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Role of Green Finance, Trade Openness, FDI, Economic Growth on Environmental Sustainability in Pakistan

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ABSTRACT

With time, the world is concerned about environmental protection and climate change, so policymakers and researchers focus on green finance. We investigate the role of green finance, GDP, trade openness, and foreign direct investment on environmental sustainability in Pakistan from the period from 1980 to 2020. By applying the autoregressive distributed lag model (ARDL) we find that green finance, GDP, and foreign direct investment are a positive and significant relationship with environmental sustainability while trade openness is a negative and insignificant effect on environmental sustainability. According to the theory of the environmental Kuznets curve, a model of environmental sustainability is developed.

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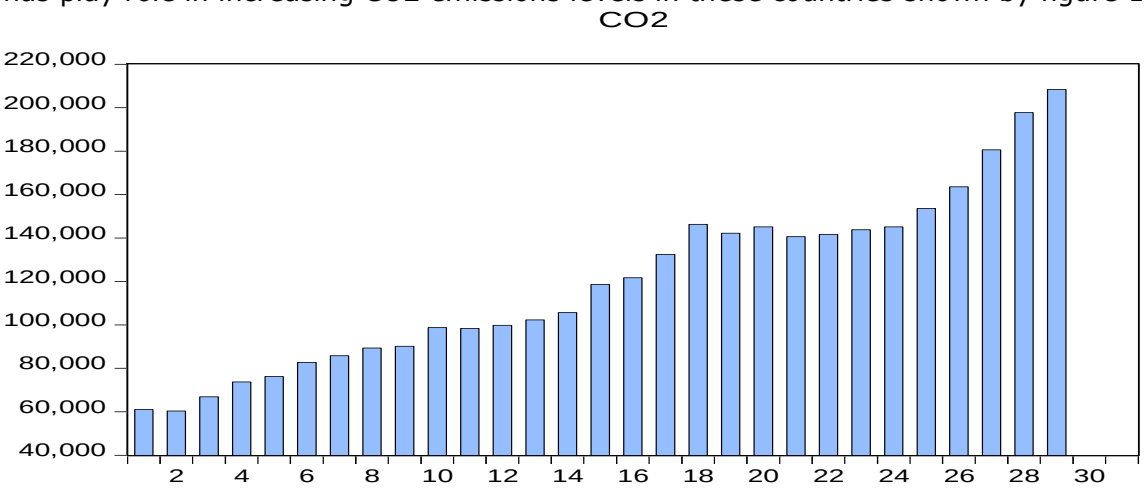
1. Introduction

In recent literature, green finance has paid attention due to increasing worldwide action. Green finance become significant in 21 centuries not only for environmental policy but also the business. All countries in this world, either developed or developing, should attempt green financing. Green finance get popularity in the 1980s and continues to get attention worldwide. Gozgor, Mahalik, Demir, and Padhan (2020) estimated the economic globalization from 1975 to 2015 in 30 OECD countries that there is a need to enhance the knowledge of how economic globalization burst to renewable energy development not only in OECD countries but also developing and developed countries such as Saudi Arabia, Iran, Viet, Nigeria, Thailand, Egypt, Argentina, Malaysia, Pakistan and Philippine (Capelle-Blancard, Crifo, Diaye, Oueghlissi, & Scholtens, 2019). Rather now studies investigating that green finance can be increases environment quality with the help of environmental percept and reduce carbon dioxide emissions

(Meo & Abd Karim, 2022). It might be a reason to decline the consumption of fossil fuels by 26 percent, while it can decrease carbon dioxide emissions by 12.4 percent (IEA, 2017). FDI also has play role in increasing CO2 emissions levels in these countries shown by figure 1.



Source: World Bank, 2020

Green finance will reach a maximum of $ 40 trillion in 2012 and so in 2030. The major part of worldly financing part is to try significant uses of worldwide savings. Actual investment spending to make able to best quality in people's life. Green finance is also a huge term that can save money that also helps in sustainable business performance. Moreover, money adjustment helps decrease the weak point of merchandise and people to the impact of environmental change (Haites, Yamin, & Höhne, 2013). The frequent and wrong uses of natural resources have created harsh environmental degradation in the whole world (Farooq, Gillani, Subhani, & Shafiq, 2023; Orsatti, Quatraro, & Pezzoni, 2020). Moreover, due to green finance people invest their savings in the financing sector and environmentally damaging projects that increase man-induced weather change (Sachs, Schmidt-Traub, et al., 2019). Green finance has covered many issues that impact the growth of green finance products (Mohd & Kaushal, 2018).

Green finance describes the circumstances while business goals are successes and consider environmental policy. Green finance controls environmental degradation through environmental activities (Y. Wang & Zhi, 2016) that which is enough proof. According to their study, the development of industry needs environmental protection through green financing. As the result, green finance is a tool that covers environmental degradation as well as the sustainability of business performance. The state bank also examines the environmental changing that linked to the financing system at that time and the financial transformation (Gagnon & Sack, 2014). Green finance get attention after financial changing in 2008/2009, when the global trying to overcome the gap of recovering opportunities that come due to economic depression and applying policies that become reasons for inequities and decreases environmental concerns, so the term green finance become globally topic (Khan, Riaz, Ahmed, & Saeed, 2022).

As a global issue, green finance also becomes an opportunity for Pakistan to overcome environmental degradation and make sure to the sustainability of business performance. Green finance aimed to start to jump their economy to a new recovery and concerning their economy a sustainable remedied tract (Glomsrød & Wei, 2018). Green finance plays an important role but a few studies have been done related to green finance. Past few years finance sector has had a relay of green investments, and that's why we cannot achieve sustainable economic growth (Stillitano, Spada, Iofrida, Falcone, & De Luca, 2021). Regarding Sachs, Schmidt-Traub, et al. (2019), green finance tools can achieve a clean environment. In this way, financial brokers and markets have introduced many financial tools just as green loans, green bonds, green home mortgages as well as a green environment so the view of green finance is not yet visible properly, and studies are trying to get a clear concept or according to (Zeppini & van Den Bergh, 2011).

Klein 2019 introduce green finance as financing of investment gives environmental benefits. Few past years, many researchers are trying to investigate the bond between economic growth and environmental sustainability (Ahmed et al 2020), which concludes that general economic growth measured with GDP and using a different method of production become a reason to destroy the environmental quality. On the other hand, foreign direct investment and trade openness are also linked with environmental sustainability. For the development of technology innovation trade openness provide a better way to produce things so the target of environmental sustainability can be fulfilled.

To gain aims of sustainable economic growth, enhancing the investment of financing that give us a lot of environmental advantages that are directly related to "green finance" (Duchêne, 2020). Green finance describes green finance as a clear method for environmental sustainability. They give two main ideas. The first of all is that if policy maker makes sure the policies are implemented that discourage financial institutions and investors from financing industry that become reasons of damage to the environment, then such industry will stop such projects that make the environment good for society. And the second idea is that there is no need for policy rather than appreciating the investor to use quality capital that does not become a reason of damage to the environment so we can get sustainability of the environment and sustainability of business performance through green finance.

2. Literature Review

Green finance is not enough to cover finance climates but it also spread a wide range of different goals such as environmental, control of manufacturing pollution, or water treatment. Global warming is the largest fact that the whole world is facing. The United Nations' sustainable development goals (SDGs) attention to focusing on the reduction of the environmental sustainability and degradation of natural resources so they introduce different new methods to get sustainability of the environment. In the past financial sector did not pay attention to the ecosystem but now financial sector focuses to remove environmental issues and gives different financial ideas that specifically focus on environmental sustainability such as green bonds, and green investments. In the past, we study focus on finance to Corban dioxide emissions.

W. Wang, Chu, Wang, Yang, and Jiang (2016) the conclusion is that the sustainability of the environment can be get through the solar system for developing financing. The same study by Xie, Jia, Meng, and Li (2017) suggests that a more effective method to decrease environmental degradation and get a sustainable environment is a sustainable finance. Green finance inspired investment in different techniques and innovations that emerged in renewable energy (Yildiz et al., 2015). Moreover, past studies Falcone and Sica (2019); Sachs (2015); Shafiq, ur Raheem, and Ahmed (2020) declined the relationship between Carbon dioxide emissions and green finance. Green finance is a tool of long-term that increased green finance are used in many finance projects that declined environmental pollution , green finance is helpful to encourage solar energy, clean water, and clean transport project.

Srinivas, Krungleviciute, Guo, and Yildirim (2014) research in Pakistan, Philippines, Mexico, Korea, Egypt, Iran Indonesia, and Bangladesh estimates the removed correlation between energy consumption and economic growth by using the autoregressive metric causality approach. Green finance is linked directly or indirectly to many sustainable development goals that can be successful through private participation in Green finance and investment influences (Sachs, Woo, et al., 2019). Chelly, Nouira, Frein, and Hadj-Alouane (2019) investigate that environmental knowledge about different stakeholders has extended. Especially literature support that organization influences environmental protection by using different environmental policies and action by under the pressure of non-government (Bhattacharya & Bhattacharya, 2014).

Green awareness is accepted as difficult knowledge that required different organization resources (Zeppini & van Den Bergh, 2011), like green finance. Green finance is not only for the decline in energy consumption but also has a significant effect on economic development as well as CO2 (Gillani & Sultana, 2020; Shen et al., 2021). The term green finance defined by (Lindenberg, 2014) means "green finances to enhance the level of financial flows (from banking, micro-credit, insurance, and investment) from the public, private and not-for-profit sectors to sustainable economic development. Furthermore, a study Paramati, Alam, and Lau (2018) investigate panel data of 23 developing and developed countries from 1990-2011 time period that estimate mixed results in these countries on Corbin dioxide emissions declined in stock market development. The analysis that it's come to be decrease in CO2 emissions in developing countries is the reason for to burst system of emission levels while the finding of the study confirmed that developing countries green their stock market by listed companies that favor environment policy and also encourage enhancing the share of renewables in their energy consumption.

Glomsrød and Wei (2018) examined that green finance will help 2.5% reduce coil consumption by 2030, and also worldwide exceed electricity by up to 46%. Neither, literature supported a limited study on green finance and environmental sustainability. Moreover, few study light on the impact of CO2 emission. For example, Dikau and Volz (2018) and Sachs, Schmidt-Traub, et al. (2019); Sachs, Woo, et al. (2019) investigate the effect of green finance on environmental sustainability. Azhgaliyeva, Kapsalyamova, and Low (2019) examined that private investment declined CO2 emissions and the economy grows a new vision of a low-carbon and green economy. Brown, Alexander, Arneth, Holman, and Rounsevell (2019) states that environmental sustainability can get by introducing green finance and new technology.

Green finance is an interaction between the environment and the business world (Capelle-Blancard et al., 2019), but there are few studies that finance has linked with greenhouse emissions and investment. Scholtens (2009) research is bound to the performance and social responsibilities of financing institutions. Sustainable finance/environmental finance as the most important method that decreases environmental pollution (Nazir, Gillani, & Shafiq, 2023). Green finance promotes investment in new technologies and evolutions, as well as renewable energy (Böhringer & Behrens, 2015; Fazal, Gillani, Amjad, & Haider, 2020). So, research gap of this study the effect of green finance on carbon dioxide emissions and investment. This research forecasted that environmental sustainability can be achieved through green finance in Pakistan.

3. Methodology

The 40 years-period, starting in 1980 and ending in 2020 has been selected for data analysis. Auto regressed disturbed model (ARDL) has been chosen. The current study aims to effect of trade openness, GDP, and green finance on environmental sustainability in Pakistan. The Augmented Dickey-Fuller and Phillips Perron tests are used to check the stationary of selected variables. The data selected for the study are taken from World Bank (WDI) shown in the table:

Table 1
Description of Variables

Variables	Measurement	Data Source
GDP growth	annual percentage	World Bank Database
Foreign direct investment	net inflows (% of GDP)	World Bank Database
Trade openness	Sum of exports and imports/GDP	World Bank Database
Renewable consumption	% of total final consumption	World Bank Database
Total greenhouse gas emissions	kt of CO2 equivalent	World Bank Database

Note: as GDP growth is a relative indicator of a country's population, it has been used as a proxy for economic growth. The total of exports & imports is divided by GDP to calculate trade openness. Renewable consumption is the proxy of green finance and co2 is the proxy of environmental sustainability.
Source: World Bank

3.1 Econometric Form of the Model

$$\Delta ENS_t = \alpha_0 + \sum_{j=1}^{Z} \gamma_1 \Delta ENS_{i-1} + \sum_{j=0}^{Z} \gamma_2 \Delta GRF_{t-j} + \sum_{j=0}^{Z} \gamma_3 \Delta FDI_{t-i} + \sum_{j=0}^{Z} \gamma_4 \Delta GDP_{t-j} + \sum_{j=0}^{Z} \gamma_5 \Delta lnTPN_{t-i} + \pi_1 lnENS_{t-1} + \pi_2 lnGRF_{t-1} + \pi_3 lnFDI_{t-1} + \pi_4 lnGDP_{t-1} + \pi_5 lnTPN_{t-1} + \varepsilon_t \alpha \quad (1)$$

3.2 Unit Root Test

The first stage in assessing time series data is the unit root test, which is also crucial for economic interpretation (Nuri, 2000). Most uncommon time series data frequently present challenges for empirical findings (Nelson & Plosser, 1982). The use of non-stationary variables may result in a misleading linear regression with meaningless study findings. This makes it necessary to ascertain if the series is stationary at level I (0) or at the first difference to detect a significant link (1). Thus, if the absolute value of the t (π) statistic exceeds the absolute DF theoretical value, who is deleted. Hence, it can be said that the time series remains stationary. Such as figuring out the DF barrier. Although it is expected that μ (t) are individually uncorrelated, Dickey and Fuller created the ADF test as a backup measure in case this assumption was incorrect. Equation (2)'s estimation is made by adding the previous lagged observation of dependent variables, or ADF;

$$\Delta Y = \beta + \beta_2 t + \delta Y\_i + \sum_{j=1} \theta_1 \Delta Y\_i + \varepsilon_t \quad (2)$$

ε_t mention in above equation is error terms and $\Delta Y = (Y_t - Y_{t-1})$, $\Delta Y_1 = (Y_{-1}, Y_{-2})$, while ADF test. whether $\delta = 0$ *or* $\delta < 0$ therefore, the study follows the same work for the stationary test as ADF for evaluating some critical observations.

3.3 Method of ARDL

Researchers have long explored ARDL, but it has recently emerged as a means of obtaining meaningful results over the long term. Pesaran, Shin, and Smith (1999) recently enhanced the ARDL, and Pesaran, Shin, and Smith (2001) and Narayan and Smyth (2005). Comparing this strategy to various Conitegration measures to promote different econometric benefits. The primary benefit of the ARDL approach is that it can be used to determine how closely a series are correlated. Another benefit of the ARDL technique is that it provides robust estimates of the long-run coefficients for small sample sizes (Pesaran et al., 1999). An ARDL regression model is as shown in Equation [3.] in its core model.

$$\Delta \boldsymbol{y_t} = \dot{\varphi}_0 + {}_1\Delta \boldsymbol{y}_t \dot{\varphi} i + \dot{\varphi}_2 \Delta \boldsymbol{y}_{t\_i} + \cdots . + {}_n \Delta \boldsymbol{y}_{t\_k} + \gamma_1 \boldsymbol{y}_{t\_1} + \gamma_2 \boldsymbol{y}_{t\_1} + \cdots + {}_n \boldsymbol{y}_{t\_k} + \varepsilon_t \quad (3)$$

Hence, ε_t "autoregressive" refers to the fact that y_t is a vector of variables used in the model, and "t" is a random disturbance term. The changing and lagging values of the $\Delta \boldsymbol{y_t}$ could be "given by $\Delta \boldsymbol{y_t}$ itself. Also, it has a "distributed lag" component in the shape of each additional explaining variable's lag values. Let's look at above Equation no (3), which shows how the Regression coefficient is generated (p, q). Considering that the dependent variable's lagged values serve as regression.

3.4 Test for Bound Conitegration

The ARDL approach, created by (Pesaran et al., 2001) is typically used to perform bound convergence tests of the variable in sustainable environmental models, like the ones found in Equations [1]. This is seen in Equation no [4].

$$\Delta \boldsymbol{y}_t = \dot{\varphi}_0 + \Sigma \dot{\varphi} \Delta \boldsymbol{y}_{t-i} + \cdots + {}_j \boldsymbol{y}_{t-1} + \boldsymbol{\varepsilon_t} \quad (4)$$

Here ny is a matrix of the dependent variable that was previously described in Equation [1] for a sustainable environmental model. The variation of the operator is denoted by the Δ. To examine the significance of the level and t-1 variables, the long-term association is calculated using F- statistics. Ho: $\gamma 1 = \gamma 2 = \cdots = \gamma 7 = 0$ is used as the null hypothesis to determine the model's joint significance.

3.5 Model for Environmental Sustainability

$$\Delta ENS_t = \alpha_0 + \sum_{i=1}^{Z} \beta_1 \Delta ENS_{i-1} + \sum_{i=0}^{Z} \beta_2 \Delta GRF_{t-i} + + \sum_{i=0}^{Z} \beta_3 \Delta FDI_{t-i} + \sum_{i=0}^{Z} \beta_4 \Delta GDP_{t-i} + + \sum_{i=0}^{Z} \beta_5 \Delta lnTPN_{t-i} + \pi_1 lnENS_{t-1} + \pi_2 lnGRF_{t-1} + \pi_3 lnFDI_{t-1} + \pi_4 lnGDP_{t-1} + \pi_5 lnTPN_{t-1} + \varepsilon_t \alpha \quad (5)$$

$\boldsymbol{H_0 = \int_1 = \int_2 = \int_3 = \int_4 = \int_5 = 0}$ (No Cointegration)

$\boldsymbol{H_0 \neq \int_1 \neq \int_2 \neq \int_3 \neq \int_4 \neq \int_5 \neq 0}$ (Conitegration)

3.6 Conitegration Long Run Association

Equation [6] in its general form illustrates how this method will be assessed based on the identified ARDL models to examine the effect that the endogenous variables have on the residual and in the long run situation.

$$y_{it} = \alpha_0 + \sum_{j=1}^{p} \alpha_j y_{it} + \varepsilon_{it} \quad ; i = 1, 2, \ldots, 4 \; and \; j = 1, 2, \ldots, 4. \quad (6)$$

3.7 Model for Environmental Sustainability

$$\Delta ENS_t = \alpha_0 + \sum_{i=1}^{Z} \beta_1 \Delta ENS_{i-1} + \sum_{i=0}^{Z} \beta_2 \Delta GRF_{t-i} + + \sum_{i=0}^{Z} \beta_3 \Delta FDI_{t-i} + \sum_{i=0}^{Z} \beta_4 \Delta GDP_{t-i} + + \sum_{i=0}^{Z} \beta_5 \Delta lnTPN_{t-i} + \pi_1 lnENS_{t-1} + \pi_2 lnGRF_{t-1} + \pi_3 lnFDI_{t-1} + \pi_4 lnGDP_{t-1} + \pi_5 lnTPN_{t-1} + \varepsilon_t \alpha \quad (7)$$

3.8 Association of the Short-Run Model

Based on the above ARDL model discussion, the equation for the error correction term will be as follows:

$$\Delta y_{it} = \beta_0 + \sum_{i=1}^{n} \beta_i \Delta y_{it-i} + \varphi_i ECT_{it-1} + \varepsilon_{it} \quad (8)$$

Where Δy_{it} is the change of every variable specified in the environmental sustainability model over time. The below equation no (9) explains the short-run model as follows.

3.9 Model for Environmental Sustainability

$$\Delta ENS_t = \alpha_2 + \sum_{j=1}^{l} \phi_{2i} \Delta ENS_{j-1} + \sum_{j=0}^{l} \Delta GDP_{t-j} + \sum_{j=0}^{l} \Psi_{2i} \Delta FDI_{t-j} + \sum_{j=0}^{l} \Upsilon_{2i} \Delta TOP_{t-j} + \sum_{j=0}^{l} \Upsilon_{2i} \Delta GRF_{t-j} + \lambda ect_{t-j} + \varepsilon_{2t} \quad (9)$$

To investigate the effectiveness or speed of the adjustment of the mechanism, the lag error correction term (ECT-1) is used which stabilizes the situation of disequilibrium in the overall model. it means it is used to explain how the point of equilibrium in the model is achieved with the help of an adjustment mechanism in stabilizing the disequilibrium. All this situation is adjusted after the specific shock in the economy (Narayan,2005).

4. Empirical Analysis and Results

Table 2 shows the result of the descriptive analysis of selected variables. In this table values of data mean, median, and maximum are determined. The values of skewness, kurtosis

along with std. Dev also shoes. The statistical test of jarque-bera determines its probability values also shown in this table. This test uses to check the normality of variables. Jarque-Bera test determines that CO2, GDP, and RC are normally distributed and the remaining variables are not normally distributed.

Table 2
Descriptive Analysis

	CO_2	FDI	GDP	RC	TOP
Mean	5.062345	9.00333	1.753068	49.44918	651.0927
Median	5.079726	9.22208	1.905379	48.13260	814.0111
Maximum	5.318835	5.59709	5.095223	58.09129	817.2458
Minimum	4.780389	2.45608	-1.843705	41.74180	22.52412
Std. Dev.	0.154319	1.45369	1.755773	4.231921	325.9770
Skewness	0.397255	1.61704	-0.060698	0.220895	-1.447090
Kurtosis	2.394991	4.95046	2.322998	2.469253	3.094163
Jarque-Bera	1.205050	17.23527	0.571625	0.576219	10.13205
Probability	0.547428	0.000181	0.751403	0.749680	0.006307

Table 3
Unit-Root test

Variables	ADF		PP		Conclusion
	I(0)	I(1)	I(0)	I(1)	
CO2	0.005***	0.000***	0.007***	0.000***	I(0)
FDI	0.129	0.01***	0.269	0.01***	I(1)
GDP	0.02***	0.000***	0.02***	0.000***	I(0)
Top	0.665	0.001***	0.228	0.001***	I(1)
RC	0.006***	0.000***	0.006***	0.000***	I(0)

Note: ***, **&*, refers to the level of significant at 1%, 5% &10% respective.

Before applying ARDL we apply the unit-root test because we check that our all variables are stationary at level 1 level. After all, if any single variable is stationary at 2 the level then we cannot use the ARDL approach. The results show that CO2, GDP, and RC is stationary at the level while FDI and TOP are stationary at 1st level. Table 4 shows the results of optimal lags. Optimal lags show different criteria but commonly use AIC and SC. Optimal lags help to decrease the correlation in the model.

Table 4
Lag of Optimal

Lag	Log	LR	FPE	AIC	SC	HQ
0	-1135.143	153.3222	8.45376	87.70330	87.94524	87.77297
1	-1028.983	163.3224	1.71429	81.46025	82.91190	81.87828
2	-1010.769	21.01608	3.67329	81.98226	84.64362	82.74863
3	-942.5179	52.50109	2.76828	78.65523	82.52629*	79.76995

Table 5
Bound Test

F-Bounds Test		Null Hypothesis: No levels of relationship		
Test Statistic	Value	Sig.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	6.774436	10%	2.2	3.09
K	4	5%	2.56	3.49
		2.5%	2.88	3.87
		1%	3.29	4.37

Table 5 shows the results of the bound test. The bound test is used to check the cointegration/long run related to selected variables in the model. Inbound test if the value of f-

statistic is greater than their selected variable's upper bound that means neglected the null hypothesis and the null hypothesis means there is no cointegration between variables that include in the model. So, the variables are existing in long run.

Table 6
Short-run coefficient of the ARDL Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(CO2(-1))	0.016165	0.072918	0.221682	0.8276
D(CO2(-2))	0.220147	0.069748	3.156311	0.0065
D(FDI(-1))	0.023700	0.017751	1.335519	0.1622
D(RC)	-4603.362	314.1962	-14.65123	0.0000
CointEq(-1)*	-0.022582	0.004481	-5.039372	0.0001

Table 6 shows the results of the short-run coefficient of the ARDL model. After knowing about the cointegration relation between variables, we step forward to short-run estimation. In this table, we know only about the speed of adjustment that is shown by the estimated value of ECM. ECM declares how much dis-equilibrium between the short-run and the long-run dependent variable is estimated in a year. The values of ECM (like… 228047.0, 0.128539, 19.41228, 33.63959, -423.5150, -0.083906) that is significant at the level of 1% and 5%. It means the ECM values show the disequilibrium between the short-run and long-run so the dependent variable is corrected and estimated in a year.

Table 7
Long run coefficient of ARDL Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FDI	0.15878	0.01698	9.351001	0.0002
RC	1397.641	190.9889	7.317918	0.0000
TOP	-25.33599	19.38189	-1.307199	0.2204
GDP	9963.375	3260.903	3.055403	0.0121

Table 7 shows the result of the long-run coefficient of ARDL. The result confirms that there is a positive and significant relationship between FDI and CO2 emission at a 1% level of significance, its mean 1-unit increase in CO2 leads to a 1.605-unit increase in FDI. The finding of the study supported by Bakhsh, Yin, and Shabir (2021). However, the results also show a positive and significant relationship between RC and CO2 emission at a 1% level of significance, its mean 1-unit increase in CO2 emission leads to a 1397.64-unit increase in renewable consumption. The finding of the study aligns with (Sahoo & Sahoo, 2022). Moreover, the finding confirms that there is a negative and insignificant relationship between CO2 emission and trade openness. The study also shows a positive and significant relationship between CO2 emission and GDP at a 1% level of significance, its mean 1-unit increase in CO2 emission and 9963.37-unit increase in gross domestic product.

4.1 Model's Stability

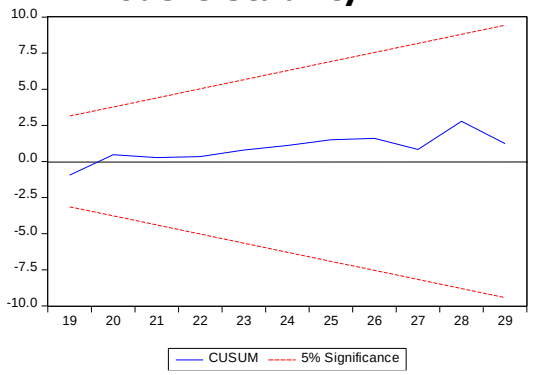


Figure 2A

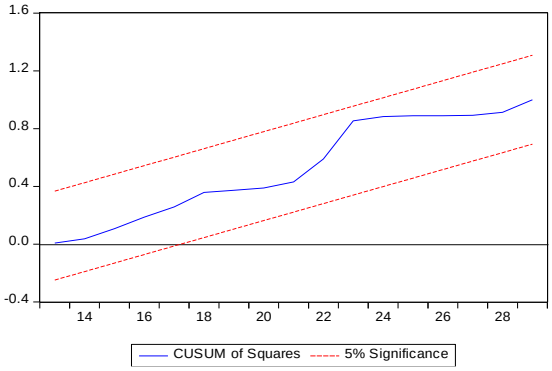


Figure 2B

When estimation is complete, we found the model's stability is so difficult. We apply CUSUM and CUSUM-SAQURE tests to check the model stability. If the plots of these tests lie between 5% then the variance and parameters are called to be stable. The results shown in diagram 2A-2B declared that plots of CUSUM and CUSUM-SAQURE lie between 5% lines which tells us about the model's stability.

5. Conclusion and Policy Implication

Green finance become a huge and worldwide term; it also helps to industrialized countries to get sustainable development. Pakistan has a main part in the implementation and policy investigation of green finance. The finical transformer in Pakistan is estimated how they can introduce green finance in macro policy analysis. The state bank of Pakistan has recently paid attention to green finance policies to reduce pollution in the air and increase foreign direct investment as well as gross domestic product.

This paper offers insight into how Pakistan is already implementing policies regarding green finance that how green finance impact significantly on carbon dioxide emission. Using the ARDL shows that green finance policies have a positive effect on reducing carbon dioxide emissions. Moreover, the study found the positive effects of foreign direct investment and gross domestic product on the sustainability of the environment.

Green finance supported green innovation organizations, purchasing green equipment, introducing new environmentally efficient technologies, and training their employees accordingly. Green finance through different projects can give a chance to stakeholders (organizations/governments/regulators) a to spend R&D on environment-related issues and reduces the risk related to green policies. Green policies faced higher costs but through green finance, they can minimize their cost without facing financial difficulties.

However, although this study shows positive results about green finance, it has some limitations, future studies can focus on developing and under-developing countries. There is an opportunity for future researchers to analyze panel data. They can check the impact of green finance on environmental sustainability in developed and developing countries by using the same model.

Authors Contribution
Sana Khizar: introduction, review, data analysis, writing-original draft
Alvena Anees: methodology, conclusion, proofreading, writing-original draft

Conflict of Interests/Disclosures
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