitan University
47	Leonti Aikaterini	Harokopio University
48	Liakou Hariklia	University of West Attica
49	Liotiris Christos	Aristotle University of Thessaloniki
50	Malesios Chrisovalantis	Agricultural University of Athens
51	Maragkaki Vasileia	Hellenic Open University
52	Marnasidis Simeon	Democritus University of Thrace
53	Maroulis Georgios	Panteion University of Social and Political Sciences
54	Matsiori Steriani	University of Thessaly
55	Mentis Charalampos	Panteion University of Social and Political Sciences
56	Michmizou Maria	University of Thessaly
57	Mitoula Roido	Harokopio University

58	Moll de Alba Jaime	UNIDO
59	Naxaki Anastasia	Aristotle University of Thessaloniki
60	Nguyen Duy Linh	Leibniz University Hannover
61	Nguyen Thanh Tung	Leibniz University Hannover
62	Nguyen Trung Thanh	Leibniz University Hannover
63	Nikolaou Ioannis	Democritus University of Thrace
64	Nisiotis Constantinos-Symeon	University of West Attica
65	Oikonomou Theoni	Centre for Renewable Energy Sources and Saving
66	Paparas Dimitrios	Harper Adams University
67	Papaspyropoulos Konstantinos	Aristotle University of Thessaloniki
68	Papavasileiou Angelos	Harokopio University
69	Paraschi Dionysia Evgenia	Hellenic Open University
70	Polyzou Olympia	Centre for Renewable Energy Sources and Saving
71	Profillidis Vassilios	Democritus University of Thrace
72	Provatari Sofia	Harokopio University
73	Rigas Nikos	University of Patras
74	Saiti Anna	University of West Attica
75	Sardianou Eleni	Harokopio University
76	Skouloudis Antonis	University of the Aegean
77	Spiliotopoulos George	University of Thessaly
78	Stamboulis Yeoryios	University of Thessaly
79	Stathi Eleni	Aristotle University of Thessaloniki
80	Stefkovics Ádám	Eötvös Loránd University
81	Stergiou Eirini	University of Patras
82	Sterner Thomas	University of Gothenburg
83	Theodoropoulou Eleni	Harokopio University
84	Thollander Patrik	Linkoping University, University of Gavle
85	Todorov Valentin	UNIDO
86	Trevlopoulos Nikolaos	Democritus University of Thrace
87	Tsadiras Athanasios	Aristotle University of Thessaloniki
88	Tsalis Thomas	Democritus University of Thrace

89	Tsantopoulos Georgios	Democritus University of Thrace
90	Tsatiris Michael	Democritus University of Thrace
91	Tsekouras Kostas	University of Patras
92	Tsesmelis Demetrios E.	Hellenic Open University, Agricultural University of Athens
93	Tsilika Kyriaki	University of Thessaly
94	Tsipouras Leonidas	University of Thessaly
95	Vatikiotis Leonidas	Hellenic Open University, Small Enterprises of GSEVEE
96	Verikouki Efstathia	Vocational School (EPAL) of Edessa
97	Vougioukalakis Emmanouil	Hellenic Open University
98	Vouros Panagiotis	University of the Aegean
99	Xenitidis Kleanthis	Democritus University of Thrace
100	Zervas Efthimios	Hellenic Open University