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Economic Impacts of Renewable Energy on the Economy of UAE

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ABSTRACT

This research is concerned with the study and analysis of the economic impacts of renewable energy on the UAE's economy. We took annual time series data for variables that include renewable energy consumption, per capita GDP, capital creation, employment, trade, inflation rate, interest rate, fixed exchange rate, foreign direct investment, and trade openness for the time period from 2010 to 2020. Initially, we applied the autoregressive distributed lag (ARDL) model to assess the long-term relationship between the variables. We encountered a multi-linearity problem where we found the correlation between the independent variables. Therefore, we adopted the alternative approach of the Ordinary Least Squares (OLS) technique to measure the relationship between renewable energy and the UAE economy. We have made an equation from OLS, in which we take renewable energy and economic growth as the independent and dependent variables, respectively. The results confirmed that there is a statistically significant relationship between renewable energy and the economy in the United Arab Emirates.

Keywords: Economic Impacts, Renewable Energy, Economy of the UAE
JEL Classifications: Q4, Q5, Y

1. INTRODUCTION

According to the Energy Information Administration's 2019 International Energy Outlook, "Renewables are the fastest-growing source of energy in the world, with consumption increasing by 3.0% per year." Every aspect of human existence requires energy. There are many places where we need it: our homes and offices; our schools; our colleges and universities; our light and heavy industries; and for the transportation of commodities from one city/country to another (Sgouridis et al., 2016). Access to energy is recognized as a fundamental human right, but unfortunately, millions of people continue to suffer from energy shortages and poverty as a result. People in poor and developing countries don't even have access to energy for fundamental needs such as cooking, lighting, heating, cooling, and other essentials like that. Fossil fuel energy production, on the other hand, increases carbon dioxide emissions, further aggravating global warming. The usage of firewood and charcoal for energy generation has been linked to major respiratory and ocular illnesses. In addition, the use of wood contributes to deforestation, causing harm to the natural environment (Jamil et al., 2016).

Constant use of old forms of energy has a negative environmental impact. Fossil fuels are unsustainable in terms of the environment due to global warming concerns. Energy disruptions and climate issues could result from continued reliance on traditional sources of energy (Said et al., 2018).

Developing countries are currently confronted with two major challenges: one is meeting the basic energy and service demands of billions of people, while the other is participating in the global transition to clean and low-carbon energy systems or models. To combat the first obstacle, governments will be able to alleviate poverty and achieve their social development goals by tackling the second. Clean energy will assist countries to improve their air and environment, which would lead to higher productivity via population health improvement. The increase in energy consumption has historically been linked to economic growth and an increase in greenhouse gas emissions (GHG). Two-thirds of global GHG emissions are attributed to energy consumption and production activities. While GHG emissions can be reduced by using renewable energy, economic growth can be accomplished (Mezher et al., 2012).

As countries convert from fossil fuels to renewable energy, the world is experiencing a paradigm shift. In order to achieve economic growth and mitigate climate change, the world is undergoing a massive and historic energy transition from high carbon-intensive fuels to low carbon renewable energies. Solar, wind, hydro, geothermal, and sustainable biomass energy can all be used to produce clean energy to meet this goal. A number of countries are working on making the switch from fossil fuels to renewable energy sources, but it won't be easy (Jebli and Youssef, 2015). In order to minimize carbon emissions and regulate global warming, deliberate decisions and consistent policymaking are necessary. By conserving the ecosystem, resources, and global climate, a greater reliance on renewable energy could assist in achieving environmental sustainability. Perhaps the high initial costs of renewable energy are to blame for its underutilization. For consumers to get energy from wind, water, solar, biomass, and geothermal sources, modern, efficient power systems are required (Charfeddine and Kahia, 2019).

However, sustainable development has roots that can be traced back thousands of years and have gained enormous importance in the 21st century as a new paradigm of development. Over the course of human history, humans have struggled to find a balance between the need for raw materials to provide food, clothes, housing, energy, and other things, and the ecological boundaries of ecosystems. From the 1950s forward, a modern idea of sustainability began to emerge. Nations embarked on economic growth and development route after World War II. In the 1970s, the concept of sustainable development began to gain major traction in political and academic circles. This means providing the requirements of the current generation without sacrificing future generations' ability to meet their own needs, as stated by Brundtland (Nathaniel et al., 2021).

In the latter half of the 20th century, many countries made significant strides in their development as a result of this newfound confidence. This enormous economic growth, coupled with technological advances and a rapidly rising population, led to the human race exceeding the Earth›s environmental constraints. As a result of this destabilization of the environment, the well-being of present as well as future generations has been severely harmed in most parts of the world, with potentially disastrous results. There are hundreds of definitions of sustainability; different researchers have tried their level best to find the most accurate and commonly accepted meanings. Four elements of sustainability have been identified from the literature. The Futurity Principle, the Environment Principle, the Equity Principle, and the Participation Principle are all discussed here (Kahia et al., 2016).

The global economy relies on renewable energy. The entire demand for energy is predicted to rise by 21% by 2030 as populations grow, living standards improve, and consumption increases. Globally, governments are looking for solutions to deliver energy while minimizing greenhouse gas emissions, as well as other environmental implications, as climate change concerns mount. Energy sector investments and infrastructure decisions made today lock in associated costs and benefits for at least a few decades (Mezher et al., 2011). As a result, they have a substantial impact on how well the energy sector contributes to economic growth in other sectors. In terms of employment generation, resource efficiency, and the environment, the energy industry has a significant impact on the economy as a whole. Oil price volatility, as demonstrated by the devastating earthquake that struck Japan in 2011 and the ensuing financial crisis, major movements in the industry can have a significant rippling effect throughout the economy. In this way, improving the economic development's long-term resilience by making energy more cost-effective, reliable, secure, and environmentally friendly (Alam and Murad, 2020).

As a result of enabling legislation and significant cost reductions in recent decades, the implementation of renewable energy technology has witnessed a spectacular increase. As a result of this increase, many people attribute it to improved energy security, reduced climate change impacts, and greater energy availability. Commercial arguments in favor of renewable energy are bolstered by their social and economic benefits. Policies are becoming increasingly interested in the potential benefits of renewable energy deployment for economic growth and job creation as many economies struggle to regain pace. There is still a need for greater research and empirical proof in this vital area (Apergis and Payne, 2010).

Sustainable development is essentially defined by the Futurity Principle. You're supposed to take care of yourself and your family without compromising the welfare of future generations. According to the Environment Principle, countries should develop without causing harm to the climate and the ecosystem. Here, fossil fuels and renewable energy sources are commonly compared, with clean renewable energy sources deemed superior to fossil fuels in terms of pollution control and reduction (Balcılar et al., 2014). Finite resources should be divided more equally than is now the case. The disparity in energy use between and within countries is staggering. Global energy consumption by low-income nations is under 1%, according to a World Bank report. When developed and industrialized countries reduce their renewable energy consumption, the equity principle can be achieved. Participants must be consulted when developing energy models in order to understand their impact on the United Arab Emirates' economy. As we migrate from old energy technology to renewable energy technologies, the opinion of the common masses should also be taken into consideration (Batool et al., 2021).

This research has a goal represented in learning the economic impacts of renewable energy on the economy of the United Arab Emirates (2010-2020). Since renewable energy is completely dependent on renewable energy technologies such as the sun and wind to be able to harness any energy, if the weather conditions are not good enough, the renewable energy technologies will lack the ability to generate any electricity. Hence, the research problem is represented in the lack of sufficient research, references, and studies that are interested in discussing these aspects and everything related to renewable energy and its impact, both negative and positive, on the economy. Consequently, the society, authorities, and responsible bodies have a sufficient degree of awareness and knowledge and are adequately prepared and take their precautions as well as the necessary arrangements until You can avoid the difficulties or problems that may occur, and also take advantage of the positive aspects and the benefits it offers.

2. LITERATURE REVIEW

According to Romer (1990), investing in renewable energy resources can induce direct and indirect growth, which can lead to a large capital spending flow across the economy. Such expansion in other industries, both directly and indirectly, contributes significantly to job creation (Romer, 1986). Rodrik et al. (2004) argue that the 2007-2008 global financial crisis provided an opportunity to accelerate the adoption of renewable energy technologies and that this sector will play a vital role in ensuring a sustainable economic recovery. Many international institutions, such as the OECD, UNEP, and the World Bank, have urged for a "green" recovery, "green growth," or a "green new deal" that combines economic recovery tactics with environmental protection to achieve this "green" development, and technological progress and innovation are essential. Particularly "green" incentives provide support (e.g. investment subsidies, low-interest loans, tax deductions, etc.) and are dedicated to clean energy technologies like renewable energy, energy efficiency, smart power grids, and transportation, among others. International organizations, EU authorities, and governments at various political levels have adopted these grants and other plans, initiatives, policies, and activities to promote economic growth and sustainable development (i.e. deployment toward a "greener" economy) (Rodriguez and Sachs, 1999). Green economy initiatives aim to aid sustainable development rather than replace it at the local, regional, and global levels.

IRENA, the international agency for renewable energy, headquartered in Abu Dhabi, UAE, has demonstrated a strong commitment to the adoption and promotion of renewable energy during the previous decade (Sala-I-Martin and Subramanian, 2013). It was established to promote renewable energy sources while also helping to transform the world's traditional energy systems. In 2017, Prime Minister Sheikh Mohammed bin Rashid Al Maktoum of the United Arab Emirates announced his vision for the UAE Energy Strategy 2050. The goal of this plan is to have 44% of the UAE's energy mix come from renewable sources, 38% from gas, 14% from clean coal, and 6% from nuclear power by 2050. 90% of the UAE's energy requirements were said to be fulfilled by natural gas as early as 2017 (Emirates 247.com). In order to achieve the status of innovative sustainable UAE, more funding needs to be allocated for Research and Development, about 3% of GDP.

And "Green" policies can facilitate growth in four ways (Sarmidi et al., 2014), an input impact (raising production factors), an efficiency effect (pushing production closer to the production possibility frontier), a stimulus effect (boosting the economy during a crisis) and an innovation effect (accelerating development and the adoption and dissemination of renewable energy technologies) (accelerating development and the adoption and dissemination of renewable energy technologies). When examining the economic consequences of renewable energy sources, the innovation effect, which can be shown by investments in R&D, is highly valued. Consider photovoltaic electricity, with the primary objective to reduce global warming pollution. If photovoltaics succeeds, it might make fossil fuels uncompetitive, increase the availability of electric power, and lower the cost of sending electric power to remote, off-grid regions. The advancement of "green" renewable energy technology is critical. Growing the economy and creating a green economy are both adversely affected. To use IEA's definition, "green" innovation is the invention and commercialization of novel approaches to environmental and economic challenges using advances in technology, with an understanding of technology that encompasses improvements to products, processes, organizations, and marketing. To put it another way, "green" innovation includes both world-first and 1st-time for the company innovations. This is sometimes referred to as absorption and involves the spread, adoption, adaptation, and application of innovative "green" technology across and within countries. Through the use of alternative energy sources, green innovation and R&D investments may be seen as important drivers in the shaping of economic systems, particularly in the concept of "green economy" growth (Suslova and Volchkova, 2012).

The creation and expansion of new jobs are critical for the development of renewable energy technologies. According to Welsch (2008), energy consumption will rise even as the cost of renewable energy falls. He insists on the creation of jobs as a stimulus for the renewable energy market to flourish. IRENA estimates that the renewable energy sector employed 8.1 million people worldwide, both directly and indirectly, at a 5% annual pace (2014). With 2.8 million jobs, the solar photovoltaic business led the way in renewable energy employment, while the wind power industry had a record-breaking year. Despite the fact that large hydropower facilities are not considered "newer" renewable energy sources due to the harm they inflict to the environment and ecology, they employed an additional 1.3 million people. In contrast to the weak labor markets in the broader energy sector and a slower than expected expansion in the number of renewables jobs, the overall number of jobs in this sector increased globally (Treisman, 2000). A study carried out in 1999 has estimated that by 2020, new jobs will be created in agriculture and biomass fuel in the EU because of the growth of renewable energy. This estimate of employment creation is accurate, according to industry estimates. A large number of jobs are already being created in numerous nations by the wind energy industry, in particular (2014). This demonstrates the hypothesis that renewable energy technologies contribute significantly to boosting employment and having a favorable economic impact on the "green" economy.

According to Torres et al. (2012), energy is intricately related to GDP, thus, any country's economic growth depends on an effective energy policy. A country's economic health is directly related to its energy policy. Using GDP as a macroeconomic indicator, we can assess the health of an economy by looking at the value of all the external products and services generated over a specified period of time. It's the most commonly used economic measurement unit. An increasing GDP indicates a healthy economy.

Orihuela (2018) produced the first study on the relationship between energy usage and economic growth. This was inspired by the time's high energy prices. They used data from the United States on gross energy inputs and Gross National Product (GNP). The findings backed up the conservation concept that GNP drives energy usage. This study had a significant impact in that it resulted in the publishing of other papers all over the world. These researches employed various time spans, control variables, econometric methodologies, and so on. The outcomes differed as a result of these changes. Some of these studies proved that the causality went from energy consumption to economic growth, but others demonstrated that energy consumption caused economic growth to increase. Yet, other studies showed that there was no causality between these variables and the last group showed bi-directional causality running in both directions between the two variables. Douglas and Walker (2017) provide a date-ordered chronological list of all 59 articles included in our investigation (oldest to newest). The countries that participated in the study are given in the "Countries" column. Sweidan's study, for example, included only one country. Other studies, like Al-Irani's, included more than one country, such as the whole Gulf Cooperation Council (GCC) countries (Olayungbo and Adediran, 2017). The "No. of Observations" column reflects how many times the GCC countries were studied in the study. Al-Iriani, for example, analyzed the six GCC countries as a group. As a consequence, we tallied six observations. Squalli investigated each of the GCC countries separately. As a result of this, four observations were made. We conducted a comparable count for the various econometric approaches used in the studies. For example, AlKhathlan and Javid evaluated the Saudi Arabia relationship using four different models: aggregate, oil, gas, and power. As a result of this, four observations were made. Kim and Lin (2017) evaluated the energy–growth relationship for each of the six GCC nations as a group and individually, as a result, 12 observations were recorded. The total number of observations using these criteria was 267. We believe that the number of times research on these nations was conducted was a good indicator of the importance of the issue and scholarly interest in the energy–growth nexus conundrum. Similarly, 267 samples were a sufficient amount to derive some reasonable findings. The time span of the data investigated in the studies is specified in the period column. Al-Iriani, for example (Okada and Samreth, 2017).

A multitude of authors has studied the relationship between GDP and energy consumption by providing a wide range of results in terms of causality, statistically highlighting either a one-way causality, a bidirectional causality, or none. Such analysis was performed in (Moradbeigi and Law, 2017) on a panel of 29 OIC countries, data period 1990-2014; in (Faria et al., 2016) on a panel of 8 east-central European countries, data period 1990-2009; in (Haapanen and Tapio, 2016) on a panel of 18 emerging countries, data period 1990-2003; in(International Country Risk Guide) (2019) on a panel of top 38 countries, data period 1990-2003; in (Becker et al., 2016) on a panel of OEDC countries, data period 1990-2010; in (Kakanov et al., 2016) on a panel of OEDC countries, data period 1980-2012; in (Ji et al., 2014) on a panel G-7 countries, in (Eregha and Mesagan, 2016) on a panel of developed countries in Europe, data period 1990-2011; in (Barro and Lee, 2013).on a panel of 100 countries, data period 1960-2000 or 1971-2000. Similar studies for the case of individual countries and for different time periods can be found for Saudi Arabia (Cabrales and Hauk, 2011), for China, Turkey, Brazil, and Lithuania. On the other hand, the European and global energy system perspectives must be assessed in light of present climate change, with a special emphasis on the role of renewable technology (Organization of Petroleum Exporting Countries, 2019). Given these concerns, we believed it would be useful to examine the impact of renewable energy consumption on GDP as well as the evolution of the share of renewable energy consumption in final energy consumption for EU member nations (Cavalcanti et al., 2011).

3. METHODOLOGY AND DATA

In the case of the UAE, we looked at the connection between renewable energy consumption and economics. Based on previous research, this study examined a range of variables, including renewable energy consumption, GDP per capita, capital formation, employment, and trade openness (2021). The research will be conducted from 2010 to 2020 using annual data gathered from a variety of sources. Data on renewable energy consumption and economic growth, such as GDP per capita (in constant 2010 US dollars), capital formation, and other measures. World Bank Indicators and IRENA were used to compile the data on labor market conditions. As a final step, UNCTAD's data on trade openness was culled. Table 1 breaks down the variables as follows.

Table 1: Details on the variables

Variable	Abbr.	Description
Renewable energy consumption	REC	Renewable energy consumption is accounted for in this metric because it encompasses all types of renewable energy: hydroelectricity; solid biomass; wind; solar; liquid biomass; biogas; and waste
GDP per capita (Constant 2010 US$)	GDP	Gross domestic product (GDP) divided by the midyear population (MYP) equals GDP per capita. It's calculated without taking into account things like fabricated asset depreciation or natural resource depletion and degradation. Data is in 2010 U.S. dollar constants
Capital formation	CF	A company's gross fixed capital formation includes everything from land improvements to equipment purchases to building roads, railways, and other public and private infrastructure. It also includes everything from private residential dwellings to commercial and industrial structures. The figures are in constant 2010 U.S. dollars
Employment	EMP	Employment is the total number of people employed in agriculture, manufacturing, and the service sector
Trade openness	TO	the degree to which a country is willing to engage in international trade

Source: The definitions for economic indicators are and renewable energy consumption is based on the world bank indicators and trade openness is based on UNCTAD

Baseline regression analysis must be preceded by basic diagnostic tests on the data set to determine whether or not the Classic Linear Regression Model's basic assumptions have been met before moving forward with any kind of baseline analysis (DeCarolis et al., 2012). Basic data tests on the data set include the unit root test for stationarity, the Pearson correlation test for multicollinearity, the Bruesch-Pagan/Cook-Weisberg test for heteroscedasticity, and the Wooldridge test for autocorrelation. A long-term relationship between the variables is the focus of this investigation (Can and Korkmaz, 2019). This study also applied the ARDL (e-views) correlation test developed by the co-integration test to examine the long-term relationship between variables. The following ARDL (e-views) model is applied to estimate the relationship:

p DLGDPt = a1 + q aT T + aGDP LGDPt-1 + aRELRECt-R + aTRLTOt-1 + aEMLEMPt-1 + aK LCFt-1 + ΣaiDLGDPt-i + Σa j DLRECt- j + ΣakDLTOt-k +ΣaLDLEMPt-l + ΣamDLCFt-m + e1t-s (1)

i=1 j=0 k =0 l=0 m=0

p DLRECt = a1 + q aT T + aGDP LGDPt-1 + aRE LRECt-1 + aTRLTOt-1+ aEMLEMPt-1 + aK LCFt-1 + Σai DLGDP t-i + Σ a j DLRECt- j + Σ ak D-LTOt-k + ΣaLDLEMPt-l + ΣamDLCFt-m+ e2t-s (2)

i=1 j=0 k = 0 l=0 m=0

DLTOt = a1 + q aT T + aGDP LGDPt-1 +aRE LRECt-1 + aTRLTOt-1 + aEMLEMPt -1 + aK LCFt-1 +Σai DLGDP t-i + Σ a j DLREC t- j + Σ ak D-LTOt-k +ΣaLDLEMPt-l + ΣamDLCFt-m+ e3t-s (3)

i=1 j=0 k = 0 l=0 m=0

p DLEMPt = a1 + q aT T + aGDP LGDPt-1 + aRE LRECt-1 + aTRLTOt-1+ aEMLEMPt -1 + aK LCFt-1 + Σai DLGDP t-i + Σ a j DLREC t- j + Σ akDLTOt-k +ΣaLDLEMPt-l + ΣamDLCFt-m + e4t-s (4)

i=1 j=0 k = 0 l=0 m=0

p DLCFt = a1 + q aT T + aGDP LGDPt-1 + aRE LRECt-1 + aTRLTOt-1 + aEMLEMPt -1 + aK LCFt-1 + ΣaiDLGDPt-i + Σ a j DLREC t- j + Σ akDLTOt-k + ΣaLDLEMPt-l + ΣamDLCFt-m + e5t-s (5)

i=1 j=0 k = 0 l=0 m=0

LREC stands for renewable energy consumption, while LGDP is the natural lograture of gross domestic product; LTO is the natural lograture of trade openness; LEMP is the natural lograture of employment; and, finally, LCF represents the natural lograture of capital formation. T stands for the time period being discussed. The residuals are presumed to be white noise with a normal distribution. Determine if variables have a long-term relationship by performing a regression analysis, the following hypothesis (H0: d 1=d 2=d 3=0) is tested and the F value (Wald Test) is measured (Dogan et al., 2020). To use causality analysis, you must first determine the ideal lag length. The number of lags that work best is determined by Akaike Information Criteria (AIC) and Schwatz Information Criteria (SIC) (SIC). Once you've completed the unit root test, you can use these criteria (ADF and PP). Finally, a vector error correction model has been developed (VECM)is required to measure the causality relationship and the direction, but in the case of ARDL multicollinearity issues, we used Ordinary Least Square (OLS) regression EEA (2014).

4. RESULTS AND DISCUSSION

Table 2 summarizes the descriptive statistics used to begin the preliminary results analysis. Variables have a normal distribution, as shown by the findings. The variables' natural logarithms have been taken in order to minimize the outliers and skewness issues (Haseeb et al., 2019).

Table 3 shows in the unit root test for determining data set stationarity follows the descriptive statistics. We used Augmented Dickey-Fuller, Phillips and Perron and Dickey-Fuller, Generalized Least Squares unit root tests to determine whether or not the data were statistical. The next step is to determine whether or not there is a long-term relationship between the independent and dependent variables after the stationary relationship has been established. However, determining the optimal lag length is critical when looking at long-term relationships between variables, and this is where Schwartz and Akaike Information Criteria come in the unablated results confirm that "2" is the optimal lag length for this research. The ARDL(e-view) bound model is used to examine the long-term relationship. However, when using the ARDL (e-view) regression technique, the results showed a problem with multicollinearity.

It is necessary to look for another method of testing the relationship if the ARDL regression techniques cause issues with multicollinearity and the VECM test yields contradictory results. We used the OLS regression technique to examine the connection between renewable energy consumption and economic growth as an alternative approach based on. There are two tables with the results reproduced: Tables 4 and 5. According to the findings, there is no correlation between renewable energy consumption and GDP, late openness, capital formation, or employment. We ran OLS twice. Once by considering the GDP as a dependent variable to assess the relationship between economic growth and renewable energy IEA RETD TCP (2016).

During the foregoing, we emphasize that there is a statistically significant relationship between renewable energy and the

Table 2: Variable descriptions and descriptive statistics dependent variable

Variables	Mean	Standard deviation	Mini.	Max.
LREC	7.1289	0.5267	6.5301	7.9761
LGDP	10.7729	0.2332	10.4309	11.080
LCF	24.7275	0.3523	24.2184	25.1773
LTO	12.5257	0.3994	11.7136	12.9026
LEMP	4.6051	0.0004	4.6050	4.6052

Table 3: Unit root test

Variable	ADF	Levels PP	Levels DF-GLS	ADF	First difference PP	First difference DF-GLS
LREC	−1.2312	−1.987	1.0547	−1.5641b	−4.2783b	−2.1479a
LGDP	−2.4532	−1.6324	−1.6314	−3.4610c	−5.0837a	−3.2140b
LCF	−0.9871	−0.3487	−2.5241	−1.5412c	−4.4777b	−0.2414a
LTO	−1.1478	−1.6479	0.9876	−2.6542a	−5.1484c	−1.9835c
LEMP	−0.5489	−1.6314	−1.5480	−3.8793c	−4.8175c	−1.8940a

Table 4: OLS results (LNGDP – independent variable)

Variables	OLS results
LNREC	0.1254 (0.987)
LNCF	−0.5178 (0.193)
LNEM	0.9874 (0.286)
LNTO	−0.1901 (0.239)
Constant	24.9262** (0.017)
Adj. R2	0.3126
Prob. >F	0.0026

Table 5: OLS results (LNREC -independent variable)

Variables	OLS results
LNGDP	1.1192 (0.286)
LNCF	0.6467 (0.959)
LNEMP	1.1471 (0.524)
LNTO	1.0734 (0.578)
Constant	−19.089 (0.607)
Adj. R2	0.5255
Prob. >F	0.0034

economy in the United Arab Emirates. This does not mean that the UAE depends only on renewable energy for the growth of its economy, but also depends heavily on the industries of aviation, tourism, hotels, construction and real estate to generate revenue.

5. CONCLUSION

This research attempted to study the causal relationship between renewable energy and the economy in the United Arab Emirates for the time period 2010-2020. The ARDL program (e-views) was used to perform the standard analysis to confirm this relationship and know its dimensions and to what extent the country depends on renewable energy and the extent of its impact. The results confirmed that there is a statistically significant relationship between renewable energy and the economy in the United Arab Emirates. This does not mean that the UAE depends only on renewable energy for the growth of its economy, but also depends heavily on the industries of aviation, tourism, hotels, construction and real estate to generate revenue.

REFERENCES

Alam, M.M., Murad, M.W. (2020), The impacts of economic growth, trade openness and technological progress on renewable energy use in organization for economic co-operation and development countries. Renewable Energy, 145, 382-390.

Apergis, N., Payne, J.E. (2010), Renewable energy consumption and economic growth: Evidence from a panel of OECD countries. Energy Policy, 38(1), 656-660.

Balcılar, M., Bal, H., Algan, N., Demiral, M. (2014), Türkiye'nin ihracat performansı: Ihracat hacminin temel belirleyicilerinin incelenmesi (1995-2012). Ege Akademik Bakış, 14(3), 451-462.

Barro, R.J., Lee, J.W. (2013), A new data set of educational attainment in the world, 1950-2010. Journal of Development Economics, 104, 184-198.

Batool, S.A., Ahmad, H., Gillani, S.M.A., Raza, H., Siddique, M., Khan, N., Qureshi, M.I. (2021), Investigating the causal linkage among economic growth, energy consumption, urbanization and environmental quality in ASEAN-5 countries. International Journal of Energy Economics and Policy, 11(3), 319-327.

Becker, S., Boeckh, K., Hainz, C., Woessmann, L. (2016), The empire is dead, long live the empire! Lon

g-run persistence of trust and corruption in the bureaucracy. The Economic Journal, 126(590), 40-74.

Cabrales, A., Hauk, E. (2011), The quality of political institutions and the curse of natural resources. The Economic Journal, 121(551), 58-88.

Can, H., Korkmaz, Ö. (2019), The relationship between renewable energy consumption and economic growth: The case of Bulgaria. International Journal of Energy Sector Management. 2019, 2951.

Cavalcanti, T., Mohaddes, K., Raissi, M. (2011), Growth, development and natural resources: New evidence using a heterogeneous panel analysis. The Quarterly Review of Economics and Finance, 51(4), 305-318.

Charfeddine, L., Kahia, M. (2019), Impact of renewable energy consumption and financial development on CO_2 emissions and economic growth in the MENA region: A panel vector autoregressive (PVAR) analysis. Renewable Energy, 139, 198-213.

DeCarolis, J.F., Hunter, K., Sreepathi, S. (2012), The case for repeatable analysis with energy economy optimization models. Energy Economics, 34(6), 1845-1853.

Dogan, E., Altinoz, B., Madaleno, M., Taskin, D. (2020), The impact of renewable energy consumption to economic growth: A replication and extension of. Energy Economics, 90, 104866.

Douglas, S., Walker, A. (2017), Coal mining and the resource curse in the eastern United States. Journal of Regional Science, 57(4), 568-590.

EEA. (2014), Energy Support Measures and their Impact on Innovation in the Renewable Energy Sector in Europe. European Environment Agency, Technical Report, No. 21, Copenhagen. available form: http://www.eea.europa.eu/publications/energy-support-measures

Eregha, P.B., Mesagan, E. (2016), Oil resource abundance, institutions, and growth: Evidence from oil producing African countries. Journal of Policy Modelling, 38(3), 603-619.

Faria, H., Montesinos-Yufa, H.M., Morales, D.R., Navarro, C.E. (2016), Unbundling the roles of human capital and institutions in economic development. European Journal of Political Economy, 45, 108-128.

Haapanen, L., Tapio, P. (2016), Economic growth as phenomenon, institution and ideology: A qualitative content analysis of the 21st century growth critique. Journal of Cleaner Production, 112, 3492-3503.

Haseeb, M., Abidin, I.S.Z., Hye, Q.M.A., Hartani, N.H. (2019), The impact of renewable energy on economic well-being of Malaysia: Fresh evidence from auto regressive distributed lag bound testing approach. International Journal of Energy Economics and Policy, 9(1), 269.

IEA RETD TCP. (2016), Revitalisation of Local Economy by Development of Renewable Energy: Good Practices and Case Studies

(REvLOCAL). IEA Renewable Energy Technology Deployment Technology Collaboration Programme (IEA RETD TCP), Utrecht. Available fromL http://www.iea-retd.org/documents/2016/09/revlocal-summary-report.pdf

International Country Risk Guide (2019). International country risk guide. Available at: https://epub.prsgroup.com/products/icrg

Jamil, M., Ahmad, F., Jeon, Y.J. (2016), Renewable energy technologies adopted by the UAE: Prospects and challenges-a comprehensive overview. Renewable and Sustainable Energy Reviews, 55, 1181-1194.

Jebli, M.B., Youssef, S.B. (2015), The environmental Kuznets curve, economic growth, renewable and non-renewable energy, and trade in Tunisia. Renewable and Sustainable Energy Reviews, 47, 173-185.

Ji, K., Magnus, J., Wang, W. (2014), Natural resources, institutional quality, and economic growth in China. Environmental and Resource Economics, 57(3), 323-343.

Kahia, M., Aïssa, M.S.B., Charfeddine, L. (2016), Impact of renewable and non-renewable energy consumption on economic growth: New evidence from the MENA net oil exporting countries (NOECs). Energy, 116, 102-115.

Kakanov, E., Blöchliger, H., Demmou, L. (2018), Resource Curse in Oil Exporting Countries, OECD Working Paper No. 1511.

Kim, D., Lin, S.C. (2017), Human capital and natural resource dependence. Structural Change and Economic Dynamics, 40, 92-102.

Mezher, T., Dawelbait, G., Abbas, Z. (2012), Renewable energy policy options for Abu Dhabi: Drivers and barriers. Energy Policy, 42, 315-328.

Mezher, T., Goldsmith, D., Choucri, N. (2011), Renewable energy in Abu Dhabi: Opportunities and challenges. Journal of Energy Engineering, 137(4), 169-176.

Moradbeigi, M., Law, S.H. (2017), The role of financial development in the oil-growth nexus. Resources Policy, 53, 164-172.

Nathaniel, S.P., Adeleye, N., Adedoyin, F.F. (2021), Natural resource abundance, renewable energy, and ecological footprint linkage in MENA countries. Estudios de Economía Aplicada, 39(2), 714.

Okada, K., Samreth, S. (2017), Corruption and natural resource rents: Evidence from quantile regression. Applied Economics Letters, 24(20), 1490-1493.

Olayungbo, D.O., Adediran, K.A. (2017), Effects of oil revenue and institutional quality on economic growth with an ARDL approach. Energy and Policy Research, 4(1), 44-54. Organization of Petroleum Exporting Countries (OPEC). (2019), Kuwait. Available from: https://www.opec.org/opec_web/en/about_us/165. httm. [Last accessed on 2019 Jun 14].

Orihuela, J.C. (2018), Institutions and place: Bringing context back into the study of the resource curse. Journal of Institutional Economics, 14(1), 157-180.

Rodriguez, F., Sachs, J.D. (1999), Why do resource-abundant economies grow more slowly? Journal of Economic Growth, 4(3), 277-303.

Rodrik, D., Subramanian, A., Trebbi, F. (2004), Institution's rule: The primacy of institutions over geography and integration in economic development. Journal of Economic Growth, 9(2), 131-165.

Romer, P.M. (1990), Endogenous technological change. Journal of Political Economy, 98(5), 71-102.

Said, Z., Alshehhi, A.A., Mehmood, A. (2018), Predictions of UAE's renewable energy mix in 2030. Renewable Energy, 118, 779-789.

Sala-I-Martin, X., Subramanian, A. (2013), Addressing the natural resource curse: An illustration from Nigeria. Journal of African Economies, 22(4), 570-615.

Sarmidi, T., Law, S.H., Jafari, Y. (2014), Resource curse: New evidence on the role of institutions. International Economic Journal, 28(1), 191-206.

Sgouridis, S., Abdullah, A., Griffiths, S., Saygin, D., Wagner, N., Gielen, D., McQueen, D. (2016), RE-mapping the UAE's energy transition: An economy-wide assessment of renewable energy options and their policy implications. Renewable and Sustainable Energy Reviews, 55, 1166-1180.

Suslova, E., Volchkova, N. (2012), Human capital, industrial growth and resource curse. The Economic Journal of the Higher School of Economics, 12(2), 217-238.

Torres, N., Afonso, Ó., Soares, I. (2012), Oil abundance and economic growth-a panel data analysis. The Energy Journal, 33(2), 119-148.

Treisman, D. (2000), The causes of corruption: A cross-national study. Journal of Public Economics, 76(3), 399-457.

Welsch, H. (2008), Resource dependence, knowledge creation, and growth: Revisiting the natural resource curse. Journal of Economic Development, 33(1), 45-70. Available from: http://www.jed.or.kr/full-text/33-1/3.pdf. [Last accessed on 2017 Oct 04].