Mohsin, M., Iqbal, N., & Iram, R. (2024). The Nexus Between Green Finance and Sustainable Green Economic Growth. *Energy RESEARCH LETTERS*, *5*(3). https://doi.org/10.46557/001c.78117

Peer-reviewed research

The Nexus Between Green Finance and Sustainable Green Economic Growth

Muhammad Mohsin[1], Nadeem Iqbal[2a], Robina Iram[1]

[1] School of Economics and Finance, Jiangsu University, China, [2] Air University School of Management, Air University Islamabad, Pakistan

Keywords: Energy, Green finance, Sustainability, Economic growth, JEL: A10 C82 E01

https://doi.org/10.46557/001c.78117

Energy RESEARCH LETTERS

Vol. 5, Issue 3, 2024

Sustainable green growth requires green finance to improve the financial sector, better the environmental and enhance economic development. This study examines how green spending affects the nation's economy in the long term. Green finance is a market-based investment that considers environmental impact when assessing risk. Hence, the study explores green financing as a means to reduce environmental risks in developing economies. The study aims to boost the value of the environment and its natural capital to improve the well-being of humans.

1. Introduction

A vital component of attaining green development is the use of green financing. According to Liu et al. (2022), green environmental management is considered a corporate social responsibility (CSR) activity through which companies attempt to do something good for society, and green financing is also considered a CSR activity of finance companies, such as banks, mutual fund companies, stock companies, and other similar organisations (Li et al., 2020). In the absence of financial profitability, financial institutions should advance green finance as a form of CSR.

Green bonds, green banks, community funds, and other innovative ways for funding green initiatives have been created in recent years. Green banks and bonds have the potential to develop renewable energy. They assist clean energy projects by providing better loan terms, aggregating small projects into commercially viable sizes, developing new financial products, and expanding the market by disseminating knowledge about clean energy benefits. Green bond supporters believe that they can offer long-term, competitively priced financing to repay a project once it is developed and operational (Taghizadeh-Hesary & Yoshino, 2020).

According to the 2018 World Energy Investment Report, global energy investment reached USD 1.8 trillion in 2017, which was down 2% in real terms from the previous year (IEA 2018). Over US$ 750 billion was spent on electricity and US$ 715 billion on global oil and gas supplies. In 2017, global energy investment was unable to meet energy security and environmental targets. After many years of growth, worldwide investment in renewables and energy efficiency fell by 3% in 2017. The deceleration may jeopardize the growth of green energy, which is required to fulfill energy security, climate, and clean air objectives. Clearly, fossil fuel continues to be the primary source of energy investment. As a result, one of the most pressing concerns in the transition to low-carbon energy is how to direct investments (Rasoulinezhad & Taghizadeh-Hesary, 2022). Banks are hesitant to fund renewable energy (RE) projects due to the Basel capital rules, which limit lending by financial institutions and because most RE projects are considered hazardous by banks. Additionally, banks' resources are derived from deposits, which are typically short to medium-term in nature, while green infrastructure projects need long-term financing, resulting in a maturity mismatch for banks. Thus, banks cannot supply all the funding for green projects; we must seek for new sources of funding for this sector to close the funding gap. Bank financing must be directed to more secure industries and companies. One potential approach is to encourage non-bank financial entities to participate in green initiatives, such as pension funds and insurance firms (Iqbal & Mohsin, 2019).

Concerning bridging the green financing gap, the role of green banking is another important factor to consider. Central banks should address climate-related and other environmental dangers at a systemic level to determine the implicit or explicit responsibilities for financial and macroeconomic stability. Furthermore, financial governance regulations should regulate how central banks and other relevant financial regulatory authorities manage environmental risk to encourage sustainable financing (Binh An et al., 2022). Many studies have been conducted on the influence of green energy projects on other businesses and regional gross domestic product (GDP), which governments may choose to partially or entirely reinvest in

a Corresponding author email: drnadeemiqbal1@gmail.com

Table 1. Threshold Model Analysis

	Model 1	Model 2	Model 3	Model 4
REP < γ1	-0.0391*** (0.000)		-0.0336** (0.001)	
EnP≥ γ1	-0.2899*** (-0.008)		-0.3160*** (0.002)	
REP < γ2		-0.2202* (0.019)		-0.2813** (0.004)
EnP ≥ γ2		-0.0924*** (0.025)		-0.3110*** (0.001)
GF	-0.0229*** (0.001)	−0.022 (1.018)	−0.016 (0.848)	−0.023 (1.002)
R & D	0.5266 (0.002)	0.6794 (0.001)	0.5239 (0.002)	0.5776 (0.001)
Trade	0.221*** (0.001)	0.2223*** (0.001)	0.2211*** (0.001)	0.1121*** (0.001)
Tech	-0.217 (0.259)	-0.348*** (0.208)	-0.214 (0.269)	-0.2320*** (0.209)
GDP	2.423 (0.431)	2.423 (0.439)	2.345 (0.403)	2.494 (0.444)
Observations	240	240	240	240
Constant	2.914(3.099)	0.832(3.56)	2.822(3.121)	0.553(3.607)
R-squared	0.441	0.109	0.439	0.101
Threshold Value	2.15	0.09	2.146	0.08
Threshold Test p-value	0.047	0	0.146	0,

Note: This table reports threshold model analysis based results. p-values are provided in brackets. Here, ***, **, and * represents statistical significance at the 1%, 5%, and 10% levels, respectively.

private companies (Sadiq et al., 2022). Funding for small and medium-sized green projects via community-based funds and village funds can be obtained. To understand the study's goal, the technique of regression is used to estimate the outcomes from the available data.

II. Results

The regression is used on raw data to estimate the results which are described in Table 1.

It has been hypothesized that green economic functioning is dependent on a significant allocation of research and development resources to green technology backed by prevailing economic development. There is an inverse relationship between the factor values of renewable energy policy and the lines illustrating that a higher level of green output is correlated with a lower level of green output growth in the next phase. This conclusion is supported by Baloch et al.'s study (2020), which discovered that the farther a nation is from the technological frontier, the greater the likelihood that it would accomplish total industrial production growth via research and development advancements.

A. Analysis of Threshold Regression Test

The analysis authenticates the upper limit to undertake the threshold estimation findings. From this analysis, we applied Hansen's upper limit longitudinal equation and the bootstrap technology recurrently over five hundred phases to analyze the upper limit. We discovered that the effect of emission policies and RE policies on the green economic efficiency indicator have a significant two-way upper limit impact, where energy policy (EP) is the upper limit unit. The one figure and two P-figure upper limit equations accepted the one percent importance analysis and were provided in Equation (1). Thus, it can be deduced that there is a two-way upper limit impact. The approximated upper limits are 0.240 and 0.82, and a single approximated upper limit plummets within the 95 percent confidence interval, [0.225, 0.692] and [0.692, 0.817] correspondingly, due to the fact that the one upper limit and the two-way upper limit equations have conceded. The one percent importance analysis attains an extreme two-way upper limit impact in Equation (2). The approximated upper limits are 0.762 and 0.823 and [0.801, 2.863] and [0.762, 2.861] within the consistent 95 percent confidence level in Table 2.

With an F-statistic of 48.54 and a P-value of 0.00, straight-line presumptions are most likely to be rejected at a 5% significance level, according to the F-statistic upper limit threshold. While the F-statistic twofold upper limit

Table 2. Results of the threshold test

	Threshold test	*F*-value	*P*-value	Critical value		
				1%	5%	10%
Model 1	Single	48.544***	0.000	23.232	13.443	10.221
	Double	31.223***	0.005	23.665	13.332	10.443
Model 2	Single	61.332***	0.000	23.542	13.221	10.551
	Double	29.331***	0.001	2.665	−4.441	−11.443

Note: This table reports threshold test results. *** indicates statistical significance at 1% level.

Table 3. Estimated threshold variables

Threshold variables		Estimated thresholds	95% confidence interval
Model 1	$\gamma 1$	0.238	[0.190, 2.651]
	γ_2	0.733	[0.551, 2.662]
Model 2	γ_1	0.672	[0.772, 2.159]
	γ_2	0.771	[0.662, 2.221]

The table provided details on estimated threshold variables.

is 31.223 with a p-value of 0.005 when situating the upper limit figure, the unique presupposition of a single upper limit may be rejected because of the low p-value. Hence, the advancement of energy-focused technology has a non-straight line influence on energy efficiency (EE), with the top limit number, 61.33, as the result. Thus, the impact of advancement in energy-inclined technologies on EE varies depending on whether they are above or below the upper limit amount. The findings revealed that there was a strong correlation between the upper limit and the possible rate with a 95 percent confidence level and a dual connection alongside the curvature, which represented both the maximum and minimum limits of the confidence level with a 95 percent confidence level.

Table 3 depicts the current regional green economic performance stage in relation to the upper limit statistics for each category. In 2010 and 2017, the energy poverty composite index (EPI) of approximately 0.301 increased by 62.3 and 85.2 percent, respectively. Similarly, areas with EPI degrees between 0.301 and 0.438 had growth rates of 3.2 and 22.6 percent, respectively, demonstrating the positive impact of green economic performance on these regions during the research period. Regions with an economic performance index higher than 0.438 saw a consistent growth trajectory that was comparable to the national average. This trajectory is the outcome of economic developments taking root at the provincial and national levels. According to Zhang et al. (2020), the national unemployment rate was between 9.7 and 16.1 percent, and provincial creative systems continue to rise in China. Nonetheless, when combined with the green economic performance, the economic performance at the provincial level was more than 0.43 (modified after 2013). Between 2010 and 2017, the proportion of provinces with a provincial economic progress stage greater than 0.438 decreased from almost 90.3 to 83.9 percent, on average.

III. Conclusion

The infrastructure of green growth is green finance. The technological development business, the finance company, the government, and the customer belong to the green growth symphony. Instead of creating a cacophony, the components should be harmonised together. A country's investment in development geared toward reducing the cost of environmental degradation opens up a plethora of possibilities for its financial industry. Banks can utilise a variety of possibilities in the field of environmentally responsible financing. Sustainable finance is the way forward, especially to compete globally.

1. The study's findings suggest that investing in education and research and development (R&D) might expedite greening of the economy. Thus, leaders should make additional monetary contributions to these fields.
2. Governments should use policy tools such as green credit and sustainable bonds to lower the risk of green investments in the subregion. In order to reduce pollution, switching to cleaner energy sources such as wind, solar, and other low- or no-emission alternatives is fundamental. Sustainable technology demand-pull initiatives in subregions include cost reductions and adopting a green lifestyle and green infrastructures.
3. In order to improve performance via commercialization of research and development, governments should continually impose innovation-driven techniques and progress toward a greater capacity to innovate.

Submitted: September 09, 2021 AEST, Accepted: January 28, 2022 AEST

References

Baloch, Z. A., Tan, Q., Iqbal, N., Mohsin, M., Abbas, Q., Iqbal, W., & Chaudhry, I. S. (2020). Trilemma assessment of energy intensity, efficiency, and environmental index: evidence from BRICS countries. *Environmental Science and Pollution Research*, *27*, 34337–34347. https://doi.org/10.1007/s11356-020-09578-3

Binh An, N., Kuo, Y.-L., Mabrouk, F., Sanyal, S., Muda, I., Hishan, S. S., & Abdulrehman, N. (2022). Ecological innovation for environmental sustainability and human capital development: the role of environmental regulations and renewable energy in advanced economies. *Economic Research-Ekonomska Istraživanja*, *36*(1), 243–263. https://doi.org/10.1080/1331677x.2022.2120046

IEA. (2018). *Global Energy & CO2 Status Report 2017*. IEA. https://www.iea.org/reports/global-energy-co2-status-report-2017

Iqbal, N., & Mohsin, M. (2019). *Assessing Social and Financial Efficiency: The Evidence from Microfinance Institutions in Pakistan Muhammad Sajid Tufail (Corresponding Author)*. *39*, 149–161.

Li, H., Bhatti, Z., Abbas, Q., Ahmad, I., Iqbal, N., & Aziz, B. (2020). MEASURING LOW CARBON ENERGY, ECONOMIC and ENVIRONMENTAL SUSTAINABILITY PERFORMANCE of BRICS. *Singapore Economic Review*, 1–20. https://doi.org/10.1142/s0217590820500617

Liu, H., Yao, P., Latif, S., Aslam, S., & Iqbal, N. (2022). Impact of Green financing, FinTech, and financial inclusion on energy efficiency. *Environmental Science and Pollution Research*, *29*(13), 18955–18966. https://doi.org/10.1007/s11356-021-16949-x

Rasoulinezhad, E., & Taghizadeh-Hesary, F. (2022). Role of green finance in improving energy efficiency and renewable energy development. *Energy Efficiency*, *15*(2). https://doi.org/10.1007/s12053-022-10021-4

Sadiq, M., Nonthapot, S., Mohamad, S., Keeong, O. C., Ehsanullah, S., & Iqbal, N. (2022). Does green finance matter for sustainable entrepreneurship and environmental corporate social responsibility during COVID-19? *China Finance Review International*, *12*, 317–333. https://doi.org/10.1108/CFRI-02-2021-0038

Taghizadeh-Hesary, F., & Yoshino, N. (2020). Sustainable Solutions for Green Financing and Investment in Renewable Energy Projects. *Energies*, *13*(4), 788. https://doi.org/10.3390/en13040788

Zhang, D., Hu, M., & Ji, Q. (2020). Financial markets under the global pandemic of COVID-19. *Finance Research Letters*, *36*, 101528. https://doi.org/10.1016/j.frl.2020.101528