



Research Article

Exploring the Dynamic Interplay Between Financial Development and Economic Growth in Pakistan

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Article Information

Article History

Received: 2 May 2026

Revised: 8 June 2026

Accepted: 15 July 2026

Published online: 3 August 2026

Keywords

Economic Growth
Financial Development
Error-Correction Models
Cointegration
Granger Causality
Pakistan

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Abstract

This study examines the impact of governance quality, the corporate tax rate, and exchange rate volatility on foreign direct investment (FDI) inflows in 16 emerging countries over the period 2003–2017. Considering the persistence of potential endogeneity issues, the study employs the system generalized method of moments (GMM), a dynamic panel data model, to estimate the variables of interest. The results provide evidence that governance quality positively and significantly affects FDI inflows, whereas the corporate tax rate has a negative effect. No significant relationship is found between FDI inflows and exchange rate volatility. From a policy and strategic perspective, the study suggests that emerging economies should reconsider their tax imposition mechanisms to reduce the burden of corporate taxation. Simultaneously, greater emphasis should be placed on maintaining strong governance performance to ensure a favorable business environment. Overall, the study highlights the importance of creating a business-friendly institutional environment to attract foreign investment.

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I. INTRODUCTION

The empirical and theoretical literature has thoroughly investigated the connection between financial development and economic growth. The theoretical underpinnings of this relationship date back to Schumpeter and Swedberg (2021) and later to McKinnon (1994), whose systems frustrate financial development by directing credit to preferential, ineffective sectors and restricting interest rates, among other constraints. The impact of financial-sector services on capital accumulation and advances in technology is another way in which the endogenous growth literature stresses their importance for the long term. Among these are data collection and savings activation for making expenditures, allocating resources, monitoring management, implementing corporate control, and helping to reduce risk.

However, important economists such as Robinson (1952) and Kuznets (2019) assert that the significance of financial development is exaggerated and that it follows real

economic growth. According to this view, unlike Shaw (1973) and the endogenous growth theorists, financial development accompanies growth, assuming there is any connection between them at all. Roubini and Sala-i-Martin (1992) and King and Levine (1993) are two examples of empirical research. Cross-sectional analysis was utilized in these investigations to determine the connection between economic growth and financial development indicators. The data collected through cross-sectional growth regressions omitted country-specific factors and offered only a single estimate.

In addition, the dynamics of the connection between financial development and economic growth are absent from cross-country growth regression models. Furthermore, in growth regressions, the significant value of a financial development measure does not always indicate a causal relationship between finance and growth. Such incorrect causal-connection analyses led scholars to look for more active time-series examinations instead of a static cross-

sectional environment in order to explore the reverse direction. Granger causality tests have therefore become the main technique for resolving this issue.

According to time-series analyses of a few specified nations by Jung (2008), Demetriades and Hussein (1996), and Luintel and Khan (1999), there is frequently little evidence for a unidirectional pattern of causality, and the pattern fluctuates greatly among nations. All of these studies show that analyzing specific nations using a wide range of financial indicators is crucial to improving our understanding of the relationship between financial development and economic growth. The previously stated methodology is implemented in our research for Pakistan from 1974 to 2023. Substantial levels of governmental influence and repression were applied to the Egyptian financial sector. Nonetheless, the Egyptian government initiated several types of financial improvements in 1991. The economy recovered from the downward trend that had continued for approximately ten years after these measures. We investigate whether moving from a regulated financial system, as established before 1991, to a more liberalized financial system improved economic development. The robustness of the four conclusions is determined using three separate statistics.

Granger causality tests are utilized within the context of a cointegration and error-correction model to analyze the direction of causation between financial development and economic growth. The fixed investment share of GDP is included in our trivariate vector autoregressive (VAR) model as a further factor, in addition to real GDP per capita and financial development metrics.

Considering investment in a VAR system permits the calculation of various ways in which financial development impacts the economy, such as through accumulating resources or improving efficiency. We examine the value of the above sample period using variance-decomposition causality tests. Khalifa Al-Yousif (2002) is the only research that we understand has explored the relationship between financial development and economic growth in Egypt. Its causality estimates, however, are probably misspecified because they are based on bivariate models. Additionally, the currency and nominal-GDP proportions are employed as financial development indicators. Later in the research project, the limitations of these two indicators will be studied, particularly with regard to Pakistan.

Abu-Bader and Abu-Qarn (2008) investigated the connection between financial development and Egypt's economic growth. They obtained strong evidence of a two-way causal association and a long-term connection, meaning that both growth and finance have a direct effect on each other. The findings support the idea that finance positively assists growth. In conclusion, this study also finds long-term relations between economic growth and finance in Pakistan, especially when models include factors such as broad money and the investment ratio. However, the causal

directions and short-term results are different, indicating country-specific variables. The paper is organized as follows: Section II explores Pakistan's financial and economic circumstances during the last forty years, with particular attention to the financial reforms of 1991. The variables and data sources employed in the article are explained in Section III. The econometric approach, drawing on Granger causality, cointegration, and error-correction (ECM) models, is discussed in Section IV. The empirical results are provided in Section V. Section VI provides a summary of the main results and some concluding observations.

II. A REVIEW OF PAKISTAN'S ECONOMIC AND FINANCIAL DEVELOPMENT

The expansion of the Pakistani economy between 1974 and 2004 was affected by a highly controlled and sometimes unstable monetary system, with labor, financial, and commodity markets all facing significant levels of government involvement. The government's acquisition of banks and insurance businesses in the 1970s made this intervention particularly common in the financial sector. In order to promote state-owned businesses, the government established banking policy, limited lending to specific public enterprises and priority sectors, and implemented interest-rate regulations. State-operated banks weakened innovation and reduced financial intermediation performance.

Although the financial system was almost liberalized and private investment was supported in the 1980s, the government continued to maintain a substantial grip on it. Politically motivated loan choices, directed credit, and regulated interest rates were still common. The banking sector's insufficient quality impeded money from being directed into profitable private investment, even while remittance inflows enhanced consumption and the balance of payments. Substantial financial-sector reforms were carried out in Pakistan starting in the 1990s, including bank privatization, the elimination of interest-rate restrictions, and an increase in Pakistan's autonomy.

However, the commencement of these reforms was inconsistent, and the large number of non-performing advances was a consequence of both insufficient implementation of prudential requirements and decades of political instability. The equitable distribution of credit remained incorrect, favoring politically linked companies and large borrowers over SMEs and agriculture. Investment levels declined around this time partly because of governmental interference and banking-sector issues, which resulted in lower savings rates (on average, 13-15% of GDP) than those of regional competitors. Particularly in the 1970s and early 1980s, the inefficient public sector provided a large portion of investment, crowding out private enterprises. Excessive fiscal deficits, reliance on foreign aid, and sensitivity to external forces hindered sustained private investment even after reform began in the 1990s. Slower

and more variable economic growth, recurrent balance-of-payments difficulties, and underdeveloped financial markets that could not adequately sustain long-term development were the result of both these interventions and structural defects.

Until the mid-2000s, the Pakistani economy grew at a relatively high rate, primarily because of higher investment made possible by significant flows of foreign aid, debt relief, and a sharp rise in worker remittances, particularly from OECD and Gulf countries. However, in response to an increase in inflation, the State Bank of Pakistan introduced a tight monetary policy starting in 2008, restricting the growth of private credit through high policy rates and limited liquidity.

Additionally, as a result of the growing fiscal deficit and government borrowing, private-sector credit as a percentage of GDP steadily declined from 28% in 2007 to less than 18% by 2015 (Ali *et al.*, 2016). Since Pakistan was affected by the global financial crisis, critical energy shortages, internal security issues, and severe floods in 2010 and 2011, this decrease coincided with a distinct reduction in economic development. Per capita GDP growth averaged 1.5% during this time, while the average GDP growth rate fell to about 3.4% (Moreno, 2009).

National savings and confidence in the private sector were further weakened by deficits and shrinking government investment. The economy did, however, partially recover between 2014 and 2018, with growth averaging 5.2% and reaching a peak of 5.8% in 2018. This was primarily because of important construction projects under the China-Pakistan Economic Corridor (CPEC), steady flows of remittances, and short-term advantages from low global oil prices (Demirgüç-Kunt *et al.*, 2020). Remittances generated significant external support, rising from 4.1% of GDP in 2004 to over 7.8% by 2020.

However, after 2018, Pakistan again had to contend with increasing macroeconomic problems, including a shortage of foreign funding, a sharp decline in the value of the rupee, rising inflation, and an IMF stabilization intervention. These factors contributed to another downturn. GDP growth declined to 1.9% in 2019, and the COVID-19 pandemic caused the economy to contract by -0.9% in 2020 (Rehman *et al.*, 2020; Ali *et al.*, 2020). Savings and investment ratios remained below those of regional competitors, and the economy was exposed to foreign shocks as well as internal structural weaknesses, as in the past decade.

In the middle of the 2000s, Pakistan renewed its commitment to a development model supported by private industry by launching a number of economic policies and modernization efforts. Since then, major modifications have been approved by the World Bank and the International Monetary Fund (2000), with the objective of improving market-oriented regulations, facilitating private-sector-led development, and maintaining the macroeconomy (Ruger,

2007; Pop-Eleches, 2009). The privatization of state-owned businesses, regulation of banking and telecommunications, and improved benefits for foreign direct investment were among the efforts implemented by subsequent administrations between 2004 and 2020 to reduce challenges facing private investment. To better integrate Pakistan into international markets, significant trade improvements were also carried out, such as export-promotion plans and reduced tariffs (Rehman *et al.*, 2015).

However, these policy measures were neither thorough nor consistent enough to establish a robust, different private sector that could maintain development over the long run, even if they encouraged periods of rapid growth, such as average GDP growth of approximately 6.8% during 2004–07 and 5.2% between 2014 and 2018. The private sector failed to maintain sufficient momentum to reduce the investment gap and attain prolonged high growth because of frequent macroeconomic difficulties, political instability, energy constraints, and a shortage of institutional resources (Kranke, 2020).

Despite continuing accords with the World Bank and IMF (2019), the Pakistani government frequently displayed resistance to fully implementing the typical economic reform packages supported by these organizations. Essential adjustments, such as raising the tax base, doing away with untariffed energy subsidies, and organizing state-owned businesses, were often delayed or modified.

To make matters worse, the government employed rigorous stabilization strategies in 2018 and 2019, including decreasing the rupee by more than 30%, restricting fiscal policy under the IMF's Extended Fund Facility, and raising the SBP policy rate from 6% to 13.25%. These restrictive policies initially affected the private sector. Private investment was strongly discouraged by high borrowing rates, exchange-rate instability, and government crowding out.

Consequently, private investment reversed increases from prior growth years, decreasing to just 9.8% of GDP in 2020, with its proportion of overall expenditure falling below 40%. Pakistan's capacity to maintain the moderate economic pace shown from 2014 to 2017 was seriously compromised by these errors. With the COVID-19-induced shock and policy expansion, real GDP per capita growth remained extremely volatile, reaching above 3% in 2016 but dropping to around 0% in 2020 (Mazari *et al.*, 2021).

Pakistan's economic approach has focused strongly on economic liberalization since the early 1990s, particularly in the banking sector. With support packages from the World Bank and the IMF's structural adjustment programs, the government implemented a number of improvements to establish efficient and competitive financial markets, which are essential for promoting long-term economic growth (Haque, 2003). Foreign-exchange limitations were reduced, interest rates were liberalized, and public-sector banks were

privatized as part of the fiscal adjustment plan. The State Bank of Pakistan (SBP) obtained greater regulatory and policy autonomy in the first phase, which consisted of strengthening the capital-allocation mechanism when determining the distribution of credit and interest rates. The second goal of the change phase was to stimulate foreign and private investment in the capital markets and commercial banking. To bring international banks and large investors to the market, legislation was modified and major banks, including HBL, UBL, and MCB, were privatized. These measures contributed to the development of banking services, the increase in monetary assets, and the expansion of intermediation.

Additionally, the financial sector underwent changes and recapitalization, and the regulatory environment improved, all of which caused an increase in asset quality and operational efficiency. The share of foreign and private banks in Pakistan's overall banking industry improved significantly, as reported by Khan (2008). The proportion of foreign banks' total assets rose from under 5% in 1995 to over 12% by 2007, showing the increase in global interest in Pakistan's financial system. The progressively rising proportion of private-sector investment in total expenditure around this time was an essential component of investment. Private-sector investment in Pakistan began to exceed public-sector investment following the liberalization and privatization strategies of the 1990s, and by 2004 it provided more than 64% of all investment (Zaidi, 2005).

Concurrently, domestic credit to the private sector as a share increased consistently, rising from approximately 18% in 1991 to a peak of 27.9% in 2007, reflecting an expanding role of financial institutions in supporting private-enterprise activity (Khan et al., 2008). This period marked a structural shift in Pakistan's investment landscape, with the private sector emerging as the main engine of capital formation and growth.

Another important factor was the corresponding improvement in monetary policy, as shown by the average rate of 2% during 2003–2018, compared with 1.5% in the more difficult years of 1977–2002. Although the investment-to-GDP rate continued to be extremely low, ranging between 15% and 18% for the entire period 1974–2023, with brief peaks above 20% in the latter part of the decade and the beginning of the 2000s and again reaching 19% during 2016–2018, this rise in financial performance occurred (Hussain, 2023). It is possible that these periods of economic recovery were caused by the private sector's growing influence over time. After economic liberalization in the second half of the 1990s, Pakistan moved from a model that was tightly controlled and dominated by the public sector to one that supported trade liberalization, private investment, and banking reform.

The 1990s and 2000s saw very important privatization activities that transferred ownership of banks, businesses, and utilities to the private sector. At the beginning of the

2000s, investment reached over 60% of all investment, and it continued to do so in a substantial number of the years that followed, even in the face of macroeconomic crises and protests. The private credit-to-GDP ratio also grew, from approximately 18% in the early 1990s to a high near 28% by 2007, but it declined in subsequent decades because of tighter monetary policy and fiscal crowding out.

Particularly in the latter half of the 2000s and again with the beginning of the China-Pakistan Economic Corridor (CPEC) in 2015, these developments significantly increased foreign direct investment and generated major interest in Pakistan's privatization projects. By the middle of the 2020s, CPEC had more than \$60 billion in anticipated projects, increasing energy and infrastructure investment. Pakistan's economy remained exposed to external factors despite these improvements; growth declined to about 1.9% in 2019 and dropped by -0.9% in 2020 because of the COVID-19 pandemic, before some improvement in 2021–2022 (Rogawski McQuade *et al.*, 2023).

III. DATA AND METHODOLOGY

The process of improving the quality, quantity, and effectiveness of intermediation is ordinarily referred to as financial development. Numerous organizations and processes are connected during this process. As a result, it cannot be defined in only one way. Four commonly applied financial-development indicators are used in this paper to test the reliability of our results. Several studies utilized M2 as an established measure of financial success (Abu-Bader & Abu-Qarn, 2008; Ur Rehman & Hysa, 2021; Wolde-Rufael, 2009; King & Levine, 1993). M2 shows the ratio of the money stock to nominal GDP. In developing economies, money outside banks accounts for an important share of the M2 stock. Because the ratio could demonstrate increased cash use rather than a rise in bank accounts, M2 is therefore a less reliable indicator of the degree of intermediation. An increase in M2 may indicate capital flight from a currency, which has a detrimental effect.

Another method for gauging financial development was first suggested by Demetriades and Hussein (1996), who derived the magnitude of M2 to GDP by subtracting currency not held by banks from M2. For Pakistan, the average amount of money kept outside banks from 1974 to 1990 was approximately 40% of M2. However, this percentage has steadily decreased since then, and in 2010 it remained at an average of around 23–25%. Improved consumer confidence in official banking, banking-sector reforms, and wider investment activities over the past few decades are all causes of this consistent decline.

The second variable introduced was the interest-rate (IR) policy at that time. Interest rates were strictly managed and sometimes negative in real terms during the 1970s and 1980s, which encouraged funds in the financial sector. Market-based interest-rate setting became achievable through financial liberalization beginning in the 1990s. To

prevent inflation and maintain macroeconomic stability, the SBP policy rate averaged 7–9% in the 2000s, increased significantly to 13.25% in 2019 under stabilization approaches, and ranged between 7% and 22% in 2020–2023 (Ul Haque *et al.*, 2019).

The third measure is PRVT, or domestic credit to the private sector by banks (% of GDP). This figure is normally utilized to estimate the amount of financial resources that M2 fails to deliver. Improved private savings translate into a stronger M2 ratio; yet, higher participation supplies credit to the private sector, which is ultimately responsible for the amount and quality of investment and cannot continue to support economic expansion. As a result, an improvement in these factors does not necessarily translate into a higher return on investment. However, there is a clearer correlation between PRVT and productivity and investment volume. The PRVT measure is undoubtedly utilized in numerous research studies (Jalil & Feridun, 2011; Abu-Bader & Abu-Qarn, 2008; Mohammad *et al.*, 2012; Demetriades & Hussein, 1996) and others.

The amount of financial development is measured by the ratio of credit, which excludes bank credit. The word "private" defines the arrangement of credit between the public and private sectors and is used for non-financial private businesses for the purpose of measuring domestic credit. A variable proposed in the VAR system and utilized during the analysis is GDP.PC, which evaluates the financial system by the percentage of investment to GDP, IY, or FDI.IN. The value of this figure is known as one of the few economic variables that has a strong relationship with financial achievement, despite the material set.

Determining the methods by which financial development promotes GDP growth is made simpler by regression analysis that includes the investment variable. The present study uses Pakistani time-series data from 1974 to 2023. Financial development was computed from International Financial Statistics (IFS). IY and GDDP data were derived from the World Development Indicators (WDI). Our sample covers the period 1974–2023. These reliable and common sources of economic and financial data are used.

$$\Delta Y_{1t} = \mu + \sum_{h=1}^r \alpha_{1,h} ECT_{h,t-1} + \sum_{k=1}^{p-1} \beta_{11,k} \Delta Y_{1,t-k} + \sum_{k=1}^{p-1} \beta_{12,k} \Delta Y_{2,t-k} + \sum_{k=1}^{p-1} \beta_{13,k} \Delta Y_{3,t-k} + \varepsilon_{1t} \quad (4)$$

$$\Delta Y_{2t} = \mu_2 + \sum_{h=1}^{p-1} \alpha_{2,h} ECT_{h,t-1} + \sum_{k=1}^{p-1} \beta_{21,k} \Delta Y_{1,t-k} + \sum_{k=1}^{p-1} \beta_{22,k} \Delta Y_{2,t-k} + \sum_{k=1}^{p-1} \beta_{23,k} \Delta Y_{3,t-k} + \varepsilon_{2t} \quad (5)$$

$$\Delta Y_{3t} = \mu_3 + \sum_{h=1}^{p-1} \alpha_{3,h} ECT_{h,t-1} + \sum_{k=1}^{p-1} \beta_{31,k} \Delta Y_{1,t-k} + \sum_{k=1}^{p-1} \beta_{32,k} \Delta Y_{2,t-k} + \sum_{k=1}^{p-1} \beta_{33,k} \Delta Y_{3,t-k} + \varepsilon_{3t} \quad (6)$$

where $\beta_{ij,k}$ defines the impact of the k th lagged value of variable j on the present value of variable i ; $i, j = Y_1, Y_2, Y_3$. The residuals from the h th cointegration equation are lagged for a single period, and $ECT_{h,t-1}$ is the h th error-correction term.

The VECM methodology not only illustrates how the variables are causally associated, but also allows us to

IV. ECONOMETRIC METHODOLOGY

A major development in the Granger causality test was the cointegration method. When two or more variables show associated movement, they are said to be cointegrated. Granger causality is active in at least one direction as long as all relevant factors have similar patterns (Granger, 1988). Although cointegration indicates Granger causality, it does not reveal whether the variables are causally connected. This may be determined by applying a vector error-correction model (VECM), which depends on cointegration vectors. We analyze the following VAR model of order p :

$$Y_t = \mu + A_1 Y_{t-1} + \dots + A_{p-1} Y_{t-p} + \varepsilon_t \quad (1)$$

where FD is the measure of financial development and Y_t is a 3×1 vector of $I(1)$ variables defined as follows: $Y_1 = \text{GDP.PC}$, $Y_2 = \text{FD}$, and $Y_3 = \text{IY}$. Let each variable in levels be $I(1)$. According to the Granger representation theorem, the VAR model may represent the following VECM if these variables trend together toward a long-run equilibrium.

$$\Delta Y_t = \mu + \Gamma_1 Y_{t-1} + \dots + \Gamma_{p-1} \Delta Y_{t-p+1} + \Pi Y_{t-1} + \varepsilon_t \quad (2)$$

where ε_t is a vector of white-noise residuals and a distinction function is used. Eq. (2) may be rewritten as follows if Π is of rank $1 < r < 3$. It can be decomposed into $\Pi = \alpha\beta$, where α ($3 \times r$) and β ($r \times 3$) are involved.

$$\Delta Y_t = \mu + \Gamma_1 \Delta Y_{t-1} + \dots + \Gamma_{p-1} \Delta Y_{t-p+1} + \alpha(\beta' Y_{t-1}) + \varepsilon_t \quad (3)$$

When the adjustment coefficients representing adjustments toward long-run equilibrium are denoted by α , and the rows of β are considered separate cointegration vectors, all variables in Eq. (3) are stationary because the linear combinations $\beta' Y_{t-1}$ are stationary processes. Using a maximum-likelihood strategy, Johansen (1988) provides a method of cointegration and estimates cointegrating correlations with the system's non-stationary variables. Eq. (3) may be defined in our trivariate VAR model as:

distinguish short- and long-run Granger causality. The standard F test is used to test the null hypothesis that $\beta_{ij,1} = \dots = \beta_{ij,p-1} = 0$ for the purpose of determining long-run Granger causation from variable Y_i to variable Y_j in the presence of cointegration in the given context (Eqs. (4)–(6)). We establish that variable Y_i Granger-causes variable Y_j by rejecting either or both of the two null hypotheses.

TABLE I JOHANSEN COINTEGRATION TEST RESULTS

Panel A

Variables	Eigen Val			Max eigen val			5 % cr.			Lag	r ²
	r=0	r=1	r=2	r=0	r=1	r=2	r=0	r=1	r=2		
Lggdp.pc, lgfdi.ni, Lgprivate	0.25	0.13	0.00	13.83	6.75	0.01	21.13	14.26	3.84	1	0
Lggdp.pc, lgfdi.ni, lgm2	0.52	0.17	0.00	34.70*	9.28	0.10	21.13	14.26	3.84	1	1
Lggdp.pc, lgfdi.ni, Lgir	0.47	0.14	0.00	31.25*	7.65	0.00	21.13	14.2	3.84	1	1

Source: Authors' calculations obtained from EViews 12.

Panel B

Variables	Trace			5 % cr.			Lag	r ²
	r=0	r=1	r=2	r=0	r=1	r=2		
Lggdp.pc, lgfdi.ni, Lgprivate	20.64	6.80	0.01	29.79	15.49	3.84	1	0
Lggdp.pc, lgfdi.ni, lgm2	44.08*	9.38	0.01	29.79	15.49	3.84	1	1
Lggdp.pc, lgfdi.ni, Lgir	38.89*	7.66	0.00	29.79	15.49	3.84	1	1

NOTE: The findings for determining the cointegrating relations are shown in the table. Using the SBIC, HQIC, and AIC, the number of lags is ascertained. At the 5% significance level, the maximum eigenvalue and trace statistics and the corresponding critical values are given in columns 2, 3, and 4 and 6 and 7, respectively. Source: Authors' calculations obtained from EViews.

V. RESULTS AND DISCUSSION

The cointegration of every variable of a given order $d \geq 1$ is an essential but not required condition. Therefore, the first step in our empirical research was to employ the ADF test (Dickey & Fuller, 1979) to measure the degree of integration of every variable in levels and first differences. We observe that, while the variables are stationary in first differences, they are all integrated of order 1.1. Searching for cointegration between the relevant factors was the second stage. Depending on the financial development measure used, both Johansen's maximum-eigenvalue (max) and trace tests, which employ the optimal lag for the VAR, provide distinct evidence of long-term correlations (see Table I). In addition, at the 5% level, we do not reject the null hypothesis of no cointegration between private-sector credit, the investment/GDP ratio, and per capita GDP, signifying no long-term equilibrium connection among these variables. However, when M2 is applied as the measure of financial development, both the maximum-eigenvalue and trace statistics show strong evidence of at least one cointegrating link. Likewise, the findings suggest a cointegrating connection among the interest rate, the investment/GDP ratio, and per capita GDP. These results

show a consistent long-term connection among financial development, investment, and economic growth when financial development is measured by M2 or the interest rate; however, the relationship does not appear when it is measured by private-sector credit. We applied Johansen cointegrating vectors to implement VECM-based causality tests based on our cointegration results. Table II presents an analysis of Granger causality tests created to investigate short-term differences among foreign direct investment (FDI), economic growth (GDP per capita), and supplementary indicators of financial development. The null hypothesis is the absence of any Granger causality between the variables in all cases. There is no evidence of a causal connection between GDP and FDI in either direction for Model 1, which includes GDP per capita, FDI, and the interest rate (IR). This indicates the hypothesis that there are only weak short-term interactions between these two variables. However, we identify a strong unidirectional short-term causal correlation between GDP per capita and the interest rate, showing that economic expansion increases investment behavior. This may reflect a demand-following process in which increased levels of production result in greater demand for investment.

TABLE II GRANGER CAUSALITY TEST

Model 1: Lggdp.pc, Lgfdi.ni, Lgir (GDP per capita, FDI, Interest Rate)

Null hypothesis	F-statistic	p-value	Lags	Causal inference
Lgfdi.ni does not Granger cause lggdp. Pc	0.842	0.363	1	No causality
Lggdp.pc does not Granger cause lgfdi.ni	1.319	0.256	1	No causality
Lgir does not Granger cause lggdp. pc	14.484**	0.000	1	Uni-directional causality from GDP to IR
Lggdp.pc does not Granger cause lgir	0.001	0.971	1	No causality
Lgir does not Granger cause lgfdi.ni	0.853	0.360	1	No causality
Lgfdi.ni does not Granger cause lgir	2.192	0.145	1	No causality

Note: *, **, and *** indicate significance levels of 10%, 5%, and 1%, respectively.

Source: Authors' calculations obtained from EViews 12.

Model 2: Lggdp.pc, Lgfdi.ni, Lgm2 (GDP per capita, FDI, Broad Money)

Null hypothesis	F-statistic	p-value	Lags	Causal inference
Lgfdi.ni does not Granger cause lggdp. Pc	0.842	0.363	1	No causality
Lggdp.pc does not Granger cause lgfdi.ni	1.319	0.256	1	No causality
Lgm2 does not Granger cause lggdp. Pc	0.775	0.383	1	No causality
Lggdp.pc does not Granger cause lgm2	1.323	0.256	1	No causality
Lgm2 does not Granger cause lgfdi.ni	0.451	0.505	1	No causality
Lgfdi.ni does not Granger cause lgm2	0.023	0.879	1	No causality

Source: Authors' calculations from EViews 12.

In contrast, there is no substantial Granger causality between any two groups of variables in the results for Model 2, which uses broad money (M2) as the financial development measure. It also suggests that there is a weak

movement process between monetary depth and real-sector activity over the sample period, because changes in FDI and GDP per capita do not predict, and are not predicted by, changes in M2 in the short term.

Model 3: Lggdp.pc, Lgfdi.ni, Lgprivate (GDP per capita, FDI, Private Sector Credit)

Null hypothesis	F-statistic	p-value	Lags	Causal inference
Lgfdi.ni does not Granger cause lggdp. pc	0.842	0.363	1	No causality
Lggdp.pc does not Granger cause lgfdi.ni	1.319	0.256	1	No causality
Lgprivate does not Granger cause lggdp. Pc	0.913	0.345	1	No causality
Lggdp.pc does not Granger cause lgprivate	4.137**	0.047	1	Uni-directional causality from GDP to Private Credit
Lgprivate does not Granger cause lgfdi.ni	0.003	0.951	1	No causality
Lgfdi.ni does not Granger cause lgprivate	0.584	0.448	1	No causality

Note: *, **, and *** indicate significance levels of 10%, 5%, and 1%, respectively.

Source: Authors' calculations obtained from EViews 12.

As with the two previous models, the findings for Model 3, which implements private-sector credit as an indirect indicator of financial development, show evidence of unidirectional causality from GDP per capita to private-sector credit but no causal link between GDP and FDI. The investigation shows that short-term economic development causes private credit to expand, suggesting a demand-based technique in which GDP growth increases the demand for credit from individuals. Overall, these Granger causality studies suggest that, according to the financial development

measure utilized, there is no evidence of short-term causal links between GDP and FDI; however, the economy seems to encourage investment and private credit in the short term. Additionally, unlike the more explicit paths seen for Pakistan over 1990–2020 for the interest rate and private-sector credit, the asymmetry of cause and effect in Model 2 creates the possibility that broad money may not be sufficient to optimally direct financial resources toward profitable investment or credit expansion in the coming years (Levine, 1997; King & Levine, 1993).

TABLE III WALD TEST AND LM TEST

Variables	Lags	LRE* Stat	Prob	t-test	F-test	Chi-square	Prob
Fdi.ni	1	9.74	0.88	2.20***	4.84***	4.84	0.00
IR	2	9.72	0.88	3.55***	12.64***	12.64	0.00
M2	3	25.71	0.05	NA	NA	NA	NA
PRIVATE	4	22.83	0.11	6.04***	36.49***	36.49	0.00

NOTE: There is no substantial evidence of recurrent correlation at these lags, as the p-values for each lag are higher than 0.05. According to this test, serial-correlation problems are not present in the model. The statistics are t and F. The null hypotheses that α_i is zero and that all magnitudes of β_{ij} in equation 1 are zero are tested using the standard F-statistic values when $i, j = Y1, Y2, Y3$: per capita income in year one, the financial development index in year two, and the investment quotient in year three. Significance is indicated by *, **, and ***. With a maximum lag of four allowed for each variable, the lag lengths of variables are calculated using the AIC approach. The LM (4) test examines residuals up to the third order (χ^2) with an asymptotic distribution for serial correlation.

Source: Authors' calculations obtained from EViews 1est.

A. Variance Decomposition Results

Our empirical results, which are based on the VECM, show an indirect causal link through investment when four financial-development indicators are applied, and a direct

causal connection between two variables when three of them are incorporated. However, we are unable to estimate the degree of Granger causality outside the sample period because the VECM demonstrates Granger causality only within the sample period. To show that there is Granger

causality outside the data, the variance of the expected value of a specific variable may be divided into proportions caused by shocks using variance decomposition. This section examines how much the indicators and the investment/GDP ratio contribute to explaining real GDP per capita.

Through the system's dynamic rules, an innovation from a random shock ϵ_{it} , $i = 1, 2, 3$, in the VECM in Eqs. (4)–(6) will instantly alter the magnitude of the independent coefficient and, consequently, the values of the other two variables in future periods. It is possible to separate the

forecast-error variance in each future period and determine the proportion of variance for which each variable is responsible, because innovations in the three variables result in movements in the forward-looking estimates of the other two variables and of themselves. A description of expected error variances for the following 50 periods is shown in Table IV. The orthogonalized residuals in the equations are ordered to distribute variance ratios to the different factors. Thus, we used Choleski's decomposition technique in the following order: real GDP per capita income, investment/GDP ratio, and the financial-development indicator.

TABLE IV VARIANCE DECOMPOSITION

Variables	After 5 years	After 10 years	After 20 years	After 30 years	After 40 years	After 50 years
Lggdp.pc	93.7%	92.9%	92.5%	92.4%	92.3%	92.3%
Lgfdi.ni	51.8%	46.4%	44.1%	43.4%	43.0%	42.8%
Lgprivate	68.8%	65.2%	63.6%	63.1%	62.9%	62.7%
Lgir	80.7%	75.4%	72.7%	71.8%	71.4%	71.1%
Lgm2	59.7%	46.9%	34.3%	28.0%	24.1%	21.6%

Source: Authors' calculations from EViews 12.

Table IV illustrates the portion of the forecast-error variation of per capita GDP that may be related to investment factors, financial-development fluctuations, and stochastic creative ideas. Almost every percentage of forecast-error variance for the investment indicators and per capita GDP approaches its long-run limit within ten years. Financial-development data represent an important amount of forecast-error variation in real GDP per capita, which is comparable with our Granger-causality findings (see Table IV). After five, ten, and twenty years, the Lgprivate variable explains 68.8%, 65.2%, and 63.6% of the variation, respectively. This suggests that credit from the private sector continues to be an important cause of economic expansion. Lgir, or the interest rate, explains an additional percentage, estimated at 80.7% after five years and 72.7% after twenty. However, after 5 years, Lgm2 (broad money supply), which in our research does not exhibit Granger causality with growth, explains 59.7% of the variation; after 20 years, this decreases to 34.3%, and after 50 years, it accounts for only 21.6%. From 51.8% at 5 years to 44.1% at 20 years and 42.8% at 50 years, the Lgfdi.ni (foreign direct investment) variable also indicates a declining contribution, implying an important but decreasing long-term impact. After five years, Lggdp.pc was 93.7%, and after fifty decades, it declined to approximately 92.3%; overall, it still explains more than half of its own variance. These results provide additional evidence that the broad-money-supply indicator is less important in fostering long-term economic growth than financial development, specifically through private-financing and interest-rate channels.

VI. CONCLUDING REMARKS AND POLICY IMPLICATIONS

The primary objective of the present study is to examine the causal connection that has occurred in Pakistan over the last

fifty years between financial development and economic growth. The VECM approach is adopted to capture both short-run and long-run dynamics, and we utilized Granger causality analyses for this purpose. Financial development, the investment percentage, and real GDP per capita are used as factors in our trivariate model. We examined the following indicators of financial development to determine the robustness of the results. According to our findings, there is a unidirectional Granger causal relationship between Pakistan's financial indicators. Our hypothesis that Pakistan's economic performance improved in the 1990s compared with before, through private investment and improved investment efficiency, is verified by a deterministic nexus between financial development and economic progress. In addition, by including investment/GDP in our framework, we observed an indirect explanatory linkage between financial development and economic growth through enhanced investment assets. The findings of our research paper have clear policy implications: the Pakistani government must further develop the financial sector and take important action to ensure long-term connections in order to maintain sustainable economic growth. These actions also involve restricting the role of the government, promoting investment in the legal system and human capital, and raising the caliber of institutions. These measures are necessary to improve the use of resources within a performance framework and establish the financial connection between investors and savers. Poor-performing funds provided by public companies, as well as politically affiliated people, are just two examples of the inefficiencies that have historically arisen from Pakistan's extensive intervention in the financial sector, specifically through nationalized banks. It is generally accepted that one of the primary deficiencies in the nation's banking system is the limited connection between lending choices and market-based risk-assessment

methodologies. Combined with weak credit-risk assessments and insufficient financial-institution independence, Pakistan's banking system has been affected by uncertainty, much like Egypt's. In conclusion, Pakistan is responsible for moving toward a more liberalized and market-focused financial system with the objective of encouraging permanent economic growth, based on the information provided. The long-term positive aspects, such as increased financial intermediation and investment effectiveness, are projected to outweigh the short-term fiscal costs; however, these improvements might initially result in a decrease in government control and revenue (Arshad, 2006).

Declaration of Conflicting Interests

The author declares no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author received no financial support for the research, authorship, and/or publication of this article.

Use of Artificial Intelligence (AI)-Assisted Technology for Manuscript Preparation

The author confirms that no AI-assisted technologies were used in the preparation or writing of the manuscript, and no images were altered using AI.

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