Financial Development and Renewable Energy in the UAE

Subjects: Business, Finance

Contributor: Turgut Türsoy

Financial development, FDI, and economic growth can significantly increase renewable energy consumption in the UAE. Therefore, it is essential to promote financial development in the UAE in order to avert the financial risks that undermine the stability of the financial markets and that negatively affect the REC. Furthermore, policymakers in the UAE should promote the concept of green finance and should provide more funds for investments in green energy for sustainable energy development in the UAE.

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1. Real Income and Renewable Energy Consumption

Much research has considered the effects of real income on energy consumption. The empirical research on the connection between the consumption of energy and real income can be shown in four hypotheses: (i) The growth hypothesis (GH), which is accepted if there is a unidirectional causal connection between the consumption of energy and the real income [1]; (ii) The conservation hypothesis (CH), which is accepted if there is a unidirectional causal connection between the real income and the consumption of energy [2]; (iii) The feedback hypothesis (FH), which is accepted if there is a bidirectional causal connection between the real income and the consumption of energy; and (iv) The neutrality hypothesis (NH), which is accepted if there is no causal linkage between the real income and the consumption of energy [1]. The effects of the real income on the consumption of energy in recent years has drawn extensive attention. In this respect, the authors of [2] used the FMOLS model, and the findings show that a bidirectional association exists in 80 selected countries for the 1990–2007 period. Applying the ARDL model [3] showed that there is a positive interconnection between real income and NREC in the BRICS nations for the period from 1971–2010. The authors of [4] utilized the Granger causality model and explored the effects of the real income on NRC in the G7 countries for the 1960–2010 period. The outcomes confirm that the feedback hypothesis is valid in Japan; the conservation hypothesis holds in Italy; the growth hypothesis is relevant in Canada; and the neutrality hypothesis is relevant in France, the United States, and the United Kingdom. The authors of [5] suggest that economic complexity is a policy factor for overall energy transformation and renewable energy demand in India.

The authors of [6] utilized the Granger causality test and discovered a significant linkage between real income and *REC* in Turkey for the period from 1970–2006, and the findings show the existence of the feedback hypothesis in Turkey. In contrast, the authors of [7] found that the GDP is not related to *REC* for the period from 1990–2015. The authors of [8] used the data period from 1980–2012, and proved that the GDP is positively related to

the *REC* for 11 MENA countries. The authors of [9] used the data period from 1990–2013 and demonstrate that the GDP is positively related to the *REC* for 29 OECD counties. The authors of [10] used the annual data period from 1980–2014, and proved that the economic growth positively affected the *REC* for G7 countries. The authors of [11] evaluated the impact of economic growth on the *REC* for the period from 1980–2012. The findings prove that there is a significant positive interconnection between economic growth and the *REC* in 30 sub-Saharan African countries. Recently, the authors of [12] explored the influence of economic growth on the *REC* in Croatia over the period from 2004–2014. The authors of [13] affirm that economic growth has a significant impact on renewable energy consumption in G7 countries. The outcomes affirm that economic growth led to an increase in *REC* over the studied period. The authors of [14] affirm a significant causal interconnection between economic growth and the *REC* in 26 selected countries over the period from 1990–2018. The authors of [15] affirm a significant positive association between economic growth and *REC* in the United States.

2. FDI and Renewable Energy Consumption

The link between *FDI* and NREC has attracted significant attention in the literature over the last few years. For instance, the authors of [16] evaluated the influence of *FDI* on the levels of GDP and NREC in 20 different selected countries. The authors affirm that *FDI* plays a significant role in energy intensity deduction. The authors of [17] explored the interaction among *FDI* and NRE in China over the annual periods from 1982–2012. The results affirm that *FDI* positively affected the levels of NREC in China over the tested period. The authors of [18] tested the link between *FDI* and the demand for energy for 27 countries in Africa. The findings reveal that *FDI* had a powerful influence on the demand for energy in the selected countries. There are a limited number of studies that test the impact of *FDI* on green energy. For instance, the authors of [19] utilized the ARDL test and affirm that *FDI* significantly affected the green energy demand in the UAE. The authors of [20] report that there is a significant linkage between *FDI* and *REC* for 20 emerging market nations. The authors of [21] utilized the ARDL model and examined the impact of *FDI* on *REC* in Turkey, China, India, Russia, South Africa, and Brazil. The findings show that *FDI* negatively affected *REC*. Recently, the authors of [22] investigated the interaction between *FDI* and *REC* in China over the period from 2000 to 2015. The findings prove the positive and powerful influence of *FDI* on the levels of *REC* in China. The authors of [23] tested the linkage between *FDI* and *REC* in Kazakhstan and Uzbekistan over the period from 1992 to 2018. The findings confirm that *FDI* positively affected the levels of *REC* in Kazakhstan and Uzbekistan.

3. Financial Development and the Consumption of Renewable Energy

Many empirical studies, e.g., [24][25][26], have stated that the development of the financial sector, including the development of the banking performance, accelerates the economic growth rate. The authors of [24] demonstrate that the provision of more funds by the banks to the markets stimulates and promotes consumption, investment, economic growth, and the demand for energy. The authors of [25] show that positive economic growth and financial development has strong links to the rates of growth, capital accumulation, and economic efficiency, which, in turn,

lead to an increase in the consumption of energy. However, many empirical papers have studied the interactions between financial development, nonrenewable energy consumption (NEC), and renewable energy consumption (*REC*). Some empirical studies reveal that financial development increases NREC; the authors of [27] reveal that financial development positively affected the demand for energy in Malaysia over the tested period, from 1971–2009. The authors of [28] found that the higher development of financial levels led to higher NREC in European countries for the period from 1990–2011. The authors of [29] used the VECM approach and confirm that financial development positively affected the NREC in India over the period from 1970–2012. The authors of [30] affirm that financial development positively affected the levels of NREC in 22 selected emerging countries over the period from 1990–2006. The authors of [31] used the period from 1984–2014, and they affirm that financial development had a powerful impact on the NREC for 79 countries. The authors of [32] used annual panel data from 1990–2011, and they found appositive links between financial development and NREC for 65 selected countries.

There are a limited number of studies on the linkage between financial development and *REC*. The authors of [33] show that financial development significantly contributed to the *REC* in 22 emerging countries over the period from 1990–2010. The authors of [34] used the annual data for 30 countries over the period from 2000–2013, and they found that financial development positively affected the levels of *REC*. The authors of [35] affirm that financial development contributed significantly to the levels of *REC* in Russia over the period from 1990–2021. The authors of [36] affirm that financial development had a positive influence on *REC* in China, India, Brazil, and South Africa from 1990–2012. The authors of [37] confirm a positive interaction between financial development and *REC* in China for the period from 1992 to 2013. Recently, the authors of [38] demonstrated that financial development led to increases in the shares of *REC* in 28 European countries, over the period from 1990–2021. The authors of [39] utilized nonlinear autoregressive distributed lags and reveal that financial development had a statistically significant influence on *REC* in the United States over the period from 1975–2019.

In summary, there are several empirical studies that have explored the influence of financial development on energy consumption using different estimate methods. These studies affirm the significant role of financial development in renewable energy. However, the influence of financial development on renewable energy consumption (*REC*) has not been studied in the case of the UAE. For this purpose, the long- and short-run interactions among economic growth, *FDI*, financial development, and renewable energy consumption are explored by applying the new technique of bootstrap autoregressive distributed lag, along with Granger causality analysis, in the context of the UAE for the period from 1989–2019. To the best of our knowledge, no empirical research has evaluated the impact of financial development on the UAE's renewable energy consumption.

References

1. Ozturk, I.; Aslan, A.; Kalyoncu, H. Energy consumption and economic growth relationship: Evidence from panel data for low and middle income countries. Energy Policy 2010, 38, 4422–4428.

2. Apergis, N.; Payne, J.E. Renewable and non-renewable electricity consumption–growth nexus: Evidence from emerging market economies. Appl. Energy 2011, 88, 5226–5230.
3. Sebri, M.; Ben-Salha, O. On the causal dynamics between economic growth, renewable energy consumption, CO2 emissions and trade openness: Fresh evidence from BRICS countries. Renew. Sustain. Energy Rev. 2014, 39, 14–23.
4. Ajmi, A.N.; Hammoudeh, S.; Nguyen, D.K.; Sato, J.R. On the relationships between CO 2 emissions, energy consumption and income: The importance of time variation. Energy Econ. 2015, 49, 629–638.
5. Ikram, M.; Xia, W.; Fareed, Z.; Shahzad, U.; Rafique, M.Z. Exploring the nexus between economic complexity, economic growth and ecological footprint: Contextual evidences from Japan. Sustain. Energy Technol. Assess. 2021, 47, 101460.
6. Erdal, G.; Erdal, H.; Esengün, K. The causality between energy consumption and economic growth in Turkey. Energy Policy 2008, 36, 3838–3842.
7. Bulut, U.; Inglesi-Lotz, R. Which type of energy drove industrial growth in the US from 2000 to 2018? Energy Rep. 2019, 5, 425–430.
8. Kahia, M.; Ben Aïssa, M.S.; Lanouar, C. Renewable and non-renewable energy use-economic growth nexus: The case of MENA Net Oil Importing Countries. Renew. Sustain. Energy Rev. 2017, 71, 127–140.
9. Gozgor, G.; Lau, C.K.M.; Lu, Z. Energy consumption and economic growth: New evidence from the OECD countries. Energy 2018, 153, 27–34.
10. Tugcu, C.T.; Topcu, M. Total, renewable and non-renewable energy consumption and economic growth: Revisiting the issue with an asymmetric point of view. Energy 2018, 152, 64–74.
11. Adams, S.; Klobodu, E.K.M.; Apio, A. Renewable and non-renewable energy, regime type and economic growth. Renew. Energy 2018, 125, 755–767.
12. Zivkovic, A.; Fosic, I.; Starcevic, D.P. Employee Turnover Trends in Croatia. Econ. Soc. Dev. Book Proc. 2020, 16, 155–162.
13. Rafique, M.Z.; Doğan, B.; Husain, S.; Huang, S.; Shahzad, U. Role of economic complexity to induce renewable energy: Contextual evidence from G7 and E7 countries. Int. J. Green Energy 2021, 18, 745–754.
14. Asiedu, B.A.; Hassan, A.A.; Bein, M.A. Renewable energy, non-renewable energy, and economic growth: Evidence from 26 European countries. Environ. Sci. Pollut. Res. 2021, 28, 11119–11128.
15. Salari, M.; Kelly, I.; Doytch, N.; Javid, R.J. Economic Growth and Renewable and Non-Renewable Energy Consumption: Evidence from the U.S. States. Renew. Energy 2021, 178, 50–65.

16. Mielnik, O.; Goldemberg, J. Foreign direct investment and decoupling between energy and gross domestic product in developing countries. Energy Policy 2002, 30, 87–89.
17. Salim, R.; Yao, Y.; Chen, G.; Zhang, L. Can foreign direct investment harness energy consumption in China? A time series investigation. Energy Econ. 2017, 66, 43–53.
18. Adom, P.K.; Opoku, E.E.O.; Yan, I.K.-M. Energy demand–FDI nexus in Africa: Do FDIs induce dichotomous paths? Energy Econ. 2019, 81, 928–941.
19. Sbia, R.; Shahbaz, M.; Hamdi, H. A contribution of foreign direct investment, clean energy, trade openness, carbon emissions and economic growth to energy demand in UAE. Econ. Model. 2014, 36, 191–197.
20. Paramati, S.R.; Ummalla, M.; Apergis, N. The effect of foreign direct investment and stock market growth on clean energy use across a panel of emerging market economies. Energy Econ. 2016, 56, 29–41.
21. Kilicarslan, Z. The Relationship between Foreign Direct Investment and Renewable Energy Production: Evidence from Brazil, Russia, India, China, South Africa and Turkey. Int. J. Energy Econ. Policy 2019, 9, 291–297.
22. Fan, W.; Hao, Y. An empirical research on the relationship amongst renewable energy consumption, economic growth and foreign direct investment in China. Renew. Energy 2020, 146, 598–609.
23. Grabara, J.; Tleppayev, A.; Dabylova, M.; Mihardjo, L.W.W.; Dacko-Pikiewicz, Z. Empirical Research on the Relationship Amongst Renewable Energy Consumption, Economic Growth and Foreign Direct Investment in Kazakhstan and Uzbekistan. Energies 2021, 14, 332.
24. Song, C.-Q.; Chang, C.-P.; Gong, Q. Economic growth, corruption, and financial development: Global evidence. Econ. Model. 2021, 94, 822–830.
25. Ekanayake, E.M.; Thaver, R. The Nexus between Financial Development and Economic Growth: Panel Data Evidence from Developing Countries. J. Risk Financial Manag. 2021, 14, 489.
26. Cheng, C.-Y.; Chien, M.-S.; Lee, C.-C. ICT diffusion, financial development, and economic growth: An international cross-country analysis. Econ. Model. 2021, 94, 662–671.
27. Islam, F.; Shahbaz, M.; Ahmed, A.U.; Alam, M. Financial development and energy consumption nexus in Malaysia: A multivariate time series analysis. Econ. Model. 2013, 30, 435–441.
28. Çoban, S.; Topcu, M. The nexus between financial development and energy consumption in the EU: A dynamic panel data analysis. Energy Econ. 2013, 39, 81–88.
29. Shahbaz, M.; Van Hoang, T.H.; Mahalik, M.K.; Roubaud, D. Energy consumption, financial development and economic growth in India: New evidence from a nonlinear and asymmetric analysis. Energy Econ. 2017, 63, 199–212.

30. Sadorsky, P. The impact of financial development on energy consumption in emerging economies. Energy Policy 2010, 38, 2528–2535.
31. Chiu, Y.-B.; Lee, C.-C. Effects of financial development on energy consumption: The role of country risks. Energy Econ. 2020, 90, 104833.
32. Omri, A.; Kahouli, B. Causal relationships between energy consumption, foreign direct investment and economic growth: Fresh evidence from dynamic simultaneous-equations models. Energy Policy 2014, 67, 913–922.
33. Wu, L.; Broadstock, D.C. Does economic, financial and institutional development matter for renewable energy consumption? Evidence from emerging economies. Int. J. Econ. Policy Emerg. Econ. 2015, 8, 20–39.
34. Kim, J.; Park, K. Financial development and deployment of renewable energy technologies. Energy Econ. 2016, 59, 238–250.
35. Freidin, M.; Burakov, D. Economic growth, electricity consumption and internet usage nexus: Evidence from a panel of commonwealth of independent states. Int. J. Energy Econ. Policy 2018, 8, 267.
36. Kutn, A.M.; Paramati, S.R.; Ummalla, M.; Zakari, A. Financing renewable energy projects in major emerging market economies: Evidence in the perspective of sustainable economic development. Emerg. Mark. Financ. Trade 2018, 54, 1761–1777.
37. Wang, J.; Zhang, S.; Zhang, Q. The relationship of renewable energy consumption to financial development and economic growth in China. Renew. Energy 2021, 170, 897–904.
38. Anton, S.G.; Nucu, A.E.A. The effect of financial development on renewable energy consumption. A panel data approach. Renew. Energy 2020, 147, 330–338.
39. Lahiani, A.; Mefteh-Wali, S.; Shahbaz, M.; Vo, X.V. Does financial development influence renewable energy consumption to achieve carbon neutrality in the USA? Energy Policy 2021, 158, 112524.