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Analyzing the Association Among Energy Consumption, CO2 Emission and Per Capita Economic Growth in the Perspective of Net Oil Importing Countries

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Abstract: In this study is arranged to investigate the relationship between renewable energy consumption, socio-economic factors and health in the presence of a stringent environmental policy and lobbying power employing a Panel Vector Auto-Regressive approach, we specifically examine the role of the government effectiveness and the lobbying pressure in moderating the impact of renewable energy consumption on CO2 emissions, economic growth and health factor considering the case of Middle East and North Africa Net Oil Importing Countries from 1996 to 2019. Our analysis shows that (i) environmental policy stringency and good governance will induce a rise in the level of renewable energy consumption; (ii) lobbying power and interest groups discourage the renewable energy sector's development since the add in economic growth of these economies is not oriented towards renewable energy projects; (iii) a rise in renewable energy consumption, perhaps generated by renewable energy policies, should favor the improvement of public health. Finally, appropriate environmental regulations be formulated and implemented.

Keywords: Energy Consumption, CO2 Emissions; Health; Government effectiveness and PVAR

JEL: I15, Q56 and R11

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1. Introduction

The destiny of the earth is on the line today, more than ever before, and the circumstances are critical. Policymakers, environmentalists, international organizations, and scientific experts are increasingly concerned about the negative effects of climate fluctuation on human health, human life, and environmental quality. (Filho et al, (2018), Alzard, Maraqa and et al, 2019&Ulucak, and Khan, 2020).Given that greenhouse gas emissions are the primary cause of climate change, it makes sense and is necessary, according to various politicians and scientific experts; a fact that was recognized at the Paris Climate Conference (COP21) and more recently at the Glasgow Climate Conference (COP26). Based on the recent assessment by the Medical Society Consortium on Climate and Health, if greenhouse gas emissions continue to grow, the average temperature would climb by more than 2 degrees Celsius, putting human health and life in jeopardy. Climate Change, 2007 & Lu et al, 2017, International Energy Agency, 2014).

There has lately been a slew of research on the environmental and economic aspects of sustainable development as they relate to human health, (European Commission, 2019 &Vasylieva et al., 2019), there are relatively few studies on how renewable energy usage, economic and social variables, and health issues interact. Health is one of the most important measures of a country's collective well-being and economic success. With rapid worldwide population expansion and environmental deterioration, the health factor is in jeopardy, but it can be addressed by switching to renewable energy sources. Indeed, (Pablo-Romero, Roman, et al, 2016) it has been found that renewable allowed for a reduction in the use of fossil fuels and CO2 emissions, resulting in good effects on human health, as evidenced by respiratory and cardiovascular ailments, to name two instances.

In the recent past, Mazur, A. (2011), examined energy/electricity consumption and many metrics of living quality in a sample of high-income industrialized countries, finding that energy use was already increasing. "Changes in per capita energy/electricity usage are not related with equivalent improvements in life quality and wellbeing," he said. Treyer, Bauer & Simons,(2014), revealed that "overall human health consequences of nuclear and renewable technologies are significantly lower than those of fossil technologies." They verified that "climate change and human toxicity contribute the most to total human health consequences," and that "the most polluting life cycle phases are fossil fuel combustion and coal mining." Nonetheless, several studies have demonstrated that improving the environment may diminish economic activity (for example, as a result, environmental policy rigor is critical in striking a balance b enhancing environmental quality and maintaining acceptable economic activity levels. That is, politicians in many nations throughout the world have been tasked with resolving this conundrum. The MENA area looks to have a high abundance of natural resources, which is thought to be important for boosting the usage of renewable energy. When compared to other places in the globe, this region receives the majority of solar radiation (OECD, 2013), Although renewable resources account for just 1% of the primary energy mix utilized in energy consumption (Jalilvand, D.R. 2012).

Renewable energy policies, on the other hand, have the potential to speed up the MENA region's energy transition, decrease unemployment, vary the energy mix, promote energy safety, improve the environmental worth, and mitigate energy price instability(REN21) 2012; Kahia, and Aissa et al., 2017& Kahia, M.; Kadria 2017). In this context, the current work examines the example of MENA Net Oil Importing Nations, which are thought to be most affected by the energy price change. It's also a chance to reduce their reliance on other areas by lowering the volume of imports affected by economic and political uncertainties. Notwithstanding, numerous environmental and socioeconomic benefits, green and renewable energy projects in MENA NOICs continue to confront significant obstacles.

According to Organization for Economic Co-operation and Development (2013), "difficulties for investors to access financing combined with an insufficient positive cash flow to recover the high costs due to the long installation life of renewable energy projects" are two main steady hurdle to private investment in this sector, which could be described by "difficulties for investors to access financing added to an insufficient positive cash flow to recover the high costs due to the long installation life of renewable energy projects." Another important stumbling block, on the other hand, is lobbying pressure, which is strongly connected with engagement in traditional energy sources. Consequently, the key objective of this study is to determine the impact of socioeconomic and health aspects in the MENA NOICs' changeover to a renewable-based economy from 1996 to 2019. The current study's contribution is to look at the links among renewable energy use, environmental improvement, government effectiveness, economic growth, lobbying power, and health in the MENA NOICs. We looked into what influence government effectiveness and lobbying pressure may have in reducing the influence of renewable energy usage on CO2 emissions, economic growth, and health factors. It's also worth noting that the multivariate panel technique in Loveand Zicchino, (2006) used the vector autoregressive (VAR) framework to investigate the relationships between the aforementioned components. The rest of the work is laid out as follows. The data is described in the second part, which also discusses the methodology. The empirical findings are presented and discussed in Section 3. The last part summarizes the most important policy consequences.

2. Data and Methodology

From 1996 to 2019, this analysis used yearly data for 10 net oil-importing countries from MENA such as (Turkey, Armenia, Tunisia, Cyprus, Morocco, Georgia, Malta, Israel, Jordan, and Lebanon (REN21 (2012), US E.I.A (2013)).This study used the renewable energy consumption expressed as a proportion of total final energy utilization, indicating the extant to which a country is transitioning to a renewable-energy-based economy (Sung and Park, 2018). The government effectiveness index assesses the worth of government policies as well as the government's effective accountability for them. In actuality, it's a stand-in for sound government and environmental policy. GDP per capita is a key indicator of economic growth for achieving sustainable development. CO2 emissions per capita as a proxy for general public awareness. Traditional energy generation as a proxy for lobbying power is expressed as a percentage contribution of traditional energy sources to overall electricity generation. The use of traditional energy resources to stifle the expansion of the renewables business is tied to lobbying pressure. The life expectancy at birth represents the health factor. The data were collected from World Development Indicators (WDI) and World Governance Indicators (WGI) databases. The variable descriptions are summarized in Table 1 with symbols, definitions, and references.

Table 01 Description and Data Source

Variables	Description	Source
Renewable Energy Consumption (RCO)	Renewable energy consumption(%of total final energy consumption)	WDI
Government Effectiveness Index(GEI)	Measures essentially the public services' quality and its policies, civil servants, and the degree of independence from political pressures	WGI
GDP Per Capita(GPC)	GDP per capita (current international$)	WDI
CO_2EmissionsPerCapita(EPC)	CO_2emissions per capita(metric tons)	WDI
Electricity Production(ELP)	Electricity production from oil, gas ,coal sources(% of total)	WDI
Life Expectancy at Birth (LEP)	Life expectancy at birth, total(years)	WDI

Some previous studies employed the vector error correction model and the vector autoregressive basis, but this study employs the Panel Vector Auto-Regressive (PVAR) method, developed by Love and Zicchino(2006).To determine the interactions between RCO, GEI, GPC, EPC, ELP, and LEP. In addition, the PVAR model offers an advantage over the traditional VAR model, which regards all factores in a single system as endogenous. This novel multivariate econometric technique also benefits from panel data analysis, which integrates fixed effects to discover previously unnoticed individual heterogeneity for all variables, improving estimation consistency. The PVAR model looks like this in most cases:

$$Y_{it} = \beta + \lambda\,(F)Y_{it} + \eta_i + b_{c,t} + \mu_{it} \qquad (1)$$

where Y_{it} denotes the dependent variables' vector (RCO, GEI, GPC, EPC, ELP, and LEP). Except for GEI, all variables are converted into natural logarithms for more reliable findings Shahbaz, Zeshan and Afza (2012) and more stationary behavior (Vogelvang, 2005)."β" individual-specific fixed effects for "the nation "I" are represented by the letters "i" and "t", which stand for country and time, respectively. "F" stands for the lag operator polynomial matrix, where (F) = $\lambda_1F_1 + \lambda_2F_2 + \ldots + \lambda_pF_p$. The country-specific impacts vector is denoted by the letter "η_i". The dummy variable bc,t represents the country-specific time."μ_{it}" denotes the residual term. Due to the delays of the endogenous variables, the Helmert approach is constructed on forwarding mean-differencing to eliminate the fixed effects, transforming variables, and lagged regressors are orthogonal (Love, Zicchino, 2006). The following abbreviated form of the PVAR model (Boubtane, Coulibaly, and Rault, 2013) is regarded to provide details regarding the Helmert procedure:

$$Y_{it} = \lambda\,(F)Y_{it} + \eta_i + \mu_{it} \qquad (2)$$

To remove the fixed effects, this technique assumes that all variables in the PVAR model be converted into deviations from forward means. Let $\overset{-n}{\underset{it}{Y}} = \sum_{s=t+1}^{Ti} Y_{is}^{n} / (T_i - t)$ refers to the methods that have been discovered as a result of the Y_{it}^{-m} computed values, which is a vector variable $Y_{it} = (Y_{it}^{1}, Y_{it}^{2}, \ldots, Y_{it}^{M})'$, where Ti denotes the country's final date"i". Let η_{it}^{-m} to show the same metamorphosis η_{it}^{m} where $\eta_{it} = (\eta_{it}^{1}, \eta_{it}^{2}, \ldots, \eta_{it}^{M})'$ As a result, the converted variable is produced as follows:

$$\tilde{Y}_{it}^{m} = \varphi_{it}\,(Y_{it}^{m} - Y_{it}^{-m}) \text{ and } \tilde{\eta}_{it}^{m} = \varphi_{it}\,(\eta_{it}^{m} - \eta_{it}^{-m}), \text{ while } \varphi_{it} = \sqrt{(T_i - t)/(T_i - t + 1)}$$

This transformation cannot be calculated since there are no future values for the previous year's data to paradigm the forward means (Boubtane, Coulibaly, and Rault 2013). As a consequence, the following is the final updated specification: $\tilde{Y}_{it} = \lambda(F)\tilde{Y}_{it} + \tilde{\eta}_{it}$, $\tilde{Y}_{it} = (\tilde{Y}_{it}^{1}, \tilde{Y}_{it}^{2}, \ldots, \tilde{Y}_{it}^{M})'$ and $\tilde{\eta}_{it} = (\tilde{\eta}_{it}^{1}, \tilde{\eta}_{it}^{2}, \ldots, \tilde{\eta}_{it}^{M})'$

As a result, the final updated specification comes from forward mean-differencing can be used instead of the first-difference, who has the disadvantage of accentuating breaches in uneven panels. This substitute alteration has the advantage of conserving sample size in the event of panel gaps (Roodman, 2009). Additionally, this approach exhibits an orthogonal deviation, in which each observation reflects a divergence from the average future observations (Boubtane, Coulibaly, and Rault 2013)It necessitates the use of a weighted variable to normalize the variation. If the updated errors did not contain an autocorrelation, they would have the same properties as the original errors and would likewise show the presence of constant variance. Consequently, this deviation is defined by homoscedasticity, and it will not induce serial correlation.(Arellano and Bover, 1995).

Finally, the model's dynamic is examined using impulse response functions (IRFs) and variance decomposition. IRFs, for starters, describe how one variable responds to changes in another. Second, the variance decomposition demonstrates how a shock in one variable affects oscillations in other variables. Over a 10-year, 1000 Monte Carlo simulations were used to decompose the forecast error variance.

3. Results and Discussion

The study initially tests the stationarity before moving on to the estimate of the PVAR model. However, whether first-generation (Maddala, and Wu, 1999); Hadri, K (2000); Levin, Lin, and Chu (2002); and Im, Pesaran, and Shin, (2003) or second-generation (Smith, Leybourne, and Kim (2004); Bai and Ng (2004); Bai and Ng (2005); and Pesaran, (2007), panel unit root tests are utilized is related to the presence of cross-sectional independence or dependency. The test described in Pesaran, (2021) is used to determine if a cross-sectional dependency (CD) exists, and the findings are shown in Table 1.

Table 01 Cross-Sectional Dependency

Variables	At Lag 1	
RCO	-214**	0.03
GEI	2.48**	0.01
GPC	30.96***	0.00
EPC	-0.10***	0.00
ELP	4.17***	0.00
LEP	31.94***	0.00

Note: *** and ** denote the significance levels of 0.01 and 0.05 (1% and 5%), respectively.

These findings show that the CD hypothesis is accepted with a high level of significance. The data also reveal a cross-sectional relationship between the oil-importing MENA countries. After that, we recommend employing second-generation panel unit root testing, such as the one described (Pesaran, 2007).However, Table 2 shows the results of the panel unit root test, which included intercept and trend. The test employed in (Pesaran, 2007) demonstrates that all variables are integrated of order 1, i.e., I (1), implying that all series are stationary when the first difference is applied.

Table 02 Panel Unit Root

Variables	State Values	P-Values
RCO	-1.147	0.12
DRCO	-4.425	0.00
GEI	-4.154	0.11
DGEI	-6.588	0.00
GPC	1.117	0.86
DGPC	-4.457	0.00
EPC	0.356	0.63
DEPC	-7.969	0.00
ELP	4.155	1.00
DELP	-3.545	0.00
LEP	0.176	0.56
DELP	-1.368	0.08

Note: *** and * denote the significance levels of 0.01 and 0.1 (1% and 10%), respectively. D(.) denotes the first difference.

According to the previous findings, (Westerlund, 2006) panel co-integration tests must be used to examine for the possibility of a long-run relationship between all of the variables. Table 3 shows the outcomes of the panel co-integration testing.

Table 03

Statistics	Values	P-Values
Gt	-1.32	0.11
Ga	-6.23	0.17
Pt	-10.46	0.26
Pa	-5.98	0.22

All four tests employed accept the null hypothesis that co-integration does not exist, as shown in Table 3 It's also worth mentioning that the robust p-values were generated with 400 replications using a bootstrapping approach and that the co-integration relationship was allowed to have a steady and predictable tendency. Because it has been demonstrated that all of the variables can be used in the first difference, the most effective tactic is to evaluation the PVAR model with one lag using the generalized method of moments to explore the possible and

To begin, the data on renewable energy consumption shows that this variable's initial lag is adversely connected with its present level. It can also be shown that the initial lag of renewable energy consumption has a coefficient of 0.17, which is substantial at a rate of 5%. Furthermore, At the 10% level, the first lag of the government effectiveness index has a positive effect on the effective level of renewable energy consumption, implying that rigorous environmental regulations and good governance would lead to an increase in renewable energy consumption. This conclusion might be used by MENA NOIC decision-makers to fund more research into the renewable energy-economy nexus.

"It is notable the combined duty of producers, consumers, and central governments toward the environmental implications of products throughout their life cycle, including end-of-life management," according to the report.(Kyriakopoulos, 2021),while discussing the techniques and legal systems that should be used to enhance the environment

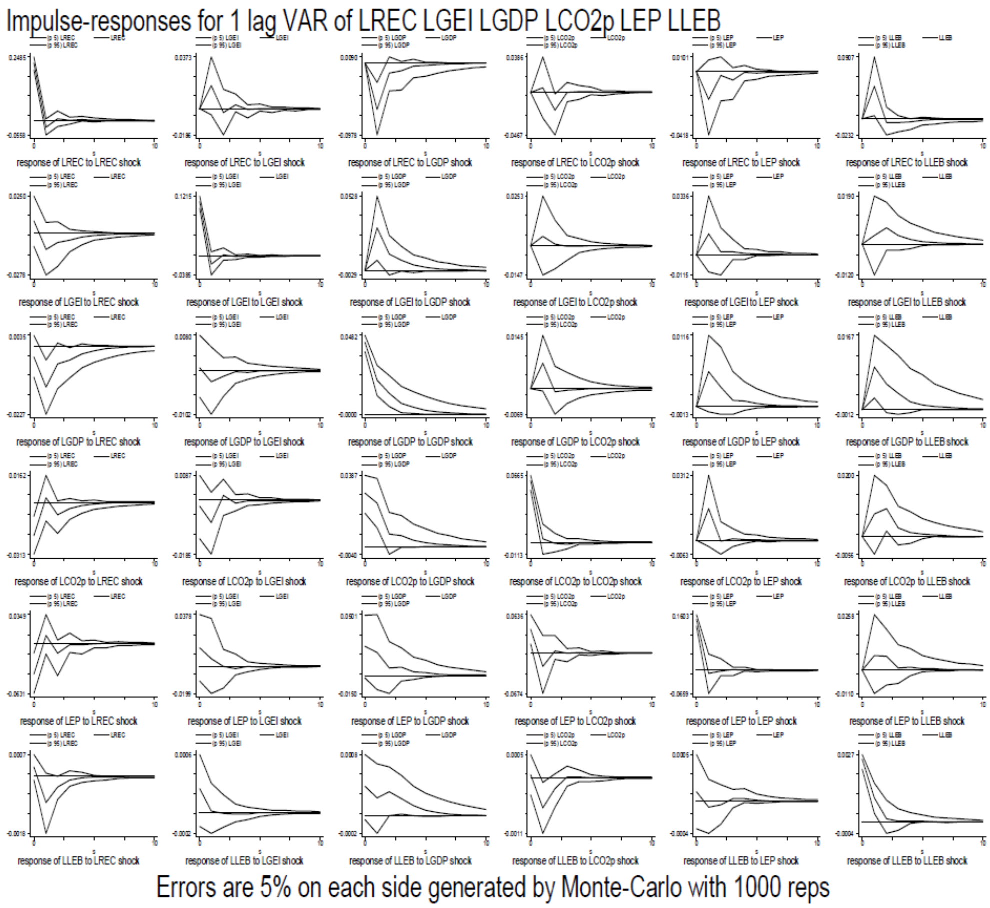
Furthermore, at a rate of 1%, the lag in GDP per capita has a negative influence on present renewable energy consumption, meaning that the benefits of these countries' economic development are not being channeled towards renewable energy projects. When it comes to the effect of the first lag of lobbying factor, the results are much more intriguing. This statistic, which is a proxy for power generation, has a negative but significant influence on current renewable energy use. Consequently, the interest organizations and lobbying power oppose renewable energy adoption, and as a result, these economies will be disinterested in the business. Finally, the lag value of life expectancy at birth, reveals a significant positive effect on current renewable energy consumption at a significance level of 10%. As a result, more demand for renewables may arise from the communication initiatives.

Second, the government effectiveness index data reveal that only the first lag of GDP per capita has a positive influence on current government effectiveness. This suggests that the quality of government services and policies has improved as a result of previous economic prosperity.

Third, the statistics demonstrate that the initial lag of the GDP per capita has a positive connection with its current level at a rate of 1%. This outcome mostly affirms the idea of economic growth. Moreover, lag of renewable energy consumption at the 5 % level is negatively associated with its current value. This is consistent with Fei, Rasiah, and Shen's (2014) findings, which also demonstrate a negative affiliation between per capita GDP and renewable energy utilization.

In a similar vein, multiple big studies have discovered that enacting renewable energy laws improves both economic development and environmental quality.(Apergis, and Tang, 2013); Destek, and Aslan, (2017); Chen et al., (2016). Furthermore, the first lag of life expectancy at birth has a positive and substantial influence at the 5% levelon the operative level of GDP per capita, indicating that human health and its association with human development boost economic growth.

Fourth, at the 10% level, the initial lagged value of the government effectiveness index is large with a negative coefficient in the CO2 emissions computation. This finding is significant because it demonstrates how excellent supremacy and sound environmental policy could help to decline CO2 emissions by encouraging the maintainable use of natural resources. To put it another way, governments that place a premium on good governance may be able to improve environmental quality by lowering CO2 emissions (Omri, and Hadj (2020); Omri, Kahia, and Kahouli, (2021).Then, by increasing the renewable energy industry, the NOICs' environmental quality may be improved. This result is consistent with earlier empirical findings (Farhani, S. 2013; Farhani, and Shahbaz (2014). This might help safeguard the environment by controlling and planning sustainable urban spatial development, (Yu et al, 2021).Furthermore, at a significance level of 5%, the first lag of GDP per capita has a beneficial influence on the effective amount of CO2 emissions. As a result, the economic development advantages employed in the MENA NOICs are not ecologically sustainable. Lastly, results show that none of the model's lagged variables are important for the electricity production equation.



Finally, the information on life expectancy at birth is more fascinating. The coefficients of the one lag of renewable energy utilization and GDP per capita are indeed positive at a significance threshold of 10%. Undoubtedly demonstrates the expanding use of renewable energy, maybe as a result of renewable energy laws, is good for public health.As though, CO2 emissions are negatively related to life expectancy with a 5% level of significance. Here worth mentioning, lag of life expectancy is positively connected to its current level at a 5% significance.The outcomes of variance decomposition are presented in Table 5 and IRFs in Figure 1.The strategy is specifically centered on two key factors of interest: renewable energy usage and birth duration. The second goal of the strategy is to assess the connections between these two primary components and others.

Table 5 Variance Decomposition

Variables	D(REO)	D(GEI)	D(GPC)	D(EPC)	D(ELP)	D(LEP)
D(REO)	0.87	0.00	0.07	0.00	0.00	0.03
D(GEI)	0.01	0.88	0.08	0.00	0.01	0.00
D(GPC)	0.84	0.00	0.83	0.01	0.01	0.04
D(EPC)	0.08	0.01	0.24	0.60	0.03	0.02
D(ELP)	0.06	0.00	0.03	0.07	0.80	0.00
D(LEP)	0.09	0.00	0.41	0.04	0.00	0.80

Note: Use of 1000 Monte Carlo simulations for 10 periods, to forecast error variance decomposition

Table 5 shows the results of the variance decomposition, which shows the amount and level of the shocks' effect on the detected variations of another factor when seen as a whole. The variance decomposition results, as derived from the orthogonalized impulse response coefficient matrices (Sims, C (1980); Lutkepohl, H. (2010).Similarly, each variable's latency has a significant influence on it. Renewable energy utilization, in particular, is responsible for about 7.25 percent of oscillations in economic growth and 4% of variations in life expectancy at birth (after 10 years), whereas life expectancy at birth, which is a proxy for health, is responsible for about 10% of variations in renewable energy consumption, 4.9 percent of variabilities in CO2 emanations, and 4.1 percent of vacillations in economic growth. The IRFs derived from Monte Carlo simulations with 1,000 repetitions and 5% error bands are shown in Figure 1.We investigate how changes in the government effectiveness index, GDP per capita, CO2 emissions, and power output affect renewable energy usage and life expectancy at birth. The estimate results and the variance decomposition generated before using the Cholesky decomposition and a study of the model dynamics, particularly the IRFs, may be corroborated.

4. Conclusions:

The study's main purpose is to look at the linkages among reduced environmental quality, renewable energy, health, and economic growth in the perspective of the environmental rules and lobbying power. To attain said objective, all possible factors like renewable energy consumption, power output from oil, gas, and coal sources life expectancy at birth, GDP per capita government effectiveness, and CO2 emissions per capita were employed containing time spanning 1996 to 2019. Therefore, data concerning variables were gathered from many oil-importing countries from MENA group from numerous research work to enlist the influence.

To extract the information modern econometric approaches like Panel vector autoregressive techniques were applied and the estimation shows that with the assistance of tight environmental strategy and efficient governance a country can promote renewable energy utilization. Because renewable energy can shrinkCO2 emissions, which indirectly affect environmental quality and also assist to attain economic growth. Moreover, the strategies prevailing in the net oil-importing countries are not in the favor of the environment but with the implementation of the lobbying pressure, utilization of renewable energy can be enhanced. Energy consumption can bound to some extent and it should assist to improve the health standard.

The quality of public policies in the MENA NOICs can assure the changeover to a renewable-energy economy while reducing lobbying pressure, according to these findings. The government, on the other hand, is seen as the principal supplier of these public policies and the first factor capable of enhancing governance quality. Furthermore, policymakers should employ some policy tools that focus to attain and maintain development, while improving the individual well-being and awareness program possibly inspiring the usage of renewables, environmental quality, and public health.

Furthermore, it is recommended that proper environmental rules be enacted to improve and protect the ecosystem. Overall, effective mitigation programs need close collaboration among a wide range of stakeholders, including research institutes, government agencies, industry, and universities. The study's most serious fault is that it fails to explain the findings using chronological, geographical, energy, and socioeconomic methods. The PVAR inquiry does not permit for discussion of these distributions due to technical limitations. As a consequence, applying a robust analytical framework may be a viable extension of this inquiry, meaning that the following argumentation areas need to be explored more closely. (Kyriakopoulos, G.L. 2021).

Reference

1. LealFilho,W.;Bönecke,J.;Spielmann,H.;Azeiteiro,U.M.;Alves,F.;deCarvalho,M.L.;Nagy,G.J.Climatechange andhealth:Ananalysisofcausalrelationsonthespreadofvector-bornediseasesinBrazil.*J.Clean.Prod.***2018**,*177*,589–596.
2. Alzard,M.H.;Maraqa,M.A.;Chowdhury,R.;Khan,Q.;Albuquerque,F.D.B.;Mauga,T.I.;Aljunadi,K.N.EstimationofGreenhouseGasEmissionsProducedbyRoadProjectsinAbuDhabi,UnitedArabEmirates.*Sustainability***2019**,*11*,2367.
3. Ulucak,R.;Khan,S.U.-D.Determinantsoftheecologicalfootprint:Roleofrenewableenergy,naturalresources,andurbanization.*Sustain.CitiesSoc.***2020**,*54*,101996.
4. TheInternationalPanelonClimateChangeWorkingGroupII(IPCC).*ClimateChange2007:Impacts,AdaptationandVulnerability*;CambridgeUniversityPress:Cambridge,UK,2007.
5. InternationalEnergyAgency(IEA).*MediumTermMarketReport*;InternationalEnergyAgency:Paris,France,2014.
6. Lu,Z.-N.;Chen,H.;Hao,Y.;Wang,J.;Song,X.;Mok,T.M.Thedynamicrelationshipbetweenenvironmentalpollution,economicdevelopmentandpublichealth:EvidencefromChina.*J. Clean.Prod.***2017**,*166*,134–147.
7. EuropeanCommission(EC).*TheEuropeanGreenDeal*;EuropeanCommission:Brussels,Belgium,2019.
8. Vasylieva,T.;Lyulyov,O.;Bilan,Y.;Streimikiene,D.SustainableEconomicDevelopmentandGreenhouse GasEmissions:TheDynamicImpactofRenewableEnergyConsumption,GDP,andCorruption.*Energies***2019**,*12*,3289.
9. delP.Pablo-Romero,M.;Román,R.;Sánchez-Braza,A.;RocíoYñiguez,R.RenewableEnergy,Emissions,andHealth.In*RenewableEnergyUtilisationandSystemIntegration*;Cao,W.,Hu,Y.,Eds.;IntechOpen:London,UK,2016.
10. Mazur,A.Doesincreasingenergyorelectricityconsumptionimprovequalityoflifeinindustrialnations?*EnergyPolicy***2011**,*39*,2568–2572.
11. Treyer,K.;Bauer,C.;Simons,A.HumanhealthimpactsinthelifecycleoffutureEuropeanelectricitygeneration.*EnergyPolicy,* **2014**,*74*,S31–S44.
12. Apergis,N.;Tang,C.F.Istheenergy-ledgrowthhypothesisvalid?Newevidencefromasampleof85countries.*Energy Econ.***2013**,*38*,24–31.
13. Destek,M.A.;Aslan,A.Renewableandnon-renewableenergyconsumptionandeconomicgrowthinemergingeconomies:Evidencefrombootstrappane

lcausality.*Renew.Energy***2017**,*111*,757–763.
14. OrganisationforEconomicCo-operationandDevelopment(OECD).*Renewable EnergiesintheMiddle EastandNorthAfrica:PoliciestoSupport Private Investment*;OECDPublishing:Paris,France,2013.
15. Jalilvand,D.R.*RenewableEnergyfortheMiddleEastandNorthAfrica:PoliciesforaSuccessfulTransition*;Friedrich-Ebert-Stiftung,DepartmentforNear/MiddleEastandNorthAfrica:Berlin,Germany,2012.
16. RenewableEnergyPolicyNetworkforthe21stCentury(REN21).*Renewables2012GlobalStatusReport*;REN21Secretariat:Paris,France,2012.
17. Kahia,M.;Aïssa,M.S.B.;Lanouar,C.Renewableandnon-renewableenergyuse-economicgrowthnexus:ThecaseofMENANetOilImporting Countries.*Renew.Sustain.EnergyRev.***2017**,*71*, 127–140.
18. Kahia,M.;Kadria,M.;BenAissa,M.S.;Lanouar,C.Modellingthetreatmenteffectofrenewableenergypoliciesoneconomicgrowth:Evaluation from MENA countries.*J.Clean.Prod.***2017**, *149*, 845–855.
19. Love,I.;Zicchino,L.Financialdevelopmentanddynamicinvestmentbehavior:EvidencefrompanelVAR.*Q. Rev.Econ.Financ.***2006**,*46*,190–210.
20. U.S.EnergyInformationAdministration,EIA.*MiddleEastandNorthAfrica*;U.S.EnergyInformationAdministration:Washington,DC,USA,2013.
21. Sung,B.;Park,S.-D.WhoDrivestheTransitiontoaRenewable-EnergyEconomy?Multi-ActorPerspectiveonSocialInnovation.*Sustainability***2018**,*10*,448.
22. Shahbaz,M.;Zeshan,M.;Afza,T.IsenergyconsumptioneffectivetospureconomicgrowthinPakistan?NewevidencefromboundstesttolevelrelationshipsandGrangercausalitytests.*Econ.Model.***2012**,*29*,2310–2319.
23. Vogelvang,B.*Econometrics:TheoryandApplicationswithEViews*;FinancialTimes/PrenticeHall:EnglewoodCliffs,NJ,USA,2005.
24. Charmeza,W.W.;Deadman,D.F.*NewDirectionsinEconometricPractice:GeneraltoSpecificModelling,Cointegration,andVectorAutoregression*,2nded.;EdwardElgarPublishing:Cheltenham,UK,1997.
25. Boubtane,E.;Coulibaly,D.;Rault,C.Immigration,Growth,andUnemployment:PanelVAREvidencefrom OECDCountries.*Labour***2013**,*27*,399–420.
26. Roodman,D.HowtodoXtabond2:AnIntroductiontoDifferenceandSystemGMMinStata.*StataJ.***2009**,*9*,86–136.
27. Arellano,M.;Bover,O.Anotherlookattheinstrumentalvariableestimationoferror-componentsmodels.*J.Econom.* **1995**,*68*,29–51.
28. Maddala,G.S.;Wu,S.AComparativeStudyofUnitRootTestswithPanelDataandaNewSimpleTest.*Oxf.Bull. Econ.Stat.***1999**,*61*,631–652.
29. Hadri,K.Testingforstationarityinheterogeneouspaneldata.*Econom.J.***2000**,*3*,148–161.
30. Levin,A.;Lin,C.-F.;Chu,C.-S.J.Unitroottestsinpaneldata:Asymptoticandfinite-sampleproperties.*J.Econom.***2002**,*108*,1–24.
31. Im,K.S.;Pesaran,M.H.;Shin,Y.Testingforunitrootsinheterogeneouspanels.*J.Econom.***2003**,*115*,53–74.
32. Smith,L.V.;Leybourne,S.;Kim,T.-H.;Newbold,P.MorePowerfulPanelDataUnitRootTestswithanApplicationtoMeanReversionin Real Exchange Rates.*J.Appl.Econom.***2004**, *19*,147–170.
33. Bai,J.;Ng,S.APanicAttackonUnitRootsandCointegration.*Econometrica***2004**,*72*,1127–1177.
34. Bai,J.;Ng,S.ANewLookatPanelTestingofStationarityandthePPPHypothesis.In *IdentificationandInferenceforEconometricModels: Essays in Honor of Thomas Rothenberg*; Andrews, D.W.K., Stock, J.H., Eds.; Cambridge University Press: Cambridge, UK,2005;Chapter18,pp.426–450.
35. Pesaran, M.H. A simple panel unit root test in the presence of cross-section dependence. *J. Appl. Econom.* **2007**, *22*, 265–312.
36. Pesaran,M.H.Generaldiagnostictestsforcross-sectionaldependenceinpanels.*Empir.Econ.***2021**,*60*,13–50.
37. Westerlund, J. Testingfor PanelCointegration withMultiple StructuralBreaks.*Oxf.Bull.Econ.Stat.***2006**, *68*,101–132.

38. Kyriakopoulos,G.L.EnvironmentalLegislationinEuropeanandInternationalContexts:LegalPracticesandSocialPlanningtowardtheCircularEconomy.*Laws***2021**,*10*,3.
39. Fei,Q.;Rasiah,R.;Shen,L.J.TheCleanEnergy-GrowthNexuswithCO2EmissionsandTechnologicalInnovationinNorwayandNew Zealand.*EnergyEnviron.***2014**,*25*, 1323–1344.
40. Chen, P.-Y.; Chen, S.-T.; Hsu, C.-S.; Chen, C.-C. Modeling the global relationships among economic growth, energy consumptionand CO_2emissions.*Renew.Sustain.EnergyRev.***2016**, *65*, 420–431.
41. Omri,A.;Hadj,T.B.Foreigninvestmentandairpollution:Dogoodgovernanceandtechnologicalinnovationmatter?*Environ.Res.***2020**,*185*,109469.
42. Omri,A.;Kahia,M.;Kahouli,B.Doesgoodgovernancemoderatethefinancialdevelopment-CO_2emissionsrelationship?*Environ.Sci.Pollut.Res.***2021**,*28*,47503–47516.
43. Farhani,S.Renewableenergyconsumption,economicgrowthandCO_2emissions:EvidencefromselectedMENAcountries.*EnergyEcon.Lett.***2013**,*1*,24–41.
44. Farhani,S.;Shahbaz,M.Whatroleofrenewableandnon-renewableelectricityconsumptionandoutputisneededtoinitiallymitigateCO_2emissions inMENAregion?*Renew.Sustain.EnergyRev.***2014**, *40*,80–90.
45. Yu,X.;Ma,S.;Cheng,K.;Kyriakopoulos,G.L.Anevaluationsystemforsustainableurbanspacedevelopment basedingreenurbanismprinciples-acasestudybasedontheQin-BamountainareainChina.*Sustainability***2020**,*12*,5703.
46. Sims,C.Macroeconomicsandreality.*Econometrica***1980**,*48*,1–48.
47. Lütkepohl,H.VarianceDecomposition.In*MacroeconometricsandTimeSeriesAnalysis*;Durlauf,S.N.,Blume, L.E.,Eds.;TheNewPalgraveEconomicsCollection,PalgraveMacmillan:London,UK,2010;pp.369–371.
48. Kyriakopoulos,G.L.GlobalizedInclinationtoAcquireKnowledgeandSkillsTowardEconomicDevelopment.*WSEASTrans.Bus.Econ.***2021**,*18*,1349–1369.