



Investigation of Causal Linkages Between Financial Development and Economic Growth: Evidence from Pakistan

Nimra Ishfaq¹, Ghulam Muhammad Qamri², Zeyyan Ajmal³, Qasim Raza Khan⁴, Aqsa Akbar⁵

¹ Scholar at Department of Economics, University of Sargodha, Sargodha, Punjab, Pakistan.

Email: maliknimra0302@gmail.com

² Faculty at Department of Economics, University of Sargodha, Sargodha, Punjab, Pakistan.

Email: gmqammar@hotmail.com

³ Scholar at Department of Economics, University of Sargodha, Sargodha, Punjab, Pakistan.

Email: zeyyanajmal@gmail.com

⁴ Faculty at Department of Management Sciences COMSATS University Islamabad, Lahore Campus, Pakistan.

Email: qasi.raza@gmail.com

⁵ Faculty at Department of Management Sciences COMSATS University Islamabad, Lahore Campus, Pakistan.

Email: aqsaakbar@cuilahore.edu.pk

ARTICLE INFO

Article History:

Received: December 04, 2023

Revised: February 19, 2024

Accepted: February 20, 2024

Available Online: February 21, 2024

Keywords:

Economic Growth

Financial Development

Agricultural Growth

Domestic Credit to Private Sector

ARDL

JEL Classification Codes:

F21, F24, N5, C01, O47

Funding:

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

ABSTRACT

Financial development is a driving factor for economic growth and is important in fostering growth. An efficient and effective financial system contributes to economic growth and fosters the performance of other economic measures. This study aims to investigate the influence of financial innovation on economic expansion to understand the correspondence between financial development and economic growth in Pakistan. Augmented Dickey-Fuller (ADF) and Phillips Perron (PP) are used for stationarity. Auto Regressive Distributed Lag (ARDL) and Error Correction Model are employed to analyze the correlation between economic growth and financial development. The finding shows that financial development stimulates economic growth. The research explains that foreign direct investment and personal remittances adversely affect GDP growth. These understandings recommend that although financial development generally promotes, its results can vary extensively and depend on specific context-dependent conditions. Furthermore, applying CUSUM AND CUSUM of square tests to measure model stability convincingly confirms a long-term relation between financial development and economic expansion, disproving the null hypothesis of no co-integration and reinforcing that financial development is essential to domestic economies. Policymakers need to practice these understandings in actionable plans by highlighting financial innovations that advance access to credit and efficiently allocate resources so investment in education and agriculture can maximize economic growth.



© 2024 The Authors, Published by iRASD. This is an Open Access Article under the Creative Common Attribution Non-Commercial 4.0

Corresponding Author's Email: zeyyanajmal@gmail.com

Citation: Ishfaq, N., Qamri, G. M., Ajmal, Z., Khan, Q. R., & Akbar, A. (2024). Investigation of Causal Linkages Between Financial Development and Economic Growth: Evidence from Pakistan. *iRASD Journal of Economics*, 6(1), 10–26. <https://doi.org/10.52131/joe.2024.0601.0191>

1. Introduction

Financial development is observed as an endogenous component of GDP growth. An efficient and effective financial system directly and indirectly affects many determinants of the

economy. The financial system has a direct effect on the money supply, inflation, economic growth, FDI, exchange rate, capital formation and monetary mechanism, and an indirect impact on resource allocation, promotion of innovation and entrepreneurial activities, risk management, enhancement of economic stability, poverty reduction and inclusive growth. It plays an important role and contributes to many perspectives in economic growth. It is the most important and driving factor in the economic development of any country. Financial development plays an important role in economic expansion by allocating capital efficiently, promoting innovation, and implementing monetary policy effectively. These factors contribute to the nation's economic development. So, it is important to draw empirical inferences for policy implications specific to developing countries. In this study, we analyze how financial innovation can affect economic expansion. How financial development is necessary for the growth of the economy. This paper uses time series data from 2000 to 2020, and different variables are used from the base paper. Financial development indicates movements in the effectiveness of efficient financial systems, including institutions and mar. The consequence of financial innovation on economic growth is a complex and miscellaneous topic, and many researchers have explored many dimensions of this relationship over the years. Classical economists such as Adam Smith and David Ricardo highlight the consequences of the financial system in supporting economic growth, and they recognize the role of financial institutions in efficiently allocating resources. The Financial Intermediation Theory, the Finance-Growth Nexus, and New Institutional Economics are the models used to study these dynamics.

Many studies have shown the strong correspondence between financial development and economic growth. Generally, when there is a developed financial mechanism, it boosts economic activities, which directly and indirectly contribute to growth. Economic growth and financial development are nonlinear in different countries (Botev, Égert, & Jawadi, 2019). M. S. Khan and Senhadji (2000) support the statistically significant and highly significant connection between financial depth and growth. The model suggests that the relationship is nonlinear between financial development and growth. Demirgüç-Kunt and Levine (2001), Levine (1997), Fishkin, Keniston, and McKinnon (1973) and Becker and Knudsen (2002) insist that financial innovation is required for economic progress (Zahoor, Khan, & Hou, 2022). Robinson (1952) examines the connection between financial development and demonstrates that it comes after economic expansion and is not a leading element to growth.

King and Levine (1993) suggested four ways in which financial development influences economic growth. According to Beckmann, Wingberg, and Hasund (1983) and Buffie (1984), financial development has caused borrowers from a grey market in labour shift to a formal sector, which has decreased the overall amount of credit available and further Lucas Jr (1988) persist that financial market has a less important contribution in an economy's development (Shapoval, 2022). Financial depth-economic growth nexus in Ukraine. Financial development and economic growth have a long-term positive link, according to the study, and the result from panel causality also found that growth desire for short term economic development. A developing country must also have a developing financial sector. Aric (2014) study is evident that the 1% rise in financial development escalates the growth by 0.7%. Many theories witness like financial growth theory; financial innovation has a direct influence on growth activities. How easily finances are available for the individuals and investors. Financial progress also has a negative influence, in contrast to the theory. Karlsson and Mansson (2015) examined that financial advancement has a long-run significant relation with economic growth Karlsson and Mansson (2015); Wang, Xu, Qin, and Skare (2022) but also hold negative relation between financial progress and economic expansion in short run. Lipovina-Božović and SMOLOVIĆ (2016); Syah and Pratama (2022) found that financial institutions innovation and financial system effectiveness have a significant influence on economic expansion. As the large number of financial institutions are available ,leads to more funds and financing that will directly boost to economic activities. Financial crisis effects the financial activities, crunches the funds availability , and reduce the efficiency of financial system which directly impact on the economic growth (Mahembe & Odhiambo, 2014).

Islam (2022) examined how GLS and FMOLS ensure that personal remittances increase the money supply and foster economic growth. Second, remittances play a role in economic growth because this not only smooths household consumption but also facilitates investment in the nation by easing financial limitations, lowering the cost of capital, and allowing the accumulation of human capital.

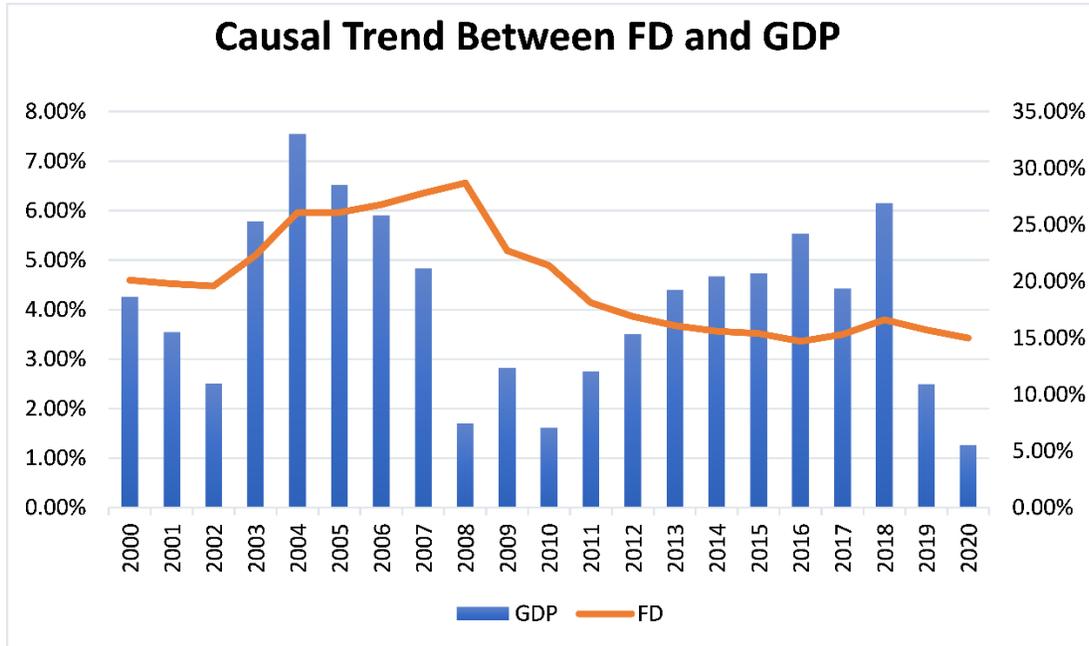


Figure 1: Causal Trends Association between FD and GDP over 2000-20

Figure 1 above determines the changes in financial development and the associated economic progress. It depicts an increase in financial development and also boosts economic growth. Previous studies used different techniques and tests, while in this paper, we will use the Augmented Ducky Fuller (ADF) test to examine the unit root because our data is time series and check the stationarity of data before using ARDL. If data is not stationary, then the first difference is to make it stationary, and at one point, data will be stationary. We will proceed toward ARDL to find the connection between financial advancement and economic growth. Studying the influence of financial advancement on economic growth is crucial because financial institutions play a crucial part in economic development.

Here are a few reasons that lead to economic growth: Capital allocation, savings and investment, innovation, and technology. Understanding the connection between financial development and economic growth helps policymakers formulate effective strategies to strengthen financial institutions, improve regulatory frameworks, and promote sustainable economic growth.

Low-income countries, specifically emerging economies, have a focus inflow of FDI. The studies argue that foreign direct investment (FDI) has a major influence on financial development. FDI plays an important part in economic expansion, and FDI is a crucial element in the economic expansion of the host country (Khattak & Khan, 2023). FDI influences economic growth in different ways. The first is that FDI encourages the adoption of advanced technologies in production, and the second one is that FDI has the potential for knowledge transformation in terms of labour training and skill acquisition. FDI increases the host nation's capital stock, and this would lead to economic growth (Qamri, Sheng, Adeel-Farooq, & Alam, 2022). The ultimate motive of this study is to explore the relationship between financial

development and economic growth over a time span from 2000 to 2020. According to Musharraf, SMEs' rise in financial development headed towards economic growth, and CPEC also contributed to the development of Pakistan, which expanded economic growth. The article uses Domestic credit to the private sector as a stand-in for financial development. The contribution of this paper is different in several ways from that of earlier articles. A time series of data is used with different indicators from others and a new empirical methodology for empirical testing. This paper used personal remittances and government expenditure on education's impact on economic growth, the agriculture sector, and personal remittances' impact on economic growth and these sectors' contribution to GDP due to these sectors' effect on economic growth. The structure of this study is divided into five phases: first introduction, second literature review and hypothesis development based on the existing studies, methodology and model development, four empirical analyses and discussion based on findings, fifth last phase study discusses the empirical influence draw from analysis and recommended policy implication based on findings.

This article is designed in this way: section two is a literature review of studies on financial development and economic growth, and section three represents a theoretical framework of study; the specifics of data and methodology used in this paper are presented in section four; section five illustrates results and discussion from time series data of Pakistan and their economic interpretation.

2. Literature Review

Real interest rate and long-term financial stability have positive effect on economic growth and proportion of financing is connected to real income, it is still not statistically significant when it comes to economic expansion and financial innovation that is indicated by CUSUM and CUSUM of Square stability test (Sghaier & Abida, 2013). This study finds the correlation between financial development, economic growth, and foreign direct investment in 4 African countries over a period of 1980 to 2011. Using GMM panel analysis concludes the proof of positive link between FDI and economic growth (Dritsakis & Adamopoulos, 2004). This study inspect the haphazard link between financial development, economic growth, and the openness of the economy. Economic growth and openness are positively associated.

Omran and Bolbol (2003) Study finds that Arab FDI will boost and favor economic growth if engaged with financial variables. This study suggests that one of the main goals of policy should be to improve the investment climate by providing more institutional and economic incentives for all investors. Using OLS, they provide a result that FDI/GDP \times LRBA are favorable and significant.

J. Shan (2005) The VAR technique is used to explore the interrelationship between financial development and expansion of economy, investment and productivity. There isn't much prove that that financial development drives economic growth M. S. Khan and Senhadji (2000). Jalil and Ma (2008) this research illustrates the connection between GDP growth and financial innovation for China and Pakistan between 1960-2005. This study uses the ratio of deposit to liability and credit to private sector as a stand in for financial development. DLR and CPS has a major influence on Pakistan's economic growth but they little impact on China (M. S. Khan & Senhadji, 2000). The results of paper conclude the statistically significant and positively increasing connection between financial depth and growth. Theoretical model suggest that correspondence is nonlinear between financial development and growth. Brownbridge and Kirkpatrick (2000) a major determinant of financial sector performance is judicious financial regulation and supervision within which the financial institutions operate. Policy framework has an increasing impact on stability and economic expansion of financial sector. Ram (1999) concluded in numerous recent investigations that Empirical data contradicts the theory that encourages economic expansion. Predominant pattern in data for sole countries is weakly negative. Independent Additionally, the conclusion of simple multiple

regression growth models does not support that there is a good correlation between financial development and growth. Huge parameter heterogeneity is observed, and negligible or adverse connection between financial innovation and growth. Q. R. Khan, Xinshu, Qamri, and Nawaz (2023) revealed that financial system is important to promote economic firmness and expansion for the sustainable use of resources. It appears that stable economic growth in developing nations can only be achieved with the presence of a functional financial system. Strong financial system provides the funds and improve hospitalization, education, governance, and development (Shah, Yan, Khan, Khurram, & Khan, 2021).

Yusuf, Malarvizhi, Mazumder, and Su (2014) finding shows that the expansion of financial sector does not leads to reduction in poverty. This only suggests that a rise in money supply of loan able funds brought about by financial sector development, is insufficient to guarantee to reduce in poverty. The finding implies that economic expansion and financial development are not responsible for decline in poverty reduction in Nigeria. Choong and Chan (2011) examined strong evidence that financial advancement has increasing effect on economic growth. Jadoon and Hasnu (2009) data of Pakistan from 1947 to 2007, simple OLS and ADF techniques are used which shows bi-directional relation between financial innovation and economic expansion. Study shows that financial liberalization results financial innovation that boost up the economic growth of country. TARIQ, KHAN, and RAHMAN (2020), according to study financial development has no impact on growth if the value is greater than financial innovation but if the value is less than financial development it can enhance economic growth.

Financial development is important to promote transparent corporate governance and philanthropy activities to alleviate poverty (Ehsan et al., 2018). Rahman, Khan, and Charfeddine (2020) study investigates that financial development exerts increasing effect on economic development but there is difference between ups and downs in growth regime. In high-growth schedule financial development impact is stronger than low growth regime. Islamic and western commercial banking both are crucial to develop efficient and effective financial system (Haider, Raza, Jameel, & Pervaiz, 2019). Shahbaz and Mafizur Rahman (2014) this study used a mediating variable of exports. A transparent finance sector can support the entrepreneur with funds and facilities that improve the exports which leads to the financial development. Different techniques (ADF, ARDL, DF GLS and Ng-parron unit root) are used for empirical verification (De & Guidotti, 1995). Financial system is crucial to fund energy sources required for the production and economic activities, Jafri, Liu, Usman, and Khan (2021) investigate that financial development can cause economic growth. On the other side, investment efficiency rather than quantity determines that how financial development translates into growth.

Levine (1997) study looks into the possibility that long-term economic growth and financial development are positively and significantly correlated. Financial development leads to industrialization and passive economic growth, and this is also a factor that can determine future growth rates. Rosalia (2013) in this study examine relation in middle of financial development and growth of economy in Latin America and the purpose of study is to investigate the verification of the region's supply-side phenomenon. Financial sector is anticipated to have effect on economic growth through its function which assist business transaction which influence positively on economic expansion. An additional theory that fails in providing evidence in support of the supply leading hypothesis by J. Z. Shan, Morris, and Sun (2001). Atif, Jadoon, Zaman, Ismail, and Seemab (2010) examines that premise of trade and co-integrated relation between economic growth ,trade openness and financial development that is evident in both short-term and long-term. It concludes that financial development and trade openness policies positively effect economic advancement. Sehrawat and Giri (2016) panel co integrated test confirm long run connection between economic advancement and financial development but in short run there is unidirectional casualty from index of growth of economy from financial development..

Shahbaz, Shahbaz Shabbir, and Sabihuddin Butt (2013) ARDL test illustrates the long run relation between variables. Analysis confirmed that long run relation in middle of agricultural growth, financial development, labor and capital. Granger causality tells the bi-directional causality between agriculture development and economic increase.

A. Khan, Ahmed, and Bibi (2019) measure financial innovation calculating economic growth. Use money supply as a stand in variable for financial innovation and private investment expenditure to proxy of EG. Masoud and Hardaker (2012) examine that the stock market has an outstanding impact on EG and remain the same after the effect of banking sector and remaining control variables and long-term relationship between the stock market and evolution of economy. Ali and Bhutta (2018) used Augmented Ducky Fuller and Unit Root test. In this study GDP is used as an endogenous variable and Economic Growth and money supply as exogenous variable. Al-Awad and Harb (2005) this study investigates that causality test with individual countries do not clearly demonstrate to gives clear evidence of direction of causality and in this study two tests of unit root is used.

3. Theoretical Framework

This study points out the role of financial intermediaries in organizing the funds, appraisal of projects, risk management and helping transaction as these elements encourage financial modernization and economic growth. Finance Growth Nexus theory refer to economic theory which inspect the interrelation between different variables and factors which contribute to economic growth of a country. It seeks to identify the relation and dependencies among different to comprehend how they affect the rate of development in economy.

Finance Growth Nexus theory address that economic expansion is difficult process which is influenced by multiple factors, and it analyze dynamic interactions between different factors which are human and physical capital, macroeconomic stability, institutional factors, trade and globalization. The growth nexus theory recognizes that the importance of these factors vary with different countries and regions. Growth nexus theory used in different context and different scholars and researchers focus on different factors.

This theory emphasizes on betterment of financial intermediaries which cause the growth. Under the assumption that financial system development is increasingly correlated with supply of financial services and their quality. Different theoretical frameworks emerged to define the connection between financial development and growth of economy. Hunjra, Arunachalam, and Hanif (2021) found the evidence of relation between economic expansion and financial development over long era of time. Excessive financial innovation can be the cause for rapid expansion of the economy. Financial liberalization, financial development and economic expansion in LDCs establish that there is no proof that financial development effects of influencing by the economic growth. LUCAS examine that the economists tend to "badly over-emphasize" the contribution of financial innovation in growth. Ekanayake and Thaver (2021) concludes the bi-directional causality of connection between financial development and economic expansion. Mavrotas and Son (2008) by using panel data analysis empirically examined correspondence in financial development and growth in era of 1960-1999 Empirical results concludes that financial development has a remarkable positive relationship towards economic growth (Masoud & Hardaker, 2012; Olorogun, Salami, & Bekun, 2022). Results postulates that (i) more financial development spurs faster growth of an economy, and (ii) emerging nations will have a greater growth-related benefit from the financial sector's expansion than industrialized nations. Evidence founds that better allocation of resources through financial sector improvement can accelerate economic growth. One can conclude that significant increasing relation is founded between financial development and economic expansion.

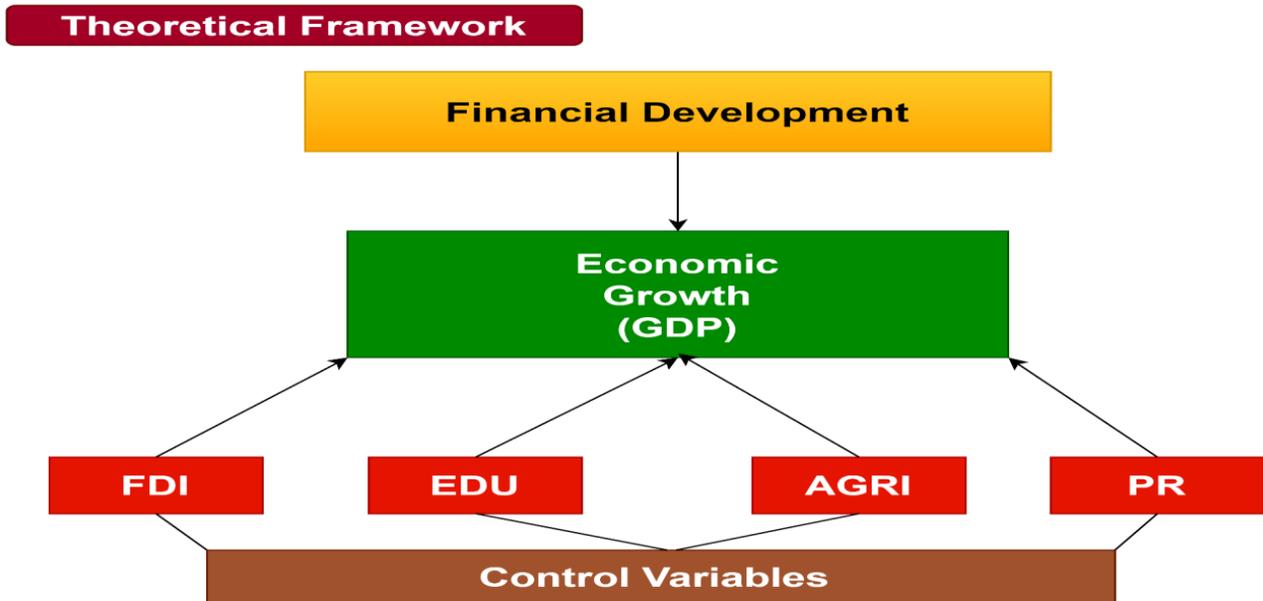


Figure 2: Theoretical Framework

FDI is a main element influencing in economic growth of developing countries (Chaudhury, Nanda, & Tyagi, 2020). The study looked at how the sectoral makeup of FDI affects its effects in South Asia. Economic development leads to economic growth. Due to growth happens through changes in development. Performance of stock market positively affect economic growth and increase private investment. Impact of Agri growth on Economic Growth; Agri sector gives employment opportunities to skilled, efficient labor and inefficient labor both. Capital Accumulation also provided by the agriculture surplus it's another important contribution of Agri-sector and when agriculture surplus increase it also increase the rural people development and also contribute in economy.

Influence of Trade on economic expansion; trade led to faster productivity growth and several benefit. it also promotes economic welfare by utilization of factor endowments and enabling individuals to purchase items from productive suppliers. Impact of Industrialization on Economic Growth; Through industrialization, an economy transitions from being based mostly on farming to producing goods and services in large quantities using cutting-edge technologies, moving labor from rural to urban areas, and raising living standards. By standard metrics, such as income per capita or labor productivity, industrialization can be analyzed as the greatest significant economic development in history of human.

Financial markets and commercial banks are examples of financial institutions that make up the financial system. By allocating resources effectively, a strong and functional financial system fosters growth. By increasing the saving and investment rates, a better financial system can also spur growth. Economic theory and revelation suggest persuasive channel through which financial development influence positively on growth. Natural resources like oil or mineral deposit boost economic growth, physical capital or infrastructure, human resources, technology and law that spur economic growth.

On the other hand, poor health and low level of education, lack of unnecessary infrastructure, political instability and institutional framework limit the economic growth. Personal remittances play a crucial role in contributing to financial development. When individuals send money back to their home countries, it can increase household income, education, healthcare, and revive local economic activities. The impact on overall financial development depends on how effectively these remittances are utilized into the formal financial

system of the receiving country. Policymakers often seek to maximize remittances to promote financial advancement and economic expansion.

3.1. Data and Methodology

3.1.1. Variables

- GDP (Gross Domestic Product)
- PR=Personal Remittance
- Agri=Agricultural growth
- EDU=Government expenditure on education
- DCPS=Domestic credit to private sector
- FDI=Foreign direct investment (Net Inflows)

Table 1
Variables Descriptions

Variables	Measurements	Sources
Dependent variable		
GDP	Annual percentage change in GDP growth	WDI
Independent variables		
DCPS	Domestic credit to private sector % of GDP	WDI
PR	Personal remittances % of GDP	WDI
Govt Exp on education	Education % of GDP	WDI
Agriculture	% of GDP	WDI
FDI	Net inflows in balance of payment	WDI

The intricate relation between financial development and economic expansion in Pakistan from 2000 to 2020 was explored in this study. Utilizing data from different websites WDI, World Bank. The empirical model for this study is:

$$GDP = \beta_0 + \beta_1 FDI + \beta_2 dcps + \beta_3 agricultural\ growth\ share + \beta_4 edu\ expenditure + \beta_5 personal\ remittances + \mu \quad (1)$$

Dependent variable **Gross Domestic Product**

Annual percentage change in real GDP Growth sourced from World Bank.

Independent Variables **Domestic Credit Private Sector**

In this paper, used domestic credit private sector proxy of financial development.

Government expenditure on Education

Education is an major element of human capital development and By investing in education, governments can improve the skills, knowledge, and abilities of their population. A well-educated labor is more productive and innovative to changes in the economy and contribute to increased overall productivity and economic growth. Education is linked to higher employment rates and lower poverty levels. As individuals acquire education and skills, they are more likely to find employment opportunities which lead to reduction in unemployment and poverty. And also lead to economic growth. Data collected from world bank.

Personal Remittances

One of the main factors influencing financial development and economic progress is personal remittances. Personal remittance data gathered from the World Bank.

Agriculture Growth

Contribution of agriculture sector in GDP and due to Agri sector economic growth, annually percentage data collected from WDI.

Foreign Direct Investment

FDI plays an influential part in a country's economic advancement. FDI will lead to an increase in the host country's capital stock, increasing economic growth. The extensive literature on the subject provided financial development as a proxy. In this paper, we used domestic lending to the private industry as a stand-in for financial growth and agriculture growth, personal remittances, and government expenditure on education as variables measuring financial development's impact on economic growth.

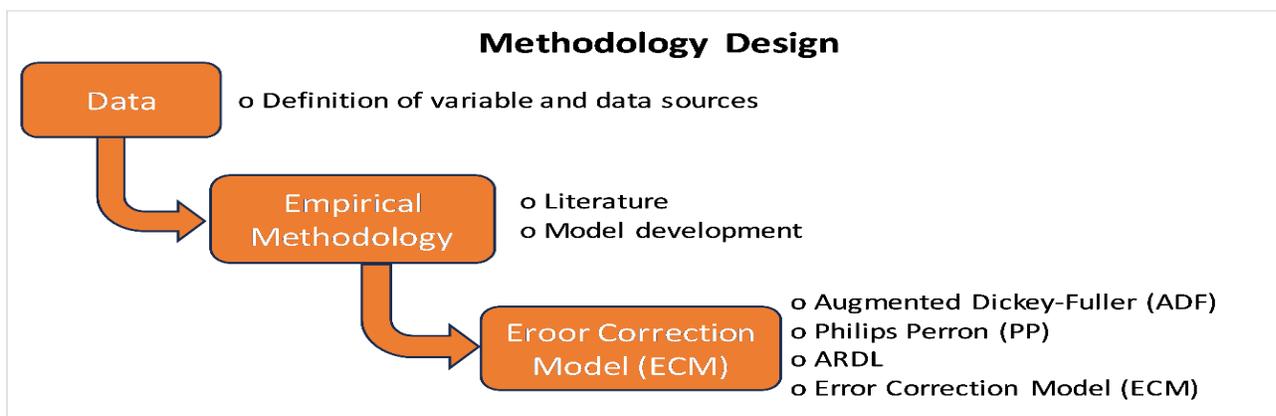


Figure 3: Methodology Design

4. Results and Discussions

4.1. Unit Root Test

Null hypothesis

Ho: there is the presence of unit root test (series is non-stationary)

Alternative hypothesis

H1: there is no presence of unit root

If the probability value is < 5% or 0.05, reject Ho and show that the data is stationary

Table 2
Unit Root Test

Variables	Level		1 ST Difference	
	C	C and T	C	C and T
GDP	0.5897	0.38129	0.0298	0.0738
EDU	0.1936	0.839	0.0264	0.0155
AGRI	0.0001	0.0006	0	0.1505
REMITTENCES	0.6115	0.0144	0.0517	0.2069
DCPS	0.8485	0.0636	0.0472	0.1271
FDI	0.0912	0.2959	0.0530	0.1612

To check the unit root, in this paper we used ADF (Augmented ducky Fuller) and Phillip Peron test. If the variable is non-stationary and has a unit root, it can be shown by a unit root test. The presence of a unit non-stationary alternative hypothesis is defined as the null

hypothesis. The alternative hypothesis is either stationarity. Levels are tested first, followed by first difference.

Table 3
Philips Perron Test

Variables	Level		1 ST Difference	
	C	C and T	C	C and T
GDP	0.5897	0.8129	0.0298	0.0738
EDU	0.3253	0.7755	0.0264	0.0687
AGRI	0.0001	0.0007	0	0.000
REMITTENCES	0.6139	0.2154	0.0594	0.2858
DCPS	0.7608	0.6491	0.0493	0.1310
FDI	0.2781	0.6214	0.0530	0.1547

Agriculture is stationary at the level, and then we applied ADF (augmented ducky Fuller), and the remaining variables are stationary at the 1ST difference. We have taken the log of all variables to normalize the data and applied the VAR MODEL to find the lag length, which is necessary to apply the ARDL TEST.

Table 4
ARDL Model

Selected Model: ARDL(1, 0, 0, 0, 0, 0)

Note: The final equation sample is larger than the selection sample

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LNGDP(-1)	0.467513	0.178949	2.612545	0.0215
LNFDI	-0.383020	0.088347	-4.335388	0.0008
LNEDU	2.122200	0.754598	2.812360	0.0147
LNDCPS	2.955123	0.814046	3.630167	0.0031
LNAGRI	0.165511	0.081379	2.033842	0.0629
LNPR	-3.245519	0.829965	-3.910427	0.0018

Table 5
Bound Test

F-Bounds Test Test Statistic	Value	Null Hypothesis: No levels of relationship		
		Significance	I (0) Asymptotic: n=1000	I (1)
F-statistic	4.901398	10%	1.81	2.93
K	5	5%	2.14	3.34
		2.5%	2.44	3.71
		1%	2.82	4.21
Actual Sample Size	19		Finite n=35	Sample: -1
		10%	-1	-1
		5%	-1	-1
		1%	-1	-1
			Finite n=30	Sample: -1
		10%	-1	-1
		5%	-1	-1
		1%	-1	-1

In the short run, education has an important effect on GDP. DCPS has a significant and increasing influence on GDP. Economic growth and agriculture have a strong and favourable association. Economic growth is adversely and dramatically impacted by PR. FDI can adversely affect the GDP, but this effect is significant.

There are upper and lower bound values that are less than F-Statistic, which means we reject the null hypothesis. It shows the co-integration between explanatory and explained variables. Additionally, there is a strong negative association between economic expansion and financial development.

Table 6
ARDL Error Correction Regression
ECM Regression

Case 1: No Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Coint Eq (-1)*	-0.532487	0.083447	-6.381168	0.000***

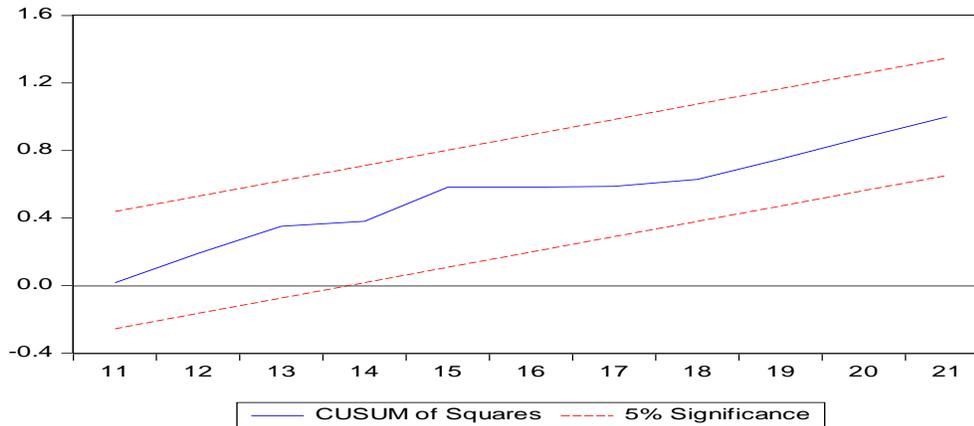
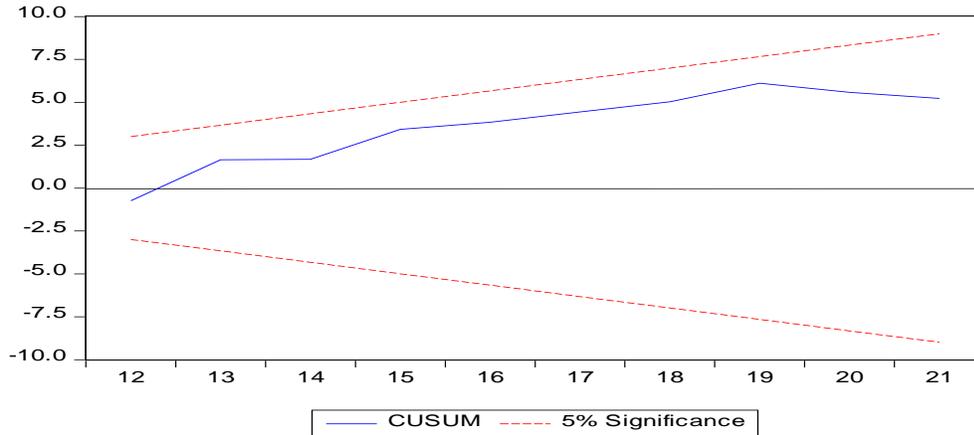
According to ECM results, the convergences factor in the long-run relationship indicates that financial development can affect economic expansion, and convergences mean that financial inclusion can change the growth pattern in a period of time. Upper and lower bound values are less than F-Statistic, which means we deny the null hypothesis and indicate long-run interconnection between variables. There is a significant and increasing relationship between financial advancement and economic growth. We used ECM to investigate the short-term correlation between the variables. It demonstrates the favourable short-term relationship between the expansion of agriculture and the economy. The result of Durbin-Watson is 2.2572, indicating a low chance of positive autocorrelation because the value is quite high. We cannot rule out the possibility of a substantial short-term association in the economy's growth and other independent variables in the model, given that the F statistic of 4.90 passes the significance test at the 1% level.

This study also proposed the link between the agriculture sector and economic growth Sertoglu, Ugural, and Bekun (2017) and found a positive relationship between the agriculture sector and economic growth. Our findings show that the influence of personal remittances on economic expansion is negative. According to regression analysis, consistent with our findings, Remittances have a markedly adverse effect on economic growth (Chowdhury, Dhar, & Gazi, 2023). Some studies oppose the findings that remittances negatively affect economic expansion. Sutradhar (2020) and Cazachevici, Havranek, and Horvath (2020) examine personal remittances as having a significant impact on economic growth. Our findings, which show that government expenditure influences economic growth, are positive, and some earlier studies support our findings (Poku, Opoku, & Agyeiwaa Ennin, 2022). Lupu and Nuță (2023) find that government expenditure on education has a positive impact in some countries, and some countries have an inverse relationship between economic growth and government spending. Some earlier studies oppose the findings that investment in education have adverse impact on economic growth (Onifade, Çevik, Erdoğan, Asongu, & Bekun, 2020; Zhang, Mohsin, Rasheed, Chang, & Taghizadeh-Hesary, 2021).

Some studies are consistent with our findings. Sarwar, Khan, Sarwar, and Khan (2020) found that finance development positively affects economic growth. Song, Chang, and Gong (2021) also support our findings that financial development promotes economic growth. These findings indicate the multipart interaction between previous GDP levels, investment in education, and domestic credit to the private sector, each contributing efficiently to economic growth. This highlights the significance of sustained economic momentum, education and access to finance as contributing factors. Foreign direct investment and personal remittances had the opposite effect, showing that not all forms of financial inflow are equally advantageous in contributing to economic expansion. It reveals a long-term linkage between financial innovation and economic expansion. At the same time, the ECM model highlighted an equilibrium correction mechanism that highlights how financial development may help adjust growth paths over time. The agricultural growth has a positive impact on Gross domestic product and highlights its significance to Pakistani economic development, suggesting the

necessity of policies that enhance agricultural productivity. Due to their distinct impacts, sector specific policies must be designed accordingly to target quality FDI investments, leverage remittances for productive investment, and prioritize government expenditure on education. This study illuminates the multidimensional impact of financial development on economic expansion in Pakistan and provides policymakers with evidence-based insights for inclusive and long-term economic development.

CUSUM And CUSUM of Square Test



According to our research, the ECM is statistically significant and convergent. The stability of ECM is evident from the CUSUM and CUSUM of a square, as all plots are within the bond. The CUSUM stability is used to demonstrate whether or not the model is structurally stable. In this case, the plot stays between critical bounds at a significance level of 5% critical bound, indicating that our model is structurally stable.

5. Conclusion

Financial development is the most contributing factor to the economic growth of any country. It directly and indirectly impacts the economy's expansion through the growth of many other developmental indicators. This study proves the link between financial innovation and the economy's growth using time series data from World Development Indicators, 2000 to 2020; this article has illuminated the multidimensional link between financial development and economic growth in Pakistan. This research argues that investment in education has a positive and significant influence on economic expansion. According to human capital theory, more investment in education contributes to financial innovation and economic expansion. It

concludes that an educated population is more productive, which promotes economic growth. After reviewing the detailed results presented earlier, examining the dynamics between various components of financial innovation and economic expansion is necessary. It is crucial to explain that variables such as FDI and personal remittances negatively affect GDP growth; such occurrences demonstrate both the complexity of this relationship and the need for targeted policy interventions. These insights suggest that although financial innovation generally promotes economic expansion, its effect can vary widely and depend upon specific context-dependent conditions.

Furthermore, the application of CUSUM and CUSUM square tests to measure the model's stability combined with an ARDL bound testing approach convincingly confirms a long-term correlation between financial innovation and economic expansion, disproving the null hypothesis of no co-integration and reinforcing the financial development is important to domestic economies. Policymakers need to use these insights for actionable strategies by prioritizing financial innovations that improve excesses to credit and efficiently allocate resources so investments in education and agricultural development maximize economic growth. The findings of the study, grounded in rigorous empirical analysis, make an urgent argument for revalorising existing policies to fully capitalize on financial innovation as a mechanism of economic expansion. Contributing substantially to economic and financial research, it explains how development catalyzes economic growth within developing economies like Pakistan.

Authors' Contribution

Nimra Ishfaq: Data collection and Estimation.

Ghulam Muhammad Qamri: Writing and Draft Preparation.

Zeyyan Ajmal: Conceptualization, Reviewing and Editing.

Qasim Raza Khan: Writing and Draft preparation.

Aqsa Akbar: Conceptualization, Reviewing, and Editing

Conflict of Interests/ Disclosures

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

Reference

- Al-Awad, M., & Harb, N. (2005). Financial development and economic growth in the Middle East. *Applied Financial Economics*, 15(15), 1041-1051. doi:<https://doi.org/10.1080/09603100500120639>
- Ali, H., & Bhutta, Z. M. (2018). Financial development and economic growth nexus in Pakistan: An analysis of bound testing approach. *Sukkur IBA Journal of Economics and Finance*, 2(1), 10-35.
- Atif, R. M., Jadoon, A., Zaman, K., Ismail, A., & Seemab, R. (2010). Trade liberalization, financial development and economic growth: Evidence from Pakistan (1980–2009). *Journal of International Academic Research*, 10(2), 30-37.
- Becker, M. C., & Knudsen, T. (2002). Schumpeter 1911: farsighted visions on economic development. *American Journal of Economics and Sociology*, 61(2), 387-403. doi:<https://doi.org/10.1111/1536-7150.00166>
- Beckmann, G., Wingberg, J., & Hasund, A. (1983). Computer-assisted cephalometry using the Bergen technic. *Fortschritte der Kieferorthopadie*, 44(5), 359-369. doi:<https://doi.org/10.1007/bf01994542>

- Botev, J., Égert, B., & Jawadi, F. (2019). The nonlinear relationship between economic growth and financial development: Evidence from developing, emerging and advanced economies. *International Economics*, 160(12), 3-13. doi:<https://doi.org/10.1016/j.inteco.2019.06.004>
- Brownbridge, M., & Kirkpatrick, C. (2000). Financial regulation in developing countries. *The Journal of Development Studies*, 37(1), 1-24. doi:<https://doi.org/10.1080/713600056>
- Buffie, E. F. (1984). Financial repression, the new structuralists, and stabilization policy in semi-industrialized economies. *Journal of Development Economics*, 14(3), 305-322. doi:[https://doi.org/10.1016/0304-3878\(84\)90061-0](https://doi.org/10.1016/0304-3878(84)90061-0)
- Cazachevici, A., Havranek, T., & Horvath, R. (2020). Remittances and economic growth: A meta-analysis. *World Development*, 134(10), 105021. doi:<https://doi.org/10.1016/j.worlddev.2020.105021>
- Chaudhury, S., Nanda, N., & Tyagi, B. (2020). Impact of FDI on economic growth in South Asia: does nature of FDI matters? *Review of Market Integration*, 12(1-2), 51-69. doi:<https://doi.org/10.1177/0974929220969679>
- Choong, C.-K., & Chan, S.-G. (2011). Financial development and economic growth: A review. *African Journal of Business Management*, 5(6), 2017-2027. doi:<https://doi.org/10.5897/AJBM10.772>
- Chowdhury, E. K., Dhar, B. K., & Gazi, M. A. I. (2023). Impact of remittance on economic progress: evidence from low-income Asian Frontier countries. *Journal of the Knowledge Economy*, 14(1), 382-407. doi:<https://doi.org/10.1007/s13132-022-00898-y>
- De, G. J., & Guidotti, P. (1995). Financial development and economic growth. *World Development*, 23(3), 433-448.
- Demirgüç-Kunt, A., & Levine, R. (2001). Financial structure and economic growth: Perspectives and lessons. doi:<https://doi.org/10.7551/mitpress/3001.003.0003>
- Dritsakis, N., & Adamopoulos, A. (2004). Financial development and economic growth in Greece: An empirical investigation with Granger causality analysis. *International Economic Journal*, 18(4), 547-559. doi:<https://doi.org/10.1080/1016873042000299981>
- Ehsan, S., Nazir, M. S., Nurunnabi, M., Raza Khan, Q., Tahir, S., & Ahmed, I. (2018). A multimethod approach to assess and measure corporate social responsibility disclosure and practices in a developing economy. *Sustainability*, 10(8), 2955. doi:<https://doi.org/10.3390/su10082955>
- Ekanayake, E., & Thaver, R. (2021). The nexus between financial development and economic growth: Panel data evidence from developing countries. *Journal of Risk and Financial Management*, 14(10), 489. doi:<https://doi.org/10.3390/jrfm14100489>
- Fishkin, J., Keniston, K., & McKinnon, C. (1973). Moral reasoning and political ideology. *Journal of Personality and Social Psychology*, 27(1), 109. doi:<https://doi.org/10.1037/h0034434>
- Haider, M. A., Raza, Q., Jameel, S., & Pervaiz, K. (2019). A comparative study of operational efficiency of Pakistani and Malaysian Islamic banks: Data envelopment analysis approach. *Asian Economic and Financial Review*, 9(5), 559. doi:<https://doi.org/10.18488/journal.aefr.2019.95.559.580>
- Hunjra, A. I., Arunachalam, M., & Hanif, M. (2021). Financial development-economic growth nexus: theoretical underpinnings, empirical evidence, and critical reflections. *Economic Growth and Financial Development: Effects of Capital Flight in Emerging Economies*, 155-178. doi:https://doi.org/10.1007/978-3-030-79003-5_9
- Islam, M. S. (2022). Do personal remittances influence economic growth in South Asia? A panel analysis. *Review of Development Economics*, 26(1), 242-258. doi:<https://doi.org/10.1111/rode.12842>

- Jadoon, I. K., & Hasnu, S. A. F. (2009). Collaboration dichotomies in knowledge management success. *Journal of Knowledge Management Practice*, 10(4).
- Jafri, M. A. H., Liu, H., Usman, A., & Khan, Q. R. (2021). Re-evaluating the asymmetric conventional energy and renewable energy consumption-economic growth nexus for Pakistan. *Environmental Science and Pollution Research*, 28(3), 37435-37447. doi:<https://doi.org/10.1007/s11356-021-13131-1>
- Jalil, A., & Ma, Y. (2008). Financial development and economic growth: Time series evidence from Pakistan and China. *Journal of economic cooperation*, 29(2), 29-68.
- Karlsson, H., & Mansson, K. (2015). *Revisiting the nexus of the financial Development and economic growth–Wavelet approach with a focus on Asian economies*. Paper presented at the Research Network Debate, Swedish Entrepreneurship Forum, Stockholm.
- Khan, A., Ahmed, M., & Bibi, S. (2019). Financial development and economic growth nexus for Pakistan: a revisit using maximum entropy bootstrap approach. *Empirical Economics*, 57, 1157-1169. doi:<https://doi.org/10.1007/s00181-018-1501-0>
- Khan, M. S., & Senhadji, A. S. (2000). FT IMF Working Paper.
- Khan, Q. R., Xinshu, M., Qamri, G. M., & Nawaz, A. (2023). From COVID to conflict: Understanding the deriving forces of environment and implications for natural resources. *Resources Policy*, 83(6). doi:<https://doi.org/10.1016/j.resourpol.2023.103700>
- Khattak, S. I., & Khan, W. A. (2023). Chinese Overseas Foreign Direct Investment–International Foreign Portfolio Investment–Financial Sector Development Nexus in the Belt and Road Initiative Economies: A Regional Analysis Based on Third-Generation Techniques. *Journal of the Knowledge Economy*(3), 1-25. doi:<https://doi.org/10.1007/s13132-023-01151-w>
- King, R. G., & Levine, R. (1993). Financial intermediation and economic development. *Capital markets and financial intermediation*, 156-189.
- Levine, R. (1997). Financial development and economic growth: views and agenda. *Journal of economic literature*, 35(2), 688-726. doi:<https://www.jstor.org/stable/2729790>
- Lipovina-Božović, M., & SMOLOVIĆ, J. C. (2016). Evidence on Economic Growth and Financial Development in Montenegro. *Management (18544223)*, 11(4).
- Lucas Jr, R. E. (1988). On the mechanics of economic development. *Journal of monetary economics*, 22(1), 3-42. doi:[https://doi.org/10.1016/0304-3932\(88\)90168-7](https://doi.org/10.1016/0304-3932(88)90168-7)
- Lupu, D., & Nuță, F. M. (2023). The impact of public education spending on economic growth in Central and Eastern Europe. An ARDL approach with structural break. *Economic research-Ekonomska istraživanja*, 36(1), 1261-1278. doi:<https://doi.org/10.1080/1331677X.2022.2086147>
- Mahembe, E., & Odhiambo, N. (2014). Foreign direct investment and economic growth: A theoretical framework. *Journal of Governance and Regulation*, 3(2).
- Masoud, N., & Hardaker, G. (2012). The impact of financial development on economic growth: Empirical analysis of emerging market countries. *Studies in economics and finance*, 29(3), 148-173. doi:<https://doi.org/10.1108/10867371211246830>
- Mavrotas, G., & Son, S.-I. (2008). Financial development and economic growth: further evidence from panel data models. In *Domestic Resource Mobilization and Financial Development* (pp. 39-69): Springer.
- Olorogun, L. A., Salami, M. A., & Bekun, F. V. (2022). Revisiting the Nexus between FDI, financial development and economic growth: Empirical evidence from Nigeria. *Journal of Public Affairs*, 22(3), e2561. doi:<https://doi.org/10.1002/pa.2561>
- Omran, M., & Bolbol, A. (2003). Foreign direct investment, financial development, and economic growth: evidence from the Arab countries. *Review of Middle East Economics and Finance*, 1(3), 37-55. doi:<https://doi.org/10.2202/1475-3693.1014>

- Onifade, S. T., Çevik, S., Erdoğan, S., Asongu, S., & Bekun, F. V. (2020). An empirical retrospect of the impacts of government expenditures on economic growth: new evidence from the Nigerian economy. *Journal of Economic Structures*, 9(1), 6. doi:<https://doi.org/10.1186/s40008-020-0186-7>
- Poku, K., Opoku, E., & Agyeiwaa Ennin, P. (2022). The influence of government expenditure on economic growth in Ghana: An Ardl approach. *Cogent Economics & Finance*, 10(1), 2160036. doi:<https://doi.org/10.1080/23322039.2022.2160036>
- Qamri, G. M., Sheng, B., Adeel-Farooq, R. M., & Alam, G. M. (2022). The criticality of FDI in Environmental Degradation through financial development and economic growth: Implications for promoting the green sector. *Resources Policy*, 78(9), 102765. doi:<https://doi.org/10.1016/j.resourpol.2022.102765>
- Rahman, A., Khan, M. A., & Charfeddine, L. (2020). Financial development–economic growth nexus in Pakistan: new evidence from the Markov switching model. *Cogent Economics & Finance*, 8(1), 1716446. doi:<https://doi.org/10.1080/23322039.2020.1716446>
- Ram, R. (1999). Financial development and economic growth: Additional evidence. *The Journal of Development Studies*, 35(4), 164-174. doi:<https://doi.org/10.1080/00220389908422585>
- Robinson, J. (1952). The model of an expanding economy. *The Economic Journal*, 62(245), 42-53. doi:<https://doi.org/10.2307/2227172>
- Rosalia, M.-R. G. (2013). Impact of Financial Development on Economic growth.
- Sehrawat, M., & Giri, A. (2016). Panel data analysis of financial development, economic growth and rural-urban income inequality: Evidence from SAARC countries. *International Journal of Social Economics*, 43(10), 998-1015. doi:<https://doi.org/10.1108/IJSE-10-2014-0211>
- Sertoglu, K., Ugural, S., & Bekun, F. V. (2017). The contribution of agricultural sector on economic growth of Nigeria. *International Journal of Economics and Financial Issues*, 7(1), 547-552.
- Sghaier, I. M., & Abida, Z. (2013). Foreign direct investment, financial development and economic growth: Empirical evidence from North African countries. *Journal of International and Global Economic Studies*, 6(1), 1-13.
- Shah, A. M., Yan, X., Khan, S., Khurram, W., & Khan, Q. R. (2021). A multi-modal approach to predict the strength of doctor–patient relationships. *Multimedia Tools and Applications*, 80(8), 23207-23240. doi:<https://doi.org/10.1007/s11042-020-09596-w>
- Shahbaz, M., & Mafizur Rahman, M. (2014). Exports, financial development and economic growth in Pakistan. *International Journal of Development Issues*, 13(2), 155-170. doi:<https://doi.org/10.1108/IJDI-09-2013-0065>
- Shahbaz, M., Shahbaz Shabbir, M., & Sabihuddin Butt, M. (2013). Effect of financial development on agricultural growth in Pakistan: New extensions from bounds test to level relationships and Granger causality tests. *International Journal of Social Economics*, 40(8), 707-728. doi:<https://doi.org/10.1108/IJSE-01-2012-0002>
- Shan, J. (2005). Does financial development ‘lead’ economic growth? A vector auto-regression appraisal. *Applied Economics*, 37(12), 1353-1367. doi:<https://doi.org/10.1080/00036840500118762>
- Shan, J. Z., Morris, A. G., & Sun, F. (2001). Financial development and economic growth: An egg-and-chicken problem? *Review of International Economics*, 9(3), 443-454. doi:<https://doi.org/10.1111/1467-9396.00291>
- Shapoval, A. (2022). The Contribution of Large Recurrent Sunspot Groups to Solar Activity: Empirical Evidence. *Universe*, 8(3), 180. doi:<https://doi.org/10.3390/universe8030180>
- Song, C.-Q., Chang, C.-P., & Gong, Q. (2021). Economic growth, corruption, and financial development: Global evidence. *Economic Modelling*, 94, 822-830. doi:<https://doi.org/10.1016/j.econmod.2020.02.022>

- Sutradhar, S. R. (2020). The impact of remittances on economic growth in Bangladesh, India, Pakistan and Sri Lanka. *International Journal of Economic Policy Studies*, 14(1), 275-295. doi:<https://doi.org/10.1007/s42495-020-00034-1>
- Syah, A., & Pratama, K. (2022). The Role of Economic Factors on the Economic Growth: Evidence from the Indonesian Economy. *Cuadernos de Economía*, 45(129).
- TARIQ, R., KHAN, M. A., & RAHMAN, A. (2020). How does financial development impact economic growth in Pakistan?: New evidence from threshold model. *The Journal of Asian Finance, Economics and Business*, 7(8), 161-173. doi:<https://doi.org/10.13106/jafeb.2020.vol7.no8.161>
- Wang, X., Xu, Z., Qin, Y., & Skare, M. (2022). Foreign direct investment and economic growth: a dynamic study of measurement approaches and results. *Economic research-Ekonomiska istraživanja*, 35(1), 1011-1034. doi:<https://doi.org/10.1080/1331677X.2021.1952090>
- Yusuf, M., Malarvizhi, C., Mazumder, M. N. H., & Su, Z. (2014). Corruption, poverty, and economic growth relationship in the Nigerian economy. *The Journal of Developing Areas*, 95-107.
- Zahoor, Z., Khan, I., & Hou, F. (2022). Clean energy investment and financial development as determinants of environment and sustainable economic growth: evidence from China. *Environmental Science and Pollution Research*, 29(9), 1-11. doi:<https://doi.org/10.1007/s11356-021-16832-9>
- Zhang, D., Mohsin, M., Rasheed, A. K., Chang, Y., & Taghizadeh-Hesary, F. (2021). Public spending and green economic growth in BRI region: mediating role of green finance. *Energy Policy*, 153, 112256. doi:<https://doi.org/10.1016/j.enpol.2021.112256>