



## **Analyzing the Financial Sector Nexus Economic Growth of Pakistan: New Insights from ARDL Approach**

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### **ABSTRACT**

In the context of Pakistan, this study looks at how local financial sector expansion and foreign capital inflows affect economic growth. The Error Correction Model is used for short run connections and the ARDL bounds testing technique to cointegration is used for long run interactions, using yearly data series from the Economic Survey of Pakistan and the WDI for the years 1998–2022. Empirical research indicates that foreign capital inflows boost economic expansion. Economic growth is facilitated by both government investment and the expansion of the financial sector. Technology, the human capital pool, and remittances all contribute positively to economic growth. According to the latest report, financial reforms should be implemented by the Pakistani government to increase the effectiveness of the country's financial industry and, eventually, accelerate economic growth.



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## **1. Introduction**

The Islamic Republic of Pakistan is the 27th largest economy in the world in terms of buying power. Pakistan's economic development faced a major setback in the 2009 fiscal year (McCartney, 2011). Sustainable economic growth is crucial for all economies, but it's crucial for rising ones that often face difficulties. The gross domestic product (GDP), a crucial indicator of a country's overall economic health, is the market worth of all completed goods and services produced there over a specific time period. However, a robust and progressive economy may alleviate poverty, lessen hunger, and create jobs as compared to a failing one. For this reason, sustainable economic growth and development are crucial (Chiwira, 2023).

Thus, when credit-constrained entrepreneurs start their own enterprises, 20–25% of GDP is invested in the financial sector. Capital accumulation and financial intermediation are allowed

to a sufficient extent at this stage of development to give entrepreneurs the resources they need to start and grow their businesses. Significantly greater rates of economic growth and a notable rise in foreign capital inflows are often found in economies with better developed financial markets and institutions. Therefore, in order to reap the benefits of inflows of foreign money, the growth of financial institutions is a prerequisite (World Bank). Foreign capital inflow is a crucial and emerging factor in global business. Through foreign capital inflows and resources, a company can access new technology, goods, skills, and funding, as well as new markets and marketing channels and more affordable manufacturing facilities. A host nation or company can also benefit from foreign capital inflows by gaining access to investment funds, cash, procedures, and managerial expertise (Ahmed & Jawaid, 2023).

By creating new markets, creating a need for new technology and inputs that ripples throughout the economy, and reducing partial current account balance of payment deficits, foreign direct investment (FDI) stimulates domestic investment (Devlin, Estevadeordal, & Rodríguez-Clare, 2006). Extensive studies by Bennell (1997) and Cotton and Ramachandran (2001) demonstrate how foreign capital inflows affect domestic investment. They conclude that for every \$1 increase in foreign capital inflows, domestic investment increases by 50 cents. It seems that there is a one-to-one correlation between increases in foreign capital inflows and increases in domestic investment. It is often known that increased foreign capital inflows can increase market efficiency and competitiveness, especially in the financial markets. Pakistan aggressively seeks inflows of foreign capital and resources. Since its inception in 1992, Pakistan has progressively opened up to foreign direct investment through three distinct government investment liberalization initiatives. These programs provide a wide range of incentives to draw in fresh foreign capital inflows.

Low foreign direct investment (FDI) was caused by a number of factors, including poor infrastructure, unstable stock markets and regulations, perceptions of political instability, challenges with law and order, inconsistent policies, unresolved issues between foreign investors and the government that have persisted for a long time, low rates of domestic investment, and resistance to new policies from certain bureaucratic elements who have not yet fully adapted to a more open economic environment. Nonetheless, the state of foreign investment overall in 2007–08 is favorable (Hafiza et al., 2022; Hassan et al., 2022; Khan & Khan, 2011; Shahid, Muhammed, Abbasi, Gurmani, & ur Rahman, 2022).

### **1.1. Overview of Pakistan Economy in the Context of Development**

Pakistan is located in one of Central Asia's most important regions. Pakistan has found that working with other Central Asian countries has been simpler because of its close proximity to them and the social and religious connections that most of them share. Pakistan had a severe economic crisis that affected the residential sector and peaked in 2014–2015. In 2015, real GDP growth was 4.2%, and in 2016, it is anticipated to reach 4.5%. With 54% of Pakistan's GDP coming from this industry, it has been the primary driver of the nation's robust economic growth in 2015 (Bank, 2015; Nawaz, Rahman, Zafar, & Ghaffar, 2023; Usman, Rahman, Shafique, Sadiq, & Idrees, 2023).

However, The general the government's gross debt to GDP in 2014 was 63.7%, higher than most of the nations in the area, according to public sector indicators (Bank, 2015). The public deficit, which is calculated as net government borrowing as a proportion of GDP, was very high in 2013 (8.1%) and 2014 (4.7%). In 2014–2015, the administration stuck to its economic austerity programme, which contributed to the deficit falling to four percent (Bank, 2015) .In this regard, the GDP's share of total revenues decreased from 20% in 2014 to 19.4% in 2015, while the proportion of total costs remained at 14.5%. The proportion of tax revenues to total revenues increased in 2015 (Nawaz et al., 2023; *Pakistan Country Report*, 2015).

However Pakistani government has been putting several structural reforms into place to improve the nation's economic performance. Pakistan may have a great opportunity to achieve a relatively high economic growth rate and development level when the results of these reforms are seen in the near future (assuming there are no security issues). It may also increase its infrastructure investments to take a step towards becoming one of the growing economies in the region (Abbas & Sultan, 2023) .

## **2. Literature Review**

According to Khor (2000) as they may result in higher exports, savings and investments, enhanced productivity and efficiency, and an improvement in the quality of production inputs, foreign capital inflows are seen to be the primary engine of economic growth. In order to balance the payments, these variables may also result in an influx of investment capital, which would eventually speed up the expansion of output and employment. Finally, investment in unexplored areas inside the host country may result in the emergence of new businesses and products Hong, Kim, and Lee (2023) and (Shahbaz, Gyamfi, Bekun, & Agozie, 2022). Moreover, as international financial flows and resources create beneficial partnerships and multinational corporations support local enterprises with technical support. It is projected that local producers will use labour and capital more efficiently and with more sophisticated technology (Nawaz et al., 2023; Sikhakhane, David, & Stiglingh-Van Wyk, 2023).

Numerous country studies that examine the impact of foreign capital inflows on economic growth can be found in a plethora of literature. Positive spillover effects have been identified, for example, in studies conducted for Mexico (Chan, Har, Kanapathy, Celik, & Aktan, 2023; Hakro & Ghumro, 2007; Iqbal, Ahmad, Haider, & Anwar, 2014). These contradictory findings might be used to highlight the significance of recipient nation characteristics in enabling a significant and positive spillover effect of foreign inflows on economic growth. Harrison and Rodríguez-Clare (2007) contend that the economy's capacity to gain from any positive spillovers from foreign inflows may be constrained by undeveloped local financial markets. In the absence of developed financial markets, the potential positive externalities of foreign inflows are limited if entrepreneurship promotes greater adoption and assimilation of best technological practices made possible by inflows of foreign capital (Hermes & Lensink, 2003; Sohail & Li, 2023).

Harrison and Rodríguez-Clare (2010) have said that for technological spillover to take place, the receiving country has to have a certain minimum or threshold amount of human capital stock. This demonstrates how human capital stocks and foreign capital inflows complement each other in order to properly utilize cutting-edge technologies. Foreign capital inflows in these situations, according to Balasubramanyam, Salisu, and Sapsford (1999) and Rehman and Islam (2023) enhance the transmission of enhanced knowledge across firms and boost competitiveness and market distortions.

According to the Rajab and Zouheir (2023) receiving country must possess a minimum or threshold amount of human capital stock in order for technological spillover to occur. This illustrates how the availability of human capital and foreign capital inflows work in tandem to fully use state-of-the-art technology. According to Kaczmarczyk and Flassbeck (2023) foreign capital inflows in these circumstances increase competitiveness and market distortions while also enhancing the diffusion of greater knowledge among enterprises.

Numerous time series analyses show how important it is for developing countries to have a growing financial sector as well as how foreign capital inflows have a significant and positive influence on economic growth. Kaur, Yadav, and Gautam (2013) examine the role China's banking industry plays in the relationship between foreign direct investment and economic development. Empirical evidence supports the views of Bailliu (2000); Hermes and Lensink (2003) and (Appiah, Gyamfi, Adebayo, & Bekun, 2023). In light of the financial sector's role in

the Malaysian economy, NGUYEN, PHAM, TRAN, and NGUYEN (2021) looks at the relationship between economic growth and foreign capital inflows. The results demonstrate the positive effects of foreign capital inflows and financial growth on economic growth. Evidence of causation indicates that, over time, foreign capital inflows are typically a result of economic expansion Hong et al. (2023) and (Shahbaz et al., 2022).

Baharumshah and Thanoon (2006) investigates the effect of financial development on foreign capital inflows and economic growth using Thailand as an example. The empirical findings demonstrate that financial development fosters economic growth whereas foreign capital inflows have a negative impact on output expansion. Furthermore, it is believed that Thailand's economy would be able to gain more from foreign capital inflows to a greater extent when there is a greater level of financial growth. Similarly, it seems to suggest that financial market expansion can amplify the impact of foreign capital inflows on growth in production. Conversely, it seems to indicate that financial market expansion may amplify the impact of foreign capital inflows on growth in production. The primary goal of the current project is to look at the connections, as they apply to Pakistan, between foreign capital inflows and economic expansion through the expansion of the financial industry (Dawood, ur Rehman, Majeed, & Idress, 2023; Rahman, Chaudhry, Meo, Sheikh, & Idrees, 2022). The remainder of the research is organized as follows: The data, models, and methodological framework are included in Part III; the results and pertinent policy implications are presented in Part V; and the findings are evaluated in Section IV.

## **2.1. Theoretical Framework**

In a neoclassical growth framework, the theoretical foundation for economic growth rests on the accumulation of physical and human capital, technological progress, and savings-investment dynamics. Drawing on this theory, we can extend the model to incorporate key variables such as foreign direct investment (FDI), public capital stock, technology, and remittances. FDI contributes to capital accumulation and technological progress, aligning with the neoclassical emphasis on the role of capital in production. Public capital stock, considered a complement to private capital, enhances overall productivity, extending the neoclassical framework to include both private and public sources of capital. This comprehensive framework integrates neoclassical principles with insights from international economics and development, providing a holistic view of factors influencing economic growth. Key references include Solow's seminal work on economic growth (Dawood et al., 2023); Rehman and Islam (2023); Solow (1956) and Romer's contributions to endogenous technological change (Romer, 1990).

## **3. Data and Methodology**

### **3.1. Data and Variables Description**

In this study, economic growth is the dependent variable, and financial development sector the human capital stock, the public capital stock, and foreign direct investment are the independent factors. under this research, technology and remittance are all kept under control.  $X^*$  signifies the formula's list of control variables in Equation 1. Variable data are extracted from the 25-year World Development Indicators (WDI) database. Based on the data that was available for the chosen factors, the duration was determined. The authors examined Pakistan's economy from 1998 to 2022 using time-series data and econometric analysis. The variables in pragmatic research are converted to natural logarithms. The data was analyzed using the EViews 10. The generalized empirical model used in the study is as follows:

$$EG_t = \alpha + \beta_1 FDI + \beta_2 FSD_t + \beta_3 HCS_t + \beta_4 PCS_t + \beta_5 X_t + \mu_t \quad (1)$$

So, in above equation the Economic Growth is denoted by 'EG', Foreign Direct investment is denoted by FDI in equation (1). Furthermore FSD is representing financial sector development,

while HCS is representing Human Capital stock, public capital stock is shown by 'PCS' and 'Donated the control variable of this study. A list of the variable's description and data source is provided in Table.1. Additionally, the measuring method is given in Table.2.

### 3.2. Description of Variables

**Table 1**  
**Description of Variables**

Variable Names	Variables Symbols	Data source
Economic Growth	EG	WDI
Foreign Direct Investment	FDI	WDI
Financial Sector Development	FSD	WDI
Human Capital Stock	HCS	WDI
Public Capital Stock	PCS	WDI
Technology	ICT	Economic Development Indicator
Remittance	RM	WDI

### 3.3. Unit of Measurement of the Variables

**Table 2**  
**Unit of Measurement of the Variables**

Variables Symbols	Measurement of variable
EG	GDP growth (annual %)
FDI	Foreign direct investment, net inflows (% of GDP)
FSD	GDP (current US\$)
HCS	School enrolment, secondary (% net)
PCS	Gross fixed capital formation (% of GDP)
ICT	Mobile cellular subscriptions (per 100 people), Fixed telephone subscriptions (per 100 people)
RM	Personal remittances received (% of GDP)

### 3.4. Econometric Model

While time series data may be continuous, they are typically found to be non-stationary. As a result, the model assessment may not be best served by the typical least squares approach. Prior to utilising the ADF Leybourne (1994) and PPT Phillips and Perron (1988) techniques, one must use the basic or multiple linear regression method. As a result, the relationship between the dependent variable and its independent factors was examined using the ARDL model. The reason the ARDL model was selected for time series analysis over other econometric techniques was its ability to manage both short and long-term dynamics within a unified framework. Since ARDL models take co-integration across variables into account, they provide a more realistic picture of the underlying economic relationships than standard models like vector autoregressive and autoregressive integrated moving average. When dealing with time series data, this is especially well-suited to solve the issues of non-stationarity. ARDL models are useful for empirical research because of their flexibility in capturing dynamic interactions and their ability to adapt to mixed-order integration levels, especially when delayed and simultaneous effects are integrated in the real data creation process. Furthermore, the Statistical methods such as the Error Correction Model (ECM) and Autoregressive Distributed Lag (ARDL), as well as bounds testing are commonly used in time series research to examine long- and short-term correlations, respectively. For modelling short-term dynamics, the ECM is a highly helpful tool. Even ECMs is used to study adjustment rates, shock effects, and the presence of short-run feedback mechanisms. An indicator of a long-term link between variables, cointegration allows the ECM to represent transitory fluctuations that occur before deviations from equilibrium more realistically. The process comprises calculating the ARDL model and perform a bounds test to determine

cointegration and then look at the ECM if a cointegration is occurring. So , the calculating the cointegrating link, figuring out the lag order, and producing the ECM, which is composed of the lag differences between the variables and then the study Verify the findings for heteroscedasticity, normality, and model durability to ensure that they are reliable. This model makes the rate of equilibrium change more understandable. The ARDL mode may be generally expressed as follows:

$$EG = f(FDI, FSD, HCS, PCS, ICT, RM) \tag{2}$$

Foreign direct investment (FDI), financial sector development (FSD), human capital stock (HCS), public capital stock (PCS), technology (ICT), and remittance (RM) are all represented, whereas the dependent variable is Pakistan's economic growth (represented by EG). Each variable. The logarithm version of the economic evaluation is used in equation. (3):

$$\log EG = f(\log FDI, \log FSD, \log HCS, \log PCS, \log ICT, \log RM) \tag{3}$$

We use the subsequent equation to look into the long-term connection between the dependent variable and a variable that is independent.

$$EG_t = \beta_0 + \beta_1 FDI_t + \beta_2 FSD_t + \beta_3 HCS_t + \beta_4 PCS_t + \beta_5 ICT_t + \beta_6 RM_t + \varepsilon_t \tag{4}$$

To determine that the time series modelling from Equation (5) are most effective, the estimate technique is used to smooth and the direct elongations corresponding to the coefficients are obtained using the logarithmic value of each parameter.

$$\log EG_t = \beta_0 + \beta_1 \log FDI_t + \beta_2 \log FSD_t + \beta_3 \log HCS_t + \beta_4 \log PCS_t + \beta_5 \log ICT_t + \beta_6 \log RM_t + \varepsilon_t \tag{5}$$

When the constant is represented by the  $\beta_0$  and the error term is  $t$  throughout the given time period. The coefficients of slope in this case are  $\beta_1, \beta_2, \beta_3,$  and  $\beta_4, \beta_5, \beta_6$

### 3.5. Unit Root test

Prior to analysis, the stationarity characteristics of the provided data should be assessed to make sure the model is appropriate for the job. Conventional techniques for evaluation in applied econometrics are predicated on the idea that variance is constant and normalcy, or mean, does not vary over time. Unit root variables are those who's mean and variance fluctuate with time, despite the fact that many economic variables do not. In the presence of steady data, the traditional technique (ordinary least square, or OLS) yields biased and untrustworthy results. In this study, excellent unit root tests such as PP Phillips and Perron (1988) and ADF Leybourne (1994) were used. Some other study do it like (Dickey & Fuller, 1979) .To find the maximum amount of integration, we do this ADF unit root test. If the findings of the first unit root analysis are uncertain, a second unit root test and the PP test are run to boost confidence in the stationary patterns of the variables (Dawood et al., 2023; Li et al., 2022; Zulfiqar et al., 2022).

Time series analysis may account for more complex serial correlations because of the PP test's resilience to heteroscedasticity. On the error distribution, less stringent assumptions are occasionally employed. Therefore, to ascertain if our variables are stable, we employ the Philips-Perron and Augmented Dickey-Fuller tests. The ADF paradigm is used to test the unit.

$$\Delta Y_t = \mu + \delta Y_{t-1} + \beta_1 + \sum_{i=1}^K d_i \Delta Y_{t-i} + e_t \tag{6}$$

In above equation The Number of Lags are represented by  $K, t - i = 1$  and  $k, \delta = \alpha^{-1}$   $\alpha =$  *coefficient of  $yt - 1$*  ,  $\Delta y_t =$  **First Difference of  $yt$  and  $et =$  white noise disturbance** . Under the Augmented Dickey-Fuller evaluation, the null hypothesis to be tested is that  $= 0$ , not zero, which

is an alternate hypothesis. The progression is stationary once we reject the null; otherwise, it is non-stationary.

The equation for the PP-Test test is below

$$\Delta y_t = \mu + \delta y_{t-1} + \beta_t + e \quad (7)$$

### 3.6. Cointegration Tests

The application of the ARDL bounds analysis is used in this study to investigate the relationship between the variable that is dependent and its independent variables. The ARDL approach was discovered to be the most effective of all earlier tests for cointegration because it provides both the short- and long-term relationship between variables while addressing the problems of non-collinearity, heteroscedasticity, and aberrations.

### 3.7. ARDL Model

After determining the stationarity components of the series, the ARDL test technique is utilized to assess if cointegration of variables occurs in long-term perspective relationships among the various variables. Pesaran and Weeks (2001) we design two asymptotic critical value bounds. When  $I(0)$  or  $I(1)$  are the independent variables, the ARDL limits test is utilized. It is agreed upon by both of us that the test results exceed the UCB levels. We conclude that there has been a significant period of time of relationship between the components. The AIC is used to choose and display the optimum delays, with the starting difference being  $\epsilon_t$ . Using the sum of the F-values, the limits test approach determines the overall significance associated with the delay variable values. Thus, the Null hypothesis in this case  $H_0: \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = 0$ , But against this the alternative hypothesis can be  $H_1: \beta \neq 0$ , So  $r=1,2,3,4,5,6$ . To determine the cointegration of the variables, use the formula below:

$$\begin{aligned} \Delta \log EG_t = & \beta_0 + \beta_1 \log EG_{t-i} + \beta_2 \log FDI_{t-i} + \beta_3 \log FSD_{t-i} + \beta_4 \log HCS + \beta_5 \log PCS_{t-i} + \beta_6 \log ICT + \\ & \beta_7 \log RM_{t-i} + \sum_{i=1}^p \beta_1 \Delta \log EG_{t-i} + \sum_{i=1}^p \beta_2 \Delta \log FDI_{t-i} + \sum_{i=1}^p \beta_3 \Delta \log FSD_{t-i} + \sum_{i=1}^p \beta_4 \Delta \log HCS_{t-i} + \\ & \sum_{i=1}^p \beta_5 \Delta \log PCS_{t-i} + \sum_{i=1}^p \beta_6 \Delta \log ICT_{t-i} + \sum_{i=1}^p \beta_7 \Delta \log RM_{t-i} + \epsilon_t \end{aligned} \quad (8)$$

### 3.8. Mechanisms in the Long and Short Runs

We employ the cointegration method and stationary pattern qualities of the series are assessed, and then the ARDL method is used to examine the short- and long-term coefficients. The ARDL cointegration method is used to determine the cointegrating vector or vectors. Stated differently, every underlying variable may be characterized by a unique long-run connection equation. The ARDL model of the cointegrating vector is reparametrized into the error corrections modelling (ECM) if just one cointegrating vector is discovered. The outcome of reparameterization offers both short- and long-term relationships between the variables that make up a mechanism frame. After the co-integration of the variables has been confirmed, both short- and long-term outcomes are calculated using equation no. 8 in accordance with the ARDL requirements. Here is the long-term equation.

$$\log EG_t = \beta_0 + \sum_{i=1}^q \beta_1 \log EG_{t-i} + \sum_{i=1}^q \beta_2 \log FDI_{t-i} + \sum_{i=1}^q \beta_3 \log FSD_{t-i} + \sum_{i=1}^q \beta_4 \log HCS_{t-i} + \sum_{i=1}^q \beta_5 \log PCS_{t-i} + \sum_{i=1}^q \beta_6 \log ICT_{t-i} + \sum_{i=1}^q \beta_7 \log RM_{t-i} + \epsilon_t \quad (9)$$

In this section  $t$  I denotes assessing the diversity in the for a long time components, the AIC selects the optimal delays for long-term evaluations. The model used by ARDL in the short term uses a later ECM. It is done by using the short run equations.

$$\begin{aligned} \log EG = & \alpha_0 + \sum_{i=1}^q \alpha_1 \Delta \log EG_{t-i} + \sum_{i=1}^q \alpha_2 \Delta \log FDI_{t-i} + \sum_{i=1}^q \alpha_3 \Delta \log FSD_{t-i} + \\ & \sum_{i=1}^q \alpha_4 \Delta \log HCS_{t-i} + \sum_{i=1}^q \alpha_5 \Delta \log PCS_{t-i} + \sum_{i=1}^q \alpha_6 \Delta \log ICT_{t-i} + \sum_{i=1}^q \alpha_7 \Delta \log RM_{t-i} + \\ & \mu ECM_{t-1} + \epsilon_t \end{aligned} \quad (10)$$

In this instance, the variation of the short-term variables is denoted by  $\alpha$ , while the short run coefficient estimates from the error correction technique (ECM) are given by  $\mu$ . Similarly,  $t-I$  captures the best delays for the short-term AIC criterion patterns. In the dynamic short run model, the error correction term  $ECMt-1$  calculates the rate of adjustment needed to restore the hidden and stable equilibrium. It is guaranteed that a long-term relationship can be developed when  $ECMt-1$  appears with a negative sign and importance. This is a simple method of demonstrating the cointegration of variables (Awan, Ali, Rehman, & Idrees, 2023; Banerjee, Dolado, & Mestre, 1998; Tabassum, Rahman, Zafar, & Ghaffar, 2023).

## 4. Estimation

### 4.1. Descriptive Statistics

For every element in this study, there were twenty-five yearly observations taken between 1998 and 2022. The variables were found to be normally distributed within tolerable ranges based on the descriptive statistics of their natural logarithms. Before estimating, heteroscedasticity was removed, and the elasticities were obtained by logarithmically transforming each variable. Heteroscedasticity was eliminated prior to estimation, and all parameters were converted to logarithms in order to determine the elasticities. Examining the lowest and greatest numbers makes it clear that all variables have variation. Moreover, whereas somewhat elevated average values for gross capital formation and consumer spending carry significance for the economy's future trajectory, the same cannot be claimed for importation. The descriptive data in Table.3 indicates that the FDI and economic growth standard deviations are approaching their averages. On the other hand, the means of the other variables were not combined with their standard deviations. Changes in any one of the individual values therefore had a big effect on the values of the next period. This significant volatility might make projections hazy. It is evident by examining the lowest and largest values that variety exists in all variables. According to Blanca, Arnau, López-Montiel, Bono, and Bendayan (2013) if the data has a normal distribution, the kurtosis range should be within -7 and +7 and the skew-ness value should be between -2 and +2.

**Table 3**  
**Descriptive Statistics**

Variables	EG	FDI	FSD	HCS	PCS	ICT	RM
Mean	4.132602	1.074999	2.01E+11	33.78401	30.24375	14.71787	5.129471
Median	4.396457	0.735837	1.77E+11	33.37407	30.90124	14.51533	5.469461
Maximum	7.546860	3.668323	3.77E+11	40.21696	35.68173	17.73199	8.990918
Minimum	-1.274087	0.355613	6.22E+10	30.50841	24.70158	12.52063	1.310692
Std. Dev.	1.980937	0.914240	1.04E+11	3.181003	3.308152	1.462259	2.148667
Skewness	-0.600477	1.876156	0.217963	0.499995	-0.071737	0.560528	-0.136345
Kurtosis	3.416730	5.244938	1.678188	2.033661	1.731432	2.446249	2.256806
Jarque-Bera	1.683284	19.91624	2.017935	2.014368	1.697761	1.628548	0.652810
Probability	0.431002	0.000047	0.364595	0.365246	0.427894	0.442961	0.721513
Sum	103.3150	26.87497	5.03E+12	844.6002	756.0937	367.9467	128.2368
Sq.Dev.	94.17865	20.06005	2.59E+23	242.8508	262.6529	51.31683	110.8025
Observatios	25	25	25	25	25	25	25

### 4.2. ADF and PP unit root

We examined the stationarity of the variables before evaluating the dynamic relationship between the independent and dependent variables. For variables that are stationary at level, first difference, or both, the ARDL model can be applied. The model's sole premise is that no variable should have a second difference that is substantial (Lee, Koh, & Ong, 1989). As a result, the stationarity tests ADF and PP are used. The findings, which validate the ARDL econometrics technique's assumptions, are shown in Table 4. For time series analysis, we thus continue using



the ARDL model. This particular approach for estimate has been used in several investigations . This page displays the table

**Table 4**  
**Unit Root Test**

Variables	AT level		AT First Difference	
	ADF	PP	ADF	PP
EG	0.00***	0.00***	0.00***	0.00***
FDI	0.02**	0.12	0.00***	0.00***
FSD	0.00***	0.01**	0.00***	0.00***
HCS	0.02**	0.02**	0.00***	0.00***
PCS	0.02**	0.02**	0.00***	0.00***
ICT	0.03**	0.03**	0.00***	0.00***
RM	0.00***	0.01**	0.00***	0.00***

Philip Peron (PP) and enhanced Dickey-Fuller (ADF) tests for unit roots have been run. There are two different significance levels: one percent and five percentage points.

#### 4.3. Co-integration F-Bound Test

Table 5 displays the outcome of the the ARDL method a cointegration test. F-statistics are used to determine if cointegration between the variables is present. At the 5% significance level, the cointegration bound test's the F statistic value of 3.79 is larger than both the upper and lower bounds. As a result, the alternative hypothesis of cointegration is accepted and the null hypothesis of no cointegration is rejected (Pesaran, 2004). Thus, there is proof that all of the study's variables have a long-term link. The variables are connected and can be joined linearly if there are signs of a cointegration. It also implies that any short-term shock that can influence how variables move would eventually converge. Therefore, to determine the variables' short- and long-term relationships, the ARDL cointegration technique was employed.

**Table 5**  
**Co Integration Test (Bound Test)**

Test Statistic	Value	Sig.	I(0)	I(1)
F-statistic	3.79	10%	1.99	2.94
K	6	5%	2.27	3.28
		1%	2.55	3.61

#### 4.4. ARDL Long-Term Results

**Table .6**  
**ARDL Results**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FDI	-2.294680	1.379159	-1.663825	0.1220
FDS	1.10E-11	1.70E-11	0.645867	0.5305
HCS	0.034022	0.460544	0.073874	0.9423
ICT	0.085451	0.153520	0.556616	0.5880
PCS	1.590300	0.907141	1.753091	0.1051
RM	0.791667	0.592874	1.335304	0.2066
C	-22.65174	23.25443	-0.974083	0.3492

EC = EG - (-2.2947\*FDI + 0.0000\*FDS + 0.0340\*HCS + 0.0855\*ICT + 1.5903\*PCS + 0.7917\*RM -22.6517 )

In contrast to previous studies Azam and Feng (2021); Jiang, Liang, and Pan (2022), Table 6 presents long-term estimates of the variables where GDP was significantly and negatively impacted by foreign direct investment (FDI). Many countries give Pakistan foreign direct investment (FDI), however international companies may decide to withhold their money from

the country. Therefore, the negative impacts of FDI on the country's economic growth may be caused by excess FDI outflows above net FDI inflows. Foreign direct investment (FDI) and economic growth have a negative link that may be primarily attributed to other issues including low human capital, high transaction costs, and poor infrastructure (Rahman, 2015).

According to the findings, there would be a 2.29% drop in economic growth for every 2% rise in FDI. According to the outcome, FDI inflows impede economic growth. The recipient can benefit from FDI inflows in a variety of ways. The only way to develop and apply cutting-edge technology and an efficient manufacturing system is to draw foreign direct investment (FDI) from large, industrialized economies. The authorities of Pakistan need to implement policies that stabilize the public and human capital stocks and boost the growth of the financial sector, all of which contribute to the expansion of the economy. In addition, the government has to show that it is protecting foreign direct investment by passing new legislation and regulations.

The government has to make it a top priority to devote a significant amount of its resources to agriculture in order to assist bridge the production gap and reduce the current account balance deficit. As a result, these actions could contribute to the economy reaching its full potential as a driver of economic expansion. This suggests that two of the main drivers of Pakistan's GDP are economic growth and foreign direct investment. The bulk of foreign capital inflows consists of foreign direct investment (FDI), which is mostly focused in the financial services and communications sectors since financial institutions are not particularly good at luring FDI through financial market incentives. Economic growth and financial development are positively correlated; a correlation of 1.1 indicates that an increase of one unit in the independent variable Economic growth, the dependent variable, increases by 1.1 units in direct proportion to financial development.

This illustrates how crucial the expansion of the financial sector is to the growth of the economy. Based on empirical research, there is a 1.0% correlation between an increase in financial development and an increase in economic growth. All things considered, our results are consistent with the economic literature Ang (2009a); Shahbaz, Leitão, and Malik (2011), among others on financial development and economic growth (Awan, Rahman, Ali, & Zafar, 2023; Fatima, Jamshed, Tariq, & Rahman, 2023; Ilyas-Lecturer, Awan, Kanwal-Lecturer, & Banaras, 2023; Shahzadi, Ali, Ghafoor, & Rahman, 2023).

Accordingly, investing in the development of human capital stock (the quality of human capital resource stock) increases the potential of an economy because more skilled workers are able to comprehend the intricacies of cutting-edge technologies (for more information, see Hermes and Lensink (2003) and (Osei & Kim, 2020)). As a result, there is a substantial and positive correlation between the human capital stock and economic growth. This explains why the nation's GDP will rise more quickly with a higher human capital pool. Economic theory states that public investments and capital stock lead to economic growth.

Public capital stock increases domestic output, which bolsters the process of job creation and economic growth promotion. This shows that economic growth significantly rises with an increase in the stock of public capital, following the consequences of financial development. The empirical evidence consistently follows the development epistemologies put forward by Nelson (2000) and (Loayza & Soto, 2002). Studies have indicated that a one percent rise in public capital expenditures corresponds to a one percent increase in output growth.

The results of Equation (2) show that the combined effect of human capital and foreign capital inflows is small and has a negative sign. This runs counter to (Hermes & Lensink, 2003). Though it is small, the interaction term's negative sign contradicts expectations, indicating that the growth impacts of foreign capital inflows which are at least partially explained by the existence of a sophisticated financial sector require a certain level of human capital quality. The sign of the interaction term is positive and insignificant. It seems to support the theoretically

expected positive sign and corroborate the findings of Hermes and Lensink (2003) and (Ang, 2009b). Financial markets, which also produce positive spillovers, are the means by which the connecting effect is achieved; this is in line with the macrocosmic study. To put it simply, well-developed financial markets lower the cost of supplying the increasing demand for intermediate items, which grows with greater inflow of foreign money. If the local financial system has advanced to a certain level, net foreign capital inflows and moderately efficient financial markets together suggest that economic development is possible. It has been demonstrated that significant and advantageous spillovers from foreign capital inflow and resources are necessary to increase the efficacy of the country's financial industry.

Remittances had a favorable and substantial impact of 0.79% on economic growth, according to another study result. According to the research, a 1% rise in remittances will therefore spur economic development by 0.79%. Remittances benefit households, supplement local savings, and spur economic expansion. Lastly, labor and human capital are relatively abundant in Pakistan. Thus, it is important for decision-makers and the national government to guarantee the strong growth of a platform that allows people to work abroad and to provide the necessary infrastructure so that current migrants may deliberately start the inflow of remittances. Additionally, the study discovered that gross capital formation positively and marginally impacted economic growth.

#### 4.5. Short Run ARDL Approach

**Table 7**  
**ARDL Short Run Results**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FDI)	-0.293828	0.453701	-0.647626	0.5294
D(FDS)	4.06E-11	1.18E-11	3.453047	0.0048
D(PCS)	1.011102	0.323198	3.128428	0.0087
D(RM)	0.588317	0.342278	-1.718828	0.1113
CointEq(-1)*	-0.951825	0.147741	-6.442510	0.0000

The long-term, considerable speed of variable adjustment is confirmed by the negative value of ECM. Table 7 indicates that the ECM's coefficient is negative (-0.95). This suggests that there is a statistically significant long-term convergence of the variables. The ECM's coefficient (-1), which equals (-0.95) in the short term, indicates that, over the long term, all other factors remaining constant, a short-term variation in economic growth is corrected by 0.9% annually. Moreover, a cointegrating relationship between economic growth and each of the explanatory factors is shown by the adjustment coefficient's negative sign. The table displays the short-term correlation between the independent variable, (FDI, FSD, PCS, RM) and the dependent variable. Economic growth.

The coefficient of ECM<sub>t-1</sub> for the short-run model is (-0.95) and significant. This implies that the long-term deviation of the FDS is modified by 4.06 percent every year. FDI negatively and dramatically affects economic growth. Therefore, the negative impact of FDI on the country's economic growth may be caused by excess FDI outflows above net FDI inflows. Public capital stock appears to have a positive short-term impact on GDP growth, although a small one. Financial development seems to have a positive, albeit not very significant, effect on economic growth.

The human capital stock and economic growth have a positive and substantial association at the 10% significance level. The model passes every short-term diagnostic test for conditional autoregressive serial correlation, missing serial correlation, functional form specification issues, and error term normality distribution. White heteroskedasticity does not exist in the short-term model either. In the end, the results showed that foreign remittances had a significant and positive influence on economic growth in the short term.

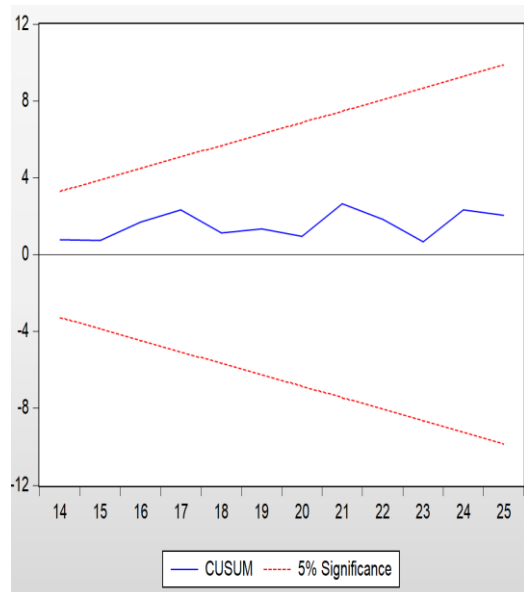
#### 4.6. Serial Correlation and Heteroscedasticity Test

**Table 8**  
**Serial Correlation and Heteroscedasticity Test**

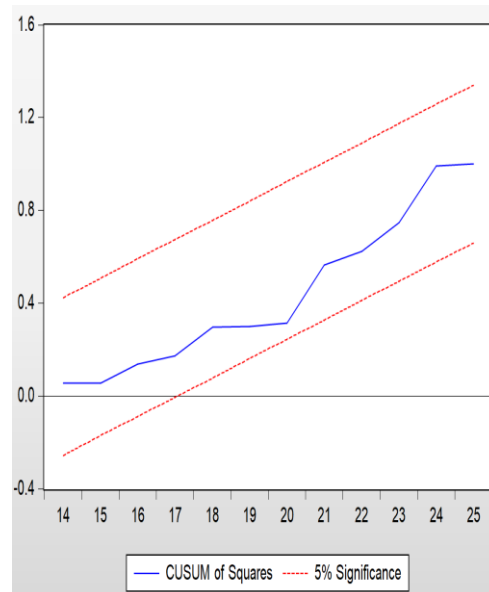
Residual Diagnostic	Test Name	F-Statistics	Prob. Value
Heteroskedasticity	Breusch-Pagan-Godfrey	0.792	0.646
Serial Correlation LM	Breusch-Godfrey	3.425	0.073
Normality test	Jarque-Bera	1.438	0.48

#### 4.7. Stability of the Model

To determine if the calculated sequence' variables are substantially stable over time, tests for stability are employed. The purpose of this is to guarantee whether the model is reliable and strong sufficient to be used in the creation of public policy. As advised by Brown, Durbin, and Evans (1975). To determine if the calculated sequence' variables are substantially stable over time, tests for stability are employed. The purpose of this is to guarantee whether the model is reliable and strong sufficient to be used in the creation of public policy.



**Figure 1: CUCSUM Test**



**Figure 2: CUSUMSQ Test**

### 5. Conclusion and Suggestions

Inflows of net foreign capital might help the country's economy grow. However, the contribution of net foreign capital inflows is highly dependent on the economic conditions of the host country. Numerous recent studies have looked at the link between foreign direct investment (FDI) and economic development, as well as the part that FDI's entry-level requirements play in this relationship. These studies' main topics were the value of human capital and the host country's export-oriented Ness. The unique contribution of this research is that it demonstrates that improving the public capital stocks and human capital of the receiving nation is necessary before foreign capital inflows may have a favorable impact on growth in the economy. This is a result of the developed financial system's enhancement of the technical diffusion linked to inflows of foreign money. Based on empirical findings, foreign capital inflows have a long-term, positive, and considerable influence on economic growth. Over time, public capital stock and financial development provide outstanding pathways via which economic expansion is stimulated. Economic growth is enhanced by an increase in the stock of human capital. These research

findings suggest the following policy implications. Prioritizing the implementation of monetary modifications to enhance the efficiency of the financial industry in the country is imperative for the authorities of Pakistan to achieve a beneficial spillover of foreign capital inflows. Only then can it focus on liberalizing capital accounts to attract foreign capital.

As the primary cause of indebtedness, the government has problems in ensuring efficient service delivery and boosting the return on public investment. When it comes to profit-making organizations, care must be taken even though more effort needs to be done to reorganize the economy to a higher and sustainable path of economic growth. This is already being done in part through the privatization of white elephants and the downsizing of government services. Over time, international savings ought to be added to domestic savings not the other way around. Export-led growth strategies might lead to higher export revenues, which could then be used to support development activities. To achieve the greatest results, the export diversification plan needs to be implemented. To increase the nation's human capital, the right policies should be implemented and resources reallocated. Economic growth is stimulated by governmental investment and the expansion of the financial sector. Technology, remittances, and the human capital pool all favorably impact economic growth. According to the current study, financial reforms should be implemented by the Pakistani government in order to boost the effectiveness of the nation's financial industry and, eventually, accelerate economic growth.

### **5.1. Recommendations**

As Tourism can have a good potential for the economy but tourism is significantly effected by fuel prices Awan, Bibi, Bano, and Shoukat (2023) so Govt should focus on fuel prices. Because Tourism boost economic growth Awan, Arslan, and Hussain (2023) So Pakistan Govt must focus in tourism industry as its one of emerging industry in this era. According to Awan, Rahman, et al. (2023) better institutional performance is mandatory for tourism growth .So Pakistan Must improve the Institutional performance to boost economic growth and financial sector development .As the majority of population in Pakistan are Muslims so Pakistan government must incorporate the Islamic economy system because according Awan, Ali, et al. (2023) Islamic economy system is best economy system as compared other economy systems .Pakistan Govt Must convert Pakistan economy into green economy system because according to Younas, Shoukat, Awan, and Arslan (2023) the environmentally friendly economy is a workable plan for putting into practice a sustainable economic growth framework that verifies rapid progress. Because unfriendly environment economy increase carbon emissions that can impact negatively on economic growth and financial development .This recommendation is align with the study (Kanwal, Khalid, & Alam, 2023). Government of Pakistan should focus on economic growth of Pakistan from every aspects like to control inflation , to encourage people to invest in business and in financial sector ,promote the use of technology and remittance to boost economic growth of Pakistan by various activities of human .

#### **Authors' contribution**

Amna Kanwal: Main Idea, Introduction, Literature Review and Original Draft of the study

Muzammal Hassan: Methodology and Analyses

Haris Butt: Results and Discussion, Conclusion

#### **Conflict of Interests/Disclosures**

The authors declared no potential conflicts of interest w.r.t the research, authorship and/or publication of this article.

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