The Impact of Institutional Performance and Environmental Sustainability on Foreign Direct Investment in Pakistan

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ABSTRACT

In the context of Pakistan, this study aims to investigate how environmental sustainability, institutional performance, financial inclusion, and economic growth interact with and affect foreign direct investment .to determine if there are substantial causal linkages or correlations between these factors, as well as how these independent variables affect FDI inflows and outflows in Pakistan. The study also intends to offer insights on how individuals and governments may support FDI in the Pakistani setting. The research uses time-series data collected from 1997 to 2022 from the (ICRG) and (WDI) .It uses NARDL modelling to analyses the dynamic relationships between FDI, environmental sustainability, institutional performance, financial inclusion, and economic growth in the context of Pakistan. Unit root tests are used to evaluate each factor's stationarity. It seeks to clarify the short- and long-term correlations between these factors by doing this. The NARDL approach reveals substantial discrepancies in the connection among independent variables and foreign direct investment. The study finds connections between FDI and the selected independent variables that are both short- and long-term with positive and negative shocks. Foreign direct investment (FDI) benefits from institutional performance and economic development in both the short and long run, although it is less immediately influenced by financial inclusion and environmental sustainability. This highlights not just the need for more research to explore the collateral advantages of sustainability and financial inclusion, but also the necessity of supporting institutions and economic growth to attract foreign direct investment. To attract more foreign direct investment, Pakistan may really promote measures that support economic growth and institutional effectiveness. This adds to the body of scholarly research and offers useful advice to stakeholders and policymakers who want to maximize FDI inflows while fostering inclusive and sustainable economic growth in Pakistan.

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1.   Introduction

FDI helps developing countries boost their general productivity, job market accessibility, and economic expansion. Over the past a quarter of a century, FDI inflows have increased significantly globally, which has led to an analysis of how this spike has affected the economic development of host nations. An array of studies suggests that foreign direct investment encourages expansion of the economy via facilitating the globally connected exchange of information, which increases job opportunities and diversifies the educational background of the host nation. Two separate lines of evidence about FDI are discovered when the corpus of study is examined: In the beginning, a group of scholars looked at how FDI inflows affected the country's economy. According to their research (Alguacil, Cuadros, & Orts, 2011) .There is a favorable association between FDI and a range of economic growth factors, including job creation, investment growth, trade liberalization, and technical improvement. In addition, Pakistan also has the ability to dramatically reduce the hazards and economic ambiguities that come with hosting nations for Chinese businesses who invest in Belt and Road nations. By means of the highest-level global collaboration in politics, synchronization of policies, and backing from governments, consequently, this promotes foreign direct investment as well as local investment inside certain areas. Some of these FDI incentives are currently in place whereas Pakistan is still in the early phases of building, but others are still more hypothetical than actual. It is projected that Chinese companies would grow their exports as well as foreign direct investments faster than those in other countries. (Gasparėnienė, Kliestik, Šivickienė, Remeikienė, & Endrijaitis, 2022; Wang, Du, Wang, Chiu, & Chang, 2022; Zahra, Nasir, Rahman, & Idress, 2023).

Furthermore, the CEIC calculates Foreign Direct Investment in Pakistan shown in Figure .1. There is yearly updated data on foreign direct investment in Pakistan from June 1977 to June 2023. Foreign Direct Investment is available in the United States through the State-owned Bank of Pakistan. The nominal gross domestic product is provided in the national currency by the Pakistan Bureau of Statistics. Whenever exchanging currency, the median marketplace rate for exchange provided by the State-owned Bank of Pakistan is utilized. Before 2003, the ratio of foreign direct investment to nominal GDP was calculated using the World Bank's Nominal GDP and the International Monetary Fund's Foreign Direct Investment. Foreign direct investment as a proportion of nominal GDP has a fiscal year that concludes in June each year.Figure One shows that the data reached a record low of 0.0% in June 1977 and to a peak of 2.8% in June 2007 (CEIC, 1ST JUNE,2023).
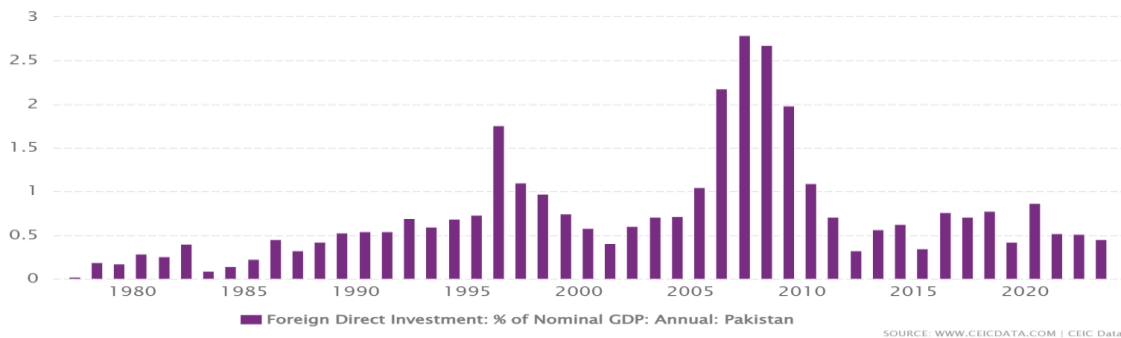

Figure 1: FDI and Nominal GDP

A studies have emphasized the growing impotence of environmental protection, including carbon reduction, the integration of green energy, and the adoption of energy-efficient technologies, as significant factors in foreign capital flows (Bhujabal, Sethi, & Padhan, 2021).

Although FDI has the potential to boost economic growth, its effects on environmental sustainability are complicated and hotly debated. Reduced carbon emissions can result from FDI inflows because they can encourage ecologically responsible behaviors and bring cleaner technology. However, FDI can also result in higher energy consumption and pollution, especially if it goes into businesses that are very polluting or energy-intensive. FDI's effect on carbon emissions in Pakistan is probably contingent upon a number of factors, such as the nature of the investment, the environmental regulations of the receiving nation, and the degree of economic growth. Research has demonstrated that foreign direct investment (FDI) in businesses with high levels of pollution can result in higher carbon emissions, but FDI in cleaner industries can improve environmental sustainability. Furthermore, strict environmental laws and a dedication to sustainable development can mitigate the potential negative environmental impacts of FDI.

The efficacy of financial Inclusion, which provide a clear picture of a organization's monetary information and operations, has a significant impact on the movement of foreign currency across international boundaries (Alam & Zulfiqar Ali Shah, 2013; Qamruzzaman, 2022). The favorable increase in appeal for both domestic and foreign investors is a result of this ease of entrance. Foreign investment is significantly impacted by the financial marketplace's efficiency and the quality of accounting information. By lowering transaction costs and allowing the effective allocation of resources, a sound financial system is crucial to economic activity (Pradhan, 2010).The literature also emphasizes the importance of a strong financial sector in promoting business operations and national economic development (Qamruzzaman & Kler, 2022). Important elements include boosting financial efficiency, expanding financial inclusion, and promoting cross-border money flows (Zeufack Nkemgha & Viviane Mbita). To attract foreign money, almost all major industrialized countries aim to expand their financial openness. In the event that market risks arise from the operations of foreign businesses, these investors seek for different marketplaces. It must be accomplished through the country hosted the project by providing enough financial inclusion to result in foreign direct investments. As International financial flows are responsible for change. However, financial inclusion demands that financial services be widely accessible and that transactions take place.

A significant component that draws in foreign investment is the implementation of effective governance practices (Aibai, Huang, Luo, & Peng, 2019; Huynh, 2022; London). For instance, a study conducted by Narayanan, Baird, and Tay (2021) examined the linkage among foreign direct investment and institutional performance. Research show that foreign direct investment, particularly when it takes place in a setting with sound institutional performance. Has a favorable effect on economic growth. To maximize its benefits, it is therefore advocated to encourage FDI. According to Hoang, Huynh, Duong, and Chau (2022) foreign direct investment inflows initially contribute to higher institutional quality. In Addition a study Awan, Rahman, Ali, and Zafar (2023) using the NARDL model in BRICS countries shows higher institutional performance boost tourism and tourism leads to economic growth (Awan, Arslan, & Hussain, 2023; Awan, Bibi, Bano, & Shoukat, 2023).

1.1. Trends of Independent Variables in Pakistan is Shown in Different Graph
1.1.1. Financial Inclusion in term of Financial Services from Banks in Pakistan

Slow and steady growth in bank accounts
Total number of bank accounts in Pakistan, in millions

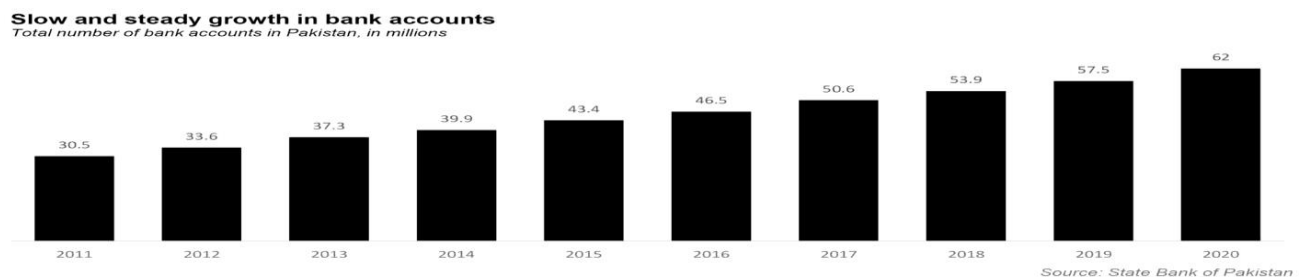| 2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
30.5	33.6	37.3	39.9	43.4	46.5	50.6	53.9	57.5	62

Source: State Bank of Pakistan

Figure 2: Financial Inclusion in term of Financial Services from Banks in Pakistan

1.1.2. Environmental Sustainability in terms of carbon emission (Co₂) Trends in Pakistan

The use of fossil fuels and industrial processes in Pakistan resulted in around 200 million metric tons of carbon dioxide (CO_2) emissions in 2022, as the figure below illustrates. Compared to the previous year, when the nation achieved its highest total since 1970, this represented a drop of almost eight percent (8%) .The Data is taken from (Statista & Zainab, 2023). Even the tourism play a major role in environmental sustainability (Altaf, Awan, & Rehman, 2023) .
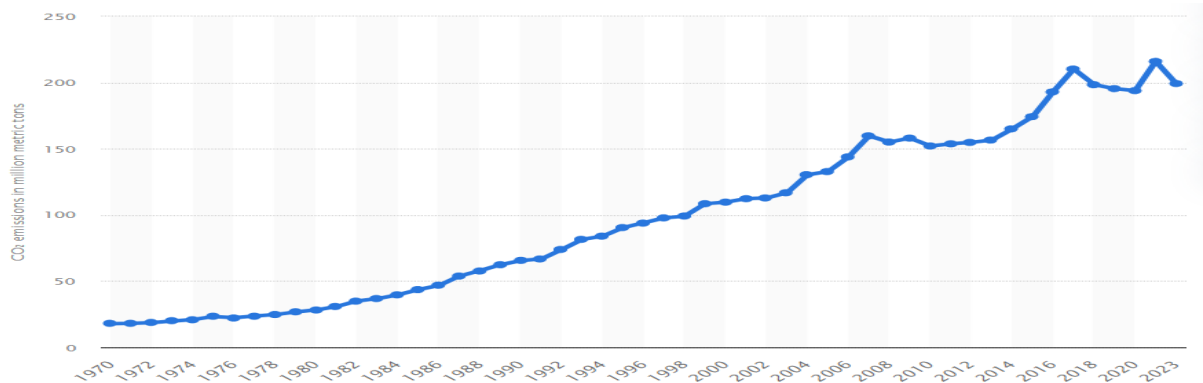

Figure 3: Environmental Sustainability in terms of carbon emission (Co2) Trends in Pakistan

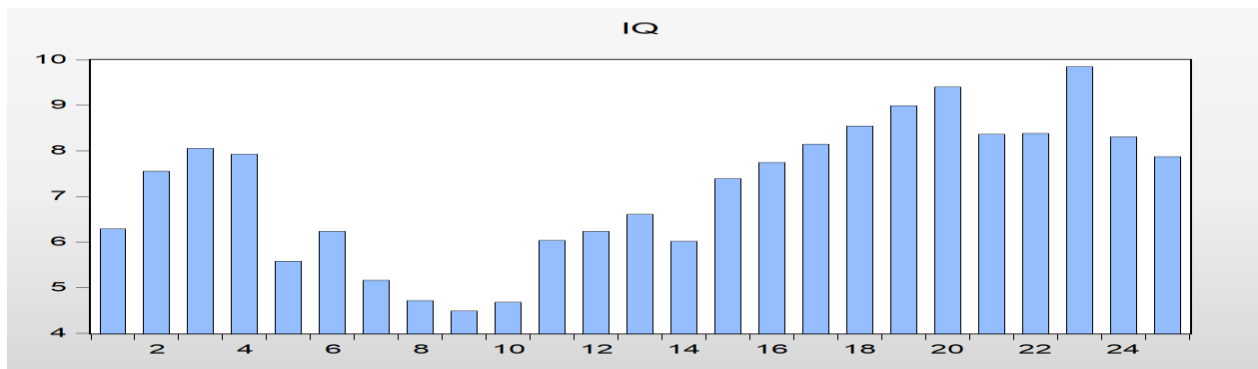### 1.1.3. Institutional Performance in Pakistan

Figure 4: Institutional Performance in Pakistan

The research seeks to explore the intricate dynamics between FDI as the dependent variable and key independent variables such as environmental sustainability, institutional performance, and financial inclusion, while also considering control variables like trade openness and GDP. It aims to elucidate the potential adverse outcomes and missed opportunities if Pakistan fails to enhance its FDI attractiveness through targeted policy interventions, thus providing a holistic perspective on the critical issue of FDI and its implications for the nation's economic progress. Therefore, understanding the determinants and solutions to improve FDI attraction is imperative for sustainable economic development. The primary research challenge is on the crucial topic of foreign direct investment in the setting of Pakistan (Rehman, Ilyas, Alam, & Akram, 2011). FDI holds pivotal importance for Pakistan's economic growth and development (Rehman, 2016). FDI is a key driver of capital infusion, technology transfer, and job creation, playing a vital role in fostering economic growth. As FDI can boost economic development. This study is align with the study conducted by (Kanwal, Hassan, & Butt, 2023) (Kanwal, Khalid, & Alam, 2023).

This work contributes to the corpus of literature in two important ways. First, by studying the impact of financial inclusion, particularly the ease of access to financial services and advantages, on FDI in the framework of Pakistan. Second, it makes use of both symmetric and asymmetric frameworks, offering insightful information on the many ways that explanatory factors affect FDI. This method improves comprehension of both beneficial and harmful innovations, assisting in more efficient policy planning for the next development projects.

Foreign direct investment is of utmost significance to economies everywhere. In the case of Pakistan, FDI is essential for closing the investment deficit, spurring the development of infrastructure, and generating employment. The importance of this research goes beyond FDI alone, though. This paper tackles a serious issue and provides insights into how Pakistan might draw investment while supporting environmental goals by examining the link between environmental sustainability and foreign direct investment.

2. Literature
2.1. Underpinning Theory

Foreign direct investment has long been seen as a key driver of economic growth. On the other hand, opinions differ and the relationship between FDI and environmental sustainability is complicated. The New Growth Theory states that foreign direct investment has the potential to promote knowledge transfer, introduce cleaner technologies, and strengthen environmental laws all of which will help ensure the sustainability of the environment. Yet, empirical study has yielded inconsistent results. Foreign direct investment and environmental sustainability have been found to positively correlate in some studies (Ambrose, 2002; Jaffe, Newell, & Stavins, 2005); however, other studies (Aitken & Alfaro, 2006; Dasgupta, Murthy, & Sandler, 2002) have found a negative correlation or no significant relationship at all. Pakistan is a growing nation that strives for both economic development and the preservation of its natural environment. FDI has had a role in Pakistan's economic growth in recent years. However, concerns have been raised about the potential negative impact of FDI on Pakistan's.

2.2. Financial Inclusion and Foreign Direct Investment

The worldwide flow of capital significantly contributes to the economic growth of any nation. The movement of money across borders has had a considerable influence on the global growth of the financial sector. This international money flow is essential for strengthening industry service standards, increasing financial efficiency, supporting the economic development of emerging nations, and ensuring the ongoing expansion of the world economy and trade. Financial systems' usability and effectiveness are significantly impacted by cross-border transfers of cash. According to Toxopeus and Lensink (2008) financial inclusion has a positive impact on foreign investment.

According to their analysis, which looked at data from 63 nations in 2008 using sources including the IMF, he World Bank's and subsidies are considered to be a part of global cross-border cash flows. Additionally, they claim that if financial inclusion is effectively carried out, earnings may rise. They argue that more access to finance promotes growth in the economy, which makes it simpler for repatriation providers to send payments overseas. This approach also asks for an increase in foreign currency reserves to promote financial inclusion. According to the Qamruzzaman and Jianguo (2018), which examined developing nations between 1993 and 2017 using the System GMM technique, foreign capital flow significantly affects an essential aspect of economic growth.

In order to encourage overseas currency circulation and demonstrate that both of them have a beneficial connection, so a nation must improve financial inclusion. Financial inclusion and the stability of financial markets are mutually reinforcing, according to Morgan and Pontines

(2018) research. They noticed that the short time period and the limited availability of foreign capital enhanced the association among foreign investment and foreign inclusion in finance. Similar to this, according to Singh and Zammit (2000) In the 1990s and 2000s, researchers using a framework for growth including 63 developing countries revealed that factors including gender disparity and rural poverty contributed have a negative impact on financial inclusion, implying an adverse association with foreign capital the flow process.

Further research indicates that although increasing financial inclusion would not have a direct effect on foreign capital flows, the nation's overall financial health could affect foreign direct investment (FDI), making the statement irrelevant. For instance, Barry, Görg, and Strobl (2003) that examined nine nations in the European Union between 1991 and 1997 discovered a link between technology transfer and the risk of financial inclusion, which has an effect on cross-border capital movement. It suggested that the problem of liquid cash can develop differently with the greatest possible financial inclusion implementations if the evaluation of financial transactions is drastically lowered. Positively, a research conducted in Barajas, Steiner, and Salazar (2000) suggested that financial inclusion was responsible for a general increase in financial growth indicating a favorable correlation among the two variables in the overseas investment industry .

Adeniyi, Oyinlola, Omisakin, and Egwaikhide (2015) evaluated the effect of economical effectiveness on foreign investment throughout 1990 and 2015 was substantial. using the empirical analytic approach known as FDI-growth. Their findings suggest that increased efficiency can have a detrimental effect on remittances and cross-border money flow. Additionally, they discovered that the high rates of investment and productivity in three nations from 1990 to 1996 were mostly reliant on outside financing. Regardless of its level of growth, Korea was the only country that rejected foreign capital. The difficulties in determining Foreign Direct Investment as a useful financial tool in industrialized nations in the late 1980s and early 1990s were highlighted by Taylor and Sarno (1997). This intricacy made it challenging to manage international financial flow and build relationships with foreign investors.

2.3. Institutional Performance and Foreign Direct Investment

The body of current literature indicates that scholars and educators have thoroughly investigated the main factors that influence the flow of foreign capital, noting a range of macro and micro-factors like currency rates, national capitalization growth, and expansion of trade. But as several studies have demonstrated, institutions and customs also referred to as good governance have a significant influence on the movements of foreign capital (Rehman & Noman, 2022; Stein & Daude, 2001). There has been a lot of research on the relationship among foreign direct investment and institutional performance , although no final conclusion has been reached (Herrera-Echeverri, Haar, & Estévez-Bretón, 2014) .

In Hillier, Ross, Westerfield, Jaffe, and Jordan (2019) research, for examples, the institutional performance for foreign direct investment in 122 developing nations during 2002 and 2017 was assessed utilizing economic methods and the World Bank's good institutional performance index. The conclusion of the study indicates that while weak institutional capacity can have a detrimental effect on economies, host nations' FDI is strongly connected with their degree of good governance. Moreover, Hoang et al. (2022) used FGLS and SGMM estimates to examine how foreign direct investment inflows affected institutional quality in 43 countries that were developing globally throughout 2002 as well as 2009.The findings suggest that although foreign direct investment inflows initially contribute to the improvement of institutional standards, their beneficial effects may be offset by the emergence of a shadow economy. This suggests that underground management is required in order to lessen the negative effects.

However, it is possible to categories the material that is currently available on FDI that is supported by good governance into two main groups: a positive association and a neutral influence. Strong administration and the inflow of foreign direct investment include a favorable as well as statistically important, according to the initial line of study Assadzadeh and Pourqoly (2013); Younsi, Bechtini, and Khemili (2021) and (Shittu, Musibau, & Jimoh, 2022). For instance, Dorożyński, Dobrowolska, and Kuna-Marszałek (2020) Applied the panel techniques and cluster analysis with hierarchical structure, investigation into the quality of institutions as well as foreign direct investment for seventeen nations in Central and Eastern Europe took place throughout the years 2007 and 2017. The study found that in countries with sound institutional foundations, FDI and GDP were positively associated.

Similar to this, According to Roy and Narayanan (2020) the foreign direct investment favorably encourages expansion of economies in the context of good institutional performance ,as it was discovered by utilizing the PMG approximation technique to study the association between FDI and good governance in ASEAN countries during 2002 to 2015. Omri, Kahia, and Kahouli (2021) contend improving democratic along with institutional performance can mitigate any prospective, minor detrimental effects on human welfare. Political stability and efficient governance are positively connected with FDI, which is advantageous for the surroundings and economy. According to Huynh and Hoang (2019) enhancing institutional quality, reducing the shadow economy, and increasing administration can all have a favorable impact on FDI.

A study by Hayat (2019) that using the GMM technique and sampled 104 countries found that there is a larger association in high-income nations between FDI and institutional quality, but a stronger correlation in economics with low and moderate incomes. The second set of studies looks at the relationship between good governance and FDI inflows objectively. For example, Huynh (2022) it found that although foreign direct investment inflows generally improve institutional quality, its beneficial impacts might be lessened in the setting of an underground economy. It is suggested that FDI inflows might raise institutional standards and promote economic productivity.

Miao, Lang, Borojo, Yushi, and Zhang (2020) found identical findings, suggesting that the influence of (FDI) on institutional quality is contingent upon the efficacy of measures aimed at regulating the standards of institutions. In conclusion, research on the interlink between FDI and good governance can be categorized into two camps: one points to an upward relationship between the two, while the other suggests neutral effects, contingent on several variables such as the existence of a shadow economy and the efficacy of policy interventions.

2.4. Environment Sustainability and Foreign Direct Investment

FDI affects the environment, with the capacity to either improve or degrade the state of ecosystems and the quality of natural resources. So, the threats to biodiversity, and human activities that harm the environment are just a few of the ways that deterioration in the environment can appear. Degradation of the environment that follows is a basic prelude to rising expenses and capital loss. The increasing expenses for businesses highlight how important environmental quality is. Furthermore, the environment has a critical impact on the accessibility of clean air and water. Thus, maintaining environmental sustainability is essential for maintaining human health as well as the viability of businesses. Environmental rules should be applied to foreign direct investment due to its significant role in economically advanced firms and institutions. Three key factors pollution levels, industry-specific FDI, and environmental laws affect how environmentally sustainable FDI inflows are (Hamid et al., 2022).

A evidence demonstrates a positive correlation, as stated by Bao, Chen, and Song (2011); Opoku and Boachie (2020) and (An, Razzaq, Nawaz, Noman, & Khan, 2021). For instance,

Bhujabal et al. (2021) used the PMG causality test to look at how FDI affected sustainable development in important Asia-Pacific nations between 1990 and 2018. According to their research, FDI growth is linked to a rise in ICT infrastructure, which reduces air pollution and enhances the environment as a whole. Business and the environment are strongly positively correlated, claim Contractor, Nuruzzaman, Dangol, and Raghunath (2021). Given that foreign direct investment (FDI) frequently goes to regions with inefficient entry and departure procedures, this emphasizes the necessity of government policy changes.

According to Hitam and Borhan (2012) and (Arif, Arif, & Khan, 2022). There is a detrimental relationship between FDI and environmental quality. For instance, Behera and Sethi (2022) used ARDL to analyze how government expenditure and FDI affected environmental sustainability in Korea between 1970 and 2018. According to their findings, pollution levels rise along with FDI, which eventually results in a decline in environmental quality. As a result, they advocate for the adoption of extensive green growth strategies. In 17 Asian nations between 1980 and 2014, Khan and Ozturk (2020) investigated the relationship between FDI and environmental pollution, notably in terms of carbon dioxide emissions. Their research, which was based on panel co-integration and other tests, suggests that FDI is linked to an increase in environmental pollution, necessitating the development of additional government programs to reduce this pollution caused by FDI. According to Adeel-Farooq, Abu Bakar, and Raji (2017) and The long-term sustainability of the natural environment and FDI inflows into the economy are not clearly correlated.

For instance, Demena and Afesorgbor (2020) used meta-analysis to investigate the effect of FDI on environmental sustainability in mixed-income countries for 2017 and 2018. Their investigation indicates a possibility of a positive correlation between these two factors, in contrast to the majority of literature which indicates a negative influence. This suggests that, in theory, FDI might have both favorable and unfavorable effects on the sustainability of the environment (Manigandan et al., 2023). Following a neutral research conclusion, various contaminants produce divergent results. Using panel data approaches, Pazienza and De Lucia (2020) examined the relationship and extent of FDI's impact on the environment in 30 OECD countries between 1989 and 2016. Even while the bulk of their data suggested that FDI and the environment had a positive association, they did find some negative effects in other criteria, necessitating a re-examination of the study. Shahbaz, Nasreen, Abbas, and Anis (2015) used the FMLOS and causality test to look at the non-linear connection between environmental deterioration and foreign direct investment in 99 income-based nations between 1975 and 2012. Uche, Das, Bera, and Cifuentes-Faura (2023) found that the influence of foreign direct investment on ecosystems at different income levels varied. This suggests that appropriate regulations are needed to enhance the FDI's sustainability for both the economy and the environment.

3.   Methodology
3.1. Model Description

This study's main goal was to evaluate the impact of the environment, institutional performance, and financial inclusion on foreign direct investment (FDI) flows to Pakistan throughout a 25-year period, from 1997 to 2022. The investigation used a time series research approach to achieve this. The World Bank's International Country Risk Guide (ICRG) and World Development Indicators provided pertinent data for this study. Before being submitted to empirical analysis, all of the data were converted using the natural logarithm in order to reduce any inherent discrepancies in the dataset (Qamruzzaman & Karim, 2020). The research variables, proxies, and data sources are shown in Table 1.

3.2. Variables Definitions and Data source:

Table 1
Variable Description

Variables	Symbols	Data Source
Foreign Direct investment	FDI	WDI
Financial Inclusion	Fi	WDI
Institutional quality	IQ	ICRG
Environmental Sustainability	CO2	WDI

3.3. Measurements of variable with names are describes below

Foreign Direct investment = Foreign direct investment, net inflows (% of GDP)
Financial Inclusion = Insurance and financial services (% of service imports, BOP)
Institutional quality = PCA OF (Internal conflict, Externa Conflict, corruption, socio-economic condition, Government Stability)
Environmental Sustainability = CO2 emissions (% of total fuel combustion)
Net FDI inflows given as a percentage of GDP serve as a representation of FDI. The study has taken into account institutional performance in the economy, financial inclusion, and environmental sustainability data as demonstrated by emissions of carbon as explanatory factors.

3.4. Estimation Strategy

In this work, we examine the asymmetric correlations between various parameters as modifications to the independent variables might have either favorable and unfavorable outcome on foreign direct investment (FDI). To evaluate these unequal interactions, we employ a non-linear "autoregressive distributed lag" ARDL model that was first presented by Shin, Yu, and Greenwood-Nimmo (2014). This approach enables us to look at the long-term links between independent factors and visitor arrivals using a linear equation. We may use the non-linear ARDL technique to look at the asymmetrical impacts of these components. This approach achieves many important objectives, including the integration of cointegration and nonlinear asymmetry into a single equation. Specifically, both positive and negative fluctuations of the deconstructing variables with respect to the variable that is dependent, FDI, are investigated using the Non-linear ARDL model. The variables are shown in detail as functions of FDI below.

$$FDI = F(FI, IQ, CO2,) \tag{1}$$

Where FI, IQ, CO2 and FDI represent financial inclusion, institutional performance, environmental sustainability and Foreign direct investment respectively.

The generalized empirical model used in the study is as follows

$$FDI_t = \alpha + \beta_1 FI + \beta_2 IQ_t + \beta_3 CO_{2t} + \mu_t \tag{2}$$

CO2 means environmental quality; IQ denotes Institutional performance and FI signifies the financial inclusion. Foreign direct investment in a nation's economy is referred to as FDI. μ_t is a error term in this equation.

NARDL is used subsequent to the F-bound test. Equations (1) may be expressed as follows after undergoing a logarithmic transformation and sign adjustments, respectively, in the explanatory variables:

$$\ln \text{FDI}_t = \alpha_t + \delta_t + \beta^+ \ln FI_t^+ + \beta^- \ln FI_t^- + \beta^+ \ln IQ_t^+ + \beta^- \ln IQ_t^- + \beta^+ \ln CO_{2t}^+ + \beta^- \ln CO_{2t}^- + \mu_t$$
$$(3)$$

In this Equation μ is the ϵ_t with the time period t, α is the intercept, and β is the constant coefficient. The predicted coefficient and the trend's implications are both. Unit root tests are used in the investigation.

3.4.1. Unit Root Test

To ensure that the model is suitable for our needs, it is crucial to assess the stationarity properties of the provided data before beginning the study. This involves running two distinct unit root tests: the Augmented Dickey-Fuller test, which was initially introduced by Tagaya et al. (1989), and the Phillips-Perron test, which was developed by Cheung and Lai (1997). These unit root tests are essential to determine whether the facts are stable. Consequently, we have confirmed data stationary patterns by means of the augmented Dickey-Fuller and Phillips-Perron tests.

The ADF paradigm in the following ways:

$$\Delta y_t = \mu + \delta y_{t-1} + \beta_t + \sum K \; i = 1 \; di\Delta y_t - i + \epsilon_t \qquad (4)$$

In above equation K is representing numb. of lags, $t-i=1$ and k, $\delta = \alpha^-1 \; \alpha = coefficient \; of \; yt - 1$

$\Delta y_t = First \; Difference \; of \; yt \; and \; et \; white \; noise \; disturbance$.

The alternative hypothesis of 0 is not the null hypothesis for the augmented Dickey-fuller test; instead, it is = 0. The number series is stationary if we refuse the null; otherwise, it is non-stationary.

The PP test model is following.

$$\Delta y_t = \mu + \delta y_{t-1} + \beta_t + e \qquad (5)$$

3.5. NARDL test

The following is a statement of the Eq. (3) model known as NARDLs:

$$\Delta\ln \text{FDI}_t = \mu + \ln FDI_{t-1} + \theta^+ \ln FI_{t-1}^+ + \theta^- \ln FI_{t-1}^- + \vartheta^+ \ln IQ_{t-1}^+ + \vartheta^- \ln IQ_{t-1}^- + \omega^+ \ln CO_{2t-1}^+ +$$
$$\omega^- \ln CO_{2t-1}^- + \sum_{j=0}^{n1} \Delta \ln FDI_{t-j} + \sum_{j=0}^{n2}\left(\theta_j^+ \Delta\ln FI_{t-j}^+ + \theta_j^- \Delta\ln FI_{t-j}^-\right) + \sum_{j=0}^{n3}\left(\vartheta_j^+ \Delta\ln IQ_{t-j}^+ +\right.$$
$$\left.\vartheta^- \Delta\ln IQ_{t-j}^-\right) + \sum_{j=0}^{n4}\left(\omega_j^+ \Delta\ln CO_{2t-j}^+ + \omega^- \Delta\ln CO_{2t-j}^-\right) + \epsilon_t \qquad (6)$$

The nonlinear ARDL model has been estimated in three stages: in the first, the F-Statistics Bound test was tested; in the second, short-run estimates were used; and in the third, the long-term estimation was tested.

3.6. F-statistics Bound test

For the asymmetrical long-run cointegration, which Shin et al. (2014) introduced the bound test, which is a combined test of all the lag levels of the explanatory variables. In this work, cointegration is assessed using the t- and f-statistics of (Pesaran, Shin, & Smith, 2001). The null hypothesis for the F-statistics test is $a = a+ = a-= 0$ against the alternative hypothesis $a=a+ = a-\neq 0$, while the null hypothesis of the t- statistic test is $a=0$ against the alternative hypothesis $a\neq 0$. The evidence of the bound test, which compares the F- and statistics with the

critical values of the upper and lower limits, will determine whether to reject either of the hypotheses. The determination of cointegration occurs when the F-stats value is higher or lower than the upper bound. The result is uncertain if the F-statistics are between the top and lower boundaries.

3.7. NARDL Model

Using an error-correcting method, the short-run NARDL elasticities may be predicted using the subsequent formula.

$$\Delta \ln \text{FDI}_t = \mu + \sum_{j=0}^{n1} \Delta \ln FDI_{t-j} + \sum_{j=0}^{n2}(\theta_j^+ \Delta \ln FI_{t-j}^+ + \theta_j^- \Delta \ln FI_{t-j}^-) + \sum_{j=0}^{n3}(\vartheta_j^+ \Delta \ln IQ_{t-j}^+ + \vartheta^- \Delta \ln IQ_{t-j}^-) + \sum_{j=0}^{n4}(\omega_j^+ \Delta \ln CO_{2t-j}^+ + \omega^- \Delta \ln CO_{2t-j}^-) + \emptyset ECM_{t-1} + \epsilon_t \qquad (7)$$

The influence of the parameters FI, IQ and CO2, may be divided into two parts, either positive or negative, according to what we have demonstrated in Eq. (3):

$$FI_t = \ln FI_0 + \ln FI_t^+ + \ln FI_t^- \qquad (8)$$
$$\ln IQ_t = \ln IQ_0 + \ln IQ_t^+ + \ln IQ_t^- \qquad (9)$$
$$\ln CO_{2t} = \ln CO_{20} + \ln CO_{2t}^+ + \ln CO_{2t}^- \qquad (10)$$

Where $\ln FI_0, \ln IQ_0, and \ln CO_{20},$ represent the random initial value and $\ln FI_t^+ + \ln FI_t^-, \ln IQ_t^+ + \ln IQ_t^-$ and $\ln CO_{2t}^+ + \ln CO_{2t}^-,$ Determine whether certain mechanisms are referred to as such and which collect modifications that are positive or negative.

$$\ln FI_t^+ = \sum_{j=0}^{t} \Delta \ln FI_t^+ = \sum_{j=0}^{t} \max(\Delta \ln FI_{j,0}) + \epsilon_t \qquad (11)$$
$$\ln FI_t^- = \sum_{j=0}^{t} \Delta \ln FI_t^- = \sum_{j=0}^{t} \min(\Delta \ln FI_{j,0}) + \epsilon_t \qquad (12)$$
$$\ln IQ_t^+ = \sum_{j=0}^{t} \Delta \ln IQ_t^+ = \sum_{j=0}^{t} \max(\Delta \ln IQ_{j,0}) + \epsilon_t \qquad (13)$$
$$\ln IQ_t^- = \sum_{j=0}^{t} \Delta \ln IQ_t^- = \sum_{j=0}^{t} \min(\Delta \ln IQ_{j,0}) + \epsilon_t \qquad (14)$$
$$\ln CO_{2t}^+ = \sum_{j=0}^{t} \Delta \ln CO_{2t}^+ = \sum_{j=0}^{t} \max(\Delta \ln CO_{2j,0}) + \epsilon_t \qquad (15)$$
$$\ln CO_{2t}^- = \sum_{j=0}^{t} \Delta \ln CO_{2t}^- = \sum_{j=0}^{t} \min(\Delta \ln CO_{2j,0}) + \epsilon_t \qquad (16)$$

4.   Model Estimation and Analysis
4.1.   Descriptive Statistics

Descriptive statistics in EViews for time series data are extremely valuable to investigators, economists, and analysts because they offer a comprehensive summary of the essential components of time-related data.

Table 3
Descriptive Statistics

Variables	FDI	FI	IQ	CO2
Mean	6.688978	1.344799	7.143909	0.807074
Median	6.708166	1.421345	7.555515	0.848882
Maximum	6.827324	2.595001	9.848047	1.718487
Minimum	6.299071	0.213828	4.490595	0.113711
Std. Dev.	0.130197	0.565607	1.533027	0.431766
Skewness	-1.518453	-0.072672	-0.189598	0.286486
Kurtosis	4.944172	2.823431	1.984059	2.378588
Jarque-Bera	13.54438	0.054481	1.224922	0.744219
Probability	0.001145	0.973127	0.542015	0.689279
Sum	167.2245	33.61997	178.5977	20.17685
Sum Sq. Dev.	0.406831	7.677883	56.40414	4.474120
Observations	25	25	25	25

The resulting data table displays key metrics, including the total number of values in the time series, the skewness, the kurtosis, the mean of the series, the median, the highest and lowest values, the standard deviation, and the number of data points. This data is necessary for comprehending the primary patterns, variations, and dispersion patterns as it is the initial and critical step in the data exploration process (Gacula Jr & Rutenbeck, 2006). The coefficient matrix demonstrates the relationship across each variable. The high coefficient of correlations value demonstrates the close relationship among the variables of interest.

4.2. Unit Root Test

One statistical method used in time series analysis to assess a time series dataset's stationarity is the unit root test. Table 5 displays the results of the ADF test, which verify that variable shows stationarity at the first difference and the level. It was found that none of the variables were steady at the Second difference. This suggests that the series has different levels of integration. The unit root test results demonstrate that the integrating orders of every variable are jumbled. Additionally, the data indicating that the study would consider the a cointegration of the variables in variables during both the short and long terms, with some exhibiting stationarity at the level and others at the first difference. Consequently, it is determined that the NARDL bound test approach published by Shin et al. (2014) is appropriate for examining the series' relationships over time.

Table 5
Unit Root Test

Variables	I (0)		I (1)	
	ADF	PP	ADF	PP
FDI	5.677***	2.646	2.666	6.876***
FI	6.765***	1.765	1.875	7.764***
IQ	5.432***	5.097***	5.830***	-0.365
CO2	1.391	3.076**	4.490	2.031

Note: Triple and double asterisks symbolize significance levels at 1% and 5% respectively.

4.3. F-Statistics Bound Test

Table 6 displayed the F-statistics for the bound test. The cointegration connection is shown by the estimated f-statistic value, which is greater than the upper bound critical value at a 1% level of significance. A large F-statistic was the main emphasis of Pesaran et al. (2001) in order to confirm the long-term association.

Table 6
Bound Test

Test Statistic	Value	Sig.	I(0)	I(1)
F-statistic	4.359235	10%	1.730	2.93
K	5	5%	2.39	3.38
		1%	2.06	3.65

NOTE: *, **, and *** stand for the crucial bound measures' significant thresholds of 1%, 5%, & 10%. The fact that the actual value of F-Statics is higher than the upper limit value indicates a significant cointegration connection. For asymmetrical cointegration, which p = θ = θ = 0 is the null assumption.

4.4. NARDL Estimation

The NARDL approach reveals variations in the relationship between FDI and the independent variables. Because the effects of financial inclusion, institutional quality, environmental sustainability, and economic growth on foreign direct investment vary at different phases, asymmetric repercussions may exist. The analysis discovers both short- and long-term relationships, as well as both beneficial and detrimental shocks, among FDI and the chosen

independent variables. Investors and regulators must have a solid understanding of the time period in order to make informed decisions. The study shows that countries with stronger ecological rules and regulations tend to attract more foreign investment, indicating the growing importance of sustainability in global financial decisions. The paper claims that countries with stronger environmental rules and regulations usually attract more foreign expenditures, demonstrating the rising significance of sustainability in global economic decisions (Andriamahery & Qamruzzaman, 2022).

Table 7
NARDL Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
	Long Run Equation			
FI_POS	0.015308	0.007403	2.067773	0.0417
FI_NEG	0.003196	0.011065	0.288868	0.7734
IQ_POS	0.035914	0.047628	0.754055	0.4529
IQ_NEG	-0.342213	0.047986	-7.131581	0.0000
CO2_POS	-0.019474	0.006209	-3.136283	0.0024
CO2_NEG	0.028591	0.008242	3.468896	0.0008
	Short Run Equation			
COINTEQ01	-0.786553	0.195421	-4.024916	0.0010
D(FI_POS)	-0.016813	0.015156	-1.109302	0.2705
D(FI_NEG)	0.037607	0.025636	1.466990	0.1461
D(IQ_POS)	0.012824	0.028470	0.450458	0.6535
D(IQ_NEG)	0.038243	0.048800	0.783663	0.4354
D(CO2_POS)	-0.004333	0.015156	-0.285869	0.7757
D(CO2_NEG)	0.008883	0.012584	0.705933	0.4822
C	0.744233	1.037329	0.717451	0.4751

In order to evaluate the asymmetric impacts of financial inclusion, sustainability of the environment, and institutional performance on FDI inflows to Pakistan, the study adopted a non-linear methodology. InTable8, the outcomes of the asymmetric estimate are shown. Both the short-term asymmetry coefficient and symmetrical test and the longer-term asymmetrical coefficients and symmetry test findings are available. The long-term study reveals a significant and positive relationship between asymmetrical shock having both positive and negative indications and foreign direct investment (FDI) flowing into Pakistan. The study's findings showed that FDI flow might be affected both favorably and adversely by access to financial services and benefits. FDI inflows might be sped up (slowed down) by a 10% positive (negative) innovation in financial inclusion in the banking sector. The same study demonstrates a favorable and statistically significant correlation between FDI and the short-term asymmetric shock of financial inclusion. Particularly, an increase of 10% in financial inclusion will result in a rise of -0.01% in FDI inflows. An elasticity of 0.03 and a 30% decrease in financial accessibility may help to explain the negative outcome. The paper claims that environmental sustainability has a positive effect on FDI inflows. With each one percentage point decrease in emissions of carbon dioxide, the trend in foreign direct investment in the country's economy. The study's results showed that there was a statistically significant negative connection between FDI inflows and asymmetric shocks to environmental sustainability. The short-term in nature examination revealed both positive and negative relationships. When considering the asymmetric environmental sustainability evaluation on foreign direct investment, it is evident that laxer and less restricted environmental regulations promote foreign investment. It suggests that foreign investors would prefer to place their money in countries that allow them to profit from the use of traditional energy sources, even if doing so has a negative impact on the environment.

Furthermore, nations with strong environmental laws are least attractive to international investors due to the large upfront costs associated with integrating renewable energy. The positive and statistically significant asymmetric advantages of intuitional performance on FDI inflows suggest that preserving governmental operations and protecting investments are

important components of promoting foreign capital flow in the economy. To put it more precisely, FDI inflows into Pakistan might rise or fall by in response to a positive or negative shock to effective institutional performance. According to a study, FDI is significantly impacted by institutional performance, and its flexibility has a bigger effect than changes in regulatory processes. Favorable shock are statistically significant as well as beneficial in the short term, according to the asymmetrical short of Institutional performance.

4.5. Dynamic Stability Test

We subsequently assess the specification's suitability and the model's dynamic stability through the execution of diagnostic assessments. The findings from these assessments, which are tested overall serial correlations, heteroscedasticity, and normality that are displayed below in Table.9. These results affirm the model's lack of serial correlation and heteroscedasticity issues, while also indicating that the variables follow a normal distribution, as demonstrated by the Jarque-Bera test results.

Table 9
Dynamic Stability Test

Test	F-statistics	Prob-value
Serial-correlation		
Breusch-Pagan-Godfrey test	2.67	0.13
ARCH	1.73	0.19
Heteroscedasticity		
Normality		
Jarqa-Bera Test	4.59	0.84

4.6. Structural Stability Test

Furthermore, it is imperative to ensure the model's dynamic stability due to the autoregressive model's sensitivity to variations in the number of variables, sample size, and interval size.

Brown, Durbin, and Evans (1975) proposed the utilization of the Cusum and Cusum square tests, and Figure 1 (a, b) illustrates the CUSUMSQ and CUSUM graphs. In accordance with the approach of (Brown et al., 1975). The results of these tests amply demonstrate that the residuals have a normal distribution and the model exhibits not any serial correlation or heteroscedasticity. Moreover, this holds true for the long-term stability of the coefficients, as indicated by the blue lines remaining within the upper and lowers critical boundaries at a five percent margin of significant. These findings affirm the stability of the NARDL model, with the blue line remaining within the 5% significance boundary, thus confirming the model's stability.
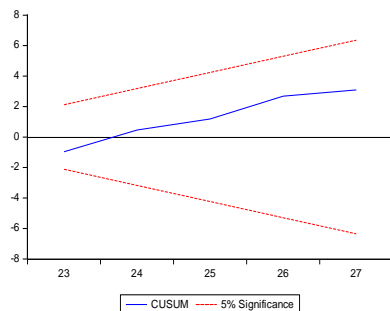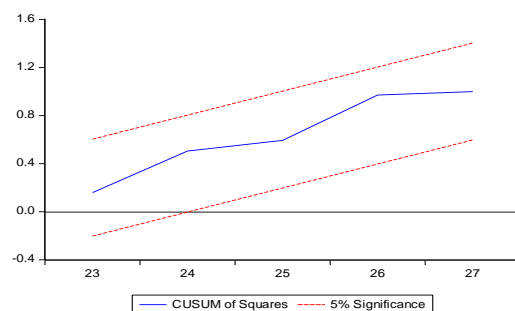
Figure 5: CUSUM Graph

Figure 6: CUSUMSQ Graph

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5.   Discussion of Findings

In Pakistan, the rise of foreign direct investment has been significantly influenced by financial inclusion. A 1% increase in access to financial amenities and services within the financial sector may result in a long-term improvement as well as a short-term increase in FDI. According to this study, offering easily available and effective financing aid to foreign investors may attract them and enable them the option to choose investments that would supply the money and technological expertise required to sustain the regional economy. The significance of financial inclusion in fostering economic growth and sustainability has garnered global attention in the field of development of Economy and Fiancé. There is a concern since millions of individuals live outside the official financial institutions worldwide to their savings and investable funds, and, consequently, the wealth-building capacity of the global economy. It is well known that financial services have the power to stimulate capital formation and credit growth, which in turn stimulates investment and growth in the economy. Government policies and political initiatives play a crucial role in enhancing monetary availability to facilitate growth in the economy. Improving access to money contributes to increased economic activity and production among economic actors. By providing individuals across income levels with access to the financial system, financial inclusion promotes inclusive development. FDI inflows have the potential to accelerate capital formation, boost aggregate output, and facilitate poverty reduction and trade liberalization. Good governance is shown to have a positive correlation with FDI inflows in Pakistan, highlighting its role as an effective tool for attracting foreign investors and instilling confidence in the host country's economic performance and investment protection. This perspective aligns with studies by Fertő and Sass (2020); Raza et al. (2021) and (Kayani & Ganić, 2021). which emphasize the role of political stability, accountability, and the rule of law in motivating foreign investors to invest in the host country. International economic openness, facilitated by private capital and FDI, serves as a crucial source regarding financing towards performance development and enhancement, as emphasized in the works of Sahoo, Swain, and Panda (2012) and (Qamruzzaman, Tayachi, Mehta, & Ali, 2021).

According to Khudair and Al-Zubaidi (2021); Rahman and Idrees (2019); Shafique, Rahman, Khizar, and Zulfiqar (2021); Shahzadi, Sheikh, Sadiq, and Rahman (2023) international investors are more likely to transfer their capital, technological expertise, and abilities as ventures and consequently contribute to the national sector when access to financing is simple and essential financial assistance is readily available. for the nation's social and financial development. FDI inflows have the potential to accelerate capital formation, boost aggregate output, and facilitate poverty reduction and trade liberalization. Good governance is shown to have a positive correlation with FDI inflows in Pakistan, highlighting its role as an effective tool for attracting foreign investors and instilling confidence in the host country's economic performance and investment protection. This perspective aligns with studies by Fertő and Sass (2020); Raza et al. (2021) and Kayani and Ganić (2021) which emphasize the role of political stability, accountability, and the rule of law in motivating foreign investors to invest in the host country. International economic openness, facilitated by private capital and FDI, serves as a crucial source regarding financing towards performance development and enhancement, as emphasized in the works of Sahoo et al. (2012) and (Kanwal, Khalid, et al., 2023; Qamruzzaman et al., 2021; Shahzadi et al., 2023).

FDI brings advantages to most countries, such as job creation, increased market competition, and the transfer of foreign-acquired technology and skills. Government's ability to maintain stable governance conditions fosters predictable and trustworthy market environments, a concept explained in studies by Cuervo-Cazurra (2008) and (Jensen, 2003). Good governance is also shown to enhance economic performance at both the aggregate and firm levels, ensuring a higher return on investment with lower risks, as seen in studies by Hassan, Sheikh, and Rahman (2022); Hope, Billett, and Cresser (1994); Rehman, Ali, Idrees, Ali, and Zulfiqar (2022); Usman, Rahman, Shafique, Sadiq, and Idrees (2023). A study by Sepehrdoust, Tartar, Zamani

Shabkhaneh, and Heydari Parvin (2023) demonstrates how MENA nations' vulnerability to risk associated with investments is greatly reduced by effective governance underscores the critical role of corporate governance mechanisms in maximizing returns and minimizing risk. In light of growing concerns about environmental degradation, governments have initiated controlled global environmental standards and efficient execution. Energies-efficient technologies and renewable power connectivity have implications for economic structures and incentives for environmental control. The study notes that stringent and heavily regulated environmental policies can discourage foreign investment due to their additional costs.

5.1. Conclusion

Foreign capital inflows are becoming a crucial component of equitable growth, particularly in emerging nations. Foreign Direct Investment plays a highly regarded part in capital accumulation, enhancing production capacity, knowledge sharing, and economic competitiveness. The sufficiency of domestic capital and the sustainability of economic growth are heavily contingent on technical progress, administrative skill, and the availability of funds within an economy. Demonstrate that the research-based model has a for a long-time link. The results imply that elements like good institutional performance simple access to financial services, and a less regulated financial sector approach to ecological concerns serve as motivating factors for decisions related to capital transfers. The study's assessment of asymmetry has identified a long-term asymmetric relationship between financial inclusion, institutional quality, CO2 emissions, and FDI. In reference to the elasticity of asymmetric shocks study has shown that inflows of FDI, especially over a long period of time, have an advantageous and statistically important link with them. The author identified the main factors influencing FDI in the study. By examining the primary factors influencing foreign direct investment, nations may develop policies for FDI that align with their unique economic structures. The role that FDI plays in nation-building can be expressed by the results of each determinant individually or by the results of all of the criteria together. The role of foreign direct investment in the nation.

5.2. Future Direction

Future research in the domain of environmental sustainability, institutional quality, and FDI sustainability in Pakistan should undertake a more in-depth exploration of the regional and sector-specific intricacies within these dynamics. As Pakistan is an Islamic country so future researcher make the analyses of this Research variables within the context of Islamic economic system. Because according to Awan, Ali, Rehman, and Idrees (2023) Islamic economic system is the best economic system among all other economic systems .In today's era , according to Younas, Shoukat, Awan, and Arslan (2023) Green economy is the main strategy for the sustainable development so the future researcher must include this variable with the current research in the context of Pakistan including green economy as a variable .In Addition, the future researcher can yield a more comprehensive understanding of the complexities inherent in the interplay of environment suitability ,Financial technologies , Financial inclusion , blockchain technologies, institutional performance , and FDI dynamics in Pakistan. As Acknowledged by Kanwal, Tayyab, and Idrees (2023) financial inclusion is being impacted by financial technology and ongoing technological advancement, which has important implications for the financial sector So these variables must be combine with the present study variables with multiple new methodologies because now day a era of technology ,innovation and digital transformation. In addition, future researcher should explore this intricate topic through a variety of methodological and data-driven approaches. For instance, the integration of qualitative research methods, such as case studies, interviews, and surveys, can provide deeper insights into the qualitative aspects of institutional quality and FDI decision-making. Advanced data analytics and machine learning techniques. By diversifying research methodologies and drawing from a range of data sources.

5.3.   Limitations

While the primary objective of this research is to offer valuable insights into the intricate connections among environmental sustainability, institutional quality, and FDI sustainability within Pakistan, it's crucial to recognize a number of inherent limitations. To begin with, the quality and accessibility of data can present challenges, as the validity of research findings is heavily contingent on the comprehensiveness and precision of data sources. Limitations related to data may encompass the unavailability of up-to-date or region-specific information, potential biases stemming from data collection methods, or gaps in fundamental variables. Additionally, despite endeavors to establish associations among these variables, the study may be restricted by the complexity of establishing causality since correlations do not invariably signify causation, potentially necessitating more extensive experimental or qualitative approaches.

Authors Contribution
Syed Muhammad Arslan: Introduction, Literature Review & Main Idea Of the research
Amna Kanwal: Methodological section and Analyses
Syed Muhammad Farman Ali Kazmi: Analyses Review and interpretation
Saif Ur Rahman: Conclusion and proof reading

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