The Impact of Green Financial Development on Economic Growth of Pakistan

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Abstract: Nowadays, green finance that is, the growth of financial operations in harmony with ecological balance and environmental protection is seen as the primary means of achieving sustainable development, which is the considered as the main goal for every organization. This study intends to investigate the effects of green financial development, including green credit, green securities, green insurance, green investment, and foreign direct investment on Pakistan's economic growth. Keeping in mind the significance of green financial development for economic growth the time series for the years 1990 to 2020 was taken from the State Bank of Pakistan (SBP) and the World Development Indicators (WDI). The Autoregressive Distributive Lag (ARDL) and Granger Casualty test have been used for the study. The results shown experimentally that foreign direct investment, green credit, green securities, green insurance, and green investment all contribute positively to Pakistan's economic growth. These results give stakeholders the knowledge that they need to increase their attention to green financial development, which is essential for the nation's economic growth.

**Keywords:** Green Finance, ARDL, WDI, Economic growth

1. Introduction

It has been investigated from the last few years that sustainability has become a debatable topic for the scholars. This debate has created a new emerging concept which is known as green finance, which is widely used for the sustainable economic growth. Green finance is basically the investment in financial goods and services that creates economic growth and environmental sustainability Mahmood et.al, (2021). It is basically includes investment in energy optimization, preservation and in sustainable energy project. For the sustainability the role of the financial market is significant and crucial from anything else (Khan, M. A, 2020). Pakistan is a developing country where the economic expansion is highly experienced in the country. It is the requirement of the day for Pakistan to improve the economic sustainable environment (Yoshino and Hesary, 2019). There are so many obstacles regarding the environmental sustainability of Pakistan like water pollution, scarcity of water, air pollution and the susceptibility towards the climate changes. Now, in order to align the environmental obligations with the economic ambitions, the role of the green finance is important (Stern, 2007). The developing country like Pakistan should allocate financial resources for the environmental sustainability for aching the long term environmental goals (Salazar, et.al, 2020).

The relationship between economic development of Pakistan and green finance is not a simple phenomenon and various factors like policy makers, market mechanism and environmental factors make it complex. Although, this relationship is very much interesting and useful for the all the stakeholders involved in the green finance and economic development like financial institutions, political figures and institutes involved in economic development.

Here, a question arise on the credibility and application of the green finance on the economic development of a nation like Pakistan in the presence of all these obstacles (Sachs et.al. 2019).

The current study is and investigation of the relationship between green finance and economic development in case of Pakistan. The study has investigated the current situation of the environmental sustainability is Pakistan. Secondly, it has identified the factors that may contribute towards the economic development. The study has very strong recommendations for the economic development and green finance. In this particular study the impact of the green credit, green investment, green securities, green insurance and foreign direct investment. Ahmed et.al (2017) stated that through green credit small amount of loan may be provided to the institutions for the training and development purposes of the employees with intentions to regulate the policies regarding the environmental safety and requirement. In the same time green securities will take care of the health and will expedite the process smoothly. The green insurance covers the harmful aspects of the infrastructure in the environment. It is the better infrastructure that creates a good and favorable environment. The green investment encourage the projects that reduce the air and water pollution and increase the overall performance of the organization with respect to environmental sustainability (Xia et.al,. 2019).

The current investigation is all about the relationship between the mentioned green finance determinants and economic development of Pakistan. With respect to the GDP Pakistan has ranked 46th having the amount of the GDP is 340.64 billion U.S. dollars in 2023. It has been observed that GDP of Pakistan in decreasing day by day due to many factors like political conditions and economic instability. The environmental awareness can minimize the problems for the country like Pakistan (Shah et.al., 2019). In the case of Pakistan the major contributors towards the GDP is agriculture (19.75%), industrial sector (21.44) and the service industry (59.04%). In indicates that service industry has more contribution in the GDP which at the same time effect the other sectors of the economy as well. If good policies are developed for the financial institutions the growth of the economy may be increased (Luqman et.al, 2019).

Pakistan: Gross domestic product (GDP) in current prices from 1987 to 2023 (in billion U.S. dollars)
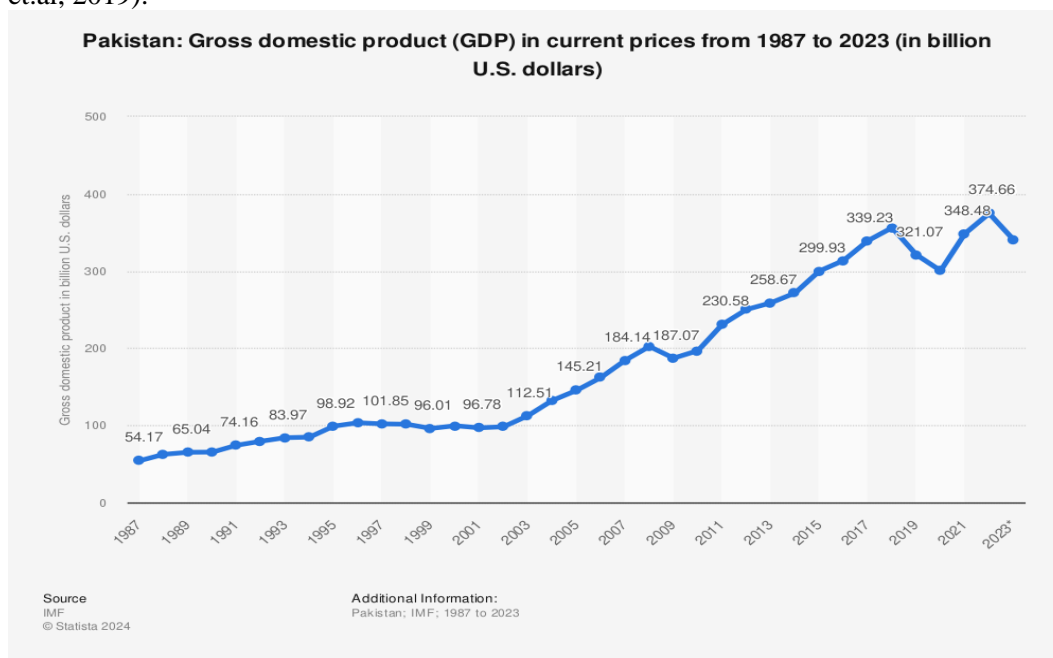
The manufacturing companies in Pakistan creates air and water pollution due to which natural resources are flourished and results in bad environment but the green finance development may create innovation and awareness about the green finance. At the same time investment in green projects and securities may also reduce the impact of these bed environments (Shah, 2019). This study has a great importance for the prospective of Pakistan as global sustainability objectives will lead to economic stability model. The green finance has already provided good insights for the economy of Pakistan as it is endorsed by the global economy as well. This study has contribution in economic development and sustainability in Pakistan. This study will create and awareness about the green finance with respect to the economic development.

2. Literature Review

Green finance has a very vital role in the sustainability and economic development in the literature of finance. In the current era of globalization green finance has got too much importance and become a debatable topic for the scholar of finance. The importance of the green finance is very much high but still lots of investigation have to be done. In the words of Tan et.al. (2014) the addition of the environmental aspects to the financial policies may enhance the financial performance of the financial institutions in a country which leads to the economic development. The same statement were attested by Tahir et.al. (2013) that the components of the green finance has multiple factors like green insurance, green securities and green investment that has direct impact on the sustainability of environment and country. There is a growing body of evidence suggesting that green financing contributes positively to economic growth. Studies conducted by researchers like Beck, Demirguc-Kunt, and Levine (2010) indicate that it significantly stimulates investments in environmentally beneficial projects. This, consequently, not only enhances economic growth but also promotes environmentally sustainable practices. The aim of this study is to delve into various dimensions of green finance, encompassing green credits, securities, insurance, and investments. Additionally, it seeks to explore the strategic role of foreign direct investment in advancing a green economy (Beck, Demirguc-Kunt & Levine, 2010).

Pakistan requires a tailor-made green financing strategy to address its distinct environmental and economic hurdles. This section provides a comprehensive examination of how the advancement of green finance correlates with economic growth, scrutinizing legislative structures, the accessibility of green financial instruments, and the contribution of financial institutions to bolstering green investments. The aim of this endeavor is to identify the most effective tactics and lessons learned from past endeavors, with the ultimate goal of fostering the growth of green finance in Pakistan (Khan, 2021). Pakistan's stagnation in the realm of green finance primarily stems from gaps in legislation, limited engagement from investors, and entrenched financial system challenges. This segment proposes practical policy recommendations, including regulatory reforms, incentives for investments, and capacity-building measures for financial entities and stakeholders (Ahmed, Zhang, & Goto, 2019). These suggestions are informed by contemporary research and policy analyses. This Literature Review aims to underscore the potential of green financial development in fostering sustainable economic growth in Pakistan. Additionally, it highlights the importance of understanding the role of green finance, overcoming implementation challenges, and embracing strategic solutions. Moving forward, it is imperative to prioritize longitudinal impact assessments, innovate green financial products, and integrate green finance into broader economic and environmental policies. This holistic approach will contribute to the advancement of green finance in Pakistan (Ahmed, Zhang, & Goto, 2019).

3. Research Methodology

In order to investigate the relationship between green financial developments on the economic development of Pakistan data were taken from SBP and WDI from the period 1990- to 2020. A deductive research approach with the philosophy of positivism is applied in this research work. The details of the variables enlisted in the research work is described in Table 1

Table 1: List of Variables

Serial Number	Name of the Variable	Formula	Source of data
1	Economic Development & Growth (Dependent variable)	The annual % growth in the GDP	World Bank
2	Green Credit (GC)	Green credit/ Total Loans	State Bank of Pakistan
3	The Green Securities (GS)	Market value of environmental protection companies/ total market value of all the companies	World Bank
4	Green insurance (GI)	Total agricultural insurance/ total insurance	State Bank of Pakistan
5	Green Investment (GIN)	Total Fiscal Expenditure by Environmental protection companies and energy companies/ Total Fiscal Expenditure	World bank
6	FDI(Foreign Direct Investment)	The Total % of the inflow to GDP	World Bank

On the basis of literature and above discussion on the variables the following equation is used for the main estimations of results

$$ED_t = \alpha 0 + \beta 1\,(GC_t) + \beta 2\,(GS_t) + \beta 3\,(GI_t) + \beta 4\,(GIN_t) + \beta 5\,(FDI_t) + \epsilon \qquad (1)$$

The ED shows the economic development of Pakistan while the GC shows the Green Credit, GS indicates the Green securities, the GI shows the insurance in the green finance while GIN shows the amount of investment in green finance and the last variable is the foreign direct investment that is denoted by FDI.

For the analysis of the data it is compulsory to check the stationarity of the data for which the Augmented Dickey-Fuller (ADF) unit root test has been implemented. The main idea of checking stationarity is to apply the proper statistical model for the analysis of data. The overall model that has been used for the ADF test is

$$d(Y_t) = \alpha_0 + \beta t + YY_{t-1} + d(Y_t(-1)) + \varepsilon_t \qquad (2)$$

In the current research work the ARDL Model is implemented to check the short and long run relationship among the variables. For the ARDL it is compulsory to check the bond test by using the following equation.

$$\Delta ED_t = \alpha_{0+}\sum{}^{\&}_1{}^{\Delta EG_{t-1}} + \sum{}^{\&}_2{}^{\Delta GC}{}_{t-1} + \sum{}^{\&}_3{}^{\Delta GS}{}_{t-1} + \sum{}^{\&}_4{}^{\Delta GC} + \sum{}^{\&}_5{}^{\Delta GINV}{}_{t-1} + \sum{}^{\&}_6{}^{\Delta FDI}{}_{t-1} + \varphi_1 EG_{t-1} + \varphi_2 GC_{t-1} + \varphi_3 GS_{t-1} + \varphi_4 GI_{t-1} + \varphi_s GINV_{t-1} + \varphi FDI_{t-1} + \epsilon \qquad (3)$$

In this research work Granger casualty has also been investigated among the variables in order to check the uni-literal or bi-literal relationship. For which the following estimations have been used.

$$Y_t = \beta_o + \sum{}_{J=1}\beta_1 Y_{t-1} + \sum{}_{h=1}\beta_{2h}y_{t-p} + \epsilon \qquad (4)$$
$$X_t = \alpha_o + \sum{}_{t=1}\alpha_{1s}\,y_{t-s} + \sum{}_{t=1}\alpha_{2t}x_{t-m} + \epsilon \qquad (5)$$

4. Results and Discussion

Table 2: Descriptive statistics

Variables	Obs	min	max	mean	Std dev.
ED	30	1.115	2.782	1.948	.321
GC	30	1.009	1.410	1.209	.091
FDI	30	0.069	2.220	0.083	.299
GS	30	6.899	7.109	1.775	.398
GI	30	16.001	34.871	25.436	6.981
GIN	30	1.331	0.097	7.004	.181

The table 2 is about descriptive statistics, encompassing key metrics such as the lowest and highest values, mean, and standard deviations for the variables. The statistical analysis reveals that, on average, economic growth in Pakistan accounts for 1.948 percent of the GDP. Furthermore, the average values indicate that green credit (GC) stands at 1.209, green securities (GS) at 1.775, green insurance (GI) at 7.004, green investment (GIN) at 25.436, and FDI at 0.083.

Table 3: Correlational Matrix

Variables	ED	GC	FDI	GS	GI	GIN
ED	1.000					
GC	0.134	1.000				
FDI	0.231	-0.513	1.000			
GS	0.093	0.665	-0.118	1.000		
GI	0.067	-0.117	-0.310	0.054	1.000	
GIN	0.321	0.291	-0.087	0.681	-0.651	1.000

The Table 3 is related with the correlational matrix and shows the correlation among the variables in the data set. The results indicate that almost all the variables have positive correlation with the economic development of Pakistan. It is the green investment (0.321) has maximum positive and significant correlation with the economic development followed by the foreign direct investment (0.231).

Table 4: Unit Root Test

Augmented Dickey-Fuller Test (ADF)	level	t- value	Sig.
ED	I(0)	-2.8769	0.0001
GC	I(0)	-4.9821	0.0000
FDI	I(1)	-6.5643	0.0000
GS	I(0)	-3.9870	0.0001
GI	I(1)	-7.3296	0.0005
GIN	I(0)	-5.4319	0.0021

The outcomes from the ADF unit root test indicate that economic growth, green credit, green securities, and green investment exhibit stationarity at a level, whereas FDI and green insurance display stationarity at the first difference. These findings affirm the suitability of employing the ARDL model for this study. On the basis of the Bound test it has been found that the F-value is 11.311 which is higher than the critical value. The results indicates that Co-integration exist in the model and as a result the short run as well as the long run relationship have been described among the variables.

Table 5: Short run relationship

Variables	Coefficients	Std. Error	t-value	Prob.
GC	1.220034	0.404094	4.765560	0.0000
FDI	0.775061	0.219771	6.721258	0.0001
GS	0.312977	0.032427	4.652225	0.0000
GI	0.819670	0.215370	7.804416	0.0005
GIN	0.719102	0.285067	6.615938	0.0021
Coint Equation	-0.755004	0.276264	-5.804088	0.0000
R- Square	0.943428	Mean dependent var		0.0318
Adjusted R-square	0.906857	S.D. dependent var		0.2819

The above table 5 indicates that all the independent variables have positive and significant relationship with the economic development of Pakistan in the short run.

Table 6: Long run relationship

Variables	Coefficients	Std. Error	t-value	Prob.
GC	1.888101	0.311279	4.980119	0.0001
FDI	0.344711	0.167190	1.110901	0.1355
GS	0.564321	0.103555	5.665421	0.0009
GI	0.129019	0.217890	0.917652	0.4103
GIN	0.006644	0.005121	1.914510	0.0881
C	1.612336	0.718901	2.910101	0.0287

Secondly, the findings also indicate a long-term connection, and the data reveals that there is a positive relationship between economic growth in Pakistan and green credit, green securities, and green investment over the long term. In contrast, green insurance and FDI exhibit insignificant associations with economic growth.

Table 7: Granger Casualty

Null Hypothesis	Obs	F-Stat.	Prob.	Decisions
Green credit does not Granger cause Economic development	30	3.139011	0.0003	
Economic development does not Granger cause Green credit	30	3.761900	0.0004	Bi
Foreign direct investment does not Granger Economic development	30	4.127891	0.0001	
Economic development does not Granger Foreign direct investment	30	1.319080	0.2189	Uni
Green securities does not Granger cause Economic development	30	0.987561	0.0012	
Economic development does not Granger cause Green securities	30	4.190634	0.0001	Uni
Green insurance does not Granger cause Economic development	30	0.129017	0.0981	
Economic development does not Granger cause Green insurance	30	1.343190	0.0012	NO Result
Green investment does not Granger cause Economic development	30	4.451901	0.0001	
Economic development does not Granger cause Green investment	30	0.189161	0.0101	Uni

The results indicates that it is only the foreign direct investment that has bi-literal links with the economic development of Pakistan. it is the green insurance that has no link with the economic development as indicated in Table 6.

4. Discussion

The study's conclusions demonstrate that a nation's economic growth is significantly and favorably impacted by the promotion of green financial development, especially through the issue of green credit. Changing lending regulations to take environmental issues into account helps ensure the long-term viability of economic activity. These results are consistent with the findings of Jin and Mengzi's (2011) study, which argues that the introduction of green credit guarantees a healthy labor force and puts the economy in a competitive position globally. Similarly, the findings show that both short- and long-term economic growth may benefit from green financial development, which is made possible by the issue of green securities. The results of Porfir'ev (2016), which highlight the beneficial impact of environmentally friendly securities on economic growth, are corroborated by this correlation. These findings are further supported by prior study by Berensmann and Lindenberg (2016), which emphasizes the critical role that environmentally friendly securities play in attaining a high GDP rate, which is a sign of a nation's improved economic growth and stability.

Furthermore, the study reveals that the introduction of green insurance has a positive impact on the short-term economic growth rate. This observation aligns with C. Wang, Nie, Peng, and Li's (2017) research, emphasizing the significant contribution of green insurance to economic growth. The findings are consistent with Landini's (2014) studies, which underscore the importance of green insurance in various sectors, including vehicles, accommodations, and business organizational structures, along with associated equipment. Additionally, the study underscores the positive contribution of investment in eco-friendly projects to both short and long-term economic growth rates. These findings are supported by Mielke and Steudle's (2018) research, emphasizing that investments in projects aimed at reducing

pollution, waste, and toxic materials lead to an acceleration in a country's economic growth rate. Moreover, the study indicates that foreign direct investment positively influences a country's economic growth in the short run.

5. Conclusion

The main goal of this paper is to highlight how important green money is to Pakistan's economic growth. The objective of the study is to assess how Pakistan's economic growth has been impacted by green financial development between 1990 and 2020. Many green finance metrics, such as green credit, green securities, green insurance, and green investment, have been used to reflect the green aspect of financial growth. Green securities are measured as the percentage of the total market value of shares listed on the stock market that are owned by environmentally protected companies, whereas green credit is defined as the percentage of green credit to the total loans issued by Pakistan's banking sector. The proportion of insurance premiums paid for agricultural to the overall amount of insurance expenditures is known as green insurance, and the percentage of industry revenue from energy-saving and environmental protection sectors to the entire amount of revenue is known as green investment. The study also evaluates the effect of foreign direct investment on Pakistan's economic development. The results of the study concluded that all the independent variables has positive and significant relationship with economic development of Pakistan in the short run. Additionally, it is the green credit, green securities and green investment that has positive and significant relationship with the economic development in the long run as well.

This report emphasizes how important it is for Pakistan's economic growth plan to include green finance. Due to the beneficial effects of green finance, financial institutions should implement eco-friendly lending practices, which will lessen pollution, dangerous chemicals, and dangerous gasses while promoting economic expansion. In a similar vein, the issuance of green securities is thought to act as a stimulant for economic expansion, enticing companies to engage in environmentally beneficial ventures that improve their bottom line. Green insurance is positioned as a helper for businesses, providing them with environmentally friendly cars, technology, lodging, and office buildings at a reduced cost or by replacing them in the event of a loss. It is advised that green insurance programs be promoted in all economic sectors. Additionally, it is recommended to encourage foreign direct investment toward environmentally friendly initiatives so that commercial groups may make a more meaningful contribution.

5.1 Future Direction

In future, the researchers may identify the impact of the green finance in the various sectors and industry across the country. In the future research work the addition of many other independent variables like labor, capital, and technological innovation may modify the results in more positive direction. Including these variables would provide more robust theoretical foundation for the model related to the national economic development model. The determinants of the green financial development may also be identified in the future studies as well.

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