Foreign Capital Inflows and Financial Development in Pakistan: A Linear and Nonlinear ARDL Analysis

Qurra Tul Ain[1], Muhammad Afzal[2] and Fahmida Zahid[3]

Abstract

Foreign capital inflows play a significant role in sustainable development of financial sector of any country. This study investigates the impact of foreign capital inflows (including remittances, foreign direct investment (FDI), foreign aid, and external debt) on the financial development of Pakistan. For empirical analysis, this study used linear and nonlinear autoregressive distribution lags (ARDL) techniques with time series data from 1972 to 2022. Findings reveal that FDI, workers' remittances, and foreign aid support financial development, whereas external debt negatively impacts financial development. Moreover, there appear to be asymmetrical effects of FDI and external debt on the financial development in the long run which reduces to a nonlinear FDI-finance relationship in the short run. The outcomes of this study imply policies that encourage networks for FDI and remittances while discouraging external debt inflows to stabilize the financial sector.

Keywords: Foreign Capital Inflows; Financial Development; Foreign Aid; Foreign Direct Investment; ARDL and NARDL.

Introduction

An efficient financial sector is essential for any country to achieve economic development. This sector assists the business sector by creating capital and expediting scientific revolutions. Moreover, it reduces the different costs associated with the information, exchange, and monitoring of credit, while guaranteeing risk-sharing between households and firms (Allen & Gale, 2001; Ayadi. et al., 2013). Numerous researchers have empirically demonstrated the effectiveness of a well-developed financial sector for overall growth across various economies (Greenwood et., 2013; Durusu-Ciftci et., 2017; Bist, 2018; Sghaier, 2023).

Despite being aware of the benefits of the financial sector, many developing countries do not fully benefit from it due to weak foundational structures and underdeveloped financial systems. In this context, foreign inflows may play an important role in the improving domestic financial markets by linking them to the international financial system, as indicated in the IMF report (2010). These inflows, whose historical significance is linked to the evolution of dual-gap models in the world of economic thoughts (Chenery & Strout, 1966), also contribute to the development of the financial sector of many economies (Rajan & Zingales, 2003; Sghaier & Abida, 2013; Adeniyi et al., 2015;

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[1]*National College of Business Administration & Economics, Lahore, Pakistan.*
Corresponding Author Email: qurratulain07@gmail.com
[2]*Professor, Department of Economics, Lahore College for Women University, Lahore, Pakistan.*
Email: muhammad_afzalch@yahoo.com
[3]*Assistant Professor of Economics, Government Fatima Jinnah College F/W, Chuna Mandi, Lahore, Pakistan.*
*Email: fahmida.zahid@gfjc.edu.pk*

Boateng et al., 2017; Mustafa et al., 2020). Pakistan is among the lists of countries having underdeveloped financial sectors despite undergoing significant financial reforms in 1992, 1997, and 2000. Since the liberation of the country, this sector has been trying to create various investment opportunities to boost saving culture in the society. However, it faces various challenges from time to time due to unfavorable social, political, and economic conditions. Glitches such as poor credit valuations, poor handling of risk, and excessive interactions with specific risks have also negatively affected this sector (Khan, 1996; Khalid & Nadeem, 2017). All problems result in minor improvements in the financial sector, as evident from the performance of its indicators, which are shown in table 1.

Table 1: Financial indicators from 1972 to 2023

Year	Domestic credit to the private sector	M2	Domestic credit by banks	M3	M2/M3
1972	25.448	43.459	25.021	45.082	0.497
1980	23.442	41.559	21.599	42.068	0.149
1990	24.157	39.137	24.157	39.763	0.376
2000	16.604	28.690	16.604	35.648	0.384
2005	21.602	37.601	21.602	45.210	0.109
2010	19.285	47.295	19.173	41.139	0.131
2015	13.878	48.095	13.805	42.092	0.171
2020	15.033	54.526	14.933	51.755	0.171
2021	15.340	51.262	15.294	44.533	0.176
2022	14.842	46.135	14.795	47.589	0.366
2023	11.961	42.514	11.886	47.879	0.219

Source: World Development Indicators (WDI) (2024). All the variables are expressed as percentages of GDP.

Along with the above-mentioned issues, one of the important reasons behind the meager performance of financial sector is the non-availability of adequate domestic resources. Although Pakistan is highly enriched in natural resources, due to poor governance and damaged infrastructure, these resources are not converted into useful capital assets. To overcome the inadequacy of capital for the financial development, Pakistan has sought different forms of foreign capital. The country is a higher recipient of FDI, workers' remittances, external debt, and foreign aid (WDI, 2024), as evident from Fig. 1. Most of these capital inflows have contributed positively in developing a systemic financing system of financing for the financial sector of Pakistan (Abzari et al., 2011; Aggarwal et al., 2011; Mustafa et al., 2020; Agapova & Vishwasrao, 2020; Batool et al., 2024).

Figure 1: Trends in Foreign Capital Inflows (1970-2023)
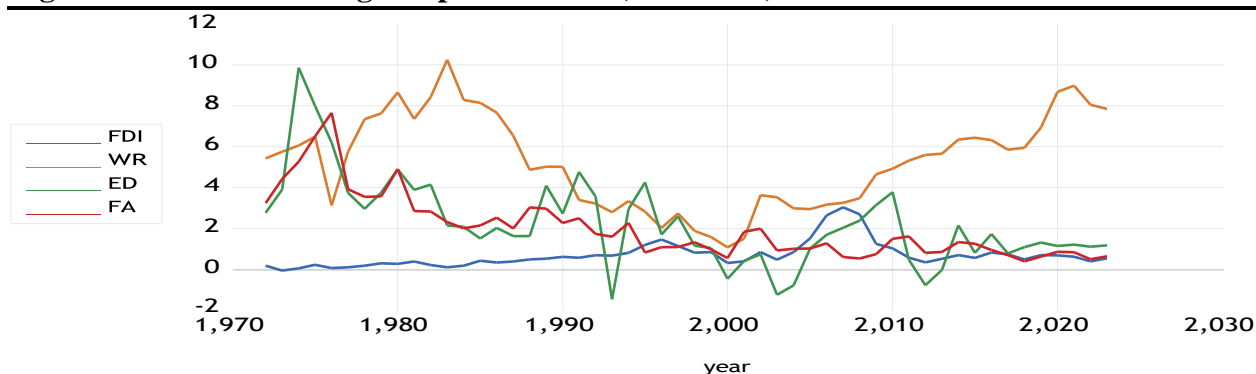
Source: WDI (2024).

However, some economists claim that some forms of capital flows, such as external debt, erode the growth capacity of a receiving country by placing an extra burden on their balance of payments of these nations (Rajan & Subramanian, 2005). In the case of Pakistan, these forms of inflows, along with huge distortions in banks' liquidity, have led to adverse effects on the performance of the financial sector of Pakistan. Moreover, they increase risk exposure and damage the ability of banks and supervisors to sufficiently access and manage risk (Khan, 1996).

Considering the diverse impacts of different foreign capital inflows, this study explores the linear role of these inflows i.e., FDI, workers' remittances, external debt, and foreign aid in the financial development of Pakistan. Many studies have recently considered the nonlinear impact remittances on financial development using the NARDL technique (Özyakışır et al., 2024). However, potential non-linearity particularly in the context of FDI, external debt, and foreign aid, remains underexplored. Therefore, this study aims to fulfill this need by applying the non-linear ARDL technique to time series data for the period 1972-2023 that examines both the non-linear distinctive effects of FDI, external debt, and foreign aid, along with workers' remittances, on the financial development of Pakistan. The findings of this study offer a new perspective on the complex relationship between foreign capital inflows and financial development, expanding the understanding of how different forms of foreign capital interact with financial systems. This new approach provides valuable insights for policymakers and researchers in shaping more effective strategies for leveraging foreign capital in developing economies.

The remainder of this study consists of four sections. The literature on foreign capital inflows and financial development is discussed in section 2. Section III details the theoretical framework, data sources, and methodology. Section IV provides results based on model estimations. Section 5 concludes the paper and presents policy implications.

Literature Review

It is argued that capital availability is indispensable for the success of any economy. Many developing countries like Pakistan attract foreign inflows to develop their economies. This foreign influx, with domestic capital, increases the developmental pace of recipient countries. This section examines the relationship between foreign inflows, such as FDI, remittances, external debt, foreign aid, and financial development by reviewing previous studies.

FDI and Financial Development
FDI inflows largely fund private capital inflows to developing countries. This is one of the most stable inflows that contribute to the long-term growth of the receiving countries. There is a vast body of literature on the effectiveness of FDI on the economic progress of different countries, including Pakistan (Falki, 2009; Iqbal et al., 2014; Jawaid & Saleem, 2017; Sohail & Li, 2023). Expanding this, many researchers have also established that the extent of financial sophistication matters for the benefits of FDI to register on economic growth, which may strengthen the former relationship (Sghaier & Abida, 2013; Adeniyi et al., 2015; Boateng et al., 2017). In addition to FDI-growth relationship, numerous studies have focused on the direct and positive associations between FDI and the development of the financial sector (Al Naseer & Soydemir, 2010; Tajgardoon et al., 2012; Sahin & Ege, 2015; Abzari et al., 2011). In the case of Pakistan, Batool et al. (2024) established the positive and linear long run impact of FDI on financial expansion.

Workers' Remittances and Financial Development
Every year, developing countries receive these remittances from various developed countries to support their economic growth. Researchers claim that these remittances are the second most important source of foreign capital for underdeveloped countries after FDI (Ratha, 2005; Sirkeci et al., 2012). Consequently, extensive research exists on the importance of remittances for the growth of the receiving countries (Sutradhar, 2020; Azizi et al., 2024; Dutta & Saikia, 2024). Many studies have also explored the positive effects of workers' remittance and financial development on the economic expansion of receiving economies (Luqman & Haq, 2015; Ur Rehman, & Hysa, 2021; Ajide & Osinubi, 2024). Regarding causal relationships, researchers have demonstrated that workers' remittances positively affect the financial development of receiving nations (Demirguc-Kunt et al., 2011; Oke et al., 2011; Aggarwal et al., 2011; Sharif et al., 2013; Odhiambo & Musakwa, 2024). In Pakistan, Mustafa et al. (2020) determined that remittances positively and linearly affect the financial expansion of Pakistan. There is also the possibility of a negative association between workers' remittances and financial development. This hypothesis was tested by Brown et al. (2013), who found a negative relationship between these two variables. Most of these studies considered the linear association between remittances and financial development. However, Özyakışır et al. (2024) established the non-linear and positive effect of remittances on Turkey's financial growth through by applying the NARDL technique.

External Debt and Financial Development
As an important component of foreign inflows, many researchers conducted have investigated the importance of external debt in the growth of a country. There is substantial literature on the relationship between external debt and economic growth, which highlights different directions for this relationship. For instance, many academics have revealed an inverse relationship between these variables (Soydan & Bedir, 2015; Azretbergenova et al., 2022; Kharusi & Ada, 2018; Gurung & Rijal, 2023). However, few studies have demonstrated how debt inflows boost economic development (Siddique et al., 2015). In addition to the debt-growth nexus, some researchers have examined the effectiveness of external debt and financial development on economic growth (Senadza et al., 2017). There is some literature on the influence of public external debt on the financial sector. Kipyego et al. (2022) identified the positive impact of external public debt on the financial development of Kenya. Considering external debt, which includes public as well as private guarantees, Hwang et al. (2010) examined the negative influence of external debt on the

financial sector development of recipient countries, including Pakistan. Moreover, Emmanuel (2013) established the inverse impact of external debt on Nigeria's banking sector performance.

Foreign Aid and Financial Development
Like other capital inflows, there is debate about the usefulness of foreign aid inflows to receiving economies. Numerous studies have found a promising role for foreign aid in economic expansion (Sahoo & Sethi, 2013; Das & Sethi, 2020; Nnubia et al. 2022). However, some studies have found no association between foreign assistance and economic growth (Rajan & Subramanian, 2008; Bird & Choi, 2020). In addition to aid-growth relationship, there is a scarcity of research on the relationship between foreign aid and financial development. To support this relationship, Nkusu and Sayek (2004) and Tsaurai (2018) explored the prominent role of strong financial markets in the effectiveness of foreign aid for economic growth. Other studies have found that foreign assistance has a harmful impact on economic progress, but this effect is positive when the financial sector is liberalized or strong (Ang, 2010; Luqman et al., 2013; Appiah-Otoo et al., 2024). For causality relationships, Nsengiyumva (2016) theorized that foreign aid in the form of official development assistance has a favorable impact on financial sector development when strong institutions are present in recipient countries, including Pakistan. Few studies have explicitly assessed how beneficial foreign aid specific for financial sector is to the financial sector performance in various countries, including Pakistan (Maruta, 2019; Agapova & Vishwasrao, 2020).

Most of the analyzed studies demonstrated a significant relationship between foreign capital inflows and financial development. Most of these studies were based on pooled data from many countries. There is also a considerable number of case studies on the relationship between FDI or remittances and financial development of various countries. However, a limited number of case studies exists on the impact of external debt or foreign on the financial development

Methodology
Theoretical Framework
Rajan and Zingales (2003) hypothesized that capital inflows positively contribute to financial development. Based on this hypothesis, we developed a time series model to determine the effect of independent variables, i.e., FDI, workers' remittances, external debt, and foreign aid, on the financial development of Pakistan. It had also included one control variable, i.e., domestic savings to strengthen the relationship between capital inflows and financial development in Pakistan. This model is specified in equation *1* as follows:

$$FD = f(FDI, EDB, WRT, FA, DS) \qquad (1)$$

Where FD = financial development, FDI = foreign direct investment, ED = external Debt, WR= workers' remittances, FA = foreign aid, DS = domestic savings as a control variable and μ = error term.

Data Sources
Data were collected from the WDI database (2024) from 1972 to 2023. There is no single measure of financial development. Therefore, it is usually measured using various proxies, such as monetary aggregates, interest rates, ratios of financial sector performance, and many other variables (Hassan et al., 2011; Abduh et al., 2012). In this study, we measured financial development by constructing an index using Principal Component Analysis (PCA). The results are mentioned in Appendix. This index comprises of credit supplied domestically by the banking

sector (DCBS), credit supplied domestically to the private sector (DCPS), and liquid liabilities (M_3). All variables are expressed as percentages of GDP. Explanatory variables, such as FDI, workers' remittances, external debt, foreign aid, and domestic savings, are also taken as ratios of GDP.

Methodology
Unit root tests
Most of the time series are non-stationary. This behavior is exclusively evident in financial indicators data. If the data exhibits the attribute of non-stationarity, then the simple regression method, such as ordinary least square method (OLS) gives spurious results. Therefore, it is necessary to check the stationarity of the time series data used in a specific analysis prior to applying any method to identify relationships. Various approaches have been proposed to check the stationarity of the time series data. In this study, we used two unit root tests: ADF test and Ng-Perron test. The ADF test proposed by Dickey and Fuller (1979) is, the most commonly used unit root checking method. This test sometimes gives contradictory results because it uses different techniques for correcting serial correlation in the series. Ng and Perron (1996) developed a new unit root test that removes the trend of the series by applying a Generalized Least Squares estimator. This feature increases the power of this test in the presence of a large auto regressive (AR) root and decreases size falsifications in the presence of a non-positive moving average (MA) root in the series at first or second difference. The Ng-Perron test also improved the criterion of selection of lag length. This feature eliminates the limitation of the ADF test to select small lags in the presence of non-positive MA root.

Linear and Non-linear ARDL Techniques
Based on the results of the unit root tests, we utilized time series techniques, including the linear and nonlinear ARDL approaches and the error correction model (ECM) for model estimations. The ARDL approach is a popular approach for determining the co-integration between variables (Pesaran et al., 2001). These models are Least Square Methods in which regression is performed by including lags of variables (Greanee, 2008). They are superior to other co-integrating techniques, i.e., the bivariate (Engle Granger technique originated in 1987) and multivariate (Stock and Watson test articulated in 1987, Johansen test formulated in1988 and revised in 1991 and Johansen and Juselius developed in 1990). This superiority is because of their usefulness in the case of a mixture of variables at 1(0) and 1(1) orders of integration, whereas other co-integration methods require the stationarity of variables at the first difference (Pesaran et al., 2001). The ARDL models also give good results when using small samples, whereas other techniques require large samples (Pattichis, 1999; Mah, 2000). Moreover, they exclusively specify the dependent and independent variables, which ensures the absence of endogeneity bias.

To investigate short run and long run relationships among financial development, FDI, workers' remittances, external debt, foreign aid, and domestic savings, the complete version of ARDL model which is also known as the unrestricted error correction model (UECM), is represented as follows:

$$\Delta FD = \beta_{0FD} + \sum_{i=1} \beta_{1FD} \Delta FD_{t-i} + \sum_{i=1} \beta_{2FD} \Delta FDI_{t-i} + \sum_{i=1} \beta_{3FD} \Delta WR_{t-i} +$$
$$\sum_{i=1}^{n} \beta_{4FD} \Delta ED_{t-i} + \sum_{i=1}^{n} \beta_{5FD} \Delta FA_{t-i} + \sum_{i=1}^{n} \beta_{6FD} \Delta DS_{t-i} + \delta_{1FD} FD_{t-1} + \delta_{2FD} FD1_{t-1} +$$
$$\delta_{3FD} WR_{t-1} + \delta_{4FD} ED_{t-1} + \delta_{5FD} FA_{t-1} + \delta_{6FD} DS_{t-1} + \varepsilon_t \qquad (2)$$

Where β_1, β_2, β_3, β_4, β_5 and β_6 are short run coefficients and δ_1, δ_2, δ_3, δ_4, δ_5 and δ_6 are long run coefficients.

The short run relation in ARDL is found using Equation 2, which is transformed in a shorter version (Pesaran et al., 2001). In this transformed equation, the ECM at the first difference is also incorporated.

$$\Delta FD = \beta_{0FD} + \sum_{i=1} \beta_{1FD} \Delta FD_{t-i} + \sum_{i=1} \beta_{2FD} \Delta FDI_{t-i} + \sum_{i=1} \beta_{3FD} \Delta WR_{t-i} +$$
$$\sum_{i=1}^{n} \beta_{4FD} \Delta ED_{t-i} + \sum_{i=1} \beta_{5FD} \Delta FA_{t-i} + \sum_{i=1} \beta_{6FD} \Delta DS_{t-i} + \zeta ECT_{t-1} + \varepsilon_t \qquad (3)$$

In addition to the linear relationship between financial development and explanatory variables, this study also considers the influence of positive and negative variations in foreign capital inflows on financial development. This analysis was performed by applying the NARDL approach proposed by Shin et al. (2014). In this approach, foreign inflows are decomposed into positive and negative foreign inflows. We estimated positive and negative variables using the following equations:

$$FCI\_P = \sum_{L=1}^{t} max\,(dFCI_L, 0) \qquad (4)$$
$$FCI\_N = \sum_{L=1}^{t} min\,(dFCI_L, 0) \qquad (5)$$

Where FCI represents foreign capital inflows.

The complete nonlinear ARDL equation for all foreign capital inflows considered in this study isas follows:

$$\Delta FD = \vartheta_{0FD} + \sum_{i=1} \vartheta_{1FD} \Delta FD_{t-i} + \sum_{i=1} \vartheta_{2FD} \Delta FDI\_P_{t-i} + \sum_{i=1} \vartheta_{3FD} \Delta FDI\_N_{t-i} +$$
$$\sum_{i=1}^{n} \vartheta_{4FD} \Delta WR\_P_{t-i} + \sum_{i=1} \vartheta_{5FD} \Delta WR\_N_{t-i} + \sum_{i=1} \vartheta_{6FD} \Delta ED\_P_{t-i} + \sum_{i=1} \vartheta_{7FD} \Delta ED\_N_{t-i} +$$
$$\sum_{i=1}^{n} \vartheta_{8FD} \Delta FA\_P_{t-i} + \sum_{i=1} \vartheta_{9FD} \Delta FA\_N_{t-i} + \sum_{i=1} \vartheta_{10FD} \Delta DS_{t-i} + \psi_{1FD} FD_{t-1} +$$
$$\psi_{2FD} FDI\_P_{t-1} + \psi_{3FD} FDI\_N_{t-1} + \psi_{4FD} WR\_P_{t-1} + \psi_{5FD} WR\_N_{t-1} + \psi_{6FD} ED\_P_{t-1} +$$
$$\psi_{7FD} ED\_N_{t-1} + \psi_{8FD} FA\_P_{t-1} + \psi_{9FD} FA\_N_{t-1} + \psi_{10FD} DS_{t-1} + \varepsilon_t \qquad (6)$$

Where ϑ_1 to ϑ_{10} are short run coefficients and ψ_1 to ψ_{10} are long run coefficients. Before estimating these coefficients, we have applied the bound test (F-test) to check the existence of co-integration between variables. The proposed method can be applied as follows:

The null hypothesis is as follows:

H$_0$: $\gamma_1 = \gamma_2 = \gamma_3 = 0$ (Absence of co-integration) $\qquad (7)$

The alternative hypothesis is as follows:

H$_1$: $\gamma_1 \neq \gamma_2 \neq \gamma_3 \neq 0$ (Presence of co-integration) $\qquad (8)$

These hypotheses were tested to determine the existence and absence of co-integration between the dependent and independent variables. For this purpose, we calculated the F-test value and harmonized it with the critical bound values proposed by Pesaran et al. (2001). The lower bound (LB) values express variables at levels, whereas the upper bound (UB) values demonstrate variables at the first difference. The co-integration exists when the estimated bound test value exceeds the UB value.

Results and Discussion

As mentioned in Section 3, we applied the ADF and Ng-Perron tests to the series included in the study to determine the presence and absence of unit roots. Both tests have the same null hypothesis for checking stationarity. However, unlike the ADF test, which has only one statistic, the Ng Perron test has four statistics abbreviated as MZ_α, MZ_t, MSB, and MPT. The first two statistics are the most efficient and are mostly used to check stationarity (Gregoriou et al., 2006; Cuestas & Staehr, 2013; Raihan et al., 2017). This study also uses Z- statistics to interpret the findings. We applied The ADF and Ng Perron for both intercepts and intercepts and trends. The presence of unit root was checked at both levels and the first difference because these results specify an appropriate technique for determining co-integration between variables. Table 2 lists the results of the unit root tests.

Table 2: Results of the unit root tests

Variable	ADF test statistics	Ng-Perron test statistics	
		MZ$_a$	MZ$_t$
FD with intercept	-2.2868 (0.1804)	-4.0239	-1.1797
FD with intercept and trend	-2.3013 (0.4248)	-7.1426	-1.8640
ΔFD with intercept	-5.2670*** (0.0001)	-19.4619***	-3.1167***
FDI with intercept	-3.9108** (0.0520)	-13.6091**	-2.6085***
WR with intercept	-1.6731 (0.4379)	-5.4060	-1.6133
WR with intercept and trend	-1.6035 (0.7763)	-5.4886	-1.6035
ΔWR with intercept	-7.2875*** (0.0000)	-22.3086***	-3.3397***
ED with intercept	-3.0782** (0.0353)	-13.4832**	-2.5780**
FA with intercept	-2.0859 (0.2511)	-17.3902***	-2.8507***
FA with intercept and trend	-4.0810** (0.0126)		
DS with intercept	-1.7899 (0.3808)	-5.5729	-1.6535
DS with intercept and trend	-1.6681 (0.7493)	-5.9543	-1.6604
ΔDS with intercept	-7.7452*** (0.0000)	-22.2650***	-3.3357***

Note: ** and *** denote rejection of the presence of unit roots at the 5%, and 1 % significance levels, respectively.

These results show that there is a mixture of variables at the levels and first difference, and none of the variables is stationary at the second difference. Therefore, linear and nonlinear ARDL approaches are suitable for assessing the co-integration between variables. The selected models for checking the co-integration and their bound test statistics are presented in table 3. This table also lists diagnostic tests performed to evaluate the strength of the models.

Table 3: Bound test and diagnostic tests results

Estimated Model	F-statistic	/¹Serial	/¹Bruesch Pagan	/¹Normal	/¹Ramsey
FE(E/FD, FDI, WR, ED, FA, DS)	5.264***	0.0357 (0.850)	5.479963 (0.791)	.20718 (0.902)	1.2568 (0.270)
FE(E/FD, FDI_P, FDI_N, WR_P, WR_N, ED_P, ED_N, FA_P, FA_N, DS)	5.769***	0.340 (0.844)	7.869 (0.998)	0.205 (0.903)	1.860 (0.185)
Critical values					
Significance level		LB value		UB value	
5%		2.62		3.79	
1%		3.41		4.68	

Note: ** and *** denote rejection of the presence of unit roots at the 5%, and 1 % significance levels, respectively.

The results show the existence of a co-integrating relationship between financial development and explanatory factors, as the calculated value of the F-statistic in both models exceed the UB values at the 5% and 1% significance levels. Moreover, the findings of the diagnostic tests revealed that the models were free from autocorrelation, hetroskedasticity, and specification errors. Therefore, the values of the long run coefficients can be estimated using linear and nonlinear ARDL approaches. These long run estimates are presented in table 4.

Table 4: Long run results of ARDL and NARDL models

Variable	Linear	Non-linear
FDI	1.512*** (0.514)	
FDI_P		0.788** (0.306)
FDI_N		1.751*** (0.376)
WR	0.929*** (0.342)	0.344**
WR_P		0.557*** (0.188)
WR_N		0.277 (0.160)
ED	-0.711** (0.315)	
ED_P		-0.276*** (0.091)
ED_N		-0.553*** (0.160)
FA	1.349*** (0.453)	
FA_P		0.055 (0.342)

FA_N		0.893***
		(0.317)
DS	0.536***	0.102
	(0.172)	(0.084)
C	-13.721***	0.829
	(4.012)	(0.817)

Note: ** and *** denote significance levels at 5%, and 1 %, respectively.

The results of long run linear ARDL model indicate that the estimated FDI coefficient is significantly positive. This indicates that FDI promotes long run financial development by creating capital, enhancing technology use, and reforming institutions. This long run positive relationship between FDI and financial development was also found by Saidi (2018), Sayılır et al. (2018), and Majid et al. (2021). Remittance inflows also positively and linearly affect financial development in the long run at a 7.4 % level of significance, consistent with the results of Fayissa and Nsiah (2012), Sharif et al. (2013), and Odhiambo and Musakwa (2024). These are the most stable form of foreign capital inflows, as evident from figure 1. Remittances bring financial stability by promoting financial inclusion and savings. Regarding external debt, it exerts a negative influence on financial development, which was also established by Hwang et al. (2010) and Emmanuel (2013). This negative effect arises from excessive debt servicing burdens and external debt volatility. The last considered form of foreign capital is foreign aid, which seems to promote financial development in Pakistan because its coefficient is positive at a 4 % significance level, as explored by Nsengiyumva (2016). Finally, the control variable, domestic savings, is positively and linearly effective for financial development in the long run.

Considering the asymmetric relationship, the non-linear model analyzes the influence of positive and negative FDI inflows on financial development. The results from this model indicate that a positive change in FDI inflows leads to more financial development, which is similar to the long run estimates in the linear ARDL model. In contrast, negative changes in FDI inflows also positively impact financial development. This relationship can be attributed to increased productivity of domestic firms in the case of decreasing FDI, as Gerschewski (2013) confided, or to increased employment of cheap labor by local firms, as indicated by Zilinske (2010) and Forte and Moura (2013). The estimates of the non-linear model also show that an increase in remittance inflows have a significant positive impact on financial development, similar to the results found in linear model. Regarding external debt, a significant negative asymmetric relationship exists between these inflows and financial development. Along with the negative effect of an increase in external debt, a decrease in external debt also seems to negatively affect financial development, as also found by Kipyego et al. (2022). Furthermore, a negative change in foreign aid has a positive effect on financial development in the non-linear model, which may be attributed to the volatile nature of foreign aid inflows to Pakistan.

Table 5: Short run results of ARDL and NARDL models

Variable	Linear Model	Non-linear Model
ΔFDI_P		-0.159
		(0.265)
ΔFDI_P(-1)		0.800***
		(0.267)
ΔFDI_N		0.491**
		(0.204)
ΔFDI_N(-1)		-1.303***
		(0.232)
ΔWR	0.028	
	(0.086)	
ΔWR(-1)	-0.234***	
	(0.081)	
ΔWR_POS		0.0003
		(0.073)
ΔWR_POS(-1)		-0.418***
		(0.086)
ΔED_NEG		-0.167***
		(0.044)
ED_NEG(-1)		0.085
		(0.047)
ΔFA	0.125	
	(0.301)	
ΔFA_POS		-0.386***
		(0.130)
ΔFA_NEG		0.519***
		(0.108)
DS(-1)	0.152***	
	(0.047)	
ΔDS	0.048	0.002
	(0.046)	(0.025)
ΔDS(-1)		0.068**
		(0.031)
ECT(-1)	-0.283***	-0.813***
	(0.081)	(0.086)

Note: ** and *** denote significance levels at 5%, and 1 %, respectively.

Regarding the short run effects, the outcomes of the linear model in table 5 depict that financial development in the short run is only linearly affected by worker's remittance. The change in these inflows in the previous year has an inverse impact on financial development. This negative relationship may be because of non-utilization of these inflows in investment purposes or inability to immediately augment financial development , also conjectured by Fromentin (2017) in case of low-income economies. Moreover, the short run impact of one-year lagged domestic savings on Pakistan's financial development is also significantly positive.

Considering the asymmetric relationship between foreign capital inflows and financial development, the results of the non-linear model indicate that a positive change in one-year lagged FDI positively affects financial development, whereas a negative change in FDI has a slighter positive impact on the dependent variable. However, a lagged decline in FDI adversely affects

financial development. In the short run, FDI might have positively affected the financial markets by enhancing liquidity. However, decline in FDI may induce some financial instability, resulting in asymmetry. Regarding remittances, the positive changes in this factor during the previous period reduced current financial development, similar to what we witnessed in the long run. The next foreign capital inflow, external debt has a positive relationship with financial development in the short run because negative changes in external debt lead to a reduction in financial development. Foreign aid has also a negative relationship with the financial development as evident from its estimates. This may be because of the overdependence on foreign aid which diminishes the motivation for domestic governments to establish strong financial systems. The control variable, domestic savings also positive affects the financial development.

The absolute value of the ECM term at one lag indicates how quickly variables return to equilibrium. This value must be negative and significant. Negative values of this term indicate convergence in the short run models. The ECT value in the short run linear model illustrates that 28.3% of volatility is adjusted annually. While, in the case of non-linear model, 81.3% of the error of the previous year is corrected in the next year.

The CUSUM and CUSUM squares were applied to check the stability of the above models (see, figure 1). These tests confirmed that the models were stable because the residual plots were in between the bound values at the 5 % significance level. This also shows the absence of the structural break (absence of unpredicted change in the residuals) in the above models.

Figure 2: Stability of the Models

Linear Model
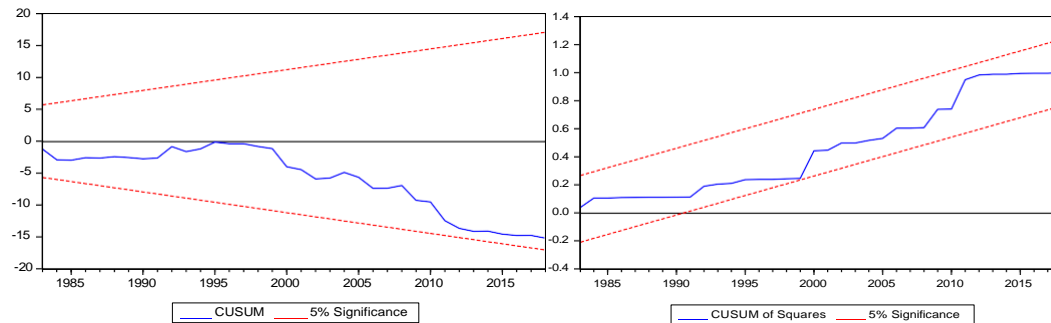
Non-linear Model
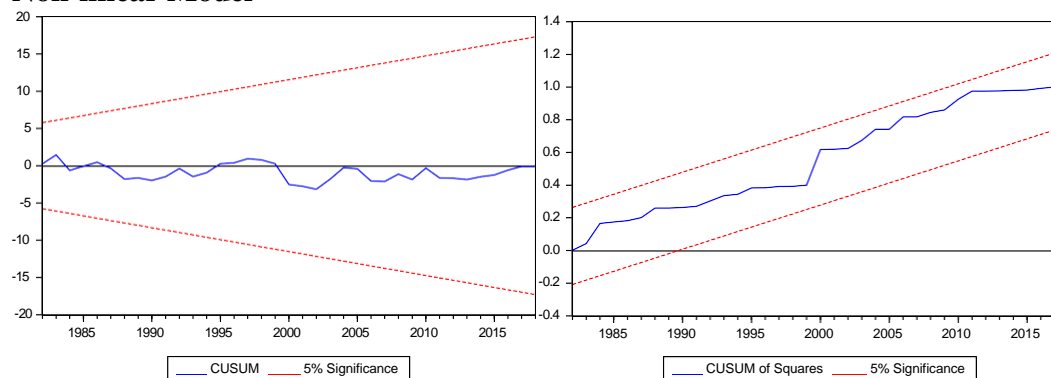
Conclusion

This study attempted to examine the position of Pakistan's financial sector in the debate on the importance of foreign capital inflows for financial development. There is considerable literature on the effectiveness of different forms of foreign capital inflows for financial development. However, uncertainty exists regarding which specific forms of foreign capital inflows are favorable and which are detrimental to financial development in the case of Pakistan. Finding solutions to this ambiguity is important for policy development. Therefore, linear and nonlinear ARDL techniques are used to examine the effects of FDI, workers' remittances, external debt, and foreign aid on Pakistan's financial development. The findings of this study vindicate the significance of all four forms of foreign capital inflows for the Pakistan's financial development in the long and short run. Regarding long run linear effects, FDI, workers' remittances, and foreign aid promote financial development in Pakistan, whereas external debt has a negative effect on the financial pace of the country due to the volatile nature of external debt. In the short run, workers' remittances negatively effects the financial pace of the country. The non-linear relationships established in this study reveal that FDI and external debt have an asymmetrical relationship with financial development because negative and positive changes in these inflows have varying impacts. However, in the short run, only FDI asymmetrically affects financial development. The non-linear effects of workers' remittances are less evident. Moreover, domestic savings help strengthen both linear and non-linear relationships between foreign capital inflows and Pakistan's financial development. On the basis of these findings, this study recommends that the policy makers in Pakistan should make policies to encourage stable FDI inflows and discourage external debt for the development of the financial sector in Pakistan. To create a stable capital base and lessen reliance on volatile foreign inflows, they should focus on strengthening remittance networks and encourage domestic savings. It is also important to prioritize the transparent and effective utilization of foreign aid to optimize its effectiveness for country's financial development.

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Appendix

Table A-1: Correlation matrix of the variables used in FD index construction

Variables	DCPS	DCPB	M3
DCPS	1.0000		
DCBS	0.9770	1.0000	
M$_3$	0.4292	0.4829	1.0000

Table A-2: Reliability test for PCA

Reliability test value	0.8253

Table A-3: Eigenvalues and proportions of all the principal components

Principal Component	Eigenvalue	Difference	Proportion	Cumulative
Pc1	2.2976	1.6164	0.7659	0.7659
Pc2	0.6812	0.6600	0.2271	0.9930
Pc3	0.0211	-	0.0070	1.0000

Table A-4: PCA results for FD index

Variable	PC
DCPS	0.6279
DCBS	0.6384
M$_3$	0.4452