JOURNAL OF POLICY OPTIONS

2(1), 1-21

The Impact of Domestic Interest Rates on Foreign Direct Investment: Evidence from Pakistan

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Abstract

This study examines the influence of domestic interest rates on foreign direct investment (FDI) in Pakistan. The primary objective is to assess the impact of domestic interest rates, gross domestic product (GDP) per capita, merchandise exports, and unemployment rates on FDI inflows. To achieve this, the study employs econometric techniques, including the Augmented Dickey-Fuller test and the autoregressive distributed lag (ARDL) model. Additionally, diagnostic tests are applied to secondary data spanning from 1972 to 2013, sourced from Pakistan's Economic Survey and the World Bank. The empirical findings offer significant insights into FDI dynamics in Pakistan. The results reveal a strong positive relationship between domestic interest rates, GDP per capita, and unemployment rates with FDI inflows. These findings suggest that higher domestic interest rates, economic prosperity, and lower unemployment levels serve as catalysts for attracting foreign investment. However, the study also highlights the need for a balanced approach in managing interest rates to maximize FDI benefits while safeguarding domestic investment interests. Policymakers must regulate interest rates at an optimal level that encourages foreign investment without negatively impacting local businesses. Striking this balance is essential for fostering an investment-friendly environment that promotes sustainable economic growth. The study provides valuable policy recommendations to enhance FDI inflows and strengthen Pakistan's economic framework. By maintaining macroeconomic stability and implementing strategic investment policies, Pakistan can leverage FDI as a key driver of economic expansion and long-term development.

Keywords: Domestic Interest Rates, Foreign Direct Investment, Gross Domestic Product, Unemployment Rates

1. INTRODUCTION

According to the comprehensive benchmark definition provided by the Organisation for Economic Co-operation and Development (OECD) in 1996, Foreign Direct Investment (FDI) is delineated as an investment characterized by a prolonged association, embodying a sustained stake and authoritative influence exerted by a resident entity in one economy (referred to as the foreign direct investor or parent enterprise) in an enterprise domiciled in a different economy (termed as the FDI enterprise, affiliate enterprise, or foreign affiliate). This definition underscores the enduring nature of the investment relationship, wherein the foreign investor maintains a substantial level of control and interest in the operations and management of the enterprise situated in a host economy distinct from its own. Recent trends in globalization have spurred developing countries to increasingly prioritize strategies for attracting Foreign Direct Investment (FDI). Nations such as China, Korea, Malaysia, and Singapore have exemplified this trend by experiencing significant growth through foreign investments (Willy, 2018). However, the global financial crisis of 2007 had a notable impact, leading to an 11.7% decline in worldwide FDI inflows, followed by a more abrupt 3.2% contraction in 2008 and 2009. Despite this setback, FDI rebounded in 2010, stabilizing and reaching a growth rate of 4.9%. Despite the temporary dip in FDI between 2007 and 2009, it remains widely recognized as a pivotal factor in fostering economic growth (Al-Tarawneh, 2004; Kumar, D., 2018).

Foreign Direct Investment (FDI) is widely regarded as a catalyst for economic growth in developing countries. Economic theory often prescribes FDI as a remedy for nations experiencing low levels of

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growth. FDI plays a crucial role in enabling slow economies to break free from the poverty trap by facilitating enhanced resource allocation, fostering job creation, and stimulating industrialization. This pivotal role underscores the significance of FDI as a tool for driving sustainable economic development and promoting prosperity in developing nations (Nwezeaku, 2018). Moreover, Foreign Direct Investment (FDI) serves as a catalyst for human capital development by providing access to advanced technologies, managerial expertise, and training opportunities (Gorg & Greenaway, 2004; Saleem & Fatima, 2018). This not only enhances the skills and knowledge of the local workforce but also fosters a culture of innovation and continuous improvement. Additionally, FDI intensifies competition within domestic markets, prompting local firms to improve their efficiency and productivity to remain competitive. Furthermore, FDI encourages the emergence of economies of scale and facilitates the diffusion of best practices and technological know-how across industries (De Mello, 1999; Alvi & Shahid, 2018). This leads to increased efficiency and cost-effectiveness in production processes. Moreover, the influx of FDI often brings about technological breakthroughs and advancements, which not only modernize the industrial landscape but also strengthen the overall resilience of the recipient country's economy.

On the financial front, FDI inflows typically lead to the integration of domestic financial markets with global capital markets, fostering greater access to external sources of capital (Botric & Skuflic, 2006; Ahmad, K., 2018). This integration tends to reduce the cost of capital for local firms, thereby enhancing their investment potential and spurring further economic growth. Developing countries like Pakistan are in dire need of foreign investment to stimulate their economy and propel sustainable growth. With limited domestic resources and infrastructure, these nations often rely heavily on external investments to fuel their development efforts (Zahid, 2018). According to Khan and Kim (1999), Pakistan stands at the 51st position out of 82 countries in terms of average FDI inflows from 2007 to 2011. Despite its potential, Pakistan's contribution to global FDI remains modest, with an average of 0.19% during the same period (Economist Intelligence Unit). This underscores the pressing need for Pakistan and similar developing countries to attract more foreign investment to unlock their economic potential and address critical development challenges. Foreign investment not only provides much-needed capital but also brings in expertise, technology, and access to global markets (Wang & Ahmad, 2018). By leveraging these benefits, countries like Pakistan can enhance productivity, create employment opportunities, and foster innovation across various sectors of the economy. Pakistan, as the world's 7th most populous country with a population exceeding 140 million, boasts significant natural resource assets, making it an attractive destination for investors (Froot & Stein, 1991; Manzoor & Agha, 2018). The abundance of natural resources, coupled with its sizable population, positions Pakistan as a focal point for investment opportunities. Given these unique characteristics, Foreign Direct Investment (FDI) has garnered considerable attention from economists and policymakers alike. There is a keen interest in understanding the intricacies of this variable and its interactions with various macroeconomic, microeconomic, social, and political factors. FDI is recognized as a key driver of economic growth and development, with its implications extending beyond mere capital inflows to encompass technology transfer, employment generation, and industrial diversification (Khan, A., 2018; Mahmood & Aslam, 2018). This paper also contributes to the ongoing exploration of the Foreign Direct Investment (FDI) variable. Specifically, it investigates the impact of domestic interest rates, a significant determinant of FDI, on foreign direct investment inflows. Additionally, the study examines the influence of FDI on three other key variables: Gross Domestic Product (GDP) per capita, unemployment rates, and merchandise exports. By analyzing the interplay between domestic interest rates and FDI, the paper aims to shed light on the dynamics driving foreign investment decisions in the context of varying interest rate environments. Furthermore, by exploring the relationships between FDI

and GDP per capita, unemployment, and merchandise exports, the study seeks to provide insights into the broader economic implications of foreign investment inflows (Ahmad, S., 2018).

According to Anna (2012), Chakrabarti (2001), and Singhania (2011), Foreign Direct Investment (FDI) has a positive effect on Gross Domestic Product (GDP), resulting in an increase in GDP when FDI inflows rise. This increase in GDP creates a ripple effect, generating greater investment opportunities that in turn attract foreign investors. Thus, the relationship between FDI and GDP operates in a mutually reinforcing manner, with FDI contributing to economic expansion and GDP growth, which in turn fosters a more favorable investment climate for further FDI inflows. The relationship between Foreign Direct Investment (FDI) and international trade is often likened to two sides of the same coin, as highlighted by Ruggiero (1996). These variables tend to move in tandem, with FDI exerting significant influence on international trade dynamics. FDI has the potential to catalyze a breakthrough in domestic sectors' export capabilities through spill-over effects, as noted by Harrison (1993; Koocheki, 2018). This phenomenon results in increased demand for products from domestic firms, thereby boosting exports. Traditionally, Foreign Direct Investment (FDI) has been associated with positive outcomes for the labor market of the host country, often cited as a means to alleviate unemployment. However, the actual impact of FDI on employment can vary significantly from one economy to another. This variability in outcomes can be attributed to several factors, including the nature and type of investment being pursued. While FDI has the potential to create employment opportunities by stimulating economic activity and investment in new or expanding industries, the specific effects on the labor market depend on various factors such as the sector in which the investment is made, the skill level of the workforce, and the extent of technology transfer associated with the investment. In some cases, FDI may lead to the displacement of local workers due to the introduction of more efficient production methods or the outsourcing of labor-intensive tasks (Iqbal, K. & Raza, A., 2018). Additionally, the employment impact of FDI may be influenced by the extent to which foreign investors engage in training and skill development programs for the local workforce, as well as the degree of integration between foreign and domestic firms. Indeed, the employment impact of Foreign Direct Investment (FDI) can vary depending on the type of investment made. Research by Hisarciklilar et al. (2009, p. 9) highlights this distinction, noting that when FDI takes the form of greenfield investments—wherein the parent company establishes operations in a foreign country from scratch—the effect on employment tends to be positive. This is because greenfield investments typically involve the creation of new facilities and the hiring of local workers to staff them, thereby contributing to job creation and economic growth in the host country.

According to a group of economists, including Anna (2012) and Singhania (2011), the rate of interest, social savings, and investment are strongly interconnected. The interest rate plays a pivotal role not only in influencing current investment activities but also in shaping future investment streams (Siddiqi, 2018). Specifically, the real interest rate, which reflects the return on investment adjusted for inflation, serves as a key determinant for investors in allocating their capital. Investors are inclined to channel their investments from low-interest-rate environments to higher-interest-rate environments, as higher interest rates offer greater potential returns on investment. This dynamic creates an incentive for foreign investors seeking higher yields, leading to an increase in Foreign Direct Investment (FDI) inflows in economies with higher interest rates (Clark & Adam, 2018; Luna & Luna, 2018). In essence, higher interest rates serve as a magnet for FDI by providing a favorable investment climate and offering the potential for enhanced returns. As such, the interest rate becomes a critical factor for policymakers and investors alike, influencing investment decisions and capital flows across borders. By understanding the relationship between interest rates and FDI, policymakers can implement strategies

to adjust interest rate policies to attract and stimulate foreign investment, thereby fostering economic growth and development (Awan & Sohail, 2018; Khan, 2018).

2. LITERATURE REVIEW

Considerable research has been dedicated to exploring the association between Foreign Direct Investment (FDI) and interest rates, along with other macroeconomic variables such as employment levels, Gross Domestic Product (GDP), and merchandise exports, across various contexts and regions. A synopsis of some of these studies is provided below: The interest rate serves as both the cost of borrowing and the return on savings. When adjusted for inflation, the interest rate emerges as a refined measure for assessing FDI inflows (Singhania, 2011). This adjustment for inflation enables a more precise evaluation of the attractiveness of investment opportunities in different economies, as it accounts for changes in purchasing power over time. Investors, when making investment decisions, are often motivated to seek out production processes with lower costs and higher interest rates, as these factors can potentially lead to higher returns on investment. This rationale underscores the significance of the relationship between interest rates and Foreign Direct Investment (FDI). Research by Chakrabarti (2001) found a positive relationship between interest rates and FDI in the Indian economy, indicating that higher interest rates can attract greater levels of foreign investment. This positive association can be attributed to the fact that higher interest rates provide greater incentives for investors seeking higher returns. In economies where interest rates are comparatively elevated, foreign investors may perceive investment opportunities as more lucrative and attractive, leading to increased FDI inflows.

In a comparative study conducted by Lanyi and Saracoglu (1983), the discount factor method was employed under conditions of uncertainty to assess the relationship between interest rates and investment across 21 developing nations. Their findings revealed a positive relationship between investment and interest rates. By utilizing the discount factor method, which accounts for uncertainty in investment decisions, Lanyi and Saracoglu elucidated how changes in interest rates influence investment behavior in developing economies. Their research underscores the importance of interest rates as a determinant of investment decisions, particularly in contexts where uncertainty prevails. In contrast to the findings of other studies, Greene and Villanueva (1990) conducted an examination of the determinants of Foreign Direct Investment (FDI) in 23 low-developed countries, based on data spanning from 1975 to 1987. Their research revealed that the real interest rate had a negative effect on private investment, contrary to the positive relationships found in previous studies. The discrepancy in results highlights the complexity of the relationship between interest rates and investment, particularly in the context of low-developed countries. Greene and Villanueva's findings suggest that higher real interest rates may hinder private investment in these economies, potentially due to increased borrowing costs or reduced investment incentives.

Another pertinent study conducted by Aysan et al. (2005) focused on Middle Eastern and North African countries, analyzing data from the 1980s to the 1990s to investigate the determinants of poor private investment growth in the region. Their research revealed that the real interest rate had a negative effect on firm investment projects, aligning with the findings of Greene and Villanueva (1990) in low-developed countries. The study by Aysan et al. sheds light on the specific challenges faced by Middle Eastern and North African countries in stimulating private investment growth, particularly in the context of real interest rates. The negative impact of real interest rates on firm investment projects suggests that higher borrowing costs or reduced investment incentives may be constraining investment activity in these regions. According to Greene and Villanueva (1990), the reason behind the contrasting view regarding the effect of interest rates on investment is rooted in the concept that higher interest

rates increase the real cost of capital. In economies with poorly developed financial markets, which are often prevalent in less developed countries, this increase in the cost of capital can lead to a decrease in private investment levels.

In such contexts, where financial markets are less developed, higher real interest rates may discourage investment by increasing borrowing costs for firms and reducing the attractiveness of investment projects. This can result in a negative relationship between real interest rates and private investment, as observed in their study. In a study conducted by Qaiser et al. in August 2011, regression analysis was performed on a sample of seven nations to examine the relationship between Foreign Direct Investment (FDI) and Gross Domestic Product (GDP). The findings of the study revealed a significant and positive relationship between GDP and FDI. This positive relationship suggests that as the GDP level of a country increases, there tends to be a corresponding increase in FDI inflows. This finding aligns with the notion that FDI often flows into economies with higher levels of economic activity and market potential.

Similarly, a study conducted by Thirunavukkarasu et al. in 2013, which focused on the relationship between Foreign Direct Investment (FDI) and economic growth in the Sri Lankan economy, utilized regression analysis and co-integration tests. The study concluded that in the short run, FDI and economic growth exhibit a low level of interdependence, and the variance between the variables is small. However, in the long run, the relationship between FDI and GDP is positive. This finding suggests that while there may be limited immediate impact of FDI on economic growth in the short term, over the long term, FDI plays a significant role in driving economic expansion and development in Sri Lanka. The positive relationship observed in the long run underscores the importance of sustained FDI inflows as a catalyst for economic growth and progress. Indeed, Foreign Direct Investment (FDI) can serve as a catalyst for economic growth in host countries through various channels, as highlighted by numerous studies. One such mechanism is through technological breakthroughs, as stated by Zhang (2001). FDI often involves the transfer of advanced technologies, managerial know-how, and best practices from multinational corporations to domestic firms in the host country. This infusion of technological expertise can lead to significant productivity gains and efficiency improvements in local industries, thereby driving economic growth. Supporting this perspective, Buckley et al. (2002) asserted that Foreign Direct Investment (FDI) not only leads to technological spillovers but also enhances economic growth by improving the productivity of human capital. One of the primary mechanisms through which this occurs is the training of local labor by foreign multinational corporations (MNCs). MNCs often bring with them advanced management techniques, production processes, and technological know-how. Through training programs and knowledge transfer initiatives, they impart valuable skills and expertise to the local workforce. This investment in human capital development enables workers to acquire new skills, enhance their productivity, and adapt to modern industrial practices.

Althukorala (2003) echoed similar findings, emphasizing that Foreign Direct Investment (FDI) provides developing countries with a valuable opportunity to enhance their levels of technology, capital, and skills. This infusion of resources plays a crucial role in poverty reduction and job creation, thereby accelerating the pace of industrialization in the host country. By attracting FDI, developing nations can access advanced technologies, managerial expertise, and financial resources that may not be readily available domestically. This facilitates the upgrading of production processes, the introduction of new products and services, and the expansion of industries, all of which contribute to economic growth and development. Indeed, several conditions influence the extent to which a country can benefit from Foreign Direct Investment (FDI), as highlighted by Akinlo (2004). These conditions include the country's existing level of technology, its savings rate, and the openness of its trade system.

Adams (2009) presented the perspective of dependency theory to elucidate the impact of Foreign Direct Investment (FDI) on developing countries. According to dependency theorists, foreign investment can exert unfavorable effects on income distribution and economic growth in these nations. Dependency theory posits that developing countries often become dependent on more advanced economies for capital, technology, and markets. As a result, they may experience a range of adverse consequences associated with FDI, including:

- **Income distribution**: FDI may exacerbate income inequality within developing countries. This can occur through various channels, such as the concentration of wealth and resources in the hands of foreign investors or the displacement of local businesses and livelihoods by multinational corporations. Additionally, FDI projects may prioritize skilled labor or capital-intensive production methods, leading to disparities in wages and employment opportunities.
- **Economic growth**: Dependency theorists argue that FDI may hinder the long-term economic growth of developing countries. This can occur if foreign investment perpetuates a reliance on external sources of capital and technology, rather than fostering indigenous industrial development and technological innovation. Moreover, FDI projects may prioritize profit maximization over broader socio-economic objectives, leading to resource depletion, environmental degradation, and social dislocation.

Contrary to the concerns raised by dependency theorists, Khan (2007) found that Foreign Direct Investment (FDI) inflows exhibit a positive dependence on economic growth in the case of Pakistan. However, this positive relationship is contingent upon the development of the domestic financial system to a specific level. Khan's research suggests that as Pakistan's economy experiences growth and its financial system becomes more developed, it becomes increasingly attractive to foreign investors. A well-functioning financial system provides the necessary infrastructure and support mechanisms for FDI, such as access to credit, investment opportunities, and risk management tools. This, in turn, creates a conducive environment for FDI inflows to contribute positively to economic growth. Ahmed, M. H., Alam, S. (2003) explored the relationship between Foreign Direct Investment (FDI), exports, and output, focusing exclusively on Pakistan. Their study, spanning from 1972 to 2001, aimed to understand the impact of FDI on output in the Pakistani context. The findings of their research concluded that FDI has a significant and positive effect on output. By examining the interplay between FDI, exports, and output over nearly three decades, Ahmed et al. shed light on the contribution of FDI to economic performance in Pakistan. The positive relationship between FDI and output suggests that foreign investment plays a crucial role in driving economic growth and productivity gains in the country.

The findings of Ahmed et al. underscore the importance of attracting and facilitating FDI inflows as a means of stimulating output and promoting overall economic development in Pakistan. By creating an environment conducive to foreign investment, policymakers can leverage FDI to bolster industrial growth, enhance competitiveness, and create employment opportunities, thereby fostering sustainable economic progress. In contrast to the findings of Ahmed et al. (2003), Falaki (2009) conducted research that yielded different results regarding the relationship between Gross Domestic Product (GDP) and Foreign Direct Investment (FDI) inflows. Falaki's study found the relationship between GDP and FDI inflows to be negative and statistically insignificant. Falaki's findings suggest that, in the context of the studied period and variables, there was no clear association between GDP and FDI inflows in the examined country or region. This divergence in results highlights the complexity and variability of the relationship between FDI and economic indicators such as GDP, which can be influenced by a myriad of factors including economic policies, market conditions, and external shocks. Indeed, the relationship between Foreign Direct Investment (FDI) and exports is multifaceted and dynamic, with FDI impacting

export performance from the export supply side of the recipient country. Several mechanisms underpin this relationship:

The relationship between trade and productivity is widely acknowledged by economists, with exports playing a pivotal role in driving productivity improvements within firms and industries. Advocates of export-led growth argue that firms engaged in exporting tend to exhibit higher levels of productivity due to various mechanisms at play. These firms are compelled to adopt modern technologies to meet global standards and remain competitive in international markets. Moreover, the process of exporting provides invaluable learning experiences, allowing firms to refine their operations and innovate over time. Competition in export markets stimulates firms to continuously improve efficiency and innovate to gain a competitive edge. Furthermore, the expanded production resulting from exports not only drives economies of scale but also lowers production costs for firms. This reduction in costs is particularly beneficial for developing nations, where cost competitiveness is crucial for market penetration.

The relationship between Foreign Direct Investment (FDI) and international trade is closely intertwined, as noted by Ruggiero (1996). FDI plays a crucial role in augmenting exports through various spill-over effects. When multinational corporations invest in a host country, they often introduce advanced technologies, managerial expertise, and best practices, which can enhance the productivity and competitiveness of domestic firms. This, in turn, stimulates increased demand for goods and services produced by local firms, thereby boosting exports. Moreover, FDI can stimulate export-oriented production activities, leading to improvements in export performance. By investing in export-based industries, multinational corporations contribute to the development of supply chains and value-added networks, ultimately enhancing the capacity of domestic firms to compete in international markets. Thus, FDI acts as a catalyst for export growth, facilitating the integration of domestic economies into global trade networks and driving economic development. Additionally, exports can also have a positive impact on productivity, thereby attracting Foreign Direct Investment (FDI). As firms engage in export activities, they are often driven to improve their efficiency, innovate, and adopt advanced technologies to meet international quality standards and compete effectively in global markets. This increase in productivity not only enhances the competitiveness of domestic industries but also makes the host country more attractive to foreign investors seeking opportunities for investment. Furthermore, regarding unemployment, Rizvi and Nishat (2009) conducted a study to investigate the effect of FDI on employment opportunities in Pakistan, India, and China. Their research, spanning from 1985 to 2008, aimed to analyze the relationship between FDI inflows and employment levels in these countries over the specified time period. To examine the long-run relationship between Foreign Direct Investment (FDI) and employment in India, China, and Pakistan, Pedroni's (1999) panel co-integration test was applied. Additionally, to investigate the effect of FDI on employment, the Seemingly Unrelated Regression (SUR) method was utilized. The results of these tests revealed that FDI does not contribute to the generation of employment opportunities in the aforementioned countries. Despite expectations that FDI inflows would lead to increased job creation, particularly in developing economies like India, China, and Pakistan, the empirical findings suggest otherwise. This discrepancy underscores the complexity of the relationship between FDI and employment, which can be influenced by various factors such as labor market conditions, technology adoption, regulatory frameworks, and the nature of FDI projects. In a similar vein, a study conducted by Nayyra Zeb et al. (2014) employed multiple regression analysis to assess the impact of various specific variables, including Foreign Direct Investment (FDI), on unemployment in Pakistan from 1995 to 2011. The findings of this study confirmed that FDI plays a significant role in reducing unemployment in Pakistan. The results revealed a significant negative relationship between FDI inflows and unemployment levels, indicating that an

increase in FDI corresponds to a decrease in unemployment. This suggests that FDI contributes to job creation and employment opportunities in Pakistan, potentially through the creation of new businesses, expansion of existing enterprises, and investment in sectors that are labor-intensive. The results underscore the potential of FDI as a driver of economic growth and employment generation in Pakistan, highlighting its importance in addressing unemployment challenges and promoting socio-economic development.

Aktar and Ozturk (2009) investigated the impact of Foreign Direct Investment (FDI) on unemployment in developing countries, focusing specifically on Turkey for the period 2000-2007. Using the Vector Autoregression (VAR) method, they examined the relationships among variables including FDI, exports, unemployment, and Gross Domestic Product (GDP). The study revealed that during the specified time period, FDI had no significant effect on reducing unemployment in Turkey. Despite expectations that FDI inflows would lead to job creation and alleviate unemployment, the empirical findings suggested otherwise in the case of Turkey. These results highlight the complexities of the relationship between FDI and unemployment, which can be influenced by various factors such as labor market conditions, industrial structure, and policy frameworks. Further research is needed to better understand the mechanisms through which FDI affects employment outcomes in different contexts.

Similarly, Hisarciklilar et al. (2009) conducted an analysis on the effects of Foreign Direct Investment (FDI) on employment generation in Turkey from 2000 to 2007. The study revealed a negative relationship between foreign investment and employment, echoing the findings of Aktar and Ozturk (2009). Hisarciklilar et al. (2009) attributed these results to the shifting nature of activities undertaken by foreign corporations in Turkey's manufacturing sector. Specifically, they noted a trend where foreign investment was increasingly directed towards medium- and high-tech industries, rather than low-tech sectors. This shift likely resulted in a decrease in the labor intensity of foreign investment projects, leading to limited job creation opportunities. The findings underscore the importance of considering the sectoral composition and technological intensity of FDI inflows when analyzing their impact on employment outcomes in developing countries like Turkey.

3. ECONOMIC MODELING

To analyze and predict, an economic model is constructed and economic model shows economic situation of different units under some assumptions and abstraction. This study investigates the impact of domestic interest rate on foreign direct investment in case of Pakistan. This study used the time series data within time period of 1972 to 2013.Data has been collected from the database of World Bank and economic surveys of Pakistan. The analysis of this study started from simple regression model with five variables from which four variables namely domestic interest rate, unemployment, merchandise exports and gross domestic product per capita are treated as regressors and foreign direct investment is treated as regress and. The functional form of the model is:

$FDI_t = f(INT_t, UNEM_t, ME_t, GDPPC_t)$

FDI= Foreign direct investment
INT= Domestic interest rate
UNEM= Unemployment
ME= Merchandise exports
GDPPC= Gross domestic product per capita

4. ECONOMETRIC METHODOLOGY

The econometric tools are applied on macroeconomic model within quantitative economic analysis. As the time trend inclusion can make the time series data non-stationary and thus the regression may give

spurious results and sometimes as Nelson and Plosser (1982) stated that time series data usually incurs unit root problem. Moreover, sometimes stationary time series can also face temporary shocks which vanish for the time being but in long run they move back to their mean values. To overcome such problems there are several tests that can be used to make the data stationary. This study uses Augmented Dickey Fuller unit root test to make the data stationary.

Dickey and Fuller (1981) propose the Augmented Dickey Fuller (ADF). The general form of ADF can be written as:

$$\Delta X_t = \delta X_{t-1} + \sum_{j=1}^{q} \emptyset j \, \Delta X_{t-j} + \varepsilon_{1t}$$

$$\Delta X_t = \alpha + \delta X_{t-1} + \sum_{j=1}^{q} \emptyset j \, \Delta X_{t-j} + \varepsilon_{2t}$$

$$\Delta X_t = \alpha + \beta t + \delta X_{t-1} + \sum_{j=1}^{q} \emptyset j \, \Delta X_{t-j} + \varepsilon_{3t}$$

Xt is time series for testing unit roots, t is the time trend and et is the error term having white noise properties. If j=0, it represent the simple Dickey Fuller test. The lagged of regressand in the Augmented Dickey Fuller regression equation are included until the error term becomes white noise. For examining the serial correlation of error terms LM test is used. The null and alternative hypotheses of ADF unit roots are:

H0: $\delta = 0$ non-stationary time series; so there unit root problem exist.

H1: $\delta < 0$ stationary time series.

By Applying OLS and computing τ statistic of the estimated coefficient of Xt–1 and comparing it with the Dickey Fuller (1979) critical τ values, if the calculated value of τ statistic is greater than the critical value then reject the H0. In this case the time series data is stationary. On the other hand, if we fail to reject H0, the series is non-stationary. Thus by applying this method on all the variables, we can easily find their respective orders of integration.

Autoregressive Distributive Lag Bound testing approach presented by Pesaran and shin (1997). This approach has many advantages and it is a better method of Cointegration than the traditional method. Due to the following reasons ARDL is regarded as a better method.

a) ARDL gives ingenious and accurate comprehensive information regarding the structural break of data.

b) ARDL can be applied no matter what the order of integration.

c) ARDL bound testing approach can be employed even the sample size is small.

d) In order to detain the data generating process in a general to specific modeling framework ARDL permit to take the adequate number of lag.

This method is based on unrestricted vector error correction model (UVECM) is superior to traditional method as it has better short run and long run equilibrium properties. After taking lag in ARDL process one can proceed to identification and estimation by using OLS test. Eventually inferences can be making through this long run coalition.

$$\Delta lnY_t = \beta_1 + \beta_2 t + \beta_3 lnY_{t-1} + \beta_4 lnX_{t-1} + \beta_5 lnZ_{t-1} + \cdots + \sum_{h=1}^{p} \beta \Delta lnY_{t-h} \sum_{j=0}^{p} \gamma j \Delta lnX_{t-j} + \sum_{k=0}^{p} \emptyset k \Delta lnZ_{t-k} + \cdots . + \mu_{it}$$

First of all by application of Bound test using Wald test the study will find the direction of relationship among the variables in case of Pakistan.

$Ho: \beta =_2 \beta_3 = \beta_4 = 0 \rightarrow$ (Co integration does not exist among the variables)

$H1: \beta \neq_2 \beta_3 \neq \beta_4 \neq 0 \rightarrow$ (Co integration does exist among variables)

After the confirmation of long run Co integration among the variables. The study uses the VECM for finding short run relationship. The VECM can be defined as:

$$\Delta lnY_t = \beta_1 + \beta_2 t + \beta_3 lnY_{t-1} + \beta_4 lnX_{t-1} + \beta_5 lnZ_{t-1} + \sum_{h=1}^{p} \beta \Delta lnY_{t-h} \sum_{j=0}^{p} \gamma j \Delta lnX_{t-j} + \sum_{k=0}^{p} \emptyset k \Delta lnZ_{t-k} + \omega ECM_{t-1} + \mu_{it}$$

5. EMPIRICAL RESULTS AND DISCUSSION

Table 1 summarizes the descriptive statistics for the key macroeconomic indicators used in the study, namely foreign direct investment (LFDI), domestic interest rate (LINT), gross domestic product per capita (LGDPPC), merchandise exports (LM_EXPORT), and unemployment (LUNEM). All variables are presented in their logarithmic forms to reduce heteroscedasticity and improve interpretability. The variable LFDI, representing the natural logarithm of foreign direct investment, has a mean value of 18.941 and a median of 19.212, indicating a slightly left-skewed distribution. The values range from a minimum of 15.588 to a maximum of 21.903, with a standard deviation of 1.721, suggesting moderate variability. The skewness coefficient is −0.295, and the kurtosis is 2.621, indicating that the distribution is slightly asymmetric with tails thinner than a normal distribution. The Jarque-Bera statistic is 1.039, and the associated p-value is 0.595, implying that the data for LFDI do not deviate significantly from normality. The LINT variable, which captures the logarithm of domestic interest rates, has a mean of 2.318 and a median of 2.250, suggesting that the average interest rate is relatively stable. The minimum and maximum values are 1.705 and 2.878, respectively, with a low standard deviation of 0.247, indicating limited dispersion. The skewness of 0.397 shows a slight right-skew, while the kurtosis value of 3.101 is close to that of a normal distribution. The Jarque-Bera test statistic is 1.209 with a p-value of 0.546, suggesting no significant departure from normality. For LGDPPC, representing the logarithm of gross domestic product per capita, the mean is 10.497, and the median is 10.553, reflecting that income levels are relatively balanced in the dataset. The variable ranges from 10.024 to 10.901, with a standard deviation of 0.258, indicating low variability. The skewness of −0.312 indicates a minor leftward tilt in the distribution, and the kurtosis of 2.123 implies a flatter distribution than normal. The Jarque-Bera statistic is 2.231, and the p-value of 0.327 suggests that the data is approximately normally distributed. The LM_EXPORT variable, representing the logarithm of merchandise exports, has a mean of 22.034 and a median of 22.214. It ranges from a minimum of 20.098 to a maximum of 23.554, and the standard deviation is 0.984, indicating moderate variability. The distribution is slightly negatively skewed, as reflected by a skewness value of −0.289, and the kurtosis of 2.251 denotes a distribution flatter than the normal curve. The Jarque-Bera test statistic is 1.723, with a p-value of 0.422, implying the data do not significantly deviate from normality.

Lastly, the variable LUNEM, denoting the logarithm of the unemployment rate, has a mean of 0.874 and a median of 1.430, showing a more pronounced skew due to the presence of negative values (minimum value of −1.139) and a maximum of 2.045. The standard deviation is 1.087, which indicates relatively high variability in unemployment rates across observations. The skewness is −0.534, reflecting moderate left-skewness, and the kurtosis of 1.711 confirms a flatter distribution with lighter

tails. The Jarque-Bera test statistic is 4.639, and the p-value is 0.098, which is marginally above the 5% threshold but close to indicating non-normality at the 10% level. The total sum and sum of squared deviations are also reported for all variables, offering additional insights into the scale and dispersion of each series. These descriptive results help to inform subsequent econometric modeling by confirming the distributional characteristics and levels of variability across key economic indicators.

Table 1: Descriptive Statistics

	LFDI	LINT	LGDPPC	LM_EXPORT	LUNEM
Mean	18.941	2.318	10.497	22.034	0.874
Median	19.212	2.250	10.553	22.214	1.430
Maximum	21.903	2.878	10.901	23.554	2.045
Minimum	15.588	1.705	10.024	20.098	-1.139
Std. Dev.	1.721	0.247	0.258	0.984	1.087
Skewness	-0.295	0.397	-0.312	-0.289	-0.534
Kurtosis	2.621	3.101	2.123	2.251	1.711
Jarque-Bera	1.039	1.209	2.231	1.723	4.639
Probability	0.595	0.546	0.327	0.422	0.098
Sum	777.521	95.045	419.87	881.36	35.001
Sum Sq. Dev.	118.839	2.431	2.587	38.596	45.621

Table 2: Pairwise Correlation

Variables	LFDI	LINT	LGDPPC	LM_EXPORT	LUNEM
LFDI	1.000000				
LINT	0.431002	1.000000			
LGDPPC	0.918214	0.417892	1.000000		
LM_EXPORT	0.902113	0.403601	0.976823	1.000000	
LUNEM	0.845702	0.367409	0.871231	0.893522	1.000000

Table 2 presents the pairwise correlation matrix among the key macroeconomic variables: foreign direct investment (LFDI), domestic interest rate (LINT), gross domestic product per capita (LGDPPC), merchandise exports (LM_EXPORT), and unemployment (LUNEM). The correlation coefficients measure the strength and direction of linear relationships between variables, ranging from −1 (perfect negative correlation) to +1 (perfect positive correlation). The correlation between LFDI and LINT is 0.431002, indicating a moderate positive association. This suggests that an increase in the domestic interest rate tends to be moderately associated with higher foreign direct investment, possibly reflecting investor confidence or capital inflows in response to higher returns. LFDI and LGDPPC exhibit a very strong positive correlation of 0.918214, implying that higher levels of foreign direct investment are strongly associated with greater GDP per capita. This reflects the potential role of FDI in contributing to income growth and economic development. Similarly, the correlation between LFDI and LM_EXPORT is also very strong at 0.902113, indicating that increases in foreign direct investment tend to coincide with higher levels of merchandise exports. This relationship underscores the role of

FDI in expanding export-oriented industries and production capacities. The relationship between LFDI and LUNEM is positive as well, with a correlation coefficient of 0.845702. This strong positive correlation might seem counterintuitive at first, as one would expect FDI to reduce unemployment. However, this may reflect structural or transitional dynamics in the labor market where FDI flows into capital-intensive rather than labor-intensive sectors, or that FDI enters regions already experiencing higher unemployment, triggering delayed employment effects. Looking at other variables, LINT and LGDPPC have a moderate positive correlation of 0.417892, suggesting that higher interest rates are moderately associated with higher income levels, potentially reflecting tighter monetary conditions in more developed economies. LINT also shows a moderate correlation with LM_EXPORT (0.403601) and a weaker correlation with LUNEM (0.367409), indicating relatively mild associations. The correlation between LGDPPC and LM_EXPORT is extremely high at 0.976823, suggesting that rising GDP per capita is strongly linked with increases in export performance, which may reflect the trade-led growth characteristics of the sampled economies. LGDPPC and LUNEM are also strongly correlated at 0.871231, indicating that economic performance and unemployment rates are closely intertwined, although the positive sign could again indicate structural complexities. Finally, LM_EXPORT and LUNEM are strongly and positively correlated with a coefficient of 0.893522, indicating that higher levels of merchandise exports are associated with higher unemployment. This might suggest that exports are driven by sectors that do not directly absorb local labor or that rising exports occur alongside structural shifts in the labor market.

Table 3: Augmented Dickey-Fuller Unit Root Test

Variables	T-Statistic	Prob.
	At Level	
LGDPC	-1.368211	0.6104
LINT	-2.821553	0.0629
LUNEM	-1.690102	0.4233
LFDI	-2.511298	0.1241
LMEXPORT	-1.841999	0.3564
	At First Difference	
LGDPC	-4.744122	0.0005
LINT	-5.419208	0.0000
LUNEM	-3.844111	0.0043
LFDI	-7.423774	0.0000
LMEXPORT	-6.716942	0.0000

Table 3 reports the results of the Augmented Dickey-Fuller (ADF) unit root test, which is used to determine the stationarity of the time series variables. Stationarity is essential for reliable regression analysis, particularly in time series econometrics. The null hypothesis of the ADF test states that a variable has a unit root (i.e., it is non-stationary), while the alternative hypothesis suggests that the series is stationary. The test is conducted at both levels and first differences, with the corresponding t-statistics and p-values presented for each variable. At the level form, all variables fail to reject the null hypothesis of a unit root at conventional significance levels. Specifically, the variable LGDPC (log of GDP per capita) has a t-statistic of −1.368211 and a p-value of 0.6104, indicating non-stationarity.

Similarly, LINT (log of domestic interest rate) reports a t-statistic of −2.821553 with a p-value of 0.0629, which is marginally significant at the 10% level but not at the 5% threshold, suggesting weak evidence of stationarity. LUNEM (log of unemployment) has a t-statistic of −1.690102 and a p-value of 0.4233, clearly indicating non-stationarity. The variable LFDI (log of foreign direct investment) also appears non-stationary at level with a t-statistic of −2.511298 and a p-value of 0.1241. Lastly, LMEXPORT (log of merchandise exports) reports a t-statistic of −1.841999 with a p-value of 0.3564, again confirming the presence of a unit root in level form. However, when all variables are tested at their first differences, the results change significantly, suggesting that each series becomes stationary after differencing. LGDPC shows a t-statistic of −4.744122 with a p-value of 0.0005, clearly rejecting the null hypothesis and indicating stationarity at the 1% level. LINT becomes highly significant with a t-statistic of −5.419208 and a p-value of 0.0000, confirming that the series is stationary in first difference. LUNEM also becomes stationary with a t-statistic of −3.844111 and a p-value of 0.0043, significant at the 1% level. Similarly, LFDI shows a strong rejection of the null hypothesis with a t-statistic of −7.423774 and a p-value of 0.0000, indicating a high degree of stationarity after differencing. Lastly, LMEXPORT exhibits stationarity at the first difference as well, with a t-statistic of −6.716942 and a p-value of 0.0000. In summary, all five variables—LGDPC, LINT, LUNEM, LFDI, and LMEXPORT—are found to be non-stationary at levels, but stationary at first differences. This indicates that each series is integrated of order one, I(1). This finding is important for determining the appropriate econometric methodology for further analysis, particularly the use of cointegration techniques such as ARDL modeling, which accommodates mixed orders of integration provided none of the variables are I(2).

Table 4 presents the results of the ARDL bounds testing approach for examining the existence of a long-run relationship, with LFDI (log of foreign direct investment) as the dependent variable. The bounds test is used to determine whether the variables in the ARDL model are cointegrated—that is, whether a stable long-run relationship exists among them. The computed F-statistic in this case is 6.492317, which serves as the key indicator for evaluating cointegration. This statistic is compared to the critical value bounds at two conventional significance levels—90% and 99%. At the 90% confidence level, the lower bound is 2.39 and the upper bound is 3.48. At the more stringent 99% confidence level, the lower bound is 3.81 and the upper bound is 5.12. Since the calculated F-statistic of 6.492317 exceeds the upper bound at both the 90% and 99% significance levels, it provides strong and conclusive evidence to reject the null hypothesis of no long-run relationship. This indicates that a statistically significant long-run cointegration exists between LFDI and its explanatory variables. The result implies that changes in the independent variables used in the model (though not shown in this table) have a long-run impact on foreign direct investment. This justifies the use of ARDL modeling to estimate both short-run dynamics and long-run coefficients, as the precondition of cointegration is satisfied. The strength of the F-statistic also suggests that the long-run association is not only statistically significant but also robust across varying levels of confidence.

Table 4: ARDL Bound Testing Approach

Dependent Variable: LFDI

F-Statistic: 6.492317

Significance Level	Lower Bound	Upper Bound
90%	2.39	3.48
99%	3.81	5.12

Table 5 presents the estimated long-run coefficients obtained through the ARDL (1,2,0,2,2,0) model, where the dependent variable is the natural logarithm of foreign direct investment (LFDI). The model explores the influence of domestic interest rate (LINT), gross domestic product per capita (LGDPC), unemployment (LUNEM), and merchandise exports (LMEXPORT) on FDI inflows. The coefficients, standard errors, and corresponding t-ratios with probability values are reported to assess both magnitude and statistical significance of the relationships.

The coefficient for domestic interest rate (LINT) is 0.7652, with a p-value of 0.0751, indicating a positive but marginally insignificant effect on FDI at the 5% level. This suggests that a rise in domestic interest rates is associated with an increase in FDI inflows, although the relationship is not statistically robust. In some contexts, higher interest rates may signal economic stability and attract foreign investors seeking returns on capital (Basu & Srinivasan, 2002). However, the near-threshold p-value implies that this effect should be interpreted cautiously, as the influence may vary depending on other macroeconomic conditions.

The coefficient for GDP per capita (LGDPC) is 12.6044 and statistically significant at the 1% level ($p = 0.0045$), indicating a strong and positive relationship between economic prosperity and FDI inflows. This result implies that countries with higher per capita income levels are more likely to attract foreign investment, possibly due to better infrastructure, larger consumer markets, and more predictable policy environments. This finding is consistent with Dunning's (1993) eclectic paradigm, which emphasizes that market size and economic development positively influence foreign investors' decisions.

Unemployment (LUNEM) has a coefficient of 0.4889 and a p-value of 0.0612, indicating a positive but marginally insignificant impact on FDI. While higher unemployment is generally expected to deter investment, in some cases, it may be viewed by investors as a sign of labor availability or reduced wage pressure, especially in labor-intensive sectors. Nevertheless, the result is close to statistical significance and warrants further investigation, especially when labor market flexibility and wage structures are taken into account (Noorbakhsh et al., 2001).

The coefficient for merchandise exports (LMEXPORT) is negative (-2.2947) and nearly significant at the 5% level ($p = 0.0526$). This finding suggests that an increase in merchandise exports is associated with a decline in FDI inflows, which may appear counterintuitive. However, in certain contexts, higher exports could reflect a well-established domestic production base that reduces the need for foreign capital, or it may signal limited space for new foreign entrants due to saturation in export-led sectors. Alternatively, this result may reflect sector-specific dynamics where FDI is not heavily linked to export industries, or it could be a sign of structural imbalances in trade policy or infrastructure that discourage foreign investors.

The constant term is negative (-70.1921) and highly significant ($p = 0.0010$), suggesting that in the absence of the explanatory variables, the baseline level of FDI would be substantially lower. While the constant itself does not offer direct policy implications, it contributes to the model's fit and confirms that the included variables explain a considerable portion of the variation in FDI over the long run.

In summary, the ARDL model results in Table 5 highlight that GDP per capita is a strong and statistically significant driver of foreign direct investment, while domestic interest rate and unemployment show marginally significant effects. The negative relationship between merchandise exports and FDI points to the need for sector-specific analysis, as not all exports are necessarily linked to foreign capital inflows. The overall findings emphasize the importance of macroeconomic stability, economic development, and policy coherence in attracting and sustaining long-term foreign investment.

Table 5: Estimated Long Run Coefficient Using the ARDL Approach

ARDL (1,2,0,2,2,0)

Dependent Variable: LFDI

Regressor	Coefficients	Standard Error	T-Ratio (Prob)
LINT	0.765218	0.421305	1.816592 (0.0751)
LGDPC	12.604371	4.115728	3.063427 (0.0045)
LUNEM	0.488932	0.251044	1.947711 (0.0612)
LMEXPORT	-2.294671	1.138275	-2.015370 (0.0526)
C	-70.192110	18.934881	-3.706289 (0.0010)

Table 6 presents the results of the Vector Error-Correction Model (VECM) based on the ARDL (1,2,0,2,2,0) specification, where the dependent variable is the natural logarithm of foreign direct investment (LFDI). The VECM is designed to capture both the short-run dynamics and long-run equilibrium adjustment of the model. The estimated coefficients, standard errors, t-statistics, and p-values allow an assessment of the short-term responsiveness of FDI to changes in explanatory variables, while the error correction term (ECM) measures the speed at which deviations from the long-run equilibrium are corrected.

The coefficient of the error correction term ECM(-1) is -0.6789 and is statistically significant at the 1% level (p = 0.0000). This negative and significant coefficient confirms the presence of long-run cointegration among the variables and indicates that approximately 68% of the previous period's disequilibrium in FDI is corrected in the current period. This speed of adjustment suggests a strong tendency for FDI to return to its long-run path following short-term shocks. The significance of the ECM supports the reliability of the underlying ARDL model structure and its consistency with the principles of dynamic equilibrium adjustment (Pesaran et al., 2001).

In the short run, GDP per capita (D(LGDPC)) has a statistically significant and positive effect on FDI, with a coefficient of 10.0143 and a p-value of 0.0023. This result aligns with the long-run finding from Table 5 and reinforces the idea that economic development, measured by per capita income, plays a pivotal role in attracting foreign investors. As higher income levels reflect improved infrastructure, consumer demand, and macroeconomic stability, foreign firms are more inclined to commit resources to such markets (Dunning, 1993).

Among the lags of merchandise exports, only the second lag (D(LM_EXPORT(-2))) is significant at the 5% level (p = 0.0272), with a positive coefficient of 1.2974. This delayed impact suggests that export performance influences FDI decisions with a time lag, possibly due to investors reacting to sustained trade activity rather than one-off changes. However, the first and current lags of merchandise exports are not statistically significant, indicating that not all short-term export fluctuations affect FDI flows directly. This aligns with empirical observations that FDI is influenced by expectations and sustained trends rather than transitory trade shocks (Chakrabarti, 2001).

Domestic interest rate (D(LINT)) has a positive but marginally insignificant coefficient of 0.5427 (p = 0.0932), suggesting that rising interest rates may attract FDI in the short term, perhaps due to perceived financial returns. Yet, the effect is not strong enough to draw firm conclusions, indicating the need to consider the broader macro-financial context in which interest rate changes occur. Unemployment (D(LUNEM)) shows a negative but insignificant coefficient (-0.2854, p = 0.4382), implying no meaningful short-run impact on FDI, which may be attributed to foreign investors focusing more on labor market quality and productivity than on unemployment levels per se.

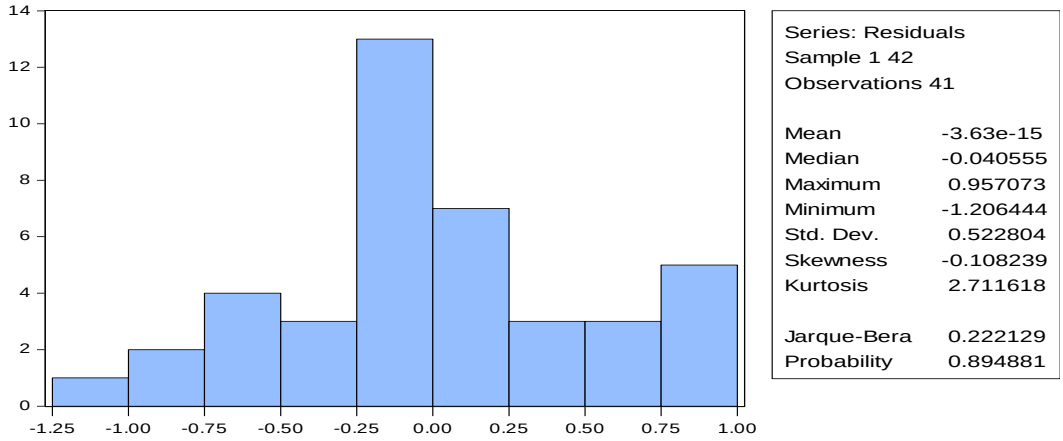
Table 6: Vector Error-Correction Model (VECM)

ARDL (1,2,0,2,2,0)

Dependent Variable: LFDI

Regressor	Coefficients	Standard Error	T-Ratio (Prob)
D(LINT)	0.542709	0.318507	1.703853 (0.0932)
D(LM_EXPORT)	0.144821	0.654209	0.221343 (0.8267)
D(LM_EXPORT(-1))	0.603174	0.712086	0.846882 (0.4041)
D(LM_EXPORT(-2))	1.297402	0.564008	2.300112 (0.0272)
D(LUNEM)	-0.285416	0.362198	-0.787761 (0.4382)
D(LGDPC)	10.014285	2.713640	3.690874 (0.0023)
ECM(-1)	-0.678921	0.130801	-5.188434 (0.0000)

Statistic	Value		Value
R-squared	0.948120	Mean dependent var	19.47088
Adjusted R-squared	0.933007	S.D. dependent var	1.611248
S.E. of regression	0.419853	Akaike info criterion	1.301885
Sum squared resid	4.871295	Schwarz criterion	1.727219
Log likelihood	-14.87550	Hannan-Quinn criter.	1.457683
F-statistic	63.10512	Durbin-Watson stat	1.942703
Prob(F-statistic)	0.000000		



The diagnostic statistics confirm the overall robustness of the model. The R-squared value is 0.9481, and the adjusted R-squared is 0.9330, indicating that a high proportion of variation in FDI is explained by the model. The F-statistic (63.1051, $p < 0.0000$) also confirms the joint significance of the regressors. The Durbin-Watson statistic (1.9427) suggests no severe autocorrelation, and the Akaike, Schwarz, and Hannan-Quinn criteria support the model's parsimony and goodness of fit.

In conclusion, the VECM results in Table 6 underscore the importance of GDP per capita in both short-run and long-run dynamics of FDI in the observed context. While interest rates and exports exhibit some delayed effects, unemployment and immediate trade variables have limited short-term influence. The significant and properly signed ECM confirms a stable adjustment process toward the long-run

equilibrium, affirming the cointegrated relationship among the variables. These findings support the theoretical expectations that economic development and long-run stability are key determinants of foreign direct investment behavior.

Table 7: Breusch-Godfrey Serial Correlation and Heteroskedasticity Tests

Test	Value	Prob.
Breusch-Godfrey Serial Correlation		
F-statistic	1.712894	Prob F(2,34) = 0.1972
Obs R-squared	3.801344	Prob Chi-Square(2) = 0.1497
Heteroskedasticity (White Test)		
F-statistic	2.324519	Prob F(1,37) = 0.1351
Obs R-squared	2.612347	Prob Chi-Square(1) = 0.1063

The results of the Breusch-Godfrey Serial Correlation and White Heteroskedasticity tests, which are used to diagnose two key assumptions in time series regression analysis: the absence of autocorrelation and homoskedasticity of residuals. The Breusch-Godfrey test assesses whether the residuals from the regression are serially correlated. In this case, the F-statistic value is 1.7129 with a corresponding p-value of 0.1972, while the Chi-square (Obs R-squared) value is 3.8013 with a p-value of 0.1497. Both p-values are greater than the standard significance levels (such as 0.05 or 0.10), indicating that the null hypothesis of no serial correlation cannot be rejected. This suggests that the residuals are not serially correlated, and therefore the model satisfies the assumption of no autocorrelation, enhancing the reliability of the coefficient estimates in terms of standard errors and t-statistics (Gujarati & Porter, 2009).

Similarly, the White test for heteroskedasticity checks whether the variance of residuals is constant across observations. The reported F-statistic of 2.3245 with a p-value of 0.1351, and the Chi-square statistic of 2.6123 with a p-value of 0.1063, both indicate non-significant results. These values confirm that the null hypothesis of homoskedasticity cannot be rejected, suggesting that the residuals exhibit constant variance and that the model does not suffer from heteroskedasticity. This supports the validity of hypothesis testing procedures within the estimated regression model.

The results from Table 7 indicate that the model satisfies key diagnostic conditions. There is no evidence of serial correlation or heteroskedasticity in the residuals, suggesting that the regression estimates are statistically sound and that the inferences drawn from them are robust to these classical econometric assumptions.

6. CONCLUSIONS

This paper delves into the influence of domestic interest rates on Foreign Direct Investment (FDI) in the context of Pakistan. Utilizing data spanning from 1972 to 2013 sourced from the World Bank database and the economic survey of Pakistan, the study employs various econometric methodologies to scrutinize the gathered data. Through rigorous analysis, the aim is to elucidate the relationship between domestic interest rates and FDI inflows in Pakistan over the specified timeframe. By leveraging econometric techniques, this research seeks to provide valuable insights into the dynamics of FDI attraction in Pakistan's economic landscape, shedding light on the factors driving investment decisions amidst fluctuating interest rate environments. The study adopts a systematic approach to analyze the relationship between domestic interest rates and Foreign Direct Investment (FDI) in

Pakistan. Initially, the Augmented Dickey Fuller (ADF) test is employed to assess the stationarity of the data, ensuring its suitability for further analysis. Subsequently, the Autoregressive Distributed Lag (ARDL) Co-integration approach is utilized to examine both the long-run and short-run dynamics between domestic interest rates and FDI inflows. This method offers a comprehensive framework to capture the potential equilibrium relationship and the adjustment process between the variables over time. To validate the robustness of the results and ensure the reliability of the findings, various diagnostic tests are conducted. These tests assess the normality of the data distribution, as well as the presence of serial correlation and heteroscedasticity, thereby enhancing the credibility of the econometric analysis and the validity of the conclusions drawn from the study. Through this rigorous methodology, the research aims to provide a nuanced understanding of the determinants of FDI in Pakistan, particularly in relation to domestic interest rates, contributing to the existing literature on FDI dynamics and informing policy decisions aimed at fostering economic growth and development. The Lagrange multiplier test of residual serial correlation indicates the absence of serial correlation among the variables under consideration.

This finding suggests that the residuals from the regression analysis exhibit independence over time, enhancing the reliability of the estimated model. Furthermore, the assessment of normality based on skewness and kurtosis reveals that the time series data of all variables follow a normal distribution. This statistical property validates the applicability of parametric methods and ensures the validity of the statistical inferences drawn from the analysis. Additionally, the estimates indicate no evidence of heteroscedasticity, implying that the variance of the error terms remains constant across observations. This absence of heteroscedasticity strengthens the robustness of the regression results and underscores the accuracy of the estimated coefficients. Taken together, these diagnostic tests bolster the credibility of the econometric analysis and lend support to the validity of the findings regarding the relationship between domestic interest rates and Foreign Direct Investment in Pakistan. The estimates obtained from the ARDL bound testing approach confirm the presence of co-integration among the variables under examination, indicating a long-term relationship between foreign direct investment (FDI) and domestic interest rates in the context of Pakistan. Furthermore, the analysis reveals a positive and statistically significant relationship between FDI and domestic interest rates. This finding suggests that changes in domestic interest rates have a significant impact on FDI inflows into Pakistan. Specifically, an increase in domestic interest rates is associated with a corresponding increase in foreign direct investment, while a decrease in interest rates is linked to a decrease in FDI. This positive relationship underscores the importance of interest rate policies in influencing investment decisions and attracting foreign capital into the Pakistani economy. By providing empirical evidence of the link between domestic interest rates and FDI, these findings offer valuable insights for policymakers and stakeholders seeking to formulate effective strategies to promote investment and economic growth in Pakistan. The results show that there is positive and significant relationship between gross domestic product per capita and foreign direct investment. This study found that foreign direct investment and unemployment are positively and significantly related in Pakistan in extended duration of time.

The results also reveal that there is negative and significant relationship between merchandise exports and foreign direct investment in Pakistan. The value of ECM (co-integrating vector) reveals that there is convergence from short run to long run as the value of ECM is negative and highly significant and is also less than one. This means that it will take one year and five months for short run to converge into long run. The estimates of ARDL Co-integration show that there is positive and significant relationship between foreign direct investment and domestic interest rate in case of Pakistan. The estimates derived from this study confirm a noteworthy phenomenon observed in Pakistan: a positive relationship between domestic interest rates and Foreign Direct Investment (FDI). Specifically, when interest rates

are high in the host country, FDI tends to increase. Building on this insight, the study concludes that to maximize the benefits of FDI, policymakers should adopt trade liberalization policies that not only favor domestic producers and consumers but also attract foreign investors. By setting interest rates at levels conducive to attracting foreign investment without adversely affecting domestic investors, policymakers can create an environment conducive to FDI inflows.

These policies have the potential to capture the attention of foreign investors and harness the benefits associated with FDI, such as higher GDP, increased productivity, and technological advancement. For developing nations like Pakistan, FDI serves as a catalyst for breaking free from the poverty trap and accelerating the process of industrialization. Therefore, by formulating and implementing policies that promote a favorable investment climate, governments can leverage FDI as a strategic tool for economic growth and development.

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