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RESEARCH ARTICLE

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Dynamics of Financial Development and Industrial Growth in Pakistan: ARDL Based Secondary Data Analyses

Khawaja Asif Mehmood [a] Awais Masroor [b] Farzana Munir [c]

Corresponding Author: Awais Masroor; awaismasroor996@gmail.com

Abstract: The study aims to analyze the impact of various dimensions of financial development on industrial progress of Pakistan over the time period of 44 years (1980-2024). This research adopted the techniques of Autoregressive Distributed Lag (ARDL) for the purpose of analyses. The results show a strong and direct correlation of money supply, internal credit to the private sector, and market capitalization with industrial growth. The study suggested coordination of financial sector for investment in education, research and development funding, and industrial credit. Moreover, public investment in vocational and technical education, expanding the capital market, removing dependence on commercial banks for capital market trading, favoring inflows of Foreign Direct Investment (FDI), and subsidized industrial initiatives can promote industrial growth in Pakistan.

Keywords: Financial Development, ARDL, Industrial Progress, FDI, Time Series Analysis, Pakistan

Introduction

Background of the Study

The link between financial development and industrial growth has been long-standing and well known to be fundamental to lasting economic advancement. This area of study is important for developing countries like Pakistan, where the impact of these parameters is directly apparent on productivity, employment, income distribution, and long-term competitiveness. Economic development is not only helpful for natural endowments or infrastructural development but is increasingly propelled by the mobilization of financial resources, the development of human resources, and the dynamism of industrial sectors. It is therefore crucial to understand the triadic relationship as it matters for policymaking purposes, institutional reforms, and in general for the country's economic future (Evans et al., 2002).

Meanwhile, industrial growth continues to be the lifeline for economic structural transformation and economic diversification. Industry, which refers to manufacturing, construction, and large industries, including textiles, cement, and chemicals, is a significant contributor to GDP, job opportunities, and exports in Pakistan. A strong industrial sector improves productivity, minimizes reliance on primary products, and helps industries become part of global value chains. In the past, however, the energy sector has been a major constraint on industrial development in Pakistan, along with policy volatility, poor infrastructure, access to finance, and skilled workers. The structural barriers underscore the need to combine financial development with human capital formation in an effort to re-establish and continue industrial development.

[a] Assistant Professor, School of Economics, Bahauddin Zakariya University, Multan, Punjab, Pakistan.
[b] M.Phil. Scholar (Economics), School of Economics, Bahauddin Zakariya University, Multan, Punjab, Pakistan.
[c] Assistant Professor, School of Economics, Bahauddin Zakariya University, Multan, Punjab, Pakistan.

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Financial development is related to the efficiency of financial institutions and markets in mobilizing savings. It also addresses the depth and breadth of the financial market, allocates credit, and manages risks. The financial sector in Pakistan has transformed through reforms, like financial liberalization, microfinancing, and capital market development. But there are major challenges that remain untouched, such as limited access to credit for internal small-scale industries and capital markets, which are not fully utilized compared to neighboring countries. These limitations have decreased the capacity of the financial system to support industrial growth. Therefore, this limits the role of the financial market in contributing to sustainable economic growth. (Goldsmith, 1969)

The present study aims to investigate these linkages in a comprehensive manner to determine the impact of various dimensions of financial development on industrial development of Pakistan. Table 1.1 and Table 1.2 highlight the indicators of financial development and the indicators of industrial growth of Pakistan. It is evident that financial development is evaluated through various channels to locate the precise impacts on the economy. Also, industrial growth is monitored on a decentralized forum, such as the contribution to the GDP and a glance at the sectoral level.

Table 1

Financial Development Indicators in Pakistan

Indicator	Recent Status (Pakistan)	Implication
Domestic credit to private sector (% of GDP)	Around 15-18% (2024, World Bank est.)	Low credit penetration limits industrial investment
Financial inclusion (Adults with bank accounts, %)	Around 25% (Global Findex 2021)	Financial exclusion remains high; many SMEs lack access
Microfinance borrowers (millions)	9-10 million (2023, PMIC data)	Microfinance is growing, but still small relative to demand
Stock market capitalization (% of GDP)	Approx. 20-22% (2024, PSX reports)	The stock market is underutilized for industrial financing
Banking sector NPL ratio (%)	Approx. 7-8% (State Bank, 2024)	High NPLs weaken banking stability and lending capacity

Table 2

Industrial Growth Indicators in Pakistan

Indicator	Recent Status (Pakistan)	Implication
Industrial sector contribution to GDP (%)	Approx. 19-20% (Economic Survey 2024)	The industrial base remains narrow and underdeveloped
Large-scale manufacturing (LSM) growth (%)	Contracted by 2-3% in FY2023-24	Negative growth shows the fragility of the sector
Textile exports share of total exports (%)	Around 55-58% (PBS trade data, 2024)	Export concentration on textiles limits diversification
Energy shortages impact (hrs./week avg.)	Average 6-8 hours of load-shedding in peak seasons	Energy crises continue to disrupt output
Industrial policy reforms (recent years)	2023: Special industrial zones, tax incentives, but policy inconsistency	Policy inconsistency weakens long-term investment

Problem Statement

Pakistan, with its enormous resource potential, significant population, and strategic location, has failed to take sustainable steps for its industrial development in the last few decades. Financial development has advanced alongside the growth of banking corporations, microfinance, and capital markets, but there remain persistent structural problems in accessing finance for industry, particularly the small and medium enterprise

(SME) sector, including low levels of financial inclusion, high borrowing rates, and credit allocation inefficiencies. This often puts the industrial sector under strict budgetary restrictions, preventing modernization, innovation, and competitiveness.

These limitations are further compounded by recurring challenges in the industrial sector, including energy shortages, policy inconsistency, infrastructural bottlenecks, and weak institutional support. Collectively, these factors have constrained Pakistan's ability to generate robust industrial growth, diversify exports, and reduce reliance on low-value-added sectors. The slow industrial growth is among the biggest issues in Pakistan's economy. The energy shortage, macroeconomic instability, low technological advancement, and low investment have led to volatility in the industrial sector over the past couple of years. The World Bank also pointed out that the economy's growth model had not picked up steam due to structural issues in productivity, the investment climate, exports, and private-sector involvement, thereby diminishing the industrial sector's significance in the country. Pakistan's industrial growth has shown a negative percentage of 1.03% in fiscal year 2024, which indicates a major decline in industrial growth. (World Bank, 2025)

Although financial development and industrial growth are closely interconnected, their relationship in Pakistan remains fragmented and underexplored. While financial development should ideally support investments in human capital and industrial expansion, in practice, the expected synergies have not fully materialized. Effective linkages have not been established, leading to weak industrial development and low employment, and weak linkages with global value chains. Hence, the scope and magnitude of financial development's influence in Pakistan on human capital development and industrial development need to be explored, and the three goals need to be synergized to facilitate the process of economic transition. Without closing these gaps, the country may face continued economic stagnation, and opportunities for industrial development may be wasted, and Pakistan might lag behind the peer economies in the region further.

Research Questions

1. To evaluate the direct effects of financial development on industrial growth by examining selected financial performance indicators, including domestic credit to the private sector, financial inclusion, stock market capitalization, and banking performance on industrial expansion and modernization.
2. To detect structural, policy, and institutional factors affecting the links between financial development and industrial growth.

Scope of the Study

This study is confined to examining the relationship between various dimensions of financial development and industrial development in Pakistan and is designed to offer an understanding of how these three dimensions can act in either supporting or interfering ways to influence the country's economic development. This study mainly focuses on three major variables: The analysis assesses the depth, reach, and effectiveness of the financial system in Pakistan. Additionally, implications of financial policies, interest rates, and regulatory requirements for the financing of industrial companies, especially SMEs, for their growth and modernization, are accounted for in the research.

Primary Justification of the Research

This study is important in the current economic situation in Pakistan. Unemployment is increasing, industrial recovery is slow, there are balance of payment pressures, and a decrease in foreign investment. Economic reforms' priorities include measures for industrialization, export promotion, digitalization, and human resource development. To develop a policy-sound approach, however, the empirical evidence of financial development and industrial growth is required. This research will therefore contribute towards providing an understanding of financial capital boosting industrial performance in Pakistan to the policymakers, financial market, and planners.

Organization of the Research

The study has been organized into five Sections, which are: Introduction, Literature Review, Conceptual Framework, Data and Methodology, Discussion on Results, and Conclusion and Policy Implications, respectively.

Literature Review

Financial capital is an important driver of economic advancement. It is critical to the nation's sustainable economic expansion. A lot of research has looked at how monetary expansion relates to economic growth. However, there is still little evidence of a direct relationship between financial growth and industrial development, particularly in Pakistan.

Studies on the Financial Progress and Industrial Expansion

Schumpeter's (1911) foundational work argues that properly operating monetary institutions stimulate economic expansion through investment. Following that, policymakers and academics have revived their curiosity in the finance-growth nexus. Shaw (1973) and McKinnon (1973) both found that limitations on financial capital hamper investment decisions; thus, they advocated for reduced regulation and financial freedom, which would lead to more effective resource allocation. Effective financial organizations and a well-developed financial system have a substantial and beneficial effect on investment activity. A similar study found that economic output is reliant on the extent of financial progress.

Ahad et al. (2019) shed light on whether a link exists between the two factors (financial progress and expansion of industries) in the case of Pakistan. The data used were time series and secondary data covering the period from 1972 to 2014. The methodology adopted by the study was Bayer and Hanck's (2013) cointegration technique. The study included the diagnosis of causality and ran the causality analysis to understand which factor is causing a change in the other. The influence of financial progress on industrial growth in Pakistan was found to be direct and increasing. Both long-term and short-term estimates provide the direct association of financial development and industrial growth.

This study by Ahad et al. (2019) contended that a good financial system can make capital available for industries and thus enhance industrial productivity and investment activities. The study also developed a stable equilibrium between financial progress, savings, plus industrial production in Pakistan. Rahman et al. (2020) examined the contribution of the financial sector to the industrial growth of Pakistan using the Markov Switching Model with time series data of 40 years. The study was primarily concerned with the impact on the single economy, but the study pointed out that financial sector inefficiencies and instability can have adverse implications for other productive sectors, such as industry. The results showed that financial development is less than optimal in promoting growth in the presence of structural problems, inflation, slow growth, and higher interest rates. The importance of the active implementation of financial reforms, institutional quality, and sustainability of macroeconomic policies in order to ensure that financial development serves productive industrial activities was highlighted.

Ali et al. (2025) evaluated the linkage among output and core indicators of finance, which is defined by industrial growth in Pakistan. This study utilized the ARDL technique for time series secondary data covering 1980-2024. Financial development indicators like gross capital formation, market capitalization, and FDI were used as the independent factors and proved that financial development positively affects economic industrial growth in Pakistan. While this study did not directly analyze the relationship between industrial growth and the development of the financial market. But it pointed out that financial expansion helped to facilitate industrial investment and increased the productive capacity of the economy through capital allocation.

Shahbaz et al. (2016) examined the finance-growth-energy nexus in Pakistan using the ARDL bounds testing technique. This study covered data from the past 60 years in Pakistan, covering 1958-2019. The study

discovered evidence of both a financial development-industrial growth nexus and an industrial growth-financial development nexus, suggesting that financial development was not only associated with industrial growth but also that industrial and economic growth were associated with financial development. This research argued that financial development helps in expanding the industry by providing capital-intensive industries and technology-driven industries that are essential for sustainable industrialization in Pakistan.

Table 3

Chronological Review of Finance and Growth Literature

Year	Author(s)	Key Contribution/Finding
1911	Schumpeter	It is suggested that efficient financial organizations (by capital) contribute to national growth. This key work revived enthusiasm among scholars and policymakers concerning the finance-economic progress convergence.
1912	Schumpeter	Established the foundational link between finance and growth, positing that a robust financial system is essential for economic expansion. Specifically, he argued that well-functioning banks stimulate technological innovation and growth by making credit available to entrepreneurs.
1973	McKinnon & Shaw	This study supports financial liberalization and sectoral deregulation. It is argued that the financial reforms helped to increase investment in the industrial sector. This study suggested that interest stimulates domestic savings. These savings can be used as an investment in productive projects which would lead to higher economic and industrial growth.
2000	Xu	It was discovered that powerful financial firms and a regulated financial system have an important and beneficial effect on investment-driven economic prosperity.
2003	Calderon & Liu	The financial services market's depth has been discovered to enhance output and investment through accumulating capital.
2004	Rioja & Valev	The output growth was discovered to be influenced by various stages of financial progress.
2009	Hasan et al.	In developing the correlation of finance and national output, the quality of governance was discovered as a core input.
2013	Ayadi & Arbak	The national output decreases with the growth of lending and cash deposits. But the ease of converting the assets into cash and stock exchange growth can increase the national output.
2013	Law et al.	The empirical findings are aligned with Hansen et al. (2009). It also verified the significant position of quality institutions in the finance-output progress link.
2018	Ouyang & Li	This study has used the financial indicators such as broad money, stock market capitalization, and credit market growth to estimate the influence of financial progress on industrial development. This research presented a negative association of financial progress with output progress in China.

Studies about the Interlinkage of Financial Progress, Talent, and Industrial Growth

Human capital and financial capital development are two pillars that, while connected, operate in distinct ways to stimulate economic growth. Schultz (1961) and Becker (1964) established that talent is the productive capacity of individuals, which includes the health, skills, and education of a person, developed through strategic investments. Human development is well supported by the broad money supply. It's the unseen thing that makes a worker earn more lifetime earnings and innovation. At the same time, FD means an advancement of quality, quantity, and efficiency of financial services, institutions, and markets.

Levine (1997, 2005) gave an exhaustive description of the functions of monetary broadening, which accepted that both are critical factors, and their combined contribution is the most significant route for

continuing economic development. Many studies have been conducted on the direct link between a healthy financial system and human capital buildup. A strong financial system, with available banking and credit markets, facilitates easier loans for households and individuals, as discussed by authors such as Pascucci et al. (2012). It is an important function, because it lets the poorest families save for major and future investments, such as higher education and specialized vocational training.

The World Bank (2025) also points to the benefits of financial services, such as insurance and targeted savings accounts, to help households cope with health-related shocks and make preventative health spending. The stability and efficiency of resource allocation that financial development provides tend to facilitate long-term, high-return human capital investments, resulting in a healthier and more productive workforce. As is also true in reverse, a well-educated workforce is an essential condition for a complex financial system to develop and flourish. Investors need an adequate supply of human capital in order to develop and implement complex financial technology, instruments, and regulations. Furthermore, there is a significant place of human capital

in resolving financial problems in the sense of classic problems. Educated borrowers are better equipped to understand the risks involved and also to use the money wisely, which minimizes the information asymmetry among lenders. A financially educated society can more easily scrutinize institutions and hold them accountable for their performance, which is crucial for continued financial progress, as highlighted by work on institutional quality, such as Law et al. (2013). Current thinking on the relationship of first and second languages is that it is complementary and mutually reinforcing rather than sequential. Capital-skill complementarity is taken macroeconomically, with the notion that physical capital is more productive if it is used in conjunction with skilled labor (Griliches, 1969). This is reflected in the fact that the positive effect of human capital and growth can only be observed at a certain point of financial development and vice versa. Evidence that this is actually true comes from theory-oriented studies such as those by Allub et al. (2019). In fact, several scholars such as Saroj et al. (2023) have repeatedly shown that high human capital and high financial liberalization, commonly represented as an interaction term in growth regressions, are an effective combination for the attainment of better economic results.

Literature Gap

Most of the available analyses focus on establishing a correlation between financial progress and overall economic output; almost none of the separate analyses are conducted on the industrial sector. This leaves an imbalance between sectors, as the industrial sector could respond differently to financial development than the agriculture or services sector. The studies on financial development and industrial production in Pakistan relied primarily on traditional measures of financial development and were devoid of new measures, including financial inclusion, digital finance, institutional quality, and technological finance, etc. Though some of the previous studies were of value, their singular use of traditional indicators of financial education restricts the breadth of past research.

Conceptual Framework, Data, and Methodology

This study is grounded in the theoretical foundations of Endogenous Growth Theory and the Finance-Growth Nexus, which emphasize the structural importance of financial systems in promoting industrial development.

Development of Financial Market and Institutions

Financial development is a significant driver in mobilizing domestic savings, accommodating the efficient allocation of resources, reducing information asymmetry and transaction costs, and supporting large-scale investment activities. According to Schumpeter (1911), a developed financial sector stimulates industrial growth by providing credit to productive sectors, enabling technological innovation and supporting capital formation. It acts as a bridge between idle capital and industrial entrepreneurship. Financial development is measured by various indicators, such as access and availability of loanable funds to private industries for

investment through internal sources. Monetary expansion can also be measured by the broad money supply (M2), which indicates the total available money in circulation within a financial system. It includes cash as well as other demand deposits and near-money assets. It can also be measured by the financial system depth and the industry's access to banking credit.

Industrial Growth

The industrial growth is an output variable in this study and is elaborated by expansion in industrial production or output and growth of industrial activities in a country. It is typically measured by the output generated by the industry, which is the net wealth produced by the industrial sector.

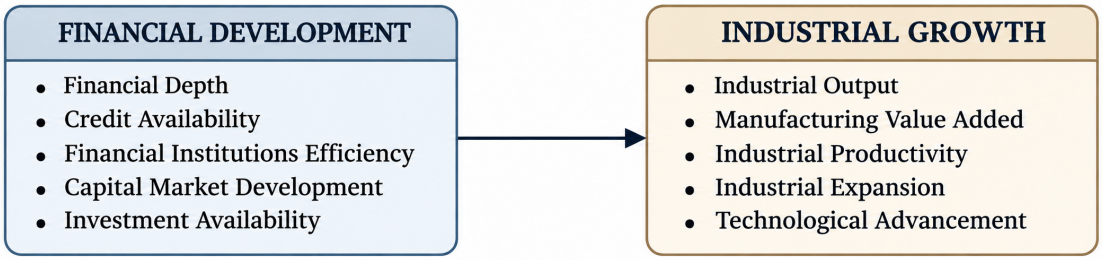
Theoretical Linkage of Financial Development and Industrial Growth

Schumpeter (1911) provided the theoretical evidence that financial development can bring industrial growth through saving allocation, supporting investment, resource allocation, supporting innovation and technology, and financing the investment or innovation needs of the industry. Financial development is subject to better access to the banking system and capital market, which becomes a source of credit and finance for the industry to finance innovation, research, and investment. Therefore, eventually leads to industrial development and output growth.

Goldsmith (1969) and McKinnon (1973) provided the supply-leading hypothesis, which supports that industrial growth and economic output expansion can be achieved through financial development because financial development increases the availability of financial resources to the industry. These financial resources help the industry to finance investment at low transaction costs with lower constraints on loans. Better access to loanable funds increases capital allocation in the industry and improves the industry's productivity. Levine (1997) provides evidence that financial development can increase innovation and industrial growth. Financial development is treated as an endogenous variable to drive innovation and industry growth. Financial development internally increases investment in research and development activities and provides the funds for adopting modern methods and technologies for industrial production.

Figure 1

Conceptual Framework for Industrial Growth



Source: Author's own elaboration.

Data Collection and Variable Selection

This study utilizes secondary trend data, particularly collected in the context of Pakistan. It covers the duration of 44 years, 1980-2024. The utilization of this specific timeframe allows for the capturing of multiple economic cycles, policy shifts, and structural reforms in Pakistan.

The sources of data collection are:

1. World Development Indicators (WDI) by the World Bank
2. World Governance Indicators (WGI) by the World Bank
3. State Bank of Pakistan (SBP)
4. Pakistan Economic Surveys (where necessary for triangulation)

The dataset includes variables related to:

- **Industrial Growth (IG):** measured as industrial value added (annual % growth).
- **Financial Development (FD):** Decomposed into FDA, FDB, and FDC; bank-based (proportion of internal private sector loans to GDP), liquidity (M_2/GDP), and market-based (stock market capitalization % of GDP), respectively.
- **Control Variables (Z):** To prevent omitted variable bias, variables such as FDI, inflation (consumer price index), exchange rate (local currency units to USD), labor productivity, trade openness (trade to GDP ratio), control of corruption, and institutional quality are added to the respective models.

Development of Models

The functional relationships are transformed into formal econometric equations to estimate temporary and permanent interaction. Log-linear transformations are applied to stabilize variance and reduce heteroskedasticity.

Model 1A: Industrial Growth = f (FD – Bank-Based)

This model measures the impact of internal-source loans to the private sector on industrial growth, along with other macroeconomic control factors. The output factor is industrial progress, which is captured through industrial value added. Explanatory factors are financial development minus bank base, which considers the importance of banks to sell bonds and stocks into the market, thus showing the dominance of banks. The other control variables whose effects are held constant are inflation, exchange rate, labor force participation, FDI, control of corruption, quality of governance, and trade openness, respectively.

The functional form is as follows:

Industrial Growth = f (FD – Bank-Based, Inflation rate, exchange rate, labor participation rate, FDI, control of corruption, institutional quality, trade openness)

IG = f (FDA, INF, EXR, LPR, FDI, COC, INQ, TRD)

While the econometric form of the model is given as:

$$IG_t = \beta_0 + \beta_1 FD1A_t + \beta_2 INF_t + \beta_3 EXR_t + \beta_4 LPR_t + \beta_5 FDI_t + \beta_6 COC_t + \beta_7 INQ_t + \beta_8 TRD_t + \varepsilon_t$$

Model 1B: Industrial Growth = f(FD–Liquidity)

This model captures the impact of liquid liabilities (broad money as % of GDP) on industrial output along with another institutional factor. The explanatory variables are financial development minus liquidity, measured by the M2 monetary aggregate, keeping the output variable identical to Model 1A. The M2 is showing the total supply of money in the system. It includes paper notes, demand deposits, savings deposits, certificates of deposit by National Saving Centers, and mutual funds sold on retail in Pakistan. The other control variables whose effects are held constant are inflation, exchange rate, labor force participation rate, FDI, control of corruption, institutional quality, and trade openness, respectively.

The functional form of Model 1B is given as:

Industrial Growth = f (FD – Liquidity, Inflation rate, exchange rate, labor participation rate, foreign direct investment, control of corruption, institutional quality, trade openness)

IG = f (FDB, INF, EXR, LPR, FDI, COC, INQ, TRD)

The econometric structure of the model is:

$$IG_t = \beta_0 + \beta_1 FDB_t + \beta_2 INF_t + \beta_3 EXR_t + \beta_4 LPR_t + \beta_5 FDI_t + \beta_6 COC_t + \beta_7 IQ_t + \beta_8 TRD_t + \varepsilon_t$$

3.5.3 Model 1C: Industrial Growth = f (FD – Market-Based)

This evaluates the role of stock market depth and capitalization in industrial expansion and other external control factors. The other control variables whose effect will be held constant are inflation, exchange rate,

rate of participation in the labor market by workers, international investment, control of corruption, quality of state institutions, and trade openness, respectively.

The functional form is given as:

Industrial Growth = f (FD – Market-Based, Inflation rate, exchange rate, labor participation rate, foreign direct investment, control of corruption, institutional quality, trade openness)

IG = f (FDC, INF, EXR, LPR, FDI, COC, INQ, TRD)

$$IG_t = \beta_0 + \beta_1 FDC_t + \beta_2 INF_t + \beta_3 EXR_t + \beta_4 LPR_t + \beta_5 FDI_t + \beta_6 COC_t + \beta_7 INQ_t + \beta_8 TRD_t + \varepsilon_t$$

Table 4

Description and Measurement of Core Variables

Variable	Description
Industrial Growth	Industrial Value-Added Growth (%)
FDA	Internal Loans to Non-public Sector (% of GDP)
FDB	M2/GDP (%)
FDC	Market Capitalization (% of GDP)
INF	Consumer Price Index (Annual %)
EXR	Official Exchange Rate (LCU per USD)
TRD	(Exports + Imports) / GDP (%)
LPR	Labor Force Participation (%).Gross Fixed Capital Formation (%GDP)
FDI	Net Inflows (% of GDP)
COC	Composite Index from minus 2.5 to plus 2.5. The unit negative 2.5 indicates poor control, and plus 2.5 means strong control
INQ	Institutional quality Index from minus 2.5 to plus 2.5. The unit minus 2.5 means weak institutions, plus 2.5 means strong institutional governance

Methodology

Tests of Stationarity (Unit Root Testing)

To avoid the statistical phenomenon of spurious (meaningless) regression, the integration order of the time series is verified using the Augmented Dickey-Fuller (ADF) test, which helps verify whether the variables opted in this study are stationary or not.

The Autoregressive Distributed Lag Bound Test

This study employs the ARDL approach developed by Pesaran et al. (2001) due to having multifaceted advantages in the computations and results.

Diagnostic and Stability Tests

To check robustness, validity, and reliability of findings, the following tests are performed:

- Autocorrelation: Breusch-Godfrey LM Test.
- Heterogeneity Test of Variance: Breusch-Pagan-Godfrey / ARCH Test.
- Normality: Jarque-Bera Test.
- Stability Model-Based Test: Cumulative Sum (CUSUM) and Cumulative Sum of Squares (CUSUMSQ) tests.

Empirical Analyses & Discussion

In this section of the study, empirical analysis is provided based on the historical time-series data for Pakistan (1980–2024).

Unit Root Testing (ADF)

It is a precondition of ARDL to estimate the integration order of each core variable. The stationarity of the core variable is tested by using the ADF test of stationarity (Dickey & Fuller, 1979). The primary assumption

states the assumption of a unit root, and the alternative assumption assumes no unit roots. The p-value of all variables leads to rejecting the primary assumption. The stationarity requirement of ARDL is fulfilled. Moreover, Pesaran et al. (2001) confirm that the ARDL is applied when the core factors are integrated in various orders. The order of integration is different for core variables that fulfil the precondition of the ARDL technique. Table 5 confirms that the series of variables are integrated of order I(0) and I(1).

Table 5

Results of Stationarity Test Using ADF

Variable	I(0)	Probability	I(1)	Probability	Conclusion
IG	-2.551	0.104	-10.689	0.000	I(1)
INF	1.299	0.997	-2.776	0.062	I(1)
EXR	-2.778	0.062	-5.399	0.000	I(1)
LPR	-3.156	0.023	--	--	I(0)
FDI	-0.794	0.821	-4.965	0.000	I(1)
COC	1.259	0.254	-5.859	0.002	I(1)
INQ	0.524	0.258	-3.254	0.000	I(1)
TRD	-2.584	0.054	--	--	I(0)
FDA	3.589	0.254	-8.589	0.001	I(1)
FDB	8.524	0.587	--	--	I(0)
FDC	5.478	0.588	-5.477	0.004	I(1)

Bound Test

After exploring the order of integration, the ARDL requires testing the existence of cointegration among the core variables for the long-term analysis. For this purpose, the ARDL bound test is applied (Pesaran et al., 2001), where the H_0 states that there is no cointegration among the factors. The H_1 is that cointegration exists across the core factors. The values of the F-statistics, given in Table 6, are 3.67, 23.67, and 4.58, which are larger than the upper-bound critical value, and this leads to the rejection of the H_0.

Table 6

Estimates of ARDL Bound Test for Cointegration

Test Statistic	Value
Model-1A	
F-Statistic	3.67
Lower Bound p-value	2.25
Upper Bound p-value	3.11
Model-1B	
F-Statistic	23.67
Lower Bound p-value	4.57
Upper Bound p-value	3.54
Model-1C	
F-Statistic	4.58
Lower Bound p-value	1.99
Upper Bound p-value	2.94
Note: p-values are recorded at 5 percent	

Long-run Coefficient Estimates

Table 7 demonstrates the estimated results of ARDL for Model A. The results show that internal credit to businesses (FDA) has a direct and significant effect on industrial progress. This means that the more involved the banks are in the financial sector, the more productive the industries will be.

The coefficient of the bank-based financial development is positive and significant at the 1 percent level. That means that financial development has an effect of about 0.321 on industrial growth for every one-unit change in financial development, ceteris paribus. This outcome corroborates the finance-led growth hypothesis proposed by Schumpeter (1911), according to which a well-functioning financial system channels savings for investment, concentrates capital on productive investment opportunities, brings technology into the market, and drives the growth of the economy. In the industrial field, banks act as credit providers when customers need credit for the purchase of machines, the upgrading of technologies, investments in infrastructure, and working capital. So, access to financial resources allows firms to increase their production and production efficiency. The finding is consistent with Levine (1997) and King and Levine (1993), who found significant effects of financial broadening on economic and industrial growth via capital allocation and financial intermediation. But there are some studies that have conflicting results. When financial sector development becomes too large relative to the real sector, excessive financial development can harm growth (Jean-Louis Arcand et al., 2015). Likewise, Cecchetti and Kharroubi (2012) discovered that as financial sectors grow, at a particular point in time, their growth could crowd out investment in productive sectors and stunt overall economic growth.

The slope of inflation is recorded to be -0.145; moreover, it is significant at 5 percent. So, for every one unit rise in the inflation rate, industrial growth will decrease by about 0.145 units in the long term. The negative impact can be attributed to higher production costs as well as economic uncertainty. When prices increase, so do the prices of inputs, energy costs, transportation, and borrowing costs, and there is a decrease in profits and investment possibilities for firms. High inflation also means uncertainty about future returns, which makes people reluctant to invest in industries when all inputs are non-constant. The resulting suggestion is in line with Barro (1995), who observed that inflation adversely impacts growth by reducing the efficiency of investment. In a similar fashion, Fischer (1993) concluded that economic performance is hurtled by the macroeconomic instability that accompanies inflation. On the other hand, some studies indicate that moderate inflation can help industries expand by increasing aggregate demand. For instance, Bruno and Easterly (1998) suggested that low and stable inflation does not need to be bad for growth and can be a useful ingredient in the process of economic expansion of developing countries.

Control of corruption exhibits a positive coefficient, 0.098, and is significant. The result suggests that better control of corruption helps in the upsurge of industrial growth.

The coefficient of the exchange rate is positive and significant at 10 percent. This suggests that a depreciation has a positive effect on industrial development. The depreciated domestic currency makes domestic products more competitive in the export market. This means that the export industries are faced with greater demand, expansion of production, and greater profit margins. This finding corroborates the export-led growth thesis; it is also in accord with the findings of Rodrik (2008), who stated that low relative prices encourage structural change and industrialization among developing countries. But there's also some evidence that contradicts this hypothesis. According to Obstfeld and Rogoff (1995), depreciation of the exchange rate can lead to higher input prices for goods from abroad, especially for industries that are very sensitive to the price of imported machinery and intermediate goods, which in turn can reduce the productivity of industry.

The coefficient of the labor force participation is positive and statistically significant. So, it can be inferred that an increase in labor force participation is correlated with an increase in industrial growth. Higher labor force participation is evident to trigger industrial growth.

The FDI has a positive and significant coefficient, which further shows that industrial sector growth is positively influenced by FDI, which helps grow a national output by transferring technology, managerial skills, new production methods, and access to the global market. Foreign firms are possible sources of innovation and a source of a spillover effect that leads to enhanced productivity in the industry sector. The results are consistent with the work of Borensztein et al. (1998) and Moran (2011), who demonstrated that the transfer of technology and spillovers in knowledge are two ways in which FDI can boost productivity and growth. Nevertheless, dependency theorists can be heard to say that foreign investment can be a threat to the adoption of domestic firms and can lead to economic dependence. Aitken and Harrison (1999) found incomplete positive spillovers from FDI in some developing economies, for instance.

The coefficient of institutional quality is positive and significant. This implies that the process of industrial development can be assisted through the strengthening of institutions. Improvements in the quality of institutions increase the protection of property rights, facilitation of contracts, efficiency of the rule of law, and assessment of governance, which in turn decrease transaction costs and stimulate investments. This finding is consistent with that in the institutional economics literature by North (1990), who states that institutions are central to long-run economic performance.

Every 1 unit increase in the level of trade openness is found to result in an increase of industrial growth by 0.089 units. The findings indicate that more integration with international markets results in more industrial activity. Trade liberalization enables industries to tap bigger markets, gain from economies of scale, import advanced technologies, and gain a competitive edge from international competition. The finding supports the arguments of Sachs and Warner (1995), who found that open-border economies generally experience faster economic growth. However, some critics, like Rodriguez and Rodrik (2001), argue that the beneficial impacts of trade liberalization are critically dependent on institutions' capacity and economic structure, and hence can be limited or negative at times.

Table 7

ARDL Long-Run Results (Bank-Based FD) for Model A

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FDA	0.321	0.112	2.86	0.008
INF	-0.145	0.065	-2.23	0.032
EXR	0.078	0.041	1.90	0.067
LPR	0.210	0.095	2.21	0.034
FDI	0.156	0.072	2.16	0.038
COC	0.098	0.050	1.96	0.058
INQ	0.120	0.061	1.97	0.056
TRD	0.089	0.044	2.02	0.051
C	1.845	0.732	2.52	0.017

$R^2 = 0.81$ | Adjusted $R^2 = 0.77$ | F-stat = 12.45 (Prob = 0.000)

The results of Model B are given in Table 8. The financial development coefficient based on the liquidity of financial outlets, FDB, has a positive and statistically significant sign, which suggests that an increase in financial liquidity boosts industrial development. Thus, they have a linear relationship. This discovery highlights that the more liquid the financial system is, the more available funds are for productive investments, which enables expansion in the industry. The liquid financial sector allows companies to have better access to working capital, finance technology improvements, and engage in long-term investment projects more effectively. As a result, industrial businesses have a greater chance to expand their production capacities and enhance their productivity.

The outcome corroborates Schumpeter's (1934) finance-led growth theory, which states that financial development fosters economic growth through effective mobilization and allocation of resources. The finding is also in line with Levine (1997) and Levine and Zervos (1998), who reached the same conclusions that financial sector development helps to yield higher growth rates because of increases in investment efficiency and decreases in financing constraints. This positive connection is not supported by the literature. When financial resources are shifted away from productive sectors, excessive financial development can be harmful for the growth in the future (Arcand et al., 2015). Cecchetti and Kharroubi (2012) pointed to the danger of an overly large financial sector that diverts talent and resources from manufacturing and industrial uses and negatively impacts total income.

Table 8

ARDL Long-Run Results (Liquidity FD) for Model B

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FDB	0.214	0.098	2.18	0.036
INF	-0.132	0.061	-2.16	0.038
EXR	0.065	0.038	01.71	0.096
LPR	0.189	0.087	02.17	0.037
FDI	0.142	0.069	2.05	0.047
COC	0.091	0.047	1.93	0.061
INQ	0.110	0.058	1.89	0.068
TRD	0.080	0.042	1.90	0.066
C	1.632	0.701	2.32	0.025

$R^2 = 0.78$ | Adjusted $R^2 = 0.74$

The coefficients of the control variables show the same nature of association with industrial growth as in Model A and Model B, with a slight change in the magnitude. Finally, the long-run coefficient estimates of Model C are given in Table 9. The coefficient of FDC is significant and positive in its impact on industrial growth, as found in the case of Model A and Model B. Thus, the dynamics of financial development are found to have a similar effect on industrial growth. The control variables are also found exhibiting similar impacts as earlier found in the preceding models.

Table 9

ARDL Long-Run Results (Market-Based FD) for Model C

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FDC	0.145	0.082	1.76	0.087
INF	-0.128	0.060	-2.13	0.040
EXR	0.061	0.037	1.65	0.108
LPR	0.172	0.084	2.04	0.048
FDI	0.136	0.067	2.02	0.050
COC	0.088	0.046	1.91	0.064
INQ	0.105	0.057	1.84	0.075
TRD	0.076	0.041	1.85	0.073
C	1.521	0.690	2.20	0.034

Short-run Coefficient Estimates

The short-run ARDL error-correction models explain how annual changes in the explanatory variables are associated with changes in industrial growth, while the lagged error-correction term, ECT (-1), shows how quickly deviations from the long-run equilibrium relationship are corrected in Tables 10, 11, and 12. A

negative and statistically significant ECT (-1) is the key indication that the models converge back toward their long-run equilibrium after a short-run disturbance.

Table 10

Model A: Short-Run

Variable	Coefficient	Std. Error	p-value
D(FDA)	0.321	0.112	0.008
D(INF)	-0.145	0.065	0.032
D(EXR)	0.078	0.041	0.067
D(LPR)	0.210	0.095	0.034
D(FDI)	0.156	0.072	0.038
D(CC)	0.098	0.050	0.058
D(IQ)	0.120	0.061	0.056
D(Trade)	0.089	0.044	0.051
ECT (-1)	-0.620	0.040	0.000

The coefficient of financial-development of Model A is measure at 0.321. This means that when financial development increases, industrial growth also increases. The coefficient for inflation is -0.145, which indicates that when inflation decreases, industrial growth also increases. The coefficient for the exchange rate is 0.078. This states that when the exchange rate increases, industrial growth also increases due to cheap currency in the context of foreign countries.

The coefficient for labor force participation is 0.210, thus showing that when labor force participation increases, industrial growth also increases. Moreover, the coefficients of FDI, control of corruption, institutional quality, and trade are held significant and positive in affecting industrial growth. The coefficient of ECT is -0.620. This means that the model is stable and adjusts to equilibrium quickly by 62% over the year.

Table 111

Model B: Short-Run

Variable	Coefficient	Std. Error	p-value
D(FDB)	0.214	0.098	0.036
D(INF)	-0.132	0.061	0.038
D(EXR)	0.065	0.038	0.096
D(LPR)	0.189	0.087	0.037
D(FDI)	0.142	0.069	0.047
D(CC)	0.091	0.047	0.061
D(IQ)	0.110	0.058	0.068
D(Trade)	0.080	0.042	0.066
ECT (-1)	-0.580	0.050	0.000

The coefficient estimates of the short run in the case of Model B are given in Table 11. The range of coefficients is slightly different from the one found in the case of Model A. However, the coefficient of FDB is held significant and positive in affecting industrial growth. The coefficient of ECT is also correctly signed, significant, and within the range.

Similarly, Model C is shown in Table 12. The findings on all regressors are similar to those found in the preceding models.

Thus, it is concluded that each dimension of financial development holds similar responses towards the industrial growth of Pakistan.

Table 12

Model 1C: Short-Run

Variable	Coefficient	Std. Error	p-value
D(FDC)	0.145	0.082	0.087
D(INF)	-0.128	0.060	0.040
D(EXR)	0.061	0.037	0.108
D(LPR)	0.172	0.084	0.048
D(FDI)	0.136	0.067	0.050
D(CC)	0.088	0.046	0.064
D(IQ)	0.105	0.057	0.075
D(Trade)	0.076	0.041	0.073

Diagnostic Tests

Table 13

Diagnostic Tests of all Models

Model	LM Test	Heteroskedasticity Test	Normality Test	Model Specification
Model 1A (Bank-Based FD)	0.2319	0.8227	0.8263	0.7933
Model 1B (Liquidity FD)	0.1695	0.8979	0.8781	0.7824
Model 1C (Market-Based FD)	0.1894	0.7342	0.6402	0.7782

Note: quoted observations are the p-values of corresponding diagnostic tests.

All reported diagnostics in Table 13 indicate that Model A, Model B, and Model C are found to have no issues of serial correlation, heteroskedasticity, and abnormality of the distribution of residuals. Moreover, the entire models are correctly specified.

Conclusion

The objective of this study was to know the impact of financial development on the industrial growth of Pakistan. To do the analyses, time series data were relied upon, ranging from 1980 to 2024. This research was conducted by bifurcating the constructs of financial development into three categories: bank-based, liquidity, and market-based. The long-run association and short-run and long-run coefficients of each model were estimated using the ARDL modelling technique. The results confirmed that each of the financial development indicators was found positive and significant in its impact on the industrial growth of Pakistan in each time horizon. Moreover, among the control variables, though most of them were found significant and correctly signed, the results on FDI are positive, which confirms that FDI is helpful in boosting the indigenous industrial growth of the host country. The study suggests correlating the financial sector for investment in education, research, and development funding along with industrial credit availability. Also, it is suggested to facilitate the flow of FDI for better industrial progress.

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