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Green investment, natural resource, economic growth and financial inclusion in China

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Financial inclusion not only helps individuals and families, but it helps in developing the entire communities and augment the pace of economic growth through inclusiveness, thus helps in reducing the inequality and poverty. Financial inclusions significantly helps in achieving sustainable development goals. Therefore, the current study aims at identifying the role of green investment, natural resources and economic growth on financial inclusion in the context of China. The quarterly data for the study variables is collected from different sources from 1990 to 2018 and the novel technique of Quantile Autoregressive Distributed Lag (Q-ARDL) is employed to observe the relationships among variables. The findings revealed that green investment, natural resources and economic growth are all significant in explaining the financial inclusion in China. Moreover, the causality analysis discovered a bidirectional causality running from green investment and economic growth to financial inclusion. However, a unidirectional causality is found

from natural resources to financial inclusion in the case of China. Practical policy implications are suggested in line with the study findings.

Keywords: Green investment; Natural resource; Economic growth; Financial inclusion; QARDL

Role of green investment, information and communication technology development, economic growth in carbon emission in China

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In order to achieve the sustainable development, carbon neutrality has remained the objective of almost all the economies in the world. Likewise, to better analyze China's carbon neutrality target, this study aims to determine the role of Green Investment (GIN), Information and Communication Technology (ICT), Economic Growth (GDP) and the square of GDP on carbon emissions on provincial and regional data of China from 2000 to 2018. The inclusion of the squared term also provides the opportunity to test the existence of the Environmental Kuznets (EKC) in China. This study has employed Westerlund and Edgerton's panel cointegration test to investigate the existence of a long-run relationship between carbon emission and its included determinants. The study has found, in the presence of structural break of the financial crisis of 2008, green investment, ICT development, economic growth and carbon emission to be cointegrated. Further, the EKC hypothesis has proved to be valid in case of China. In the long-run, economic growth

has been found to be a main contributor of carbon emissions. The findings recommend the need of the Chinese economy to switch to more energy efficient and sustainable sources of growth for sustainable development. China should switch its investments to green investments through energy efficient ways.

Keywords: Green investment; Information & communication technology development; Economic growth; Carbon emission

Green complexity, economic fitness and environmental degradation: evidence from U.S. state-level data

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Green production is one of the major debates as the environmental degradation poses threats globally. The paper attempts to explore the relationship between green economy and environmental quality by using Economic Fitness approach. We develop a Green Complexity Index (GCI) dataset consists of 295 traded green labeled products for US States between 2002 and 2018. We analyze the environmental performance of green production using the GCI data at the sub-national level. Findings indicate that exporting more complex green products has insignificant effects on local (i.e., Sulfur dioxide, Particulate Matter 10) and global pollutants such as Carbon dioxide (CO₂) even accounting for per capita income. Yet, overall economic complexity has a significant negative impact on the emission levels implying that sophisticated production significantly improves environmental quality in the US. The insignificant impact of GCI on environmental degradation suggests that green product

classifications should incorporate the production and end-use stages of goods to limit the adverse environmental effects of green labeled products. The study therefore provides policy implications for green industrial policies.

Keywords: Green Complexity; Economic Complexity; Sub-national level; SO₂; PM₁₀; CO₂ emissions

The green paradox phenomenon: a European Union empirical application

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The green paradox describes an undesirable and socially inefficient phenomenon caused by the expansionary reactions of the Supply as a response to the various mechanisms that combat climate change. This article seeks to understand and aggregate the different drivers of this phenomenon portrayed in the literature, as well the empirical evidence associated and the proposed solutions. For this purpose, compilation and systematization of the various scientific contributions up to date in this context have been elaborated, which led to the identification of five major drivers of the paradox: (i) Environmental Taxes, (ii) Green Supports, (iii) Uncertain Property Rights, (iv) Temporal Lag and (v) Emission limits (Cap). Moreover, we evaluate its effective impact on the European scenario in the last two decades, and we have obtained evidences that the hiatus in the implementation of the European emission cap mechanism has generated a strong green paradox. Moreover, a robust reflection regarding the economic and environmental adequacy of green supports should be considered due to its questionable net

benefits. Lastly, we offer some recommendations of public environmental policies that escape the paradoxical phenomenon, through the enunciation of the conditionalities of these provocateurs.

Keywords: green paradox; externalities; environmental taxes; emission limits; non-renewable resources; energy policy

Empirical research about applying the concept of green economy in SMEs in the Republic of North Macedonia

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Although the pandemic further complicates the situation in the Macedonian economy, it gives an advantage for development of the concept of green economy that is, by efficient use of resources and respect for the principles of natural laws to find new technological and innovative solutions that will contribute in generating income, creating new jobs and different model of consumption than the previous one. Given this, the main purpose of the paper is to analyze the SMEs in terms of the ability to apply and develop the concept of green economy, i.e. identify the opportunities and challenges faced by SMEs in terms of adopting green policies in its operations. The methodology of research is based on primary data obtained from previously prepared, structured questionnaire, submitted to small and medium enterprises in the Republic of North Macedonia. In order to

perceive the current situation, questions were referred to awareness and knowledge of SMEs on environmental regulation and application of environmental practices and principles of green economy in their operations. The analysis showed that SMEs have an obvious lack of information on how SMEs can apply the concept of green economy in their operations and are facing with complex administrative procedure in implementing environmental practices and strict rules if they want to do more than the legally prescribed requirements. This can be explained by the fact that many small and medium-sized enterprises are subject to the same environmental regulatory regime as large enterprises. Despite the modest external support, most of the surveyed companies take measures for more efficient use of resources in order to save and reduce costs. Therefore, it is necessary to create a regulatory framework for green economy in North Macedonia by bringing clear and appropriate documents with specific activities and measures, harmonized with EU standards, increase of investments in the sectors of agriculture, energy, tourism, transport and raising the awareness of SMEs about the need to implement higher environmental standards and the concept of green economy in general in order to improve competitiveness.

Keywords: green economy, SMEs, Republic of North Macedonia

Tourism, emissions and energy consumption: studies carried out to date

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Tourism was one of the most relevant activity in world economy before the COVID pandemic. It accounted for 10.4% of world GDP in 2019, generating 334 million jobs (WTTC, 2020). Although the sector's production has decreased to 5.5% of world GDP, losing 62 million jobs in 2020, most experts consider it possible to return to pre pandemic levels in 2023 or 2024 (UNWTO, 2021). Nevertheless, the positive effect on economy has been accompanied by the detrimental effects of environmental degradation by increasing CO₂ emissions (Akadiri et al., 2019). Lenzen et al., (2018) estimated that tourism was responsible for 8% of global CO₂ emissions in 2013. In fact, the tourism activities declined due to pandemic have reduced 8% in CO₂ emissions in 2020 (IEA, 2020). The global vaccination process and the recent opening of many countries to tourism make this activity begin to recover once again, which can foreseeably affect the emissions growth if it is not acted on

quickly. In this sense, the UNWTO and ITF (2019) calculated prior to pandemic that emissions related to tourism was going to increase by 25%, by 2030. The main causes of these tourism negative effects on the environmental degradation have been mainly linked to the sectoral energy consumption, especially related to transport (Sun et al., 2019).

To avoid these negative effects and contribute to the global goal of limiting growth of temperatures, it is necessary to adopt changes in the tourism activities for which is necessary to previously know how are the relationships that exists between tourism, emissions, and energy consumption. To date, many studies have been undertaken referring to different country samples and time periods, by using different methodologies and studies variables. The objective of this paper is to revise this extend previous literature with the aim to synthesize their results, allowing for a better understanding of the problem. The starting point of the literature review has been the previous research search. In this study, a meticulous search has been carried out of the studies that have been carried out from an academic point of view on this subject. Initially, the Google Academic link has been used including in the search words such as energy, tourism, and emissions of CO₂. Secondly, the founded studies have been completed by reviewing the references list of the initially selected papers. This search has been undertaken until 31 December 2020. Once all studies have been selected, the studies have been analyzed to find the publication date, the country sample, the time-period of the study, the methodology employed, the variables used and the results. Several Tables related to the

findings have been elaborated to facilitate the whole study. The number of studies founded have been 79, mostly published from 2014. The majority number of studies analyses the causal relationships between variable, but also estimate in addition the long run and/or short run relationships between variables. These studies account for 46. The smaller number of studies just analyze the causality links between two or more variables (only 11). It is worth also noting, that many recent studies test no-linear relationships between the variables, mostly by testing the tourism EKC or Energy-EKC hypothesis. A total of 28 studies have been founded.

Regarding the variables used, most of them use the tourism arrivals to measure the tourism variable, although tourism expenditure and international receipts have been also frequently used, many times in addition to tourism arrival variable. The dependent variable of estimates is usually the CO₂ emissions (more than 80% of total studies), but energy consumption is sometime used. In those studies, using energy consumption do not include the CO₂ emissions one. The tourism variable (97%), the energy consumption (64%) and GDP are usually the independent variables used (80%), while CO₂ emissions are sometimes used (26%). Regarding the methodology, there are a similar number of time series and panel data one, being the studies usually related to tourism countries or island. It is worth noting the large number of studies related to Turkey. The results are very dispersed, showing causality of the variables (emissions-tourism) in both directions. There is mostly a negative effect of tourism on emissions, when empirical

estimates are made, although a few find positive effects on these emissions. When analyzing the EKC hypothesis for tourism, there is no clear result of its existence or not. It is necessary to deepen the analysis of these results, in which the authors continue working.

Keywords: Tourism; Emissions; CO₂; Energy; Literature Review

Exploring the links between tourism growth and environmental pollution: perspectives at a regional European level

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The present study intends to explore the impact of tourism on air pollution at a regional level for five of the most important Mediterranean tourism European countries: France, Spain, Greece, Portugal, and Italy. Most of the studies found in literature examine this relationship on a national scale, while this research focuses on a regional basis, referring to the NUTS 2 classification developed by the European Union. The analysis is conducted using three air pollutants (NO_x, PM₁₀, and PM_{2.5}), over a ten-year period that goes from 2009 until 2018. This work means to investigate evidence of a tourism-induced Environmental Kuznets Curve (EKC) for the countries through the construction of five panels, one for each country, which include different variables: the

Gross Domestic Product, the energy consumption, and the number of nights spent at tourist accommodation establishments from both residents and foreign tourists. The Levin-Lin-Chu unit root test proves the variables to be stationary, whilst the Pedroni cointegration test shows that they are integrated. The Pooled OLS Estimator is employed throughout the countries to check the relationship among the variables. Other models are employed whenever the first one is not able to statistically explain some of the variables included in the model. The tourism-induced EKC hypothesis is not validated for none of the countries: the findings show that in Portugal, Italy, and Greece there is a negative relationship between economic growth and environmental pollution, while mixed evidence is found for France and Spain. The Granger panel causality test is then conducted to see the causality among the variables.

Keywords: Tourism; Air Pollution; NUTS 2 Regions; Mediterranean European countries; Tourism-Induced; Environmental Kuznets Curve

Revisiting the relationships between income inequality and CO2 emissions: evidence from the United States

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This study re-examines the relationship between income inequality and CO2 emissions by controlling gross domestic production per capita, population, and human development index and for the ten US states with the highest income inequality from 1990 to 2018. To this end, we use the Cross-Sectional Autoregressive Distributed Lags (CS-ARDL) technique that addresses cross-sectional dependency and eliminates the unit root bias problem. The empirical findings demonstrate that a negative association between income inequality and CO2 emissions as well as gross domestic production per capita in the long run. In contrast, human development index is contributing positively and significantly to CO2 emissions.

Keywords: Income inequality; Carbon emissions; CS-ARDL; USA

Effect of financial inclusion, eco-innovation, globalization and economic growth on ecological footprint: fresh evidence from MENA countries

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This research seeks to explore the effects of financial inclusion, eco-innovation, globalization and economic growth on ecological footprints in the Middle East and North African (MENA) countries using recent data. In order to achieve this objective, the data for MENA countries is taken from 1990 to 2018 from different sources. The cross-sectional dependency is tested using second generation tests for robust analysis. The study findings after applying Augmented Mean Group (AMG) estimation approach revealed that financial inclusion and eco-innovation significantly overcome the problem of the environmental degradation, while globalization and economic growth are more responsible for the environmental damages. Moreover, Dumitrescu and Hurlin (D-H) causality test revealed that there exists bidirectional causality between financial inclusion, economic growth and ecological footprint. However, unidirectional

causality is running from globalization to ecological footprint. Finally, some policy suggestions related to inclusive growth, eco-innovation, globalization and good growth are proposed and future research directions are also discussed for these economies.

Keywords: Financial inclusion; Eco-innovation; Globalization; Economic growth; Ecological footprint; MENA countries

An investigation into the role of fiscal decentralization and globalization on greenhouse gas emissions in China

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Climate warming has widely attracted the attention of research scholars and practitioners since it has affected the human life and the whole eco-system significantly. With the rise in the economic activities and globalization, environment is severely affected and fiscal decentralization, being an institutional factor, plays a crucial role in controlling the greenhouse gas (GHGs) emissions. Taking this into consideration and China's rapid economic growth and environmental pollution, the current study is an attempt to investigate the role of fiscal decentralization and globalization (economic, social and political) in GHGs in China. The data is collected for 30 provinces of China from 2005 to 2017 and spatial panel and dynamic threshold panel models are employed to investigate the effect of fiscal decentralization and social, political and economic globalization on GHGs. The findings indicate that there exists a significant positive spatial correlation among regional GHGs in China.

Likewise, fiscal decentralization and globalization positively affect GHGs in China. This implies that current fiscal decentralization system in China is ineffective in combatting GHGs in China. Therefore, it is proposed that environmental management mechanisms must be developed for collective control and prevention of GHGs in China.

Keywords: Fiscal decentralization; Social globalization; Economic globalization; Political globalization

Impact of agricultural development, technological innovation, forestry, and economic growth on environmental degradation: fresh evidence from E-7 countries

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Environmental degradation has become a serious concern for mankind over the past few decades. The distinctive nature of the contemporary environmental problems is that these are caused by anthropogenic phenomenon. Deforestation and shift of agriculture based economies to more commercial and industrialized economies and economic growth has intensified the environmental problem. Hence, the current research attempts to study the impacts of agriculture development, technological innovation, forestry and economic growth on environmental degradation in the context of emerging seven (E-7) economies. For said purpose, panel data from 1990 to 2019 is collected for E7 economies. Employing the recent appropriate econometric techniques, this study has discovered negative and significant effect of agricultural development, technological innovation, and forestry

on CO2 emissions (a proxy of environmental degradation). However, economic growth is found to be a positive contributor in environmental degradation in E7 economies. The study proposed to enhance agriculture development and forestry along with technological innovation for a better tomorrow and clean environment.

Keywords: Agricultural development; Technological innovation; Forestry; Economic growth; Environmental degradation

Energy consumption, CO2 emissions and economic growth nexus: evidence from panel data for Gulf Cooperation Council Countries

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The paper examines the nexus between economic growth, energy consumption and carbon dioxide emission (CO₂) in the Gulf Cooperation Council (GCC) countries (Qatar, Kuwait, Kingdom of Saudi Arabia, United Arab Emirates, Oman, and Kingdom of Bahrain). We used yearly data covering 1980-2020 and employed panel unit root tests, panel cointegration methods and panel causality test to investigate the relationship between the variables, Energy Consumption (EC), GDP and CO₂ emissions, for GCC countries. Results show no causal link between GDP and EC, and between CO₂ emissions and EC in the short-run. However, there is a unidirectional causality running from GDP and CO₂ emissions to EC in the long-run. Moreover, we used the FMOLS and the DOLS approach to estimate the long-run coefficients to deal with the heterogeneity in countries and the endogeneity bias in regressors.

Keywords: GCC countries; Energy consumption; Economic growth; CO₂ emissions; Panel cointegration; Panel causality

Impact of coal rents, transportation, economic globalization, electricity consumption on ecological footprint in the USA

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The phenomenon of the sustainability of globalization is a disputed subject. The evidence on the effects of economic globalization on the ecological environment does not provide clear patterns; various dimensions of globalization have different effects on various pollutants. Also, natural resources have proved to be a blessing in some countries and curse in others. In addition, transportation and energy consumption are among the largest contributors of environmental pollution. Therefore, the current study highlights these important issues and examines the impacts of coal rents, transportation, economic globalization, electricity consumption on ecological footprint in the United States of America (USA). The data is taken from different sources for all the study variables. The Quantile Autoregressive Distributed Lag (QARDL) approach is employed to investigate the issue and the findings revealed that coal rents, transportation, economic globalization, electricity generation positively and significantly influence the carbon emissions in

the USA. The research proposed to introduce energy efficient technologies for electricity generation and transportation to reduce the negative environmental effect. The study proposed future research recommendations as well.

Keywords: Coal rents; Transportation; Economic globalization; Electricity consumption; Ecological footprints

Assessing willingness to pay for electricity from renewable energy sources: a case study of east coast peninsular Malaysia

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The growing population leads to enhance electricity consumption at the same time the dependence on fossil fuel resources is increasing that is linked with climate change. As a result, it has driven for the development of renewable energy which is a top priority of the most country since its more environmentally friendly resources. Although Malaysia has promoted various forms of renewable energy but the consumption still at the low levels. Therefore, this study aims to investigate the consumers' willingness to pay (WTP) for renewable energy among household in Malaysia. This study also identifies other factors that can influence consumers' WTP for renewable energy. By applying the contingent valuation method, the findings able to determine that consumers' WTP for renewable energy is significantly influenced to the price, income, confident level and education. Research at this level can assist the government in creating a useful framework to ensure the sustainable development in future.

Keywords: Willingness to pay; renewable energy; contingent valuation method; Malaysia

Turkey's role in the South Caucasus: regional politics, environment, and shared water resources

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Turkey's rising importance in the South Caucasus regional politics since the collapse of the Soviet Union has been subject to numerous studies in the literature. The 2020 Nagorno-Karabakh war in which Turkey supported Azerbaijan intensified the debates about regional integration and political rivalries in the region. In the changing geopolitical setting in the South Caucasus, where Turkey's political weight tends to increase, Turkey's regional environmental policies contradict its cooperation and friendly relations with the regional states, especially with Georgia and Azerbaijan. Taking a recent hydropower development project in the Kura-Araks river basin initiated by the government of Turkey as a case study, this study intends to review Turkey's environmental policies in the region in connection with its political ties with the regional countries. Scrutinizing Turkey's environmental policies within the broader conceptual framework of hydrohegemony, this paper finds some signs of Turkey exerting its soft power distributively by exploiting the current and historical issue-linkages and

benefit-sharing options. As this paper aims to show, the intention to act like a hydrohegemon in the South Caucasus will negatively impact Turkey's leadership position in regional cooperation and strategic partnerships with the riparians in the Kura-Araks River Basin, especially Azerbaijan and Georgia.

Keywords: South Caucasus; Kura-Araks River Basin; hydrohegemony; hydropolitics; electricity trade

Impact of population mobility on electricity generation and consumption in Russian cities in the context of the spread of Covid-19

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The main goal of this study is to evaluate the impact of restrictive measures introduced in connection with COVID-19 on consumption and, accordingly, on electricity generation in Russian cities, which were most susceptible to outbreaks of the coronavirus infection (Moscow, St. Petersburg, Yekaterinburg and Nizhny Novgorod). Currently, based on available data, the mobility of the population has decreased resulting in lower demand for electricity during self-isolation. Therefore, the study will be based on the hypothesis that similar changes in human behavior can be expected in the future with further spread of COVID-19 and/or the introduction of additional quarantine measures in major cities around the world. The analysis also yielded additional results: the strongest reductions in energy generation occurred in cities with high building density (7% in Moscow, 14% in Yekaterinburg). Furthermore, the decrease in energy generation in cities with low building density was not

so dramatic (1% in St. Petersburg, 0% - Nizhny Novgorod). The study uses two models created with Keras LSTM. The first model forecasts power generation and uses 76 parameters. The second LSTM model forecasts new COVID-19 cases across countries, in which 10 parameters are involved.

Keywords: energy economics; power resources; energy sustainability; energy optimization

Mean and variance causality between bitcoin returns and electricity consumption

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Bitcoin is a crypto asset created by Satoshi in 2008 to enable peer-to-peer payments. Due to the sudden increases and decreases in the price of Bitcoin, a lot of work has been done in the literature to determine the factors affecting its price. However, studies examining the relationship between energy consumption, which is used as the main cost factor in determining the price of Bitcoin, and Bitcoin price are still limited. As a result of the basic algorithm (POW) used by Bitcoin, it consumes a significant amount of electricity and this consumption is thought to be reflected in the prices. As a natural consequence of this situation, investors pay close attention to the relationship between electricity consumption and price of Bitcoin. This study attempts to investigate the relationship between Bitcoin returns and the amount of electricity consumed applying time varying causality-in-mean and causality-in-variance tests developed by Hafner and Herwartz (2006). Empirical results indicate that there is evidence of a contemporaneous link between Bitcoin

return and electricity consumption. It was also found that there is a causality relation running from Bitcoin return to Electricity consumption at specific time periods.

Keywords: Energy Consumption; Bitcoin Price; Volatility Spillover Effect; Energy Economics

The electricity market in Asia: do power plants matter?

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This paper examines the relationship between economic growth and electricity production by public and private power plants in Asia. Eight selected Asia countries are grouped into ASEAN countries and non-ASEAN countries. Both linear and nonlinear estimations are used to analyze the relationships between the variables. We conclude that the public power plants are driving more economic growth when the oil price is high. On the other hand, the private power plants are performing well in triggering economic growth when the oil price is low. We recommend the government to improve the efficiency of the grid's transmission system that aims to reduce the transmission and distribution loss. We also recommend the government to offer various incentives to encourage more private power plants to increase the electricity supply.

Keywords: Electricity Production; Power Plants; Economic Growth; Renewable Energy

Economic growth and global warming effects on electricity consumption in Spain: a sectoral study

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The electricity sector was responsible for 38% of total energy-related CO₂ emissions in 2018. Therefore, the analysis of electricity production and consumption evolution is especially relevant. This paper analyzes the effect of certain factors on the electricity consumption in Spain at a sectoral level. An electricity consumption function has been estimated by using panel data, depending on gross value added (GVA), temperatures, capitalization and human capital. This function is obtained for total productive electricity consumption and for the agricultural, construction, industrial, services and public administration sectors, referring to the 17 Autonomous Communities of Spain for the 2000-2013 period. The obtained results show important sectoral differences in the effect that GVA has on electricity consumption, indicating a positive and increasing effect of temperatures above 22°C in the total economy and in the tertiary sector, and a negative effect of temperatures below 18°C in some sectors.

The results also highlight the positive effects of capitalization in all sectors, and the negative effects of human capital, with the exception of the public administration sector. In this context, it may be appropriate to carry out policies that mitigate this consumption growth, reinforcing energy efficiency measures—especially in non-industrial sectors—, and human capital investments.

Keywords: Electricity consumption; economic growth; economic sectors; global warming; Spain; CDD; HDD

Asymmetric effects of socioeconomic characteristics on electricity accessibility: evidence from urban and rural areas in Malaysia

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There have been tremendous achievements in providing greater access to electricity for Malaysian in the last decade, however, villages in the remote heartland are believed to encounter difficulty to connect to the grid due to extremely rocky and challenging terrain. Besides, the communities with early electrification are claimed to rely on the infrastructure to stably supply the electricity. The electricity accessibility also refers to the basic necessity for the people and impact the standard of living which indicates the importance of social factor. Therefore, this study aims to investigate the long-run relationship and asymmetric effects of socioeconomic characteristics (indicators of economic, financial, infrastructure and social) on electricity accessibility in the urban and rural areas. The autoregressive distributed lag (ARDL) and nonlinear autoregressive distributed lag (NARDL) models are analyzed using the annual

data from 1990 to 2018. The results of ARDL model show that human development index (HDI), the proxy for social indicator, possesses a long-run relationship with electricity accessibility among urban and rural population while the indicators of economic (GDP) and financial (credit) are related to urban electricity accessibility in the long run. In addition, the NARDL model indicates the existence of asymmetric effects of HDI, credit and infrastructure on rural access to electricity. Meanwhile, the nonlinear relationship is merely found between credit and electricity accessibility among urban population. This study implies that the policymaker and electricity companies should consider the financial support, infrastructure and social factors to ensure the electricity is interconnected for a nationwide coverage.

Keywords: Electricity Accessibility; Socioeconomic Characteristics; Urban Area; Rural Area; Malaysia

Macroeconomic impact of oil price volatility using ARCH-GARCH-EGARCH model: evidence of Timor-Leste

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The present study applies the Autoregressive Conditional Heteroskedasticity (ARCH), Generalized (GARCH), and Exponential (EGARCH) models to model the oil price volatility and the effect of macroeconomic variables on the economic growth in Timor-Leste during 2003M01-2019M12, including oil prices, Gross Domestic Product (GDP), Consumer Price Index (CPI), interest rate, exchange rates, and money supply. To conform with the ARCH (1) and GARCH (1,1) models for the oil price volatility, the interest rate can lower the oil price. Contrarily, the exchange rate, GDP, and money supply have a positive impact. Results point that an increase in CPI, exchange rate, GDP, and the money supply led to higher oil prices, while an increase in the interest rate decreases the oil price. Meanwhile, the CPI, money supply, exchange rate, and interest rate negatively impact GDP, reducing economic growth. Thus, oil prices and the money supply could influence the Timor-Leste economic

growth. EGARCH (1,1) estimation of the oil price shows that money supply and interest rate could depress the oil price. Symmetrical and asymmetrical techniques have shown that oil prices and economic growth in the Timor-Leste region are volatile. The article recommends that Timor-Leste policymakers consider the impact of oil price volatility and macroeconomic variables to be significant to the economic growth and prevent their negative effects.

Keywords: Macroeconomic Variables; Oil Price; ARCH-GARCH-EGARCH Model

Can natural gas be a contender for the green energy alternatives? An environmental perspective of energy mix in China

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There is an overwhelming amount of recent evidence that reports the increasing dominance of natural gas in the industrial and emerging economy. Owing to its comparatively lower prices it is also considered by a large number of countries as a low cost substitute of oil in their energy mix. However, the most important factor in Natural gas's growing dominance is its less damaging role to the environment due to which some researchers are proposing natural gas as a low cost substitute for the expensive green energy alternatives. In this paper, we investigate about three major questions in the context of china. First one is whether there is any change in the energy mix of China and if yes, is there any substitution of oil with natural gas. The second question is whether this change in energy mix is bringing any betterment for the environment quality in the form of reduced emissions or carbon footprint. And the last is that whether the change in energy mix of China is incurring some additional economic cost in the form of subdued economic growth or vice versa. Given the inherent asymmetry

in the relationship between variables we decide to utilize nonlinear autoregressive distributed lag model (NARDL) supported with second generation econometric methodologies. Our results are interesting and confirms the changes in the energy mix of China with an increasing dominance of natural gas. It is also visible in certain settings that this change may be helping improving environmental quality in China, however, the economic benefits of this change in energy mix could not be confirmed.

Keywords: China; Natural Gas; Environmental Quality; Economic Costs

Impact of LNG exports on Qatar's GDP

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Qatar has the third-largest natural gas reserve in the world and the country is the largest exporter of LNG in the world. Therefore, revenues from gas exports constitute an important part of total economic activity. This paper estimates the impact of natural gas exports and gas prices on the real GDP of Qatar. The model finds that the volume of gas exports has a statistically significant impact on real GDP in alternative models. However, gas prices do not seem to have a statistically significant impact on real GDP except the baseline model. This paper also provides a brief policy discussion about the future economic prospects of Qatar based on these results.

Keywords: Qatar; GDP; LNG; Energy; Macroeconomics

On how export quality alters the economic growth and energy use: non-linear evidence through regime shifts

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Since export has a key role in economic growth in terms of national production quantity, export quality can be considered another important factor regarding the revenue from the export product (Gao et al. 2014; Bas and Kahn 2015; Sultanuzzaman et al., 2019). Hence, both export and export quality can contribute to the economic growth process positively when the countries' terms of trade have moved in a favorable direction (Hausmann et al. 2007). From this point of view, it is essential to examine the relationship between the energy-growth nexus and export quality. Although available seminal studies are monitoring the energy-growth nexus, there exists a limited number of works employing the export quality. Besides, one might claim that there exists no research on how the terms of trade (export quality) alter the economic growth and energy use through regime shifts. Hence this research launches Markov regime shifts

models to observe the impact of terms of trade on employment, growth, and the use of fossil energy and renewable energy for the USA for the period 1980: Q1-2019: Q2. After conducting the non-linear analyses, this paper is expected to reveal (i) the estimated parameters varying from one regime to another regime through transition probabilities, and (ii) relevant policy proposals by underlying the prominence of terms of trade within growth-energy nexus.

Keywords: Export Quality; Energy-Growth Nexus; Markov Regime Switching

Crude oil price, policy uncertainty, pandemic stress on equity market: fresh global evidence

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The literature on the behavioral finance elucidates that the investors' decisions are subject to their sentiments and accordingly influence the equity market and the pricing of the assets. The COVID-19 pandemic outbreak has drastically disrupted the whole world, particularly the equity markets around the globe. Accordingly, this study analyzes the relationship between crude oil price shocks, policy uncertainty, pandemic stress and the volatility of the equity market in the world. A novel framework, after decomposing the oil price shocks into risk shock, demand and supply shocks, is employed to investigate the phenomenon. Subsequently, a network connectedness approach is employed for examining the static and time-varying association between such shocks and the volatility in the equity market. Empirical findings revealed a medium association between equity market volatility and crude oil price shocks, both in terms

of volatility as well as returns under the current pandemic stress of COVID-19 catastrophe. The risk and the demand shocks are the major contributors to such relationships.

Keywords: Crude oil price; Policy uncertainty; Pandemic stress; Equity market

The oil exporters' perspective of energy security: the analysis of spillover effects for GCC countries

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This study uses financial portfolio theory to assess the Energy Security (ES) from the oil exporters' perspective of the Gulf Cooperation Council (GCC) countries. Within the metric of ES, the main sources of risk faced by exporters are related to the low-carbon energy transition, the geopolitical balances, the dearth of customers and the price instability. This study enlarges the global energy landscape, highlighting an underdeveloped or omitted component of the dimension of the ES that is the security of demand and the risk management from the export side. As a risk management process, the ES involves both short- and long- term perspectives. On the short-term perspective it is crucial the reaction capacity to real and financial shocks on both the market sides (demand and supply). On the long-term perspective, dynamic dimension is crucial and mainly refers to timely investments to ensure supply energy request by economic developments necessitate taking into account the

environmental constraints. To assess the short- and long-term perspectives, the paper adopts two stages procedure. Firstly, using historical oil export 'mirror' data for five GCC countries, we construct two portfolios for each to represent the trade-offs between maximizing returns (oil export volume growth or export prices, the two key aspects of energy demand security) and minimizing risks represented by the standard deviation of return variables. Secondly, directional volatility spillovers of the oil export portfolio risk have been measured, using generalized forecast- error variance decomposition proposed by Diebold and Yilmaz (2012). The structure of a country's energy export portfolio significantly impacts the returns and risk levels associated with its ES and Portfolio Diversification. A balanced export portfolio not only shrinks the potential impacts of risks associated with import markets, but can also alleviate the consequences of systemic risks. The study highlights that demand risk management is the crucial tools for ES and it helps to address energy policy making national security strategy.

Keywords: energy security; directional volatility spillover; portfolio theory; oil exporter countries

Productive capacities-energy efficiency nexus: evidence from 125 countries grouped by income level and resource dependence

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This study examines the impacts of productive capacities in human capital, transport, information-communication technology, institutions, private sector, and structural change on energy efficiency for the 2000-2018 period of 125 countries which are taken as a world sample after excluding some countries with significant outliers. Adopting an energy-supply approach, energy efficiency is represented by energy productivity (gross domestic product per unit of total primary energy supply) and energy intensity (total primary energy supply per capita). The world sample is divided into four income levels as low-income (LIEs), lower-middle-income (LMIEs), upper-middle-income (UMIEs), and high-income (HIEs) economies by the average of gross national income over the period based on the World Bank's Atlas method. Furthermore, a specific control group of 33 countries is defined as natural resource-dependent economies (NRDEs) based on their higher comparative advantage and economic dependence on nonrenewable energy resources. The study

applies fixed-effects and random-effects regression models to a cross-sectionally dependent, stationary, and balanced panel dataset. The results reveal that the effects of the examined predictors of the improved energy efficiency (higher energy productivity and lower energy intensity) tend to vary substantially across country groups and energy productivity gains may be offset by energy intensity losses, and vice versa, in most cases. The main findings are as follows: (i) growth of gross national income per capita tends to enlarge both energy productivity and energy intensity for all income groups while the higher income brings about lower energy productivity and higher energy intensity for NRDEs. (ii) Higher human capital capacity reduces energy efficiency for middle-income sub-samples while it stimulates energy efficiency for other sub-samples. (iii) Higher transport capacity reduces energy efficiency for the world sample as well as LIEs, LMIEs, and NRDEs sub-samples. (iv) Higher information-communication technology capacity encourages energy efficiency for only HIEs while it causes two undesired effects (low energy productivity and high energy intensity) for LIEs. (v) Higher productive capacities in institutions and private sectors tend to encourage energy efficiency in the case of NRDEs by both reducing energy intensity and increasing energy productivity. (vi) Structural change productive capacities lead to an increase in energy efficiency for the world sample and LIEs sub-sample whereas their impacts on the energy efficiency indicators tend to vary for other sub-samples. Additionally, the analysis of variance reveals that the energy productivity level of LIEs is significantly lower than those of all other sub-samples while energy intensity, as well as productive capacities, increase as

the income levels of groups increases. Finally, bidirectional causalities are established between energy efficiency indicators and most of their predictors in all sub-samples.

Keywords: Energy efficiency; Energy productivity; Energy intensity; Productive capacities; Income level; Resource dependence

Testing environmental Kuznets Curve in the presence of solar energy and eco-innovation: an analysis of G-7 economies

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The practice of eco-innovation is seen common in the literature of business, however, the nexus of eco-innovation and the existence of environmental Kuznets curve received less attention in the literature. Also, the economies have been striving for economic growth along with safeguarding their environments. This has led to the need of renewable energy consumption which may include solar energy and wind energy, among others to protect the environment. In this regard, this study sets to test the existence of Environmental Kuznets Curve (EKC) with solar energy and eco-innovation in the context of G7 economies. Panel data of G7 economies from 2000 to 2018 is taken for study variables from different sources and the collected data is analyzed using appropriate recent economic approaches. The study found negative and significant effects of solar energy, eco-innovation and GDP on carbon emission while the square of GDP has a positive

and significant coefficient, thereby corroborating the EKC proposition. The study proposed increased use of solar energy and eco-innovation to get a sustainable development.

Keywords: Solar energy; Eco-innovation; Economic growth; Environmental degradation; EKC hypothesis

Fiscal decentralization, natural resource and economic growth for a modified environmental Kuznets hypothesis in China

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Fiscal decentralization holds crucial importance in designing and implementing policies regarding carbon emissions and environmental quality. Despite numerous research studies on Environmental Kuznets Curve (EKC), the literature is still inconclusive and very less attention has been paid to the welfare aspect and to incorporate the fiscal decentralization and natural resources into the equation of EKC. Consequently, the current study attempts to investigate the development-environment nexus under a fiscal decentralization and natural resource framework in the case of the 30 provinces of China during 2005 to 2018. The study has employed Common Correlated Effects form of the Pooled Mean Group (CCE-PMG) in the context of error correction based panel Autoregressive Distributed Lag (ARDL) model augmented with cross-sectional averages as the estimation approach. Moreover, U test has also been performed to examine the genuineness of the U-shaped EKC hypothesis in the context of China. The findings have confirmed an

inverted U shaped EKC hypothesis, however, this depends on the level of fiscal decentralization and the natural resource endowments. The study recommends that the efforts for economic growth should be integrated with fiscal decentralization to ensure a sustainable economic development.

Keywords: Fiscal decentralization; Natural resources; Economic growth; EKC; China

Empirical relationship between transportation, economic development, energy consumption, and CO2 emissions in the sense of EKC hypothesis: evidence from South Africa

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In this manuscript, the environmental Kuznets curve (EKC) hypothesis is taken into consideration for South Africa from the period of 1960 to 2017. The EKC hypothesis is investigated under 4 nexuses which are transportation, CO₂, GDP and energy consumption. The causal and long-term relationships between transportation, GDP, CO₂, and energy consumption are examined for these 4 developing countries by implementing co-integration test, the Toda and Yamamoto Granger non-causality test, the VAR Granger Causality/Block Exogeneity Wald test, and the Break Regression-OLS test. The research results of South Africa indicate that coefficient of sensitiveness has increased considerably, which consistent with the inverse-U shape of the EKC hypothesis. These empirical findings are also supports the Kyoto protocol's political aims and goals. On the other hand, in the context of the Toda Yamamoto co-integration test findings, there is a long-term stable linkage between transportation, GDP, CO₂ emissions and energy consumption for

South Africa. According to empirical findings, transportation causes more environmental pollution. In this sense, South African government should implement more appropriate policies to save the ecology and to achieve further economic growth without causing environmental pollution.

Keywords: Transportation; Economic Growth; EKC hypothesis; International Trade

How economic complexity induces a sustainable tourism, under an EKC hypothesis in 5 tourist destinations

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The previous empirical literature has revealed the critical link between economic complexity and environmental degradation and the linkage between air transport and environmental degradation. This paper examines the impact of both variables economic complexity and air transport on carbon emission in the five most tourist destinations (China, France, Italy, Spain, and the United States). This research provides new empirical evidence about the relevance of economic complexity and air transport on carbon emissions through the FMOLS econometric analysis. The results confirm a U-inverted connection between economic complexity and carbon emissions and air transport and carbon emissions, where trade openness and renewable energy consumption contribute to reducing carbon emission for selected countries during the period 1990-2017. The central evidence of this study is the analysis of the interaction between air transport and carbon emissions, which confirms a moderating

effect on carbon emissions. The economic significance of the empirical results confirms the importance of ascending complexity and the development of the air transport industry to reduce environmental pressure, where the promotion of renewable energy sources and the globalization processes contribute to this objective.

Keywords: Tourism; Economic Complexity; EKC; Carbon emissions

A validation of the environmental Kuznets Curve (EKC) in the presence of tourism, and eco- innovation: fresh evidence from ASEAN countries

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The existence of the Environmental Kuznets Curve (EKC) has been a debatable issue in the literature of the environment. Similarly, the patterns of the effect of tourism development on environment are among different study contexts. This calls for a fresh study for investigating the effects of economic growth and tourism on environmental degradation. Hence, the current research aims to investigate the impacts of tourism, eco-innovation and economic growth on environmental degradation in Association of South East Asian Nations (ASEAN) countries. The data has been taken from World Development Indicators (WDI) from 1990 to 2018 for selected eight ASEAN countries. Panel unit root and cointegration tests are performed to test the presence of unit root and long-run relationship among study variables. Fully Modified Ordinary Least Squares (FMOLS) and Dynamic Ordinary Least Square (DOLS) techniques are used to estimate the relationships among study variables. The

findings revealed a significant positive impact of tourism and economic growth on the carbon emissions while the coefficients of eco-innovation and GDP square are negative. The positive and negative coefficients of GDP and GDP square validate the inverted U shape of the EKC in selected ASEAN countries. Policy implications are also suggested in line with the study findings.

Keywords: Tourism; Eco-innovation; Economic growth; Carbon emission; EKC

Evaluation of the effects of covid-19 outbreak on rural tourism and rural development activities: the case of Düzce province

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It is emphasized in the literature that employment, which is one of the important components of development, is insufficient in rural areas where agricultural production activities are intense and there is a need for diversification of income sources in many different fields. In rural areas, barriers to economic growth, employment and sustainable development, rural tourism, eco-tourism, agricultural tourism, farm tourism and so on. It is thought that it can be overcome by supporting with tourism types. When the studies on rural tourism and rural areas are examined; rural areas have positive effects on physical and psychological health for urban individuals, provide recreational opportunities and gastronomy, culture, etc. Global studies are conducted on the importance of rural regions in terms of sustainable tourism and their role in regional development. The United Nations World Tourism Organization has chosen the slogan 'Tourism and Rural Development' for 27 September 2020, World Tourism Day. With the reporting of the first Covid-19 case in Wuhan, China,

to the World Health Organization (WHO) in the last months of 2019, the Covid-19 outbreak that came into our lives, affected negatively. While it was declared as an epidemic by WHO on March 11, 2020, as of March 2021, countries continue to apply measures in line with the recommendations of the World Health Organization. While the global Covid-19 outbreak crisis reduces the level of welfare all over the world, curfews, weekend restrictions, curfews applied to certain age groups at certain hours, social distance and mask practices greatly affect participation in tourism activities. However, the rate of transmission of the virus, social mobility is high and social distance is very difficult to maintain, the population density has led to a distance from crowded cities, and it has increased the tendency of individuals to plan their travels to rural areas. On the other hand, air transport, which is one of the main components of the tourism sector, negatively affected the accommodation, food and beverage sector. Within the scope of the study, the province of Düzce is selected as study area which located at a daily distance from Turkey's important metropolises Istanbul and Ankara. There are horse farms and accommodation facilities in Düzce, which are considered with the frame of rural tourism. When the population density in rural areas were assessed Düzce is carried out in Turkey $150 < \text{km}^2$, which is the ratio of the district is located in rural areas with moderate range between 15% and 49.9%. Rural tourism activities implemented in Düzce provide a contribution to rural development and increase in employment opportunities. In the method of the study, oral interviews were held with 5 important rural tourism enterprises operating in the province of Düzce and rural tourism activities were evaluated

for April-October 2020. Additionally Covid-19 measures in rural tourism and their reflections on tourists, sustainability of enterprises, quality, differences between before covid-19 outbreak regional development and employment opportunities were discussed in the study.

Keywords: Covid-19; Rural Tourism; Agri-Tourism; Rural Development; Turkey

Synthesis of nanorods of double perovskite La₂NiFeO₆ for total toluene oxidation

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Volatile organic compounds (VOCs) is a kind of hazardous material that the emission is generally from countless vehicle exhaust, industrial production process, solvents processes, etc.. Among the existed technologies of VOCs elimination, catalytic oxidation is relatively more efficient and safer for low operation temperature and less harmful secondary pollutants. To develop a kind of catalyst with high efficiency and good stability at low temperature is the unchangeable aim in this area. In this study, double perovskite oxide La₂NiFeO₆ (LNFO) with the nanorod morphology has been successfully synthesized using hydrothermal method with a good crystallinity. For comparison, another two samples La₂NiFeO₆ and LaFeO₃ were synthesized by classical sol-gel method, named as LNFO-sg and LFO-sg. In terms of toluene catalytic oxidation performance, while the double perovskite LFNO-sg shows superior performance to that of LFO-sg, the sample LFNO-nr with nanorod morphology shows the best catalytic activity for toluene oxidation,

with T90 at 243 °C. Combined with multiple characterization methods, the morphology and composition show obvious effect on the catalytic performance. According to the nitrogen adsorption-desorption, double perovskite oxide possess higher specific surface area than sample LaFeO₃ and the sample LFNO-nr shows evident the highest surface area, which could benefit to expose more active site over the surface. Based on the H₂-TPR analysis, lower initial reduction temperature and higher hydrogen consumption reflected that the introduction of nickel atoms and the morphology of nanorod could enhances the reducibility. Similarly, more surface adsorbed oxygen concentration was confirmed over the surface of LFNO-rd in O₂-TPD, which suggest that the nanorod morphology could help generate more oxygen vacancies and benefit for the redox process. Furthermore, based on the analyzation of XPS profiles, the LFNO-nr showed a higher surface Fe⁴⁺/Fe³⁺ molar ratio, which could boost the redox process for toluene oxidation and further confirmed abundant surface adsorbed oxygen species over the surface. Combined with the experiment results and analyzation, the introduction of nickel element and the morphology of nanorod could efficiently improve the surface features, like larger specific surface area, higher adsorbed oxygen species content, better low temperature reducibility, etc., which would contribute to catalytic performance enhancement. This work could further boost the application of perovskite oxide as high performance industrial catalysts.

Keywords: Catalytic Oxidation; Toluene; VOCs; perovskite; Low Temperature

Citizenship education for disadvantaged young people in forest villages: local practices of Düzce

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Citizenship education in rural areas, especially in disadvantaged living and working environments such as forest villages, contributes to social development for rural youth such as increasing living standards and income levels, increasing welfare, removing regional development disparities, food security, reducing unemployment, preventing an unhealthy migration, in existing structures in social, cultural and economic areas such as accommodation, transportation, communication, employment, marketing, rural tourism, local handicrafts. determination of needs and priorities and elimination-improvement of deficiencies, etc. To reach the targeted rural development level in forest villages in Turkey citizenship education is one of the key issues in recent years. In this study, young individuals living in forest villages in rural areas of Düzce province, which is a few hours away from Ankara and Istanbul metropolises, were considered as disadvantaged groups. In rural areas of Düzce province, especially in forest villages, citizenship education and rural development studies are explained. The differences in

the region in recent years, the rate of migration to the city by years, the changes in the population structure, and the results of the efforts undertaken to improve the economic, social and cultural conditions were emphasized. The positive effects of Düzce University's "Regional Development Focused Mission Differentiation and Specialization" Project were evaluated.

Keywords: Citizenship; Disadvantaged Young People; Forest Villagers; Sustainable Development

Insulation thickness in dwellings: impact on occupant thermal comfort

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Since 1990, when the first legislation concerning dwellings-related energy losses and gains was published in Portugal, the requirements on the maximum energy transmission coefficients for single building components expressed in U-values [$W/(m^2 \cdot K)$] have been more and more ambitious. For instance, in 1990, the maximum U-value for an exterior wall of a dwelling located in Lisbon was $1.80 W/(m^2 \cdot K)$ and, nowadays, it is $0.50 W/(m^2 \cdot K)$. Due to the energy poverty situation of many Portuguese families, they simply do not heat their homes – or they do not do it continuously. Therefore, it is relevant to study the impact of “over insulation” on the comfort of occupants. Once Portuguese buildings stock, before 1990, has a bad energy performance, it is crucial to make a reflection on how to make renovations with wider benefits (besides energy), such as those related to the health and comfort of occupants. In this study, a single house was simulated, on an hourly basis, in

TRNSYS dynamic simulation tool. Three locations were defined based on Portuguese winter zones: I1 – Santarém, I2 – Santa Maria da Feira and I3 – Guarda. Simulations were done for two ranges of wall insulation thicknesses, in “free-float” or with heating only in some hours of the day – not continuously. Results show that higher insulation thicknesses do not seem to have a significant impact on occupants’ comfort improvement.

Keywords: Residential Buildings; Thermal Comfort; Thermal Insulation

Use of vernacular materials and nanotechnology in architecture

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Anatolia has various construction techniques and materials in terms of vernacular architecture. Based on the experiences in the historical process, the buildings were built by choosing the most suitable material specific to the region where the building is located. There are many studies showing that these structures also contain many ecological design criteria. Most of the local materials are ecological materials that do not harm human health, have insulation properties, and also allow the building to breathe. However, living in a vernacular architectural building also has some disadvantages. If these disadvantages are supported by technology, it is possible to produce much healthier and good materials. In this study, vernacular materials used in Anatolia were examined briefly and samples of local materials produced by strengthening them with nanotechnology were investigated. In addition, material recommendations that can be used in contemporary architecture have been developed.

The efficiency of the selected materials, especially in terms of thermal sound insulation, was measured with simulation model based on energy efficiency.

Keywords: Vernacular architecture; Energy efficiency; Nanotechnology; Material; Insulation

Natural resource rent, financial development and urbanization on carbon intensity: fresh evidence from USA

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The reverberation of the carbon emissions of the financial crisis after 2008 has taught us that to avoid carbon intensity rebound is the only way to inhibit the carbon emissions upsurge afterwards. Yet, it is unknown how the levels of carbon emissions will alter the post-COVID-19 world, it is crucial to learn from the past and at least slow down the potential rebound effects. Therefore, the present study aims to investigate the effects of natural resource rent, financial development and urbanization on carbon intensity in the contest of United States (US). The dataset ranges from 1980 to 2019 covering 40 years observations. The unit root result of the included series revealed a mixed order of integration and the model is estimated employing the novel technique of bootstrap autoregressive distributed lag (BARDL) approach. The findings of this study revealed that urbanization and financial development augments the levels of carbon intensity in US. However, the natural resources rent reduces the carbon intensity in study area. The findings of

this research will help US and other developed economies to utilize their natural resources optimally keeping in view the environmental concerns for achieving sustainable development goals (SDGs).

Keywords: Carbon intensity; Financial development; Urbanization; Natural resources rent; USA

Military expenditures, political globalization, economic growth and environmental quality in China

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The interaction between military expenditures and political globalization issues and is not frequently studied in the literature of the environment, although issues around environmental degradation and cleaner atmosphere have augmented such awareness. Therefore, this study set to examine the influence of military expenditures, political globalization and economic growth on the environmental quality in China. Non-linear autoregressive distributed lag (NARDL) approach is employed to investigate the above-mentioned relationships due to their non-linear relationship. The findings of this study has revealed that military expenditures have deteriorated the environmental quality in China. However, political globalization improves the environmental quality. The coefficients of GDP and GDPSq are significant revealing the existence of an inverted shaped Environmental Kuznets Curve (EKC) in China. Therefore, this study suggests that military expenditures should be moved to

the procurement of environment specific energy technologies that do not hurt the environmental quality. Also, there is need of the energy efficient home-country installations, and the development of renewable energy projects and alternative fuels for major weapons systems and military exercises. This study has significant policy implications for military tactics and strategy as well as for civilian energy policies keeping in view the environment.

Keywords: Military expenditure; Political globalization; Economic growth; Environmental quality; China

An empirical analysis of environmental degradation and economic growth: the case of Turkey

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In this study, it has been investigated how environmental degradation is evaluated in economic growth models and how it affects together with the other production factors in the case of Turkey. In this context, data are used annually between the years 1961 and 2017. Model estimation is made based on the relevant EKC literature, and GDP, real fixed capital stock, employment, ecological footprint, human capital and trade openness variables are used for prediction purposes. The methods used in this study are the Johansen cointegration analysis, Granger causality analysis and error correction model, order to reveal the relationship between the variables. This study reveals that the effect of environmental degradation on GDP is significant, and various policy recommendations are developed within this framework for the case of a developing country, Turkey.

Keywords: Economic Growth; EKC Hypothesis; Environmental Degradation; Trade Openness; Johansen Cointegration Test; Granger Causality Test; Error Correction Model

How eco-innovation, environment taxes, and economic growth impact environmental degradation? Evidence from N-11 countries

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Although eco-innovation has been practiced in business for years, few studies have investigated eco-innovation in the context of environmental quality. The N11 countries, despite experiencing economic growth, have not been successful in safeguarding their environmental quality. However, the fact is these economies cannot withstand their economic progress sustainably without protecting their environmental quality concurrently. In this regard, the present research attempts to explore the nexus of eco-innovation, environmental taxes, economic growth and environmental degradation in N-11 countries. For said purpose, this study has used annual frequency data from 1990 to 2018 for N-11 economies and employed novel econometric approaches, which are robust to cross-sectional dependency, to investigate the environmental impacts of eco-innovation, environmental taxes, GDP and GDPSQ. The findings suggest that eco-innovation

and environmental taxes reduce the greenhouse gases emissions (GHGs) while the coefficients of GDP and GDPSQ are positive and negative, respectively, revealing an inverse shaped Environmental Kuznets Curve (EKC). Therefore, this study has validated the existence of U-shaped EKC in the context of N-11 countries. This study recommends that N-11 countries should invest in more eco-innovative projects to protect their environmental quality. Also, environmental taxes should be wisely imposed for protecting environmental quality as well as economic growth.

Keywords: Eco-innovation; Environmental taxes; Economic growth; Greenhouse gas emissions; N-11 countries

Transportation, economic growth and environmental degradation: fresh insights from China

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Although the travel demand among passengers has substantially reduced, the existing pre-Covid-19 impacts of gases generated by airplane engines on the environment are still substantial. Likewise, freight transportation is listed among the largest contributors of carbon emissions, making a strong negative contribution to poor air quality, health problems, and climate change. The problems arising from freight and passenger transportation are primarily associated to the use of fossil fuels. Therefore, this study examines the role of freight and passenger transportation, and economic growth on environmental degradation in China. Using recent data on freight transportation, passenger transportation, economic growth (GDP and its square) and carbon emissions for China and employing recent econometric techniques such as bootstrap Autoregressive Distributed Lag, this research has found a significant negative impact of both passenger and freight transportation on carbon emissions in China. Further, the effects of GDP and GDP square both

are significant with negative and positive signs, respectively, thereby authenticating the environmental Kuznets curve hypothesis. Keeping in view the findings of this research, it is proposed that renewable technologies such as electrification and hydrogen should be used for energy production in the transport sector for reducing the environmental negative impacts of transportation.

Keywords: Freight transportation; Passenger transportation; Economic growth; Environmental degradation

Role of tourism, environmental regulations, social globalization and institutional quality on carbon intensity in Turkey

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Recently, several countries in the world are targeting carbon neutrality and the role of tourism, environmental regulations, globalization and institutional quality holds crucial importance in achieving this target. Despite these factors have been investigated often in the literature of the environment, the nexus of tourism, institutional quality, globalization, environmental regulations and CO₂ emissions have not been offered a conclusive result on their relationships. The evidence of the relationship of above-mentioned variables is mixed, and no consensus among academics. Therefore, this study seeks to investigate the relevance of tourism, environmental regulations through environmental taxes, social globalization and institutional quality in environmental degradation in Turkey. The research is based on the bootstrap ARDL causality model as proposed by McNown et al., (2018). This specification includes a new cointegration

feature and conventional ARDL bounds tests, which increases the power of the t-test and the F-test and has several advantages, being more adequate for dynamic models with more than one explanatory variable. The research outcome has shown that environmental regulations (taxes) and better institutional quality improves the environmental quality (measured through carbon intensity). On the other hand, tourism and social globalization deteriorates the environment in Turkey.

Keywords: Tourism; Environmental taxes; Carbon intensity; Social globalization; Institutional quality

Believe it or not: Covid-19 environmental effects are more negatives than positives

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In addition to altering drastically people's daily lives, Covid 19 has slowed down economic activities, imposed restrictions, and enforced lockdown, altogether causing significant effects on the environment. Studying the direction, magnitude, and durability of these effects carries a serious lesson for the whole world. Preliminary evidence suggests that Covid 19 has temporarily improved air quality, reduced greenhouse gas emissions, and noise pollution, yet, due to lock-down, the flourishing of delivery services has pulled up the single-use plastics, increased the usages of vehicles by a lower ratio of passengers/vehicle, and raised demand for energy. Using the approach of the Ambiental Kuznets curve, we investigate the impact of Covid 19 total cases on the monthly average of carbon monoxide emissions measured in micrograms per cubic across a sample of developed, heavy

polluters, economies from 2014 to 2020. Driscoll-Kraay regressions confirm the Covid-19 long-run polluting impact by increasing monoxide emissions in countries of analysis.

Keywords: COVID 19; Environment; Monoxide emissions; Driscoll-Kraay regressions

Policy uncertainty, stock market and precious metal markets volatilities spillovers in the Russian economy

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We investigate the volatility spillovers among policy uncertainty, international oil prices, exchange rate, stock index and metal prices covering the period of 2nd July 2008 to 15th May 2020 for Russian economy applying Dynamic Connectedness based on Time-Varying Parameter Vector Autoregression (TVP-VAR). Our empirical investigation demonstrates that gold price, Russian policy uncertainty, oil price and stock index are net volatility contributors, whereas Palladium, platinum, silver and exchange rate are net volatilities receivers. Market capitalization and silver market are found to be the highest net contributor and net receiver, respectively. Our empirical finding provides several policy implications.

Keywords: Volatility Spillovers; TVP-VAR.; Policy Uncertainty.; Russian Federation

Spillover effect on currency exchange rates in oil exporting countries (Algeria, Nigeria and Russia)

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This article is dedicated to the study of interdependence between the oil prices dynamics and exchange rate movements of oil exporting countries (Algeria, Nigeria and Russia). The main goal of this study is the analysis of relationship between oil price market volatility and exchange rate movements of oil exporting countries (Algeria, Nigeria, and Russia). This paper proves the idea that spillover effect in Algeria, Nigeria and Russia became weaker after pandemic crisis beginning. The study is based on the hypothesis that the main sources of shocks to the oil market are political and pandemic risks. The current paper implements the VAR model for finding the mean spillover between Brent oil prices and national currencies volatilities for the period from 2001 until 2021. The paper adds to the growing literature on the effects of COVID-19 on spillover effect on currency exchange rates in oil exporting countries. Recent studies have shown how spillover effect has

changed in oil exporting countries. All three recent shocks (2008, 2012, 2020) in the oil market are transmitted to the currency markets of oil-producing countries. At the same time, the latest shock of 2020 caused by the covid-19 pandemic has not yet been fully transmitted to the Russian ruble exchange rate. The main reason for this is the factor of reducing the sanctions pressure and the low level of external public debt in Russia. For the last year correlation parameters became weaker, as the RUBUSD correlation coefficient is fluctuating between -0.5 and 0.5. However, before 2020 the spillover effect is more significant (in the range from -0.8 to -0.1). Nigerian Naira and Algerian Dinar were showing almost the same movements, while Russian Ruble was in different corridor.

Keywords: energy economics; power resources; energy sustainability; energy optimization; spillover effect

Crypto swings and the performance of carbon intensive equity funds in China

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The massive reliance on the consumption of non-renewable energy sources for bitcoin mining has environmental implications. This paper assesses the performance of carbon-intensive equity funds in China – the country with maximum hashrate – during the crypto boom and bust periods between 2013 and 2021. We use event study methodology and assess funds flows after sorting the sample into black, grey, brown, and green funds based on their investment exposure. The findings demonstrate significant abnormal returns for black funds during the price booms. The abnormal returns reduced as we moved across categories and were non-existent for the green funds. On the contrary, we observe negative abnormal returns for carbon-intensive funds during declining crypto prices. We report a positive relationship between investment flows and increasing bitcoin prices for the black category. The impact became less profound for low-carbon funds. While demonstrating the

effects of variation in crypto prices on investment performance and flows, the results indicate possible impediments to a sustainable financial system.

Keywords: Carbon Funds; Bitcoin; Funds Performance; Investment Flows

Environmental, social, and governance (ESF) investing and commodities: dynamic connectedness and risk management strategies

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ESG investing (sustainable or socially responsible investing) is an investment strategy for investors considering environmental, social, and corporate governance factors such as climate change and human rights while seeking to provide returns in financial markets and make portfolio selection decisions. ESG investment has gained attention from both investors and policymakers to have shown significant growth in the last few decades. According to the “2018 sustainable investment report”, which was the last (the 2020 report will be published in mid-2021) released by the Global Sustainable Investment Alliance (GSIA), sustainable investing assets in Europe, the US, Japan, Canada, and Australia and New Zealand were USD 30.7 trillion at the beginning of 2018, a 34 percent increase since 2016. This paper aims to examine the dynamic connectedness between commodities and corporations exhibiting the best Environmental, Social, and Governance (ESG) practices. In addition, it aims

to determine the optimal hedge ratios and portfolio weights for ESG and commodity investors and portfolio managers. We employ the novel frequency connectedness framework to point out volatility spillover between Refinitiv/S-Network ESG indices covering the US, Developed and Emerging Markets and S&P GSCI commodity indices, including energy (crude oil, natural gas, and heating oil), industrial metals (aluminum, copper, zinc, nickel and lead, and precious metals (gold and silver). We analyze daily data over the period between January 3rd 2011 and May 26th 2021, covering significant socio-economic developments and the COVID-19 outbreak. The data are obtained from the Factset and S-network. The results suggest a total connectedness index at a mediocre level, mainly driven by high-frequency components, indicating that the shocks creating uncertainty in the short-term, within five days, mainly drive total connectedness. We find that all ESG indices as net volatility transmitters, and all commodity indices other than Crude Oil and Copper as net volatility receivers. Our results imply statistically significant hedging and portfolio diversification opportunities to investors and portfolio managers across the asset classes, proven by the hedging effectiveness analyses.

Keywords: ESG investments; Commodity markets; Connectedness; Volatility spillover; Hedging

Do environmental innovation and knowledge spillovers facilitate meeting sustainable development goals?

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Incentivizing economic growth at the expense of the nature today compromises the ability of future generations to meet their needs. Therefore, international organizations and countries have adopted measures for promoting and supporting sustainable growth that takes into account our limited natural resources. The sustainable development goals set up by the United Nations (UN) are a milestone in this work. These goals include targets for ensuring sustainable consumption and production patterns (SDG12). The progress in meeting this goal is commonly measured via the resource efficiency, waste intensity and material footprint of economies. Relatedly, environmental innovation and subsequent environmental knowledge spillovers are heralded, at least, as part of the solution for meeting the sustainable development goals set up by the UN. Therefore, in this paper we investigate the hypothesis that environmental innovation and knowledge spillovers aid economies in meeting

the targets set in SDG12. We do so by utilizing panel data from the European Union, Japan and USA over the period of 2002–2017. The results show that whereas R&D, in general, works against meeting the targets set in SDG12, environmental innovation and knowledge spillovers facilitate achieving the goal. The findings represent important insights for policymakers for supporting sustainable development via innovation.

Keywords: environmental innovation; knowledge spillovers; resource efficiency; sustainable development

Testing the moderating role of tourism growth in “financial resource curse” hypothesis: an empirical evidence from top tourist destinations

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This study searches the moderating role of tourism growth in the financial resource curse hypothesis in the case of the top ten tourist destinations as ranked by the World Tourism Organization. Model estimations are done with/without the moderating effect of tourism growth in those destinations. Both panel and time-series analyses provide consistency in results which reveal that the financial resource curse hypothesis is not validated with/without the moderating role of tourism growth. Finally, the results of this study show that tourism growth exerts positively significant effects on financial development in the top tourist destinations.

Keywords: Financial Resource Curse; Financial Development; Tourism Growth; Moderating Role; Top Tourist Destinations

Is ownership structure related to corporate sustainable performance? The role of board gender diversity

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While there is immense literature investigating the relationship between ownership structure and corporate performance of firms, this research presents new insights on empirically presenting the relationship between ownership structure and corporate sustainable performance of Malaysian and Pakistani firms. Moreover, the role of board gender diversity is observed in the relationship between ownership structure and corporate sustainability performance. Dynamic estimator, named system generalized method of moments is used for estimations that control for potential dynamic endogeneity, simultaneity and reverse causality. Findings reveal that ownership concentration and state ownership are negatively related to economic, social, and environmental indicators of CSP both in Malaysia and Pakistan, whereas directors' ownership is positively associated with all sustainability indicators. Financial institution's

ownership showed a positive significant impact on CSP in Malaysia whereas an insignificant relationship is observed in Pakistan. Meanwhile, the moderating impact of women directors on the relationship between ownership structure and corporate sustainable performance reveals a significant impact in Malaysia and an insignificant impact in Pakistan. Generally, the findings of the study have practical implications for regulatory authorities, securities commissions, and policymakers of Malaysia and Pakistan. Moreover, there is a need to bring reforms in corporate governance structures in Pakistan, where weak economic conditions leave a frail impact of ownership structure on CSP and an insignificant moderating impact of board gender diversity.

Keywords: Board gender diversity; Corporate sustainable performance; Global reporting index; Malaysia; Ownership structure; Pakistan

The corporate social responsibility challenge on financial performance: Portuguese business situation

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According to the definition that the European Commission (2001) offered us, Corporate Social Responsibility is a set of measures that an organization can adopt, to improve the well-being of its stakeholders and promote the balance of economic, social, and environmental performance. The Stakeholder theory clarifies that this decision-making must take into consideration all groups of people, being the only way of having a proportional benefit. Based on this premise, in this study, we intend to unravel the main determinants of Corporate Social Responsibility in 63 Portuguese companies. To accomplish that, we used panel data, withdrawn from the SABI database, in the period comprehended between 2008 and 2018, applying the Probit model. The sample is composed of 42 companies that find themselves listed in the Portuguese stock exchange, and 21 that do not. We can verify that the outcomes allow the analyses of nine variables, among them, only the audit, the asset rotation ratio, the debt ratio, the size, age, and financial autonomy show

themselves as statistically positive in the implementation of Corporate Social Responsibility practices. Even though the outcomes were not what we initially predicted, they revealed the positive impact of such practices. We consider them necessary and a reality that companies should pursue, even for the gains of capital that it might represent. We firmly believe that being socially responsible constitutes an essential practice from which all of us can benefit, contributing to life improvement in the community and for environmental sustainability.

Keywords: Corporate social responsibility; Financial performance; Portugal; Panel data; Binary variables; Probit model

Clean energy transition: how much is needed to close the energy poverty gap in Poland?

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Poland is making significant progress on the road to clean energy transition. Drawing on the recently available survey on fuels and energy consumption in households in 2018, we assess the level and the depth of hidden energy poverty in Poland determined by driven by the usage of cheap and dirty fuels and self-restricted coping strategies of the poor population. We estimate the energy poverty gap in Poland in two scenarios. In the first scenario, we compute the existing energy poverty gap based on the estimated energy costs. In the second scenario, we recalculate the energy poverty gap converting the prices of the commonly used dirty fuels to natural gas prices. The rate of energy poverty is about 25% and 28.7% respectively in the first and the second scenario. We estimate that switching to gas is likely to push more households into energy poverty. Transition to gas translates into an energy-poverty-gap increase on average by 15.4 p.p. per household. Switching from dirty fuels to gas induces the additional minimum costs for ending energy poverty in Poland.

Keywords: Hidden Energy Poverty; Energy Poverty Gap; Energy-Poverty-Gap Index; Energy-Poverty-Severity Index; Energy Transition; Poland

Unemployment rate, clean energy and ecological footprint in OECD countries

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OECD countries have encountered the challenges of improving the environmental sustainability while maintaining economic growth by not impairing employment. Designing green policies that considers the clean energy is claimed to resolve the mentioned challenges. This study attempts to reexamine the Kuznets curve hypothesis by using ecological footprint as an indicator of environmental degradation. Besides, the study's novelty refers to the testing of environmental Phillips curve and the role of clean energy on ecological footprint. Our data covers a panel of 36 OECD countries from 1995-2015. We adopt the second generation panel unit root and cointegration test to account for the presence of cross section dependence (CSD). Moreover, the long-run relationship is estimated using Common Correlated Effect Mean Group (CCEMG) and Augmented Mean Group (AMG) that are robust to CSD. The results of

overall panel and individual country derived from CCEMG and AMG are able to provide better insight and policy recommendation on environmental issue in OECD countries.

Keywords: Ecological footprint; Unemployment rate; Clean energy; Environmental Phillips curve; OECD

Transition 4.0 and efficient use of energy resources: evidence from the industrial sector and implications for policy

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The industrial sector is engaged, together with other energy-intensive sectors (residential, transport and tertiary), in the decarbonization process undertaken worldwide as a measure to combat climate change; a process that requires policies to optimize the use of resources by progressively reducing the consumption of fossil fuels and ensuring, at the same time, economic development. The industrial sector is called upon to face the ambitious challenge of knowing how to interpret the decarbonization objectives of policy initiatives with the overarching aim of climate neutrality by 2050. This is an opportunity for a significant paradigm shift compared to the past, knowing how to exploit the opportunities of innovation and digitalization, to promote a model capable of generating economic development, respect for the environment and social inclusion. In this context we

analyzed the role of industrial policies and in particular the transition 4.0 plan as an effective tool to accompany the energy transition of companies in the direction of sustainability, economic development and efficient use of resources. Through an empirical survey in which 204 energy-intensive companies participated, we investigated the impact of Industry 4.0 and energy efficiency interventions on the energy performance of companies and verified the achievability of the savings targets provided by the New Deal also considering the barriers still to be overcome. Useful evidence emerged from the analysis of the data, which made it possible to collect an important set of direct experiences from energy-intensive companies. The implications for policy of our analysis can support the paradigm shift of the industrial sector towards decarbonization. Firstly, our results are useful for the definition of policies aimed at supporting the demand for technological and digital investments in order to optimize and make more flexible production processes, with clear advantages in terms of competitiveness. Secondly, important benefits are identified on the front of the sustainability of firms, not only to the progressive technological efficiency of production processes, but also on the possibility of fostering a holistic view of the efficient management of firms that will be able to better understand the benefits arising from the combination of energy efficiency interventions and transition 4.0

Keywords: transition 4.0.; energy efficiency; digital Transformation; resource use optimization; industrial policy

Financial stress, oil price, gold and natural gas on clean energy stocks: global evidence

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Burning of fossil fuels to create energy for either households or businesses causes severe environmental problems such as oil spills, acid rains, air pollution and global warming among others. In this regard, clean energy can help us reduce our dependence on fossil fuels and helps in mitigating environmental problems. Therefore, this research embarks upon analyzing the effects of financial stress, oil price, gold and natural gas on clean energy stock. For this purpose, Quantile Autoregressive Distributed Lag (Q-ARDL) is employed. The findings discovered a negative and significant impact of gold and financial stress on clean energy stocks in the lower quantiles and upper quantiles, respectively. On the other hand, oil price fluctuations positively and significantly affect the clean energy stocks in the all the quantiles. The effect of natural gas is found to be negative and positive in lower and higher quantiles, respectively. The study proposed the increased use of cleaner energy and future research is also recommended.

Keywords: Financial stress; Oil price; Gold; Natural gas; Clean energy stocks

Impact of energy efficiency, technology innovation, trade openness and institutional quality on greenhouse gas emissions in ten ASIAN economies

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Given the patterns of energy use and trade openness, mostly countries are concerned for reducing the carbon emissions for achieving sustainable development goals (SDGs). Likewise, several countries lack technological innovation and have poor institutional quality which further aggravate the environmental problem. In this regard, this study attempts to explore the impacts of energy efficiency, technological innovation, trade openness, and institutional quality on greenhouse gases emissions (GHGs) in top Asian economies. For this purpose, this study has used the panel data of 10 Asian economies from 1995 to 2018. Using recent appropriate econometric techniques, this study has found that technological innovation, better institutional quality and improvement in energy efficiency reduce the GHGs level. However, trade openness increases the environmental damage through increased GHGs. Thus, the study proposes to

use the energy efficient technologies and improvement in the institutional quality to improve environmental quality in the context of ten Asian economies.

Keywords: Energy efficiency; Technological innovation; Trade openness; Institutional quality; Top ten Asian economies

The relationship between FDI, CO2 emissions, and energy consumption in Asia-Pacific economic cooperation countries

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This paper investigates the relationship between CO2 emissions, energy consumption, economic growth, and foreign direct investment for a sample of Asia-Pacific Economic Cooperation Countries (APEC) countries from 1981:Q1 to 2021:Q1 employing panel data methodology. We identify cross-sectional dependence, hence utilize CADF panel unit root test for appropriate estimation. The cointegration test developed by Westerlund (2007) shows that there is a long-run equilibrium between CO2 emissions, energy consumption, economic growth, and foreign direct investment. The empirical findings show that energy consumption, FDI, and economic growth have an impact on CO2 emissions in APEC countries. The panel causality test results of Emir-mahmutoglu and Kose (2011) reveal a bidirectional relationship between FDI and CO2 emissions in Japan. Furthermore, for Australia, China, Japan, and Singapore, there

is a bidirectional causal relationship between GDP and energy consumption. Overall, empirical evidence suggests that APEC countries should adhere to strict regulations and invest in clean technologies that are not damaging to the environment to attract foreign direct investment.

Keywords: Foreign direct investment; Energy consumption; CO2 emissions; APEC countries

Transportation, urbanization, economic growth and environmental pollution in Asia: do environmental regulations matter?

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The COVID-19 pandemic has disrupted almost every sector of the economy and the whole world has faced this challenge, but the transportation has been the direct victim of this pandemic. The other side of the coin has shown that this reduction in the transportation has improved the environment in many countries. The study of the effect urbanization and economic growth on environment has received considerable attention in the literature, yet they are inconclusive in nature. Therefore, this study tries to find out the role of environmental regulations on the relationship of transportation, urbanization, and economic growth with environmental pollution in ten Asian countries. The data for ten selected Asian countries is taken during 1995 – 2018 from different reliable sources. The findings of this study revealed that environmental taxes significantly moderate the relationship of transportation, urbanization, and economic growth with environmental pollution (GHGs).

Also, the direct effect of these factors on greenhouse gas emission (GHGs) is positive and significant which shows that these factors significantly augment the levels of GHGs in focus countries. The study recommends policy implications for improving the environmental quality through strictly imposing the environmental taxes on all the pollution emitting sectors. The study also proposed recommendations for future research.

Keywords: Transportation; Urbanization; Economic growth; Environmental taxes; Asian countries

Effects of human capital, natural resource, urbanization, energy consumption on ecological footprint in top ten emitter countries

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The current study investigates the effects of human capital, natural resources, urbanization and energy consumption on ecological footprints in top ten emitter countries during the period 2005-2018. For the purpose of model estimation, this research has employed the Hoechle (2007) technique which produces Driscoll-Kraay standard errors for linear panel models that are not only consistent in case of heteroscedasticity but also robust in case of general forms of cross-sectional dependence. The study has found that human capital, natural resources, urbanization, energy consumption positively contribute to the environmental degradation in the panel of top ten emitter countries. The empirical literature so far has not offered any kind of practical policy implications related to human capital and natural resources in mitigating the carbon emissions. Therefore, it is imperative to integrate the human capital, natural resources, urbanization

and energy consumption to policy designing for combating the carbon emission in order to achieve a sustainable growth in the future.

Keywords: Human capital; Natural resource; Urbanization; Energy consumption; Ecological footprint

Testing the long-run impact of economic growth, energy consumption and globalization on ecological footprint: new evidence from Fourier bootstrap ARDL and Fourier Toda-Yamamoto test results

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This study aims to investigate the impacts of economic growth, energy consumption, and economic globalization process on the ecological footprints of 10 countries that have accounted for the highest carbon dioxide emissions in the world. The analyses are conducted utilizing the yearly observations from 1970 to 2017 (considering different periods for Iran and Saudi Arabia), employing the newly developed Fourier Bootstrap ARDL cointegration method developed by Yilanci et al. (2020) and the Fourier Toda-Yamamoto causality method developed by Nazlioglu et al. (2016). Accordingly, the findings obtained from the Fourier Bootstrap ARDL test reveal the presence of cointegration relationships among the ecological footprint, economic growth, energy consumption, and globalization variables of seven countries

namely Canada, China, Germany, India, Indonesia, Iran, and Saudi Arabia. The obtained long-term coefficients, in general, reveal the fact that the variables of economic growth and energy consumption have an increasing effect on the ecological footprint of the investigated countries, whereas the economic globalization process has a declining impact. To evaluate it more specifically: (i) The real gross domestic products per capita has positive effect on the ecological footprint in China, India, Indonesia, Iran, and Saudi Arabia, whereas a negative impact in Germany. (ii) Energy consumption per capita has positive effect on the ecological footprint in China, Germany, Iran, and Saudi Arabia, whereas a negative impact in Indonesia. (iii) Finally, the economic globalization process has negative effect in Canada, China, India, and Saudi Arabia, whereas a positive effect in Indonesia. On the other hand, the findings obtained from the Fourier Toda-Yamamoto causality analysis are of mixed nature. Increasing the use of renewable energy resources, disseminating environmentally-friendly technologies in production processes, and effectively implementing environmental policies play a vital role in maintaining the presence of a sustainable ecological system in these countries, which have the largest shares of carbon dioxide emissions in the world.

Keywords: Ecological footprint; Fourier Bootstrap ARDL; Fourier Toda-Yamamoto; Economic Globalization; Economic Growth

Role of renewable energy, non-renewable energy, globalization and urbanization on greenhouse gas emissions: evidence from E-7 economies

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The emerging seven (E7) countries are continuously facing the conflicting objectives of achieving sustainable economic growth and simultaneously improving environmental quality. The increased emphasis on the use of renewable energy has been the subject matter of several experts and academicians. The current paper, being the first of its kind, attempts to investigate the roles of renewable energy, non-renewable energy, globalization and urbanization on Greenhouse Gases (GHGs) emissions in the E7 economies. The data has been taken from the World Bank and the International Energy Agency (IEA). The data for the study variables is taken from 2000-2018 period for seven emerging economies. The data has been analyzed using all three estimators of the panel Autoregressive Distributed Lag (ARDL) approach are employed namely; the pooled mean group estimator; the mean group estimator; and the dynamic fixed effect estimator. The second-generation Granger test is used to determine

the direction of causality among renewable energy, non-renewable energy, globalization, urbanization and environmental degradation. The study found a significant positive effect of non-renewable energy, globalization, and urbanization on GHGs in E7 countries. On the other hand, renewable energy has a significant negative impact on GHGs in E7 economies.

Keywords: Renewable energy; Non-renewable energy; Globalization; Urbanization; Greenhouse gases emission

Income inequality, educational attainment and environmental degradation: evidence from global panel

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The Sustainable Development Goal 10 focuses on combating the climate change and its effects. The inclusion of this agenda in the Sustainable Development Goals by the United Nations has shown that worsened environmental degradation is currently a major threat facing humankind. To date, international efforts have failed in tackling the issue of environmental degradation in an effective manner. One of main reasons leading to little achievements in the mitigation efforts is that certain important factors affecting environmental degradation have been neglected by the researchers and policymakers. The World Commission on Environment and Development 2015 has highlighted that income inequality is one of the major causes for environmental deterioration. Hence, reducing environmental degradation requires a look at the problem of unequal income distribution. Moreover, educational attainment plays a vital role in providing relevant knowledge and skills to people

in handling environmental problems. Thus, the objective of the study is to investigate the relationship between income inequality, educational attainment, and CO₂ emissions by employing a panel data analysis for a group of 98 countries from 1989 to 2016. The study uses Common Correlated Effects Mean Group (CCEMG) and the Augmented Mean Group (AMG) estimators to take into account the issue of cross section dependence which has been ignored by most of the previous studies. By tackling the problem of cross section dependence, unbiased and reliable results could be produced in estimations. The findings of the study could provide a better understanding on the root causes of environmental degradation, and further suggest remedial actions to overcome the problem.

Keywords: Environmental degradation; Income Inequality; Educational Attainment; CCEMG and AMG Estimators

Information transmission in regional energy markets: Evidence from time-frequency domain

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This study investigated the connectedness of five regional energy markets following the time-frequency domain from 2 Jan 1995 to 27 May 2021. The findings indicate that regional markets of adjacent locations are highly connected. The North American region is the net transmitter of spillovers whereas the Asian region is the net receiver of spillovers. The results also reveal that the connectedness of energy markets is time and frequency-dependent. Energy markets were highly connected following the crisis periods of the Asian financial crisis, global financial crisis, European Debt crisis, Shale oil crisis, and the global crisis of the COVID-19 pandemic. Time-dependent results reveal that high spillovers formed during stress periods and frequency-domain show the higher connectedness of energy markets in the short-run followed by an extreme economic condition. These results have significant implications for

policymakers, regulators, investors, and regional controlling bodies to adopt effective strategies during the short run to avoid economic downturns and information distortions.

Keywords: Asymmetric Connectedness; Crisis Periods; Regional Energy Markets; Time-Frequency Domain

Examining the non-linear behavior of European energy market

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Market efficiency has been one of the most researched topics of the last century. There have been many reasons for its increasing importance as it can provide guidance to many government or investor decisions, and plays an important role in the World economy. However, it is clearly indicated that there is a gap in literature regarding the efficiency of energy markets. With this study, it is aimed to investigate the stationarity of the 20 major European indices relating to energy (Oil and Gas, Electricity, and Energy) using the traditional ADF test together with the newly developed nonlinear unit root tests. The results indicated that while the ADF test captured the stationarity in only one of these indices (Austria – Oil and Gas), using the non-linear tests showed stationarity in 17 of the 20 indices tested. Overall, the European Energy Market can be referred to as inefficient under the weak form of the Efficient Market Hypothesis.

Keywords: Market Efficiency; Efficient Market Hypothesis; European Energy Markets; Non-Linear Unit Root Tests

Assessment of barriers to solar energy project's adoption: a case of a developing country

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Investment of renewable energy sector in developing countries has been considered as an important factor in sustainable development. Assessment of renewable energy sources investment barriers have attracted more attention from local and foreign investors who are willing to invest in developing countries due to uniqueness of solar isolation such as Pakistan. The main purpose of this study is to reduce the main barriers and sub-barriers associated with investment in renewable energy projects, especially in solar projects and another objective of this research is to create knowledge, based on diversification of barriers and control procedures. Some scholars have explored a verity of barriers for investment in solar power sector but this study observe those barriers in specific context of solar power development. The study identifies main barriers and sub-barriers based on semi-structured interviews as a research methodology.

Fifteen barriers were selected under which five categories are most important including regulatory, political, financial, policy and terrorism. Finally, the study proposed some important and useful policy recommendations.

Keywords: Solar energy barriers; Energy shortfall; Solar power projects; Pakistan

Volatility spillovers between global energy and food markets: a time-varying causality-in-mean and causality-in-variance analysis

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This article attempts to outline the interrelationship between the energy and food prices in global markets. The study utilizes the weekly data for fuel price index and six agricultural commodity indices (i.e., general food price, meat, dairy, cereal, vegetable oils, sugar) from January 1992 to April 2021 and employs time-varying causality-in-mean and causality-in-variance tests to investigate the Granger causality patterns in volatility spillovers between global energy and food prices. Empirical findings provide evidences of causal linkages among energy and overall food prices. In particular, both the causality-in-mean test and the causality-in-variance test results indicate a causal link from energy to food markets. Despite insignificant spillover effects of food prices to the energy prices, there exists a substantial spillover effects stemming from energy prices to food prices. However, the volatility spillover effects from energy prices to meat and dairy indices seem to be weak in comparison to the cereals, vegetable oils and sugar prices. The

findings of this study provide further evidence for policy makers that the spillover effects of energy price changes on food prices might be different depending on the volatility in the food markets.

Keywords: Volatility spillovers; Energy prices; Food Price Index; Causality-in-Variance

LCA as a tool to promote sustainable management of energy projects

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A sustainable project requires an effective and efficient production and supply chains. Based on this, managers should face their projects with a new perspective, including social and environmental relevant concerns, not only the economic aspects. However, the challenge is to indentify the best way to integrate the sustaintability principles and good practices into their projects. In this context, environmental issues, namely climate changes and sustaintability, are one of the main concerns of society. Energy systems are one of the main contributors to the greenhouse global emissions, environmental pollution and health issues. In order to identify the possible impact or influences from the energy projects to the environment is used the life cycle assessment as methodology to verify the environmental impact of a product or process of their entire life cycle, from cradle-to-grave. Moreover, to observe the inputs consumption, energy demand and the associated costs. Thus, this research aims to use the life cycle assessment as a base to

identify points of improvement on promoting sustainability on an energy project, in order to reduce the social and environmental impact. Nevertheless we also discuss the implementation of good practices in management to a more efficient and balanced input consumption (which includes raw materials, water) and energy, the development of new sustainable technologies and the creation of green seals.

Keywords: LCA; Energy projects; sustainability; environmental impacts

Feed-in tariff outlook in South Asia for solar energy development

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The gap between energy demand and supply has been increased due to the enormous population and industrial development among major South Asian countries, including Pakistan, India, and Sri Lanka. The primary sources of power generation in these countries are fossil fuels that are too expensive and have devastating impacts on public health and the environment. This study aims to analyze the solar energy policy gap under the Feed-in-Tariff (FiT) mechanism for the development of solar energy in the South Asian region. There are positive indicators of successfully utilizing solar energy in power generation and the FiT policy implementation globally as well as in the South Asian region. The region is rich in solar energy resources and can enjoy this natural asset to fulfill the energy demand-supply gap with

careful planning in the future. Finally, essential policy recommendations have been proposed for the sustainable development of solar energy.

Keywords: Feed-in-tariff; Solar energy; Energy policy; South Asia

Consumers' perspective on renewable energy adoption: a review and future directions

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The paradigm shift of the usage from fossil fuels to renewable energy is observed recently due to the increased awareness towards environmental quality. Although various actions taken by government to promote the usage of renewable energy, the initiative from the consumers should not be neglected. This study seeks to review the literature on the factors influencing renewable energy adoption among consumers. The systematic search methods help to identify the relevant articles published in the area of consumer renewable energy adoption over the period of 2000 to 2020. The findings and discussions consist of: 1) the profile of the studies such as publication outlets, authorships and publication trends; 2) theories on consumer renewable energy adoption; 3) factors influencing consumer adoption of renewable energy. A framework that indicates the comparison of the factors between very important (willingness to pay, price or cost, knowledge, and government policies),

moderately important (public awareness) and less important (perceived benefits and social influence) is proposed based on the literature review. This study also draws the key implications for researchers, businesses, and policy-makers. Furthermore, the findings are synthesized with the analysis of different dimensions, in turn, setting the future research directions on renewable energy adoption including suggestions for examining political and regulatory factors, comparative studies between countries, and considering the suppliers' perspective.

Keywords: Renewable Energy Adoption; Consumers' Perspective; Review; Future Directions

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