



The Impact of Renewable Energy Consumption on Foreign Direct Investment: Examining the Role of Renewable Energy Sources

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ABSTRACT

This research has been undertaken for the investigation of the association of the renewable energy consumption (REC) with the foreign direct investment (FDI) along with moderating effect of the renewable internal energy resources (RIFS). This study's prime objective is examining the influence of the REC on the FDI, and understanding how the RIFS impacts the REC and the FDI relationship. The data has been collected from the database of the World Bank for countries belonging to OECD for the period beginning from 2011 and ending in 2020. The results have been drawn by using STATA 17 software which show significant values for the regression test, the unit root tests and the GMM test. Furthermore, this research highlights that the RIFS moderates the relationship between the said variables and results show that when there is an involvement of the renewable sources of the energy, the REC's effect on the FDI is moderated. Concludingly, it has been analyzed that the relationship of the REC with the FDI is significant while underscoring the RIFS' role in the production of renewable energy. This study suggests that the RIFS in the energy sector can increase the FDI.

Keywords: *Renewable energy consumption, Foreign direct investment, Sustainability and Technological innovation, Internal energy resources, World bank.*

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1. Introduction

The relationship among the factors that are economic, utilization of energy and concerns about the environment makes complex and vigorous areas of investigation, attracting considerable attention from various scholars, expert policymakers, and highly attentive stakeholders of the industry. Therefore, against this backdrop, a significant relationship emerges among FDI, REC and RIFS which creates a strong link while drawing a detailed inquiry (Muhammad Usman, 2021). The REC is the fundamental activity of an economy that supports the processes of an industry, systems of transportation and various functions of society through the use of renewable sources of energy. However, there are a lot of determinants of REC, and they depend on different factors, which include economic environment and regulatory interventions (Sofia Tsemekidi Tzeiranakia, 2023). FDI, which is an indicator of increased investment from the outside world into a country, significantly impacts the economic actions and resource distribution through the inflow of the finances into the host country from the companies belonging to the home countries. Increase in FDI can positively influence the economy of the country by leading to the increased inflow of funds into the country (Babalola Emmanuel Olusola, 2023). There is a significant importance of RIFS as it helps in the assistance of the production of the renewable energy with the help of the renewable energy resources such as hydropower setups and competitiveness of the market. The amount and contribution of RIFS considerably influences the availability, accessibility, and efficiency of the resources of energy and consequently impacting the arrangements of energy utilization and sustainable results (Gang Cheng, 2021). Although these factors have considerable importance, the association among FDI, REC, and RIFS has been insufficiently acknowledged in the previous studies. Especially, RIFS as a moderator between FDI and REC relationship demands empirical investigation to clearly explain its consequences and mechanisms. There is a need to comprehend how RIFS' moderating role possesses significant consequences for the formulation of policy for energy, economic management, and establishment of sustainable development goals. By put

emphasis on these dynamics, the strategists and policy makers can build concrete and effective strategies to manage the complications of energy markets and promote investments in sustainable energy (Abdulkarim Hasan Rashed, 2021). The economic development and literacy levels strongly affect the ability of the green technology adopters and users (Khan et al., 2025).

There is a complex relationship among economic factors, energy forces, and environmental challenges, which demands a thorough comprehension of those factors involved in shaping the patterns of energy utilization. Therefore, it has been observed that REC has profound implications on FDI which means that FDI increases with the increase in focus on the reinforcement of the REC projects because it causes the reduction in the consumption of the resources which are already limited by providing the sources which help save of natural resources and are provided by the renewable resources. So, the decrease in the usage of limited natural resources results in an increase in the demand of renewable resources, whereas the RIFS offers an alternative use for consumption such as a water source for the production of energy, which results in the availability of resources which are energy-saving and hence increase in FDI is reinforced. This work provides useful tools for investors, advisors, and regulators to reduce irrational decision-making while advancing behavioral finance theory by contextualizing these distortions within emerging markets, a hitherto understudied topic (Malik et al., 2025). In the Asian region, these tactics are essential for creating an atmosphere that supports digital economic growth and optimising the advantages of financial development, technological innovation, financial inclusion, and globalization (Mateen et al., 2025).

The continuous changes in the patterns of consumption of energy, economic variations, and the need for maintaining sustainability have led to the fast changes in the energy scenario around the globe. Therefore, the demand for the investigation of the relationship among economic factors, energy forces and challenges for the environment has been accelerated. However, in this issue, the renewable factors play a strengthening role as they boost the hike in FDI using the REC sources. Since there is a complex relationship between renewable energy and the economy and this relationship is

strengthened by the involvement of the sources of renewable energy that are renewable. Therefore, by examining the role of the sources of renewable energy for the supply of renewable energy as a moderator, the ongoing study improves the theoretical frameworks that explain the problems of interactions between renewable energy and the economy. Hence, it increases our understanding of the factors that shape the patterns of renewable energy utilization by incorporating the moderating role of the sources of energy in the renewable energy. Moreover, it analyzes the extent of effect of the moderating role of sources if the energy in the production of renewable energy which means to what extent it moderates the relationship between the REC and the FDI. This study has considerable importance regarding its practical implications as it facilitates the decision makers and the policy makers to gain knowledge about the processes and procedures that are relevant to decisions about the renewable energy by delving into deep insights. Since the relationship between the renewable energy utilization and the FDI is bolstered or moderated by the presence of the involvement of the sources of the energy in the renewable energy, this association between REC and FDI with the moderating role of the involvement of the sources of the energy in the renewable energy will be helpful in making proper strategies for investment and taking initiatives for the management of the renewable energy. This study contributes to the fulfilment of an important gap from the literature by empirically investigating the contributing role of the sources of the energy as a moderator between REC and FDI. This study presents vigorous empirical evidence to support the theoretical assumptions and provides insights about the influences of the involvement of the sources of the energy in the renewable energy on the relationship of the REC and the FDI. This study underscores the significance of contextual factors such as advancements in technology, regulatory environment, and market composition in the assessment of the implication of the involvement of the sources of the energy on the renewable energy utilization behavior. Hence, this study involves the investigation of those contextual forces that influence the moderating effect of the involvement of the sources of the energy in the production of the renewable energy. This study provides insights that are enforceable

for the policymakers by explaining the impacts of the involvement of the sources of the energy on the consumption patterns for the renewable energy. It shows how policy making can be helpful in optimizing the involvement of the sources of the energy in the production of the renewable energy and boosting the FDI increase owing to the increased consumption of the renewable energy. The prime objective of the underlying study is to explore the influence of the REC on the FDI, explicitly focusing on the moderating effect of the involvement of the sources of the energy in the production of the renewable energy on the relationship between the REC and FDI.

2. Literature Review

2.1. Independent Variable (REC)

The consumption of the resources of energy which include fossil fuels, sources of renewable energy and nuclear energy is known as the energy use. The usage of fossil fuels includes the consumption of oil, coal, and natural gas, while the sources of renewable energy are wind power, solar energy, hydroelectric power, and the use of biomass. Basically, the main input of the activity of human beings is energy because it is used to power the household sector, the industrial sector, the transportation sector, and the agricultural sector (Xi Chen et al., 2021). Energy is considered to be the indispensable factor of the modern economy because of its importance in the growth of an economy, advancement of the technology, and the development of the society. It is very important to provide reliable and affordable access to the sources of energy for the sustenance of the economic activities and the improvement of standard of living (Md. Muhamadul Alam et al., 2020).

The sources of energy have been emerged as important alternative options for fossil fuels which are traditional, for the development of potential offers to the generation of sustainable energy. There has always been global advocacy for a complete shift towards the renewable energy because of the environmental benefits (Richard Yolk et al., 2019). The emphasis on the importance of solar energy, wind energy and hydropower has been increased due to the need to reduce the effects of the climate change and the dependence on limited resources (Lion Hirth, 2016). The adoption of economies of scale and the advancements in the

technology has been a significant factor in reducing the cost of photovoltaic setups. There is a significant support for the setups related to renewable energy owing to the reduction in the costs for the power generation from the wind and the hydropower (A.K. Pandey et al., 2016). To reduce the consumption of energy obtained from natural resources and reduce the environmental effects, it is important to improve the renewable energy efficiency. The evaluation of the policies related to the efficiency of the renewable energy has been made for the purpose of saving energy generated from the natural resources and this evaluation has made suggestions that proper making of the renewable energy policies can help in the mitigation of demand of energy generated from the natural resources and can help also in the reduction of greenhouse emissions causing significant returns in economy (Serenella Sal et al., 2017). Highlighting the need for better waste management techniques while providing policymakers with practical insights into using fintech, renewable energy, and green finance for sustainable development (Khan et al., 2025). During a crisis, risk variables for small and midcap ETFs rise, whereas those for large cap ETFs decrease (Shaheen et al., 2024).

The examination has been made about the factors that play a significant role in influencing investments related to the efficiency of the renewable energy while underscoring the significance of the characteristics of organizations and practices at managerial levels. The improvements in the efficiency of home-based energy have been explored while highlighting the role of factors related to the social and economic parts and structuring the policy that shapes the behaviors of the consumers (Gianluca Trota et al., 2018). There is a significant role of policy frameworks in building the setups of the renewable energy and in the facilitation of sustainable transitions from the utilization of the natural resources to usage of the renewable resources. A rigorous comparative analysis about the governance of the renewable energy has been undertaken throughout various countries which underscores the importance of the capacities of the institutions and the political factors. The interactions among the security of energy, relations for trade and the geopolitical tensions have been underscored during the discussion of

energy geopolitics (Bejanmin Sovacool., 2011).

2.2. Dependent Variable (FDI)

The increase in the inflow of the funds to the country from the other countries for the purpose of the growing businesses over a time period in an economy is known as FDI. The measurement of FDI is made in terms of the money flowing into the country for the expansion of the businesses as indicated by the dollars. The FDI significantly and positively influences the efficiency of the energy and the growth of the economy, since it is one of the main sources of the capital, and also assists in the creation of new jobs which are diversified (Xiongfeng Pan et al., 2020). There is a significant importance of FDI as a macro-economic indicator because of its considerable impact on the stability of the economy and its growth (Xavier Javareel et al., 2020). An increase in the FDI is mostly seen as a positive sign for an economy because it encourages the investment projects in the host countries whereas decrease in FDI, leads towards the stagnation in an economy because of the lack of investments for the projects (Ewa Stanislawski, 2019). The FDI can also lead towards the transferring of the technology and the expertise which results in the development of the R&D and the upgradation of the economy (Xiongfeng Pan et al., 2020).

It is very important to comprehend the factors that lead to the increase in FDI so that productive responses for policymaking can be obtained. A multitude of factors have been identified which are responsible for the restrictions of the FDI from the other countries. Firstly, the entry regulations for the businesses and the startups, pollution and the bribery are the barriers for the FDI (Djankov et al., 2023). Secondly, the trade policy and the government regulations influence the decisions on the FDI (Corcoran et al., 24). Additionally, the tax regulations, the investment's protection, the contract enforcement, and the insolvency laws affect the inward flow of the FDI (Tariq Mahbub et al., 2022). Moreover, research has been made to underscore the importance of expectations which plays a significant role in devising the dynamics of FDI. Expectations regarding the taking place of FDI in future can impact the behavior about the setting of the inflow of the investments, which lead to the forecasting for self-fulfilling and restrengthening the trends regarding FDI.

The implications of FDI can be intense in terms of the sustainability of the environment owing to the intention of the transnational corporations to reduce the environmental costs by relocating their environmental danger investments towards the developing countries where the environmental standards are relatively less stringently implemented or followed. Resultantly, the relocation of the polluting industries leads the host countries towards the deterioration of their environmental performance (Rana Muhammad Adeel Farooq et al., 2021). However, it has favorable consequences in terms of the economy and the society as it positively affects the inflow of funds, availability of the money for the businesses and income and wealth distribution within an economy. The examination of the effect of FDI on the growth of an economy found that a highly influx of the FDI has fruitful effects on the performance of an economy for a longer duration owing to the availability of finances for the proper allocation of resources in the future (Guido Ascari et al., 2018).

2.3. Moderator (RIFS)

The involvement of the sources of the energy has an important role in the strengthening of the supply of the renewable resources, improvement of the efficiency and the expansion of the accessibility to the sources of the renewable energy that are reliable. There are different types of mechanisms for financing the projects related to the involvement of the sources of the energy for the production of the renewable energy and these include public-private participation and in addition to it one more important type is project finance, and the another one is venturing capital (Martha Maulidia et al., 2019). The investigation regarding the function of project finance in the investments related to the production of the renewable energy by the involvement of the sources of the energy underscored that it has capability to reduce the risks of the projects that require intensive capital in the long run. The frameworks of project finance assist the investors in the effective allocation of risks and the bringing of capital form different types of sources (Stephen Hall et al., 2015). The examination has been made to find out the capacity of green bonds and ability of various innovational financial instruments to draw in the investments from the private sector for the projects that are sustainable by the involvement of the sources of

the fresh resources. Green bonds are helpful in financing the initiatives that are friendly to the environment owing to which it has become an important tool for financing the development of the renewable energy, since it offers various opportunities to the investors to support the projects that are in accordance with their objectives of sustainability (Tou Wang et al., 2022). In order to determine the best framework for the KMI-30 stock market, Khan, Bangash, and Ullah (2023) assess a number of models using the business risk metric Value at Risk (VaR). According to the findings, a number of mediating factors significantly impact customers' desire to use RAAST, even while prior banking experiences may not have a direct impact (Ullah, U., Khan, J., Shah, J. A., & Baloch, R. 2023). In light of the expected second wave of COVID-19, this study examines important topics like as stock price prediction, investment behaviour, and the efficient market hypothesis (Khalil & Ullah). The effects of policymaking like imposing tariffs, taxes, and targets on achieving the renewable energy on the investment in projects related the involvement of the sources of the energy resources for the production of the renewable energy with the help of the private sector and the public have been examined. Tariffs ensure the prices to be fixed for the generation of the renewable energy owing to which it has become important in encouraging the projects based on solar energy, hydropower and the wind power and hence results in the reduction of costs and increase in potential for the renewable energy (Souvik Sen et al., 2017).

Concerns regarding the promotion of sustainability have significantly impacted the decisions of investors about their investments involving the fresh resources because they are keeping the ESG criteria as a priority. According to the examination of the association between the performance of ESG with the financial returns on investments by the involvement of the sources of the energy resources to produce renewable energy, the practice of sustainability shows a positive correlation with the investment performance. Firms that robustly follow the ESG practices can easily attract investments from investors who are socially responsible, and these firms can gain access to the financing options easily which have lower cost (So Ra Park et al., 2021).

2.4. Relationship between REC and the FDI

The association of the REC with the FDI is positively correlated because changes in the usage of the renewable energy can positively influence the influx of the FDI both directly and indirectly. In case of direct implication, higher usage of the renewable energy can cause an increase in the inflow of the investments to an economy, whereas in case of indirect implication, more utilization of the renewable energy can lead to the sustainability of the environmental performance (Lutz Killian et al., 2022). The usage of the renewable resources of energy impacts the increase of the FDI through the alterations in the inflow of the funds from the other countries, particularly from the developed countries for the supply of the energy throughout different sectors. Whenever the availability of the sources of energy like natural gases, oil and other commodities reduce, the shortage of the energy increases in every sector of the economy which results in reduction in the manufacturing of the goods and the services. Hence, investments from the other countries are reduced owing to the lack of energy availability. This can also lead to the increase in the prices of energy which resultantly leads to the increase transportation expenses, manufacturing expenses and the heating expenses for the companies which are heavily dependent on the utilization of energy and hence this upsurge in the expenses cause the increase in prices of commodities for the consumers (Umar Bala et al., 2018). However, the increased REC can lead to not only the production of goods and services on time but also makes their production cheaper. As this phenomenon involves an increase in FDI because of increased production of the renewable energy which results in the increase in the supply of energy along with the sustainability of the environment; therefore, this is beneficial for the influx of the FDI (Getachew Wollie, 2018). Furthermore, the shifts in the use of energy also influence the FDI by affecting the dynamics of the aggregate demand and supply. When the trends move towards the use of the technologies which are efficient in saving energy utilization and the sources which provide renewable energy, the use of energy can be resultantly lower in the processes of productions, and hence the expenditures for energy can be reduced. Whereas the more utilization of energy on processes can affect the supply of energy which causes the increase in the

prices for energy resulting in the increase in FDI and it disturbs the confidence of consumers, decisions regarding investments, and the whole economic activity (Gary Gortan et al., 2022).

2.5. Research Gap

The impact of REC impacts the FDI which can be examined from previous studies, however little work has been done on the moderating role of the contribution of the resources of renewable energy. This research addresses the impact of REC on FDI with the moderating role of the participation of renewable energy resources.

3. Research Methodology

3.1. Operationalization for Variables

The dependent variable of this study is the financial sector which means that this study examines the factors affecting the financial sector. Since the financial sector is a broad term and is difficult to measure comprehensively, it is operationalized to measure. Hence, FDI has been used as proxy variable for the measurement of changes occurred in the financial sector owing to the various factors (Xavier Javareel et al., 2020). The proxy variable for financial sector, FDI, has been taken from the database World Bank indicators due to the availability of data. It is measured by consumer prices in annual percent (annual percent). The independent variable of this study is climate change which means that this study focuses on the investigation of how climate change influences the financial sector. Since climate change has no measurement scale, it has been operationalized by using REC as proxy variable indicating its effects on the FDI, which is a proxy variable for the financial sector (Xi Chen et al., 2021). The World Bank indicators provide the proxy variable for the climate change, REC, due to the availability of data. It is measured by kg of oil equivalent per capita. The moderator in this study is infrastructure, which indicates that this study examines the alteration of infrastructure in the relationship between the climate change and the financial structure. Since there is a significant variety in the infrastructure and there is no such measurement scale for infrastructure; therefore, the involvement of the renewable energy resources is used as proxy variable for its operationalization (So Ra Park et al., 2021). The World Bank indicators provide the proxy variable for the

infrastructure, investment in energy with private participation, owing to the availability of data. It is measured in current US dollars (US \$). Since GDP growth and the inflation affect the association between the climate change proxied with REC and the financial sector proxied with FDI, they have been taken as the control variables in order to reduce their impact on the investigation of the study of the influence of REC on FDI. The World Bank indicators are used to measure the control variables. The GDP growth is measured by annual

percent (annual percent), while the inflation is measured in consumer price index (CPI) percent (percent).

3.2. Sample Selection, Data Collection and Limitations

The data for this study has been obtained from the World Bank indicators and a sample of 30 countries around the world has been taken for the period of 10 years from 2011 to 2020.

Table 3.1: Operationalization for Variables

Variable Name	Notation	Measurement	Data Source
Financial Sector	FS	annual percent	IMF, IFS & Data Files
Climate Change	CC	The amount of oil equivalent per capita is equivalent.	The IEA Statistics and OECD.
Infrastructure	INF	Current US \$	World Bank, PPI Project Database
The GDP Growth.	GDP	percent Annually	The World Bank National Accounts Data and National Accounts Data Files.
Inflation	INF	CPI annual percent	IEA, UNSD, World Bank & WHO

3.3. Theoretical Model of the Study

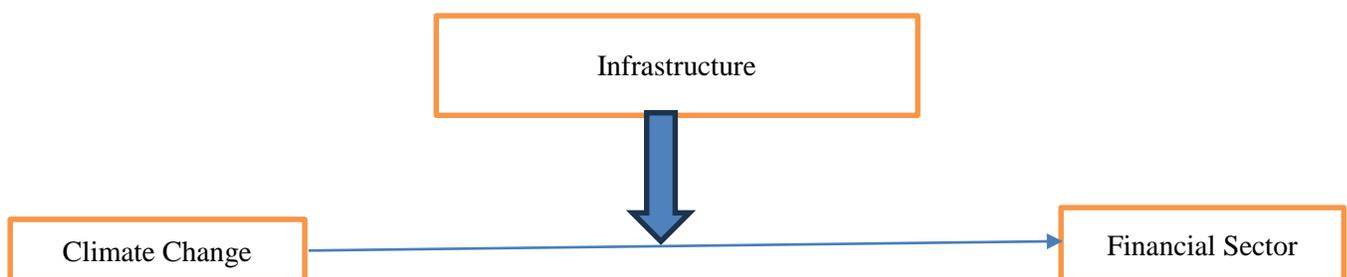


Figure 3.1: Theoretical Framework

3.4. Research Hypothesis

The change in climate change considerably affects the financial sector. The renewable energy consumption which is a proxy for climate change, indicates that when the production of the renewable energy like the hydropower energy, the solar energy and wind energy increases, the manufacturing of the goods and the services increases leading to the attraction of investment

from the various countries, especially from the developed countries indicating the increase in the FDI. In addition, the cost of production for manufacturing goods and provision of services also decreases due to the increased supply of renewable energy. Moreover, the high usage of the renewable energy products leads to significant changes in the dynamics of production

effectiveness and efficiency. An increased utilization of the renewable energy accelerates the demand of the renewable energy products; however, owing to the insufficient supply of these products, the shortage of these products increase which consequently increase the supply of the other products which are produced through the utilization of the natural resources hence leading to the decrease in the attraction of the FDI from the foreign investors (Lutz Killian et al., 2022)

H1: *Climate change has an impact on the financial sector.*

As climate change has a tendency of influencing the financial sector, there is a moderation impact of climate change on the financial sector caused by the utilization of the resources of renewable energy. The participation of private sector and the public sector in the promotion and building of the projects related the renewable energy like the wind energy and the solar energy, leads into the generation of the renewable energy resources which are cost-effective and environmentally friendly. The cost-effectiveness of these renewable resources leads to the increase in FDI owing to the reduction in the cost and manufacturing time for the production of the goods and services, along with the increase in the supply of the renewable energy for production of goods and services (Gary Gortan et al., 2022).

H2: *Climate change's association with the financial sector is moderated by the contribution of the infrastructure.*

3.5. Empirical Model of the Study

Climate change influences the financial sector's performance which means that a higher REC results in an increase in FDI. Hence, to empirically test this hypothesis, a regression model is considered to be appropriate in which REC is an independent variable and the FDI is dependent variable.

$$FSF = \beta_0 + \beta_1 \times CRE + \beta_2 \times PRCC + \beta_3 \times MSCC + \beta_4 \times CFD + \epsilon \quad \dots Eq \quad (1)$$

FSP = Financial Sector Performance, CRE = Climate-Related Events, PRCC = Policy Response to Climate Change, MSSC = Market Sentiment towards Climate Change, CFD = Climate Related

The existence of the infrastructure is moderating the relationship of climate change with the financial sector, indicating that the investment in energy by the participation of private sector reduces the impact of REC on FDI.

$$FSF = \beta_0 + \beta_1 \times CRE + \beta_2 \times PRCC + \beta_3 \times MSCC + \beta_4 \times CFD + \beta_5 \times IR + \beta_6 \times (CRE \times IR) + \epsilon \quad \dots Eq \quad (2)$$

FSP = Financial Sector Performance, CRE = Climate-Related Events, PRC = Policy Response to Climate Change, MSSC = Market Sentiment towards Climate Change, CFD = Climate Related Disclosure and IR = Infrastructure Resilience

3.6. Analysis Tools and Techniques

Since the data collected for this study has been acquired from World Bank indicators and is secondary data, this study uses STATA for the data analysis.

4. Data Analysis

The researcher conducted the data analysis to observe the relationship among the variables being studied in this research. The results are interpreted accordingly.

4.1. Basic Analysis

4.1.1. Descriptive Statistics

The testing for descriptive statistics analyze the presence of mean in the given data, the standard deviation from the mean of the given data, the minimum values in the data, and the maximum values in the data of the variables being studied and are given in the data set.

Table 4.1: Descriptive Statistics

Variables of Research	No. of Observations	Value of Mean	Value of Std. Dev	Value of Min	Value of Max
FDI (DV)	320	22.952	1.74	17.328	26.96
REC (IV)	320	23.842	16.951	1.35	82.79
RIFS (Mod)	320	8.886	1.567	6.4	13.186
GDP (CV)	320	1.83	3.196	-10.149	24.475
INF (CV)	320	1.971	2.135	-1.736	16.332

This table 4.1 shows the descriptive statistics for 32 countries belonging to OCED countries for the period of 10 years from 2011 to 2020. The results in this table show the presence of mean in the given data, the standard deviation from the mean in the given data, the minimum values of data, and the maximum values of data for underlying variables that have been examined. From this table, it has been analyzed that the mean for the

REC Variables is highest whereas the GDP is lowest. In case of the standard deviation, REC and RIFS have the highest and lowest respectively.

4.1.2. Matrix of correlations for FDI and REC

The matrix of correlation shows the strength of the association between the variables which are being studied in the research.

Table 4.2: Correlation Matrix

Variables of Research	FDI	REC
FDI	1	
REC	-0.048	1

Since the values for the given variables fall below the 10, it shows that there is no issue for multicollinearity.

The linear regression shows the relationship of dependent variables (FDI) with independent Variables (REC).

4.1.3. Testing of the Linear Regression for FDI, REC

Table 4.3: Linear Regression

FDI	Cof	Std.va	t-value	P-value	95% Coeft	A.M	
REC (IV)	-0.046	0.005	-8.93	0.000	-0.056	-0.036	***
Constant Value	24.047	0.151	159.77	0.000	23.751	24.343	***
Mean of FDI (DV)	22.952	SD of FDI (DV)		1.74			
R-square of FDI	0.2	No. of Observations		320			

The requirement for significance of the relationship, the value of P for independent Variables on the dependent Variables should be less than 0.10. The value of P for the variables

REC is 0 which means that REC has a significant relationship with the FDI.

4.1.4. Testing of the Linear Regression for FDI, REC and RIFS

Table 4.4: Results of linear regression of direct relationship

FDI (DV)	Coefft. Value	S.DavError	t- Value	Value of P	95% Coefft.	Interval	Significance
REC (IV)	-0.055	0.007	-7.79	0	-0.069	-0.041	***
RIFS (Mod)	0.144	0.077	1.89	0.06	-0.006	0.295	*
Constant Value	22.983	0.584	39.36	0	21.834	24.132	***

The value of P for REC and RIFS are 0 and 0.06 respectively and are lesser than the value 0.10 which is the indication of the significance of association for the variables being studied in this research and these are REC, RIFS and FDI.

4.2. Diagnostic Tests

4.2.1. Testing of the Heteroskedasticity (Breusch and Pagan Test)

The heteroskedasticity test investigates the dependence of existing variance of the error terms given in the presented model on the independent variables.

Table 4.5: Breusch and Pagan Lagrangian multiplier test for random effects

Variable	S.D	SQ. Root (Variable)
FDI (DV)	3.028182	1.740167
e	.8619624	.9284193
u	1.624607	1.274601

Chi-square test's result is 0 which is less than 0.10. Hence, this shows that the coefficients are heterogenous; therefore, there is rejection of null

hypothesis and acceptance of alternative hypothesis

4.2.2. Cross-Sectional Dependency

Table 4.6: Results of cross sectional dependency test

Variables	CD-test	value of P	average joint	value of mean ρ	value of mean abs(ρ)
FDI (DV)	+ 2.148	0.032	10.00	+ 0.03	0.30
REC (IV)	+ 30.07	0.000	10.00	+ 0.43	0.63

Since the value of P for the given variables, the REC and the FDI, is lesser than the value of 0.10, there is a cross-sectional dependence between the variables.

The slope of homogeneity test is performed to analyze the potential variations of the slope coefficients given in the panel data.

H0: There is homogeneity in the coefficients of slope.

4.2.3. Test for Slope of Homogeneity

Table 4.7: Results of Slope of homogeneity

Value of Delta	value of P
1.864	0.062
2.228	0.026

The result of this testing indicates that the given null hypothesis regarding the slope of homogeneity is to be rejected for the significance of 5% at value of P of 0.026. On the other hand, the value of 1.864 with value of P shows that the null hypothesis accepted at 05% but rejected at the level of 10%. Hence, this shows that there is a slope of heterogeneity which is strengthened at the

Table 4.8: Panel Unit Root Test Results

Variables	CIPS		CADF	
	I(0)	I(1)	I(0)	I(1)
FDI	-2.6		-2.6	
REC	-2.279	-2.05	-2.279	-2.05
RIFS	-0.938	-1.956	-0.938	-1.956

The chosen Deterministic are constant. The dynamics lagging the criteria decision from universal to specific on the basis of the F joint testing. H0: There is non-stationary homogeneity having $\beta=0$. The result of this shows that the CIPS for the Variables FDI is greater than the given critical values given at 10%, 5% and 1% respectively. This means that the series of FDI is stationary at the given various levels. Hence, the null hypothesis is rejected, and the alternative hypothesis is accepted.

The dynamics lagging the criteria decision from general to specific on the basis of the F joint testing. The result of this study shows that the CIPS for the Variables REC is greater than the critical values at 10% and 5% respectively but is smaller than the critical values at 1%. Therefore, it is homogenous stationary at 10% and 5% but non-stationary at 1%. Hence, the null hypothesis is accepted at 10% and 5% but rejected at 1 percent. The dynamics lagging the criteria decision from general to specific on the basis of the F joint testing. While working on the procedure of the aggregation, there has been the truncation of the individual tie. The result for this testing shows that the value of CIPS for REC has increased after taking the first difference. Hence, all the values of CIPS are higher than the critical values at given 10%, 5% and 1% indicating that there is a rejection of null hypothesis and acceptance of alternative hypothesis. The dynamics lagging the criteria decision from general to specific on the basis of the F joint testing. While working on the procedure

level of 5%.

4.2.4. Testing of Unit Root

Since the examination of regression outcomes for the variables, the FDI and the REC, shows that there is a significant relationship having value of P less than 0.10, we will undertake Unit Root Testing to further proceed our analysis.

of the aggregation, there has been the truncation of the individual ties.

The value of CIPS in this result for the RIFS variable is quite smaller than those of critical values which lie at 10%, 5% and 1%. This suggests that there is rejection of null hypothesis and acceptance of alternative hypothesis. The dynamics lagging the criteria decision from general to specific on the basis of the F joint testing. The value of CIPS in this result for the RIFS variable is smaller than the critical values at 10%, 5% and 1% even after taking the first difference. This means that there is rejection of null hypothesis and acceptance of alternative hypothesis. There is an extraction during the first period for the cross-sectional average and truncation of the T-values which are extreme. The deducted outcome of this testing indicates that the CADF testing for the variables FDI is significant and T-bar value has greater value than the observed critical values given at 10%, that of 5% and that of 1% which means that the null hypothesis is rejected, and the alternative hypothesis is accepted. There is an extraction during the first period of the average of cross-section and the truncation of the T-values. The finding obtained from this conducted testing portrays that CADF test for the Variables FDI is significant and T-bar value is higher than that of critical values given at 10% and that of 5%, however, lower than that critical value given at 1% which leads to the indication that there is certain rejection of null hypothesis and definite

acceptance of alternative hypothesis provided at given 10% and 5%. However, we reject null hypothesis and accept alternative hypothesis at the

given 1%.

4.2.5. The Specification Testing of Hausman

Table 4.9: Hausman Test Results

	Coefficient Value
The testing value for chi-square	10.076
Value of P	.002

The Hausman specification testing is done to find the systematic difference between the given fixed effects of the studied variables and the given random effects of the provided variables being under study. The chi-square test is 10.076 with the value of P of 0.002. The smaller value of P from 0.10 shows that the result is significant which means that the null hypothesis which suggests that

there has a lacking of systematic variation between the given fixed effects and the given random effects, has to be rejected. Hence the we would prefer the model involving fixed effects as compared to the model comprising random effects for the analysis of our data in this study.

4.3. Specialized Test

4.3.1. GMM Test

Table 4.10: Results of GMM Test

FDI (DV)	Coefficient Value	Standard Error	T-Value	Value of P	95% Coefficient Interval	Significance Indication
L Value	-1.019	0.046	22.03	0.000	-1.109 -0.928	***
REC (IV)	0.131	0.032	4.1	0.000	0.068 0.194	***
Mean Value of FDI	22.989	S.D from Mean	1.709	No. of Observations	0.256	

p = *** if p<0.0, p=** if p<0.05 and p=* if p<0.1

The result for this GMM test has been conducted to show the significance of the effect of the REC on the FDI. The finding of this working portrays that there exists a positive association of the REC with the FDI having a coefficient of 0.131. Moreover, the relationship between them is significant owing to the value of P of 0 which is less than 0.10.

5. Conclusion

This research is conducted to investigate the relationship between the REC and the FDI with the moderation effect of the RIFS. The purpose of this study is to examine the impact of the energy consumption on the FDI, and to understand the impact of the RIFS in energy on this relationship. The data has been gathered from the website World Bank for countries belonging to OECD for the period starting from 2011 and ending in 2020.

The outcomes obtained by using STATA 17 software demonstrate significant results for the regression test, the unit root tests, and the GMM test. Furthermore, this research indicates that the RIFS in energy regulates the relationship between the said variables and results, indicating that when there is an involvement of the renewable sources, the REC effect of the energy consumption is reduced. It has been analyzed that there is a significant relationship between the REC and the FDI while examining the role of RIFS in the energy. This study demonstrates that the RIFS in the energy sector can reduce the FDI.

5.1. Recommendations

Having investigated the variables in this study, there are certain recommendations suggested for both the researchers and the institutions. This study has been conducted by taking only 32

countries, which means that this study can be further extended by the researchers in future by studying more than 32 countries. The researchers are encouraged to take up to 60 countries or more than 60 countries This can help them to investigate the variables more broadly and deeply to understand the phenomenon. This can broaden the scope of research for the impact of the use of energy on the increase in the inflation with the effect of investment in the energy sector through the participation of the private sector. Moreover, this study has been conducted only for 10 years which depicts a shorter period of time for the analysis of the impact of the use of energy on the increase in the inflation with the effect of investment in the energy sector through the participation of the private sector. The researchers can use the data for 15, 20, 25 and 30 years or more years for the understanding of the implications existing from a longer time period. In addition to this, this study has been restricted to 2020 which lacks information and knowledge about the latest trends happening in the current time and also what changes have occurred between 2020 and 2024. The extension of this study on the basis of the

number of years or the latest years can provide deep insights into the various trends and patterns.

Various institutions such as financial institutions and government institutions can get the benefits of this study. Since this study has been made on the relationship between the consumption of the renewable energy and the foreign direct investment, all sorts of institutions can use the information to analyze the effects created by the extensive energy on the inflation. The policy makers can analyze the ways in which the REC can affect the FDI. It is recommended to the government institutions to study this research and extend it for the promotion of the FDI, particularly boosted by the use of the renewable energy. Moreover, they can incorporate the involvement of the renewable energy sources in this study to further advance the study and encourage their participation in the promotion of the FDI. The contribution of the involvement of the renewable energy resources can help in the promotion of the FDI because their investments can lead to the reduction in the use of natural resources by taking the help of the renewable energy sources.

Conflict of Interest

The authors showed no conflict of interest.

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