Analyzing the Impact of FDI and Institutional Quality on Economic Growth in South Asia: Panel ARDL Approach

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ABSTRACT

This study examines the impact of institutional quality and foreign direct investment (FDI) on the economic growth of South Asian countries (Bangladesh, Bhutan, India, Pakistan, Maldives, Nepal, and Sri Lanka) from 1996 to 2021. Utilizing statistical techniques such as panel unit root testing, panel cointegration testing, and Panel Autoregressive Distributive Lag (PARDL) models, the analysis explores the economic development of the region. The investigation addresses the unit root problem, revealing that selected variables exhibit different integration levels. Panel cointegration tests confirm long-term associations among these variables. Employing the panel ARDL test, the study assesses the long and short-term impacts of FDI, institutional quality, domestic investment, and economic growth, uncovering significant positive effects in both durations. The results highlight the persistent nature of interactions among FDI, institutional quality, domestic investment, and economic growth, underscoring the importance of policies that foster strong institutions, attract foreign investments, and stimulate domestic capital formation for sustained regional economic growth. The study offers crucial recommendations for South Asian countries to bolster economic growth by strengthening institutional quality, encouraging FDI, developing special economic zones, promoting domestic investment, investing in infrastructure, and fostering regional economic integration. These recommendations provide a clear roadmap for achieving sustained economic growth in South Asia by addressing the interplay between institutional quality, FDI, and domestic investment dynamics, ultimately securing lasting prosperity and enhancing the well-being of the population in a rapidly evolving global economic landscape.

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1. Introduction

Many economists and decision-makers understand how important the association is between institutional quality and economic growth. According to North (1990), the most significant cause of both historical stagnation and current underdevelopment in the third world is societies' incapacity to create efficient, affordable enforcement contracts. This statement underlines the importance of institutions in influencing economic growth. Strong institutions have the power to stimulate private investment, improve the efficiency of the economy as a whole, and significantly boost economic expansion. The institution's role in the present process of global economic integration has significantly changed how foreign investor's view FDI because they are the main immovable component in this period. Economic and political institutions encourage capital formation by resolving issues with dynamic inconsistency, which develop as a result of shifting leverage that states and businesses face before and following investment agreements (Yimer, 2023). The size of the host country's market also affects how attractive it is to FDI. The demand for goods and services will rise with a larger market, which will also permit economies of scale and facilitate foreign direct investment. Low corporation tax rates draw FDI. Strong institutions, as described by North (1990), have an impact on economic practices through a variety of processes, such as lowering logistics costs, trade costs, and production costs. Institutions of financial and administrative regulation, both public and private, are intended to help cut the cost of doing business. The resources needed to track shipments would be greater for weaker institutions. Poorly protected ownership rights would come with a higher risk premium, and the complexity of compliance requirements would impede economic progress (Kalandia, 2023).

The competition among emerging and developed countries to attract FDI has grown dramatically in recent years. To attract investment, host nation governments offer a variety of incentives to foreign investors, including reduced taxes and other financial benefits. Since the middle of the 1980s, the corporate environment has undergone a significant change as a result of innovations, the liberalization of the market, and the transfer of cutting-edge technology. To further liberalization, encourage the entry of FDI, and control activities of FDI, some developing nations changed their policies. Economic cooperation agreements, structural modifications, banking sector liberalization, and economic recovery programs are just a few of the countless reforms that have occurred over the years. Since that time, FDI inflows contributed by boosting domestic market competitiveness, pricing mechanisms, productivity, and resource efficiency. Additionally, they result in increased imports and exports and also free commerce, which gives investors incentives to invest in a certain location. Investors may easily access natural resources, cheap raw materials, and the labor market in these areas, which can be effectively leveraged to increase the host nation's exports (Ullah & Khan, 2017).

The South Asia region has experienced a recent period of tremendous growth. The World Bank estimates that South Asia's GDP per capita grew at a rate of about 7.5% in 2007, before the global financial crisis. South Asia still has extraordinarily high levels of poverty, despite its impressive improvement over the previous few decades. As a result, as the Millennium Development Goal of half the percentage of people working on less than $1 a day by 2015 approaches, reducing poverty has taken a leading role in the development discussion (Beirne & Panthi, 2022). Institutions have significant effects on the flow of capital internationally (ICFs), potentially preventing excessive capital outflows during financial crises while simultaneously promoting more stable and long-term capital flows. Over the past 25 years, Asia's economic development has advanced significantly. The World Bank estimates that from 1996 to 2020, Asia's GDP per capita grew by about 3.8% yearly. Accumulation of Capital, growth of productivity, and increased economic growth are all highly correlated with the quality of legal and political institutions in South Asia. Additionally, as a result of better institutional quality, several Asian economies have increased their level of integration via trade and financial channels, especially since the mid-1990s. Since the early 1990s, Asia's institutional quality has significantly

increased, which has benefited the region's financial and economic stability as well as its economies' long-term productive potential. Many institutional, political, and legal aspects of the economies of Asia have improved in relative stability as compared to other regions following the Asian financial crisis of 1997-1998 (Beirne & Panthi, 2022).

Institutional quality and FDI are very significant determinants of economic development because they play pivotal roles in economic development due to the multifaceted impacts they have on the growth of the economy of a country. The impact of FDI and institutional quality on the growth of the economy has far-reaching implications across diverse dimensions of economic, social, and environmental development. Policymakers, researchers, and stakeholders can leverage the insights gained from this study to formulate holistic and sustainable strategies that promote comprehensive and inclusive economic growth. FDI and Institutional quality contribute synergistically to the growth of the economy. Sound institutions create a stable and predictable business environment, encouraging both domestic and foreign investment. FDI, in turn, provides the necessary capital and expertise to drive economic expansion, leading to higher GDP, increased job opportunities, and improved living standards. Both institutional quality and FDI contribute to the long-term sustainable development of a country. While FDI can provide immediate benefits, strong institutions ensure that these benefits are sustained over time. Institutions act as the foundation for economic policies, legal frameworks, and governance structures that support lasting development (Soh, Wong, & Tang, 2021).

Growth is desired by developing countries, and it may come through FDI coming in or domestic investment. Aside from domestic investment, emerging economies are focused on attracting FDI. FDI demands that MNCs establish manufacturing and production operations in the host nation. There are several ways that FDI impacts host nations. By creating jobs in the host countries, they often improve development and living conditions and may even increase real GDP in terms of infrastructure and human capital. Bettering industrial standards, encouraging local inputs, promoting labor mobility, disseminating knowledge and expertise to local partners, bridging the gap between investing and saving capital, strengthening balance of payments positions, implementing better wages, and providing financial capital are additional advantages for host countries (Tang & Tan, 2018).

FDI is a significant driver of economic development. FDI brings in capital, technology, and managerial expertise that may be lacking domestically. The transfer of technology and information, or the effects of spillovers from FDI can lead to more productivity and, consequently, economic growth, based on the endogenous growth theory. Countries with strong institutional frameworks, including secure property rights and a business-friendly regulatory environment, are more likely to attract foreign investors, stimulating economic activity and creating employment opportunities. Furthermore, FDI encourages local investment by reducing the restriction of liquidity and fostering economic growth. Low institutional quality lessens the spillover benefit since it is connected with increased long-term commitment risk, high transaction costs, and reduced links between overseas affiliates and local businesses. Further boosting the growth benefit of FDI is the claim that better institutional quality will lessen the crowding-out impact of FDI by promoting foreign investment in emerging industries and lowering rivalry with local companies. To support this assertion, it is suggested that economies with comparatively high-quality institutions will gain more FDI in terms of the growth of the economy (Sohail & Li, 2023).

1.1. The Objectives of the Study

- To investigate the impact of FDI on the economic growth in South Asia
- To explore the impact of the quality of institutions on the economic growth in South Asia
- To examine the impact of domestic investment on economic growth in South Asia

This is a unique study in the context of South Asia which explores the impact of FDI, intuitional quality, and local investment on the economic growth in South Asia.

2.   Literature Review

Research on the relationship between institutional quality, foreign direct investment, and economic growth has increased significantly in the last few decades. The research continuously emphasizes how FDI and high-quality institutions contribute positively to economic growth. Economic growth is also found to be significantly influenced by domestic investment, while there is still disagreement on how this factor relates to FDI and institutional quality. This literature review aims to examine the multifaceted connection among FDI, domestic investment, quality of institutions, and growth of the economy. It will examine the empirical evidence and theoretical foundations for these variables' positive impact on economic development.

2.1.   Theoretical Arguments

Theoretical economic research has found three ways that FDI can assist the economy. First and foremost, limits on national savings must be removed, especially in developing nations (DCs) where domestic savings fall short. Indeed, private foreign capital flows and accumulations help close the existing financial gap and grow the financial market in the host country. The second is that FDI is the primary means of facilitating the transfer of knowledge from the developed to the recipient nation. FDI, which leads to productivity gains. The core of endogenous growth theory is the spread of novel best practices and induced spillovers. Thirdly, increased exports are an outcome of improved capacity and increased competition in local production brought about by FDI (Miah & Majumder, 2022).

Furthermore, FDI is typically driven by two categories of forces, pull and push factors, following economic theory. The industrial nation's progress and the state of the financial system are the driving forces. The characteristics of the host nations, like size of the market, labor quality and prices, quality of public infrastructure, tax incentives, transaction costs, and technical level, are more closely associated with the pull factors than macroeconomic policies. The pull variables define the receiving country's absorptive ability and dictate how FDI is distributed among nations (Mensah & Mensah, 2021).

High quality of institutions has been proposed as a driving force behind economic growth through promoting economic activities including investment and consumption, increasing efficiency, more effectively allocating resources, defending property rights, and promoting freedom of choices. There are also the indirect effects of the quality of institutions on GDP through FDI. It has been revealed that higher institutional quality speeds up the advantages of trade, such as economies of scale and specialization in advanced countries, which increase the impact of openness of trade on the growth of the economy (Iritié & Tiémélé, 2023). However, trade benefits may take some time to manifest because developing nations are less comparable. This raises questions about how improving the quality of institutions will affect the way trade openness will affect economic growth in emerging economies. A good quality institution can also enhance the growth of the economy benefit of FDI by improving the processes of spillover of knowledge and technology transfer, according to the majority of the literature (Burlea-Schiopoiu, Brostescu, & Popescu, 2023).

2.2.   Empirical Literature

Using yearly time series data for Pakistan from 1970 to 2019, Sohail and Li (2023) investigate the nonlinear link between domestic investment, financial development, FDI, and the growth of the economy. The nonlinear auto-regressive distributive lag (NARDL) technique of co-integration was employed by the authors. The findings demonstrate that FDI and DI have

nonlinearly increased beneficial effects relative to their negative effects. Thus, to support Pakistan's economic development, policymakers should strengthen their control over FDI channeling and efficiently enforce rules.

Kumari et al. (2023) examine the causal and long-term relationship between trade openness, economic development from India, and inflows of FDI. This study used annual time series data from 1985 to 2018 vector autoregression (VAR) and the Johansen cointegration technique. The results of Johansen's cointegration show that there is no long-term relationship between any of the three variables that were previously mentioned. Furthermore, the Granger causality findings, which demonstrate that FDI causes economic growth and that growth in turn causes FDI, corroborate the bi-directional connection.

Iritié and Tiémélé (2023) examined how foreign direct investment (FDI) impacted Côte d'Ivoire's economic growth from 1980 to 2019. The results of their ARDL technique of cointegration demonstrate that FDI has a detrimental influence on the economic growth of Côte d'Ivoire in the long and short term. We speculate that the dominance of industrial FDI in Côte d'Ivoire is the cause of these consequences. There are fraud and corruption activities in the extractive industry, and it has a tenuous connection to the whole economy. Our findings also demonstrate the value of education, or investment in humans, to the nation's economic development. To develop enhanced human capital that can adopt and apply new knowledge and advanced technologies brought about by FDI, these results highlight the need for policies that specifically attract FDI, effective integration of mining-related industries into the national economy, and improvements to the educational system.

To explore the effect of FDI on the Georgian economy, Kalandia (2023) carried out an empirical study. He asserts that an environment that encourages investment is a vital instrument for a nation's economic growth, particularly in impoverished and emerging nations that are incapable of expanding their economy using domestic resources. Foreign investment does not, however, always flow directly toward the prosperity of the regional economy as one might anticipate. The most significant effects of foreign direct investment that foreign businesses bring to the host nation are employment, technological advances, taxation, import substitution, and competition. Furthermore, local industry advancements as well as business development and support are being provided.

Yimer (2023) uses a dynamically shared correlating effect technique for an error-correction model to study the growth effects of FDI in Africa from 1990 to 2016. It employs an analytical framework to categorize African economies into three groups: investment, factor, and fragile. It also takes into consideration the issue of cross-sectional dependence and interaction effects, which were disregarded in earlier research. In economies driven by factors or investments, FDI has a large direct long-term effect on growth; in economies driven by factors or investments, the short-term impact of FDI is negligible. In the fragile group, however, the long and short-term impacts of FDI on growth are negligible.

Nguyen (2022) assesses how FDI affected the economic growth of Vietnam between 1990 to 2020 following the country's economic and political reforms (Doi Moi) in 1986. To test the impact of FDI on the growth of the economy, the study used the VAR model through unit root tests, Granger causality, impulse response, and variance decompositions. According to the findings of the study, FDI has negative short-term effects on the growth of the economy and a negative long-term impact on growth. Ayenew (2022) investigates the effect of FDI on the growth of the economy of Sub-Saharan African countries. Panel data from 1988 to 2019 from 22 Sub-Saharan African nations were examined in the study. The PMG/ARDL model was used to investigate both the long and short-term implications of FDI on economic growth. The panel unit root test and panel cointegration test were applied to improve the model's estimation. The findings demonstrate that although FDI has a statistically insignificant impact in the short run, it

has a significant and favorable impact in the long run. The results of the study indicate that sustained economic growth is promoted by foreign direct investment. As a result, Sub-Saharan African countries should focus on attracting FDI.

According to Sun et al. (2023), globalization, private as well as public investment, and population pressure all had an impact on the economic growth of 34 Asian economies. They also examine investment risk. The findings, which were obtained employing the two-step system generalized method of moment, show that, between 2001 and 2019, private capital investment in Asian emerging nations made a significant contribution to regional economic growth. These investments were primarily driven by low investment risks and advantageous demographics in comparison to low-income and advanced economies. It goes on to say that, in comparison to established economies, economic globalization speeds up the expansion of developing, emerging, and low-income economies in Asia. This study contributes to the body of previous work, which has been weak in this area, by looking at Asian economies from two separate angles: the association between globalization of the economy and economic growth, and individual public and private investment. Additionally, the report recommends that low-risk investment policies that increase institutional capacity, and productivity, and draw in international investors should support private capital investment. The results of this study demonstrate that, for economies to grow, a combination of public and private investment is essential. This combination can speed up economic growth by reducing corporate risk and external pressures through the implementation of sensible public policies for domestic investment.

The quality of institutions and FDI and domestic investment are very crucial determinants of the economic development of an economy because they cause economic development in the economy. A measure that "shows the governance and quality of institutions in a country" is called "institutional quality" Economies perform better in nations with stronger institutions. All sensible FDI investors would naturally seek substantial returns on their investments, right? Only a robust institutional foundation in the host nation would enable it to support the investors in a useful and efficient manner. Institutional quality is a factor in FDI attraction. Poor institutional quality can discourage investors and slow down production, which has negative effects on GDP per capita. On the economic front, these impede progress. Contrarily, high institutional quality can encourage domestic and foreign investment, enhance resource allocation, instill trust, support economic activity, and boost growth. The various social classes will use high-quality institutions, such as a public good, as their growth engine (Soh et al., 2021).

Ahmad and Ahmed (2014) employed the ARDL cointegration technique to investigate the impact of institutions on FDI in Pakistani. The findings indicate a long-run relationship between the quality of institutions and inflows of FDI. The results suggest that FDI is significantly influenced by institutional quality. Jointly institutional quality and trade openness have a major impact and help countries attract FDI over the long and short terms. The conclusion offers convincing evidence in support of the idea that a developing country like Pakistan can attract significant FDI by simultaneously adopting a policy combination that lowers trade barriers and improves institutional quality. Trojette (2016) examined the impact of FDI and the quality of institutions on the growth of the economy in five regions including Asia, Europe, SSA, MENA, and America by using a GMM framework, the study's findings over the years 1984 to 2013 demonstrating the significance of the development of institutions in reducing the negative effects of FDI on the growth of the economy and also employed the Caner and Hansen (2004) threshold regression technique and the result revealed the importance of institutions for all other groups except America.

Asamoah, Mensah, and Bondzie (2019) conducted an empirical investigation of 34 nations of sub-Saharan Africa (SSA) using data between 1996-2016 to test the nexus of quality of institution, FDI, trade, and growth of the economy. The findings of the study show that FDI has declining effects on the growth of the economy, which rises monotonically in the absence of institutions. The findings of the study discovered that institutional quality has a favorable impact

on trade openness in the trade openness-growth nexus. Additionally, the results conclude a beneficial institutional quality effect on growth, but not on FDI. It has been discovered that the development of human capital, financial development, and resource rent all have favorable effects on the economy's growth in SSA. The findings of the study show that to develop institutional quality and encourage the growth of the economy in SSA, a well-balanced approach is required. Huynh, Nguyen, Nguyen, and Nguyen (2020) employed the panel dynamic simultaneous equation technique to empirically test the three-way relationships among FDI, the shadow economy, and institutional quality for 19 developing nations in Asia from 2002 to 2015. The outcomes of the test demonstrate that FDI enhances the quality of institutional, which in turn draws inward FDI and institutional quality promotes FDI inflow.

Asghar, Qureshi, and Nadeem (2020) examined the impacts of institutional quality on the growth of the economy of the nations of Asia for the period from 1990 to 2013 by adopting the panel ARDL test for 13 developing Asian countries. An index of institutional quality has been developed employing principal component analysis. The Panel ARDL's results show how institutional quality contributes to economic success. The findings of the panel causality test reveal that the qualities of institutions and the growth of the economy are causally related. It further emphasizes the necessity of raising institutional quality in a few Asian developing nations to boost economic growth. Maruta, Banerjee, and Cavoli (2020) evaluated the effects of institutional quality and sectoral foreign aid on the economic growth of the economies of 74 developing nations of Africa, South America, and Asia for the period spanning from 1980 to 2016. In the study, foreign aid flows were taken into account for three different sectors: education, agriculture, and health. It has been discovered that of three aid categories, education aid is the most beneficial to the countries receiving it. The impact is significantly different between locations and depends on the current degree of quality of institutions. Aid in health is very effective in Asia; aid in agriculture is very effective in Africa; and in the case of South America aid in education very effective. As institutional quality increases, the disparity between the health and the marginal impacts of educational support and agriculture increases. The study's conclusions have significant policy recommendations for donor nations and the World Aid Organization because they demonstrate that it is preferable to direct inflows of aid into the sector of education as the quality of institutions rises.

Wang et al. (2022) conducted a panel study for 189 emerging and developing nations by employing the GMM estimators, fixed and random effect to test the effects of the quality of institutions on financial development. The empirical findings suggest that improved institutions are crucial for the financial sector development and that in the worldwide panel of the study, political stability, corruption control, and regulatory quality have favorable effects on financial development. Financial development is badly impacted by the rules of law, which shows that the rules of law are very weak in most developing nations. Financial development in developing and international panels is positively impacted by the control of the corruption index, indicating that the majority of nations have successfully lowered levels of corruption. The overall finding suggests that high-caliber institutions are the primary forces behind and stimulators of financial development. According to the study, developing and emerging nations should concentrate on enhancing institutional quality by reexamining the laws of nature, the competence of the government, and the voice and accountability.

Beirne and Panthi (2022) investigated how institutions affect macro financial resilience in Asia. The study concludes that during periods of increased financial stress, per capita and net FDI inflows are more resilient in nations with a high degree of institutional quality. It employs the quarterly panel data from 1996 to 2020 of 12 countries of Asia. The findings also show that these economies' resilience to net stock and debt inflows during crises is a product of their institutions, which also reflects the effects of portfolio rebalancing. The study offers insights into important sub-components of the quality of institutions, particularly the regulatory quality, rules of law, and political stability. It also identifies resilience thresholds in institutional quality. The

results guide policy initiatives aimed at building structural reforms and institutional capacity for boosting economic growth and shock resilience.

After thoroughly reviewing the related literature, it became clear that institutional quality, FDI, and domestic investment are very significant determinants of economic growth. The related literature shows that there are some studies for the different countries and regions of the world and there is a gap of such studies for the region of South Asia, so this study is going to fill this gap and suggest valuable recommendations for the countries of South Asia.

3.   Research Methodology

This section discusses the sources of collection of data and the econometric approaches that are utilized to derive conclusions from the collected data. It also highlights the suggested methodology and econometric approaches that are used to conduct the study. The data and variables used to test the association among the quality of institutions, FDI, domestic investment, and growth of the economy are included in this section, which begins with a brief explanation of the overall methodology and research strategy for panel data from 1996 to 2021 for South Asian nations including Bhutan, Bangladesh, Pakistan, Sri Lanka, Nepal, and India, these nations were chosen because data were available for these nations in the region.

The GDP growth rate and domestic investment data are gathered from the World Development Indicator (WDI) online database of the Bank (2022) and the quality of institutions is gathered from the World Governess Indicators (WGI) of Bank (2022) online database. The FDI data has been gathered from International Financial Statistics.

Table 1
Description of Variables and Source of Data

Variable	Description	Data source
Y	GDP growth (annual %)	WDI
FDI	Foreign direct investment, net inflows (% of GDP)	International Financial Statistics
DI	Gross capital formation (annual % growth)	WDI
IQ	Institutional quality (Index)	WGI

For testing the relationship among the selected variables, the variables are first examined for stationarity by employing the Levin and Lin Levin, Lin, and Chu (2002) unit root techniques for checking the existence of unit root issues in a series. Panel cointegration, suggested by Kao (1999) , Pedroni (2004), and Johansson Fisher technique is used to test the long-run association among the variables, and the Panel Auto-regressive Distributive lag (PARDL) model proposed by Johansen (1988) is used to test the both long and short-run association between the given variables.

3.1. Panel Unit Root Testing

Panel unit root technique is a statistical technique that is employed in econometrics to assess whether the given time series data collected from multiple individuals, groups, or entities exhibit unit root behavior or not. If a time series is not stationary it means that it does not have a stable mean and its variance may grow over time. Non-stationary series can cause spurious regressions and unreliable statistical results. Testing the unit *roots* is crucial in time series analysis because it can affect the validity of statistical tests and the interpretation of results. Panel unit root testing is particularly useful when dealing with data collected from multiple cross-sectional entities (like countries, individuals, and firms) over time. Levin et al. (2002) Levin, Lin, and Chu's (LLC) technique is a widely used test for panel unit roots. It considers both homogeneous (all units have the same unit root behavior) and heterogeneous (different units have different unit root behavior) cases.

The current study employed Levin and Lin's Levin et al. (2002) unit root technique to identify and eliminate the unit root issue. The following is the general equation for testing the unit roots:

$$\Delta Y_{it} = \beta_i + \sigma Y_{it-1} + \sum_j^n \gamma\, Y_{it-j} + \gamma_t + e_t \tag{1}$$

The unit-specific time effect is represented by the term γ_t, and the unit-specific fix effect is represented by β_i, the first term in the Levin and Lin unit root model. This model illustrates a two-way fixed effect. It is restricted that the Y ($_{it-1}$) coefficient σ be homogeneous. The following are the hypothesis that the unit root approach is used to test:

$H_0: \sigma = 0$ (Series is non-stationary)
$H_a: \sigma < 0$ (Series have no unit roots)

In panel unit root testing, the alternative hypothesis (Ha) is that the series has no unit roots, while the null hypothesis (H0) is that the series has unit roots. The acceptance or rejection of H_0 will be indicated by the probability value of t-statistics. The given panel series is non-stationary in the series if the H_0 is not able to reject and conversely for the acceptance of the alternative hypothesis.

3.2. Panel Cointegration Tests

Panel cointegration is an important concept in econometrics, particularly in the analysis of panel data, which involves observations of multiple entities over time. Cointegration implies a long-term connection between two or more non-stationary variables, which remain stable when combined as a linear combination of these variables. Understanding panel cointegration is valuable for investigating relationships between variables that exhibit both short-term fluctuations and long-term equilibriums. Panel cointegration is a powerful tool for analyzing long-term relationships among non-stationary variables in panel data. Its application has wide-reaching implications for economics, finance, and social sciences. Properly conducting panel cointegration analysis involves selecting appropriate methods, addressing challenges, and considering data quality, heterogeneity, and cross-sectional dependence. The findings of panel cointegration techniques give valuable information on the dynamics of economic and financial variables across entities and time, with significant policy and economic implications.

The process of testing for panel cointegration typically involves unit root testing; for this, it becomes necessary first to employ tests of unit root to test the stationarity of every variable. Once non-stationary variables are identified, cointegration tests are applied to assess whether linear combinations of these variables result in stationary combinations. Various panel cointegration tests are available, including the Pedroni, Kao, and Fisher Panel tests, among others. These tests examine whether cointegration relationships exist across multiple entities within the panel. There are several methods for conducting panel cointegration analysis, and the selection of these techniques depends upon the characteristics of the data and objectives of the research:

3.2.1. Pedroni Panel Cointegration Test

This test offers multiple cointegration tests, like the group-mean panel cointegration technique and the heterogeneous panel cointegration technique, which consider both homogeneous and heterogeneous cointegration relationships.

3.2.2. Kao Panel Cointegration Test

The Kao test assumes homogeneous cointegration relationships across all units and employs a group mean panel cointegration technique.

3.2.3. Fisher Panel Cointegration Test

The Fisher test is useful when researchers suspect heterogeneous cointegration relationships. It allows for different cointegration relationships for different units within the panel.

The paper further expands its technique by employing (Kao, 1999), Pedroni (2004), and Johansson Fisher tests after assessing the panel variables for unit roots. These tests verify the long-term cointegration of South Asia's economic growth with institutional quality, foreign direct investment, and local investment. The steady and coordinated movement over time is referred to as a long-term association of economic variables. For the panel cointegration testing, the following equation is specified:

$$Y_{it} = \beta_0 + \delta_i t + \beta_1 IQ_{it} + \beta_2 FDI_{it} + \beta_3 DI_{it} + e_{it} \tag{2}$$

Where Y denotes GDP growth rate, IQ denotes institutional quality, and DI represents domestic investment in South Asian countries.

3.3. Cross-sectional Dependency Tests

Cross-sectional dependency approaches are employed in the context of analysis of panel data to assess whether there is a significant interdependence or correlation among the individual units (cross-sections) in a panel dataset. In many statistical models, it is assumed that observations are independent of each other. However, in panel data, this assumption may not hold if there is the presence of cross-sectional dependence. If entities are correlated, the independence assumption is violated, and standard errors and hypothesis tests may be biased. Cross-sectional dependency tests serve as diagnostic tools to evaluate whether there is a significant correlation among entities in a panel dataset. By conducting these tests, researchers can enhance the validity and reliability of their analyses, leading to more accurate parameter estimates, valid statistical inferences, and better-informed policy recommendations. There are several tests available to test panel cross-sectional dependency. These tests help researchers assess whether there is significant interdependence among the cross-sectional entities in a panel dataset. Here are some commonly used tests:

3.3.1. Breusch-Pagan LM Test

When looking for cross-sectional dependence and heteroscedasticity in the residual terms of a panel data model, this test is quite helpful. When the variance of the errors varies between observations, it is referred to as heteroscedasticity. Assuming that there is no cross-sectional dependency or homoscedastic and uncorrelated errors across cross-sectional units, this is the H_0 of the Breusch-Pagan LM Test. The existence of cross-sectional dependence is the alternative theory.

3.3.2. Pesaran CD Test

The Pesaran CD test is a statistical test for cross-sectional dependence in panel data models. It is a robust and powerful test that can be used to detect a wide range of cross-sectional dependence patterns, including weak cross-sectional dependence. The test is also relatively easy to implement and interpret.

3.3.3. The Pesaran Scaled LM Test

The Pesaran Scaled LM Test is designed to detect the presence of cross-sectional dependence by examining the residuals of a panel data model. The test is named after its

developer, Hashem Pesaran, and it involves a Lagrange Multiplier statistic that is scaled to account for the presence of heteroscedasticity and contemporaneous correlation in the residuals.

3.4. The Panel Autoregressive Distributive Lag Model (PARDL)

ARDL test is primarily employed for testing the short and long-term associations among the selected variables for time series. It captures the dynamic association among a dependent variable and independent variables, accounting for short and long-term impacts. The ARDL model includes lagged values of the variables, typically following an autoregressive structure, which means the current value of a variable depends on its past values. The Panel Autoregressive Distributive Lag Model (PARDL) extends the ARDL framework to panel data. It allows researchers to analyze dynamic relationships between variables while considering the heterogeneity of entities within the panel and controlling for cross-sectional dependence.

The PARDL is a powerful econometric framework for analyzing the dynamics of variables in panel data while considering both short-term and long-term effects. Its ability to capture cointegration relationships and control for cross-sectional dependence makes it an important tool for a large range of empirical research and policy analysis. Researchers and analysts can use PARDL models to gain a deeper understanding of complex relationships in panel data, ultimately informing better decision-making and policy formulation. The PARDL model separates long and short-run impacts. The short-term dynamics are captured by the lagged values of the variables, while the long-term dynamics are captured by the cointegrating relationships between variables. One of the critical features of PARDL is the inclusion of cointegrating relationships. Cointegration implies long-run equilibrium or association among variables. In panel data, cointegration relationships exist if there is a common equilibrium relationship that holds across multiple entities and over time. The panel ARDL model is given below:

$$Y_{it} = \beta_0 + \sum_{j=1}^{n} \beta_{1j} \Delta Y_{i\,t-j} + \sum_{k=0}^{m} \beta_{2k} \Delta IQ_{it-k} + \sum_{p=0}^{q} \beta_{3p} \Delta FDI_{i\,t-p} + \sum_{h=0}^{f} \beta_{4h} \Delta DI_{i\,t-h} + \theta_1 IQ_{i\,t-1} + \theta_2 FDI_{i\,t-1} + \theta_3 DI_{i\,t-1} + \pi ECT_{t-1} + u_{i\,t} \tag{3}$$

The GDP growth rate is represented by Y_{it}; institutional quality is indicated by IQ_{it}; foreign direct investment is represented by FDI_{it} for each year and cross-section; and domestic investment is represented by DI_{it}; The intercept term in the equation above is also denoted by the parameter "β_0"; the short-run coefficients are shown by the β_1, β_2, β_3, and β_4 parameters, and the long-run coefficients by θ_1, θ_2, and $\theta3$. The adjustment effect is represented by the ECT component, and the dynamic stability of the entire model is indicated by the importance of its coefficient п.

4. Results and Discussion

This section highlights the results of the many econometric methods used to investigate how South Asia's economic growth is impacted by FDI, domestic investment, and institutional quality.

4.1. Cross-sectional Dependency Tests

Before finding the long and short-run impact of institutional quality, FDI and domestic investment on the economic growth of South Asia it is necessary to check whether is presence of cross-sectional decency or not? The authors employed the cross-sectional dependence tests. Table 2 reveals the findings of Cross-sectional Dependency Tests**.** Three different tests can be employed to examine the existence of cross-sectional dependence in residuals. The H_0 for all three basic tests is "There is no cross-section dependence or correlation in residuals". The first test employed is The Breusch-Pagan LM test. This test is often employed to detect heteroscedasticity in the residuals of a panel regression. In this context, it's applied to examine

the existence of cross-sectional dependence. The value of the test statistic is 0.307 and the probability value is 0.379. Since the p-value is more than the conventional 0.05 level of significance, there is no strong support to reject the H_0 of no cross-sectional dependence based on the Breusch-Pagan LM test.

The Pesaran CD approach is specifically designed to test the cross-sectional dependence. The value of the statistic is 0.964, and the associated probability value is 0.832. Again, the probability value is higher than 0.05, indicating a lack of strong support to reject the H_0. The Pesaran-scaled LM test is another test for cross-sectional dependence. The value of the statistic is 0.668, and the probability value is 0.252. Similar to the Breusch-Pagan LM test, the probability value is more than 0.05 concluding that there is no strong evidence to reject the H_0.

Table 2
Results of Cross-sectional Dependency Tests

Test	Statistic	Prob.
Breusch-Pagan LM	0.307	0.379
Pesaran CD	0.964	0.832
Pesaran scaled LM	0.668	0.252

Source: Estimation of Author

4.2. Panel Unit Root Analysis

The Levin et al. (2002) technique is a widely used technique for checking the unit root of the series. Table 3 depicts the conclusion of the panel unit root test for each variable of economic growth, domestic investment institutional quality, and FDI for the nations of South Asia. The results show that FDI is integrated into order zero or integrated at level, while other variables economic growth, institutional quality, and domestic investment are integrated into order one. The findings of the test show that the variables of the study are integrated in different order,

Table3
Levin and Lin Unit Root Test

	At Level	At 1st Difference	
Variables	t-statistic (Prob.)	t-statistic (Prob.)	Integration level
Y	-0.450 (0.674)	-3.752 (0.001)*	I(1)
IQ	-0.411 (0.341)	-11.503 (0.000)*	I(1)
FDI	-6.090 (0.000)*	-	I(0)
DI	-0.733 (0.232)	-5.497 (0.000)*	I(1)

Source: Calculation of Authors
Where*, **and *** represent1%, 5% and 10%level of significance (respectively)

4.3. Panel Cointegration Analysis

The results of the panel unit root technique conclude that some of the variables are non-stationary, so it becomes necessary to determine whether there is a presence of long-run association among the variables or not. For this, we employed Kao (1999), Pedroni (2004) and Johansen Fisher tests. The test statistics for the abovementioned tests show whether or not the variables are integrated over the long term. The dimensions of the ADF statistic for the Padroni and Kao cointegration tests as well as the significance of the maximum Eigen value for the Fisher test are used to test the H_0 of no cointegration among the variables. Table 4, Table 5, and Table 6 provide the test findings for the mentioned techniques. The value of ADF statistics of the Padroni test concludes that institutional quality, FDI, domestic investment, and growth of the economy in the nation of South Asia have a long-run association. In addition to this, the Kao test confirms long-run association as well because the statistical value of ADF is significant also and the association between institutional quality, FDI, domestic investment, and growth of the

economy in nations of South Asia is supported by at least one cointegration vectors, as indicated by the Eigen value of the Fisher rank cointegration test.

Table 4
Pedroni Residual Cointegration Test

Alternative hypothesis: common AR coef. (within-dimension)				
	Statistic	**Prob.**	**Weighted Statistic**	**Prob.**
Panel v-Statistic	-1.276	0.899	-1.167	0.878
Panel rho-Statistic	-2.334	0.009	-2.374	0.008
Panel PP-Statistic	-6.501	0.000	-6.382	0.000
Panel ADF-Statistic	-6.501	0.000	-3.715	0.001
Panel ADF-Statistic	-3.665	0.001	-3.714	0.001
Alternative hypothesis: individual AR coef. (between-dimension)				
	Statistic	**Prob.**		
Group rho-Statistic	-1.099	0.136		
Group PP-Statistic	-8.897	0.000		
Group ADF-Statistic	-2.691	0.004		

Source: Calculation of Authors

Table 5
Kao Panel Cointegration tests

	Statistic	**Prob.**
Kao	-3.657*	0.001

Source: Calculation of Authors

Table 6
Fisher Rank Cointegration test

No. of CE(s)	**Trace value**	**Prob**	**Max-Eigen value**	**Prob**
$r_0 = 0$	242.02	0.000	167.1	0.000
$r_0 \leq 1$	113.91	0.000	86.32	0.000
$r_0 \leq 2$	59.14	0.005	45.80	0.085
$r_0 \leq 3$	63.06	0.002	63.06	0.002

Source: Calculation of Authors

4.4. Panel Autoregressive Distributive Lag Model (PARDL)

To verify the specific association among domestic investment, quality of institution, FDI, and growth of the economy in South Asian Nations, the study also employs the panel ARDL technique. This method looks at the short and long-run impacts of independent variables on dependent variables. This relationship is depicted in the table 7. It depicts the long-run findings of PARDL for testing the impact of institutional quality, FDI, and domestic investment on the growth of the economy of South Asia. The coefficient value of institutional quality "IQ" is 0.136, where the value of the t-statistic is 2.813 with a low p-value of 0.007 indicates that this relationship is statistically significant, suggesting that IQ plays a significant role in the explanation of the variation in the dependent variable in the long-term. This means that, in the long-term, a 1 unit rise in institutional quality (IQ) is associated with an approximately 0.136 unit increase in the dependent variable economic growth in South Asia, holding other factors constant.

The findings of the study support the results of (Asghar et al., 2020; Beirne & Panthi, 2022; Khalil, Hussain, Bhatti, & Ibraheem, 2022; Maruta et al., 2020; Soh et al., 2021; Wang et al., 2022). According to the results of these studies, institutional qualities are very important for the economic growth of any country. When there are high-quality institutions, it attracts FDI,

which brings the latest technology to the hosting countries and the cost of production decreases and productivity increases in the economy, which increases the jobs opportunities and income and causes the economic growth. The coefficient value of "FDI" is 0.343, where the t-statistic value is 0.343 with a low p-value of 0.015 indicating that FDI is highly significant in explaining the variation in the dependent variable in the long-term. A 1 unit change in FDI caused a 0.343 unit change in dependent variable economic growth in South Asian nations. The result of the current study is similar to the results of (Ayenew, 2022; Burlea-Schiopoiu et al., 2023; Iritié & Tiémélé, 2023; Kumari et al., 2023; Soh et al., 2021; Yimer, 2023). According to the conclusions of these studies, there is a direct relationship between the FDI and the growth of the economy of a country. When the amount of FDI increases it increases the growth of the economy. When the domestic investment is not up to the required amount, FDI fills this gap which is very important for economic growth.

The coefficient of domestic investment "DI" is 0.183, where the t-statistic value is 16.748 with a very low p-value of 0.000 revealing that DI is highly significant and shows that it has long-term effects on the dependent variable. This suggests that domestic investment is a crucial factor in the long-term dynamics of the model. A 1-unit rise in domestic investment (DI) is linked with a substantial 0.183 unit increase in the dependent variable economic growth in South Asia. The conclusion of the study supports the results of (Hiep, Van Tien, Hung, Van Hanh, & Thuy, 2021; Sohail & Li, 2023; Sun et al., 2023; Tseng et al., 2019). According to these studies, Investment is the engine of economic growth. It is the key factor of the growth theories. It is the process of allocating resources to create new productive capacity. This can be done by building new factories, purchasing new equipment, or developing new technologies. When businesses invest, they are creating jobs, producing more goods and services, and increasing productivity. This, in turn, leads to higher incomes, increased consumption, and overall economic growth.

Table 7
Results of Long-run Relationship

Dependent variable: Y				
Variables	Coefficients	Sd. Error	t-statistics	Prob.
IQ	0.136*	0.048	2.813	0.007
FDI	0.343*	0.136	2.518	0.015
DI	0.183*	0.011	16.748	0.000

Source: Estimation of Author

The short-run PARDL results for evaluating the effects of FDI, quality of institutions, and local investment on South Asia's economic growth are displayed in Table 8. With an institutional quality "IQ" coefficient value of 1.955 and a low p-value of 0.002, the association is highly significant at the 1% level of significance, indicating that IQ is a substantial long-term predictor of the dependent variable's variance. This means that, in the short-term, a 1 unit rise in institutional quality (IQ) is associated with an approximately 1.955 unit increase in the dependent variable growth of economies in nations of South Asia. The coefficient of "FDI" is 1.430 with a low p-value of 0.019 showing that FDI is highly significant and explaining the changes in the dependent variable in the long-term. A 1 unit change in FDI is connected with a 1.430 unit change in economic growth in South Asia. At a 5% level of significance, the coefficient of domestic investment, or "DI," is 1.863 with an extremely low p-value of 0.041, indicating that DI is highly statistically significant and long-term variations in the dependent variable are explained. This implies that a key component of the model's long-term dynamics is domestic investment. A 1 unit increase in domestic investment (DI) is connected with a substantial 1.863 unit increase in the dependent variable growth of economies in nations of South Asia. Furthermore, the finding reveals that the ECT term is significant and reveals that the relations of domestic investment, FDI, quality of institution, and growth of the economy in South Asia are dynamically stable over time and the sign of the coefficient is negative also with size of 0.963

depicts the adjustment effect of 0.963 unit in this association and the model is dynamically stable.

Table 8
Results of Short-term

| Dependent variable: Y | | | | |
Variables	Coefficients	Sd. Error	t-statistics	Prob.
ΔIQ	1.955*	0.593	3.297	0.002
ΔFDI	1.430**	0.595	2.403	0.019
ΔDI	1.863**	0.884	2.109	0.041
Constant	4.472**	1.737	2.574	0.013
ECT	-0.963*	0.346	-2.783	0.007

Source: Estimation of Author

5. Conclusion

The current study finds the effect of domestic investment, institutional quality, and FDI on the growth of economies of South Asia over the period from 1996 to 2021 by utilizing a combination of panel unit root technique, panel cointegration techniques, and Panel Autoregressive Distributive Lag (PARDL) technique. To determine whether a unit root exists in the series, panel unit root techniques are used. The results show that some variables are integrated at the level, whereas others are integrated at the first difference. Unit roots in some series made it necessary to use a panel cointegration approach to examine the long-term association between the chosen variables of the study. The application of panel unit root testing concludes the stationarity properties of the relevant economic variables, acknowledging that they evolved, exhibiting both transitory fluctuations and persistent trends. These results of non-stationarity provided the foundation for further analysis, emphasizing the importance of accounting for both long and short-run impacts in understanding the drivers of the growth of the economy in South Asia.

The findings of the panel cointegration testing reveal the existence of long-run relationships between the quality of institutional, FDI, domestic investment, and economic growth within South Asia. These cointegration relationships demonstrate the persistent nature of the interactions between the variables by showing that, over time, despite short-term changes, they progressed toward equilibrium. This result emphasizes how important it is to establish policies that support strong institutional settings, attract foreign investment, and boost the creation of local capital to maintain regional economic growth. The Panel ARDL techniques provided a detailed analysis of the relationship among these variables. By distinguishing between the long and short-term, the PARDL models allowed us to grasp the immediate and sustained effects of the quality of institutions and FDI on the growth of the economy. Through this comprehensive analysis, it becomes evident that South Asia's economic growth has been significantly influenced by the institution's quality, the FDI inflows, and the rate of domestic investment. These factors not only contribute to the short-term dynamism of the region's economies but also sustain their long-term development.

The lessons drawn from this analysis offer valuable guidance for South Asian nations as they seek to chart a path of inclusive, sustainable, and robust economic growth in the years ahead. In the context of a rapidly evolving global economic zone, the ability to exploit the effects of institutional quality, FDI, and domestic investment is essential for achieving enduring prosperity and ensuring the well-being of the region's populations. In light of these findings, it is clear that policymakers in South Asia should prioritize efforts to enhance institutional quality, attract foreign investments, and promote domestic capital formation. These efforts should extend beyond addressing immediate economic challenges and focus on creating an environment conducive to sustained economic growth. Furthermore, the empirical results underscore the need

for a balanced approach that recognizes the interplay between long and short-term dynamics, and the importance of developing comprehensive economic policies that incorporate both.

5.1.   Recommendations

Based on the results of different econometric techniques the following recommendations are recommended for South Asian countries to increase the process of economic development:

- Strengthening institutions is vital for sustainable economic growth. South Asian countries should focus on the Rule of Law, Regulatory Reforms, and Good Governance. Enhance the legal framework, ensure property rights, and reduce corruption. Effective legal institutions and the protection of property rights are crucial for attracting investment and fostering economic growth. Promote transparency, accountability, and good governance in the public sector. This will help build trust, reduce rent-seeking behavior, and improve resource allocation.
- Encourage FDI as it can bring not only capital but also technology, skills, and market access. Create an environment that is attractive to foreign investors by offering incentives, ensuring the protection of investments, and reducing barriers to entry.
- Develop Special Economic Zones (SEZs) to attract FDI by providing tax incentives, streamlined regulations, and necessary infrastructure. Collaborate with neighboring countries to create regional investment agreements and harmonize investment regulations, making the region more attractive to investors.
- Encouraging domestic investment is vital for stimulating economic growth. Improve access to finance for small and medium-sized enterprises (SMEs) by developing a well-functioning banking system and promoting alternative sources of financing like venture capital and angel investors.
- Increase investment in infrastructure projects that can enhance the business environment, such as transportation, energy, and digital infrastructure. Increase investment in innovation and R&D to foster domestic technological capabilities and improve competitiveness.
- South Asian countries should consider deeper regional economic integration and cooperation to harness their collective potential. Strengthen existing trade agreements and explore new regional trade arrangements to promote cross-border trade. Work towards the harmonization of regulations, standards, and procedures to reduce trade barriers and improve economic integration within the region.

Authors' Contribution
Muhammad Ali Husnain: Writing Original Draft, Literature Reviewing & Editing, Data Analysis & Interpretations
Ping Guo: Supervision, Conceptualization, Review, and Editing
Guoqin Pan: Data Curation, Methodology, Visualization
Aqsa Shaukat: Revising the Draft & Editing

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