BIBLIOGRAPHIC INFORMATION SYSTEM

JOURNAL FULL TITLE: Journal of Biomedical Research & Environmental Sciences
ABBREVIATION (NLM): J Biomed Res Environ Sci **ISSN:** 2766-2276 **WEBSITE:** https://www.jelsciences.com

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JOURNAL OF BIOMEDICAL RESEARCH & ENVIRONMENTAL SCIENCES
ISSN: 2766-2276
SUBJECT AREA(S): COMMUNITY HEALTH
DOI: 10.37871

REVIEW ARTICLE

An Empirical Analysis of the Relationship Between Institutional Quality and Financial Development

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Abstract

Although the effects of institutional quality and its indicators on economic growth have been extensively examined, studies focusing on the institutional quality-financial sector development link remain limited. Therefore, this study concentrates on the institutional quality-financial development link, while also incorporating fixed capital, trade openness, and foreign direct investment as additional independent variables in the financial development model. The study employs panel data techniques, including CADF, Pedroni, Westerlund, AMG, FMOLS, and Dumitrescu–Hurlin approaches. The empirical findings indicate that the series are stationary at first differences and that a cointegration relationship exists among them. In the long run, institutional quality enhances financial sector development, while fixed capital and trade openness also play supportive roles in promoting financial development. However, no significant link is determined between foreign direct investment and financial sector development. Bidirectional causality is identified between institutional quality, fixed capital, trade openness, and financial development, whereas no causality is detected between foreign direct investment and financial development. These findings provide important implications for policy orientation.

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DOI: 10.37871/jbres2293

Submitted: 15 April 2026

Accepted: 21 April 2026

Published: 22 April 2026

Keywords

- Institutional quality
- Financial development
- Developing economies
- AMG
- Causality

Introduction

The roles of the financial system and institutional stability in promoting economic development have long been a central topic

How to cite this article: Sarigul SS, Cetin M. An Empirical Analysis of the Relationship Between Institutional Quality and Financial Development. J Biomed Res Environ Sci. 2026 Apr 22; 7(4): 10. Doi: 10.37872/jbres2293

of discussion among scholars and policymakers [1]. While financial development is widely regarded as a potential dynamic of economic progress, it also enables developing economies to address critical challenges such as poverty, inequality, and export concentration. Moreover, a well-functioning financial system can facilitate economic diversification, support efforts to combat climate change, and contribute to sustainable development. Financial development—defined as improvements in the capacity of financial systems to generate and process information about investments, monitor individuals and firms, enhance diversification and risk management, and facilitate the exchange of goods and services—is consistently identified in the literature as a key determinant of economic advancement [2].

Financial development promotes economic growth through several channels, including expediting trade in goods, mobilizing savings toward productive investments, improving resource allocation, enhancing diversification and increasing liquidity. Therefore, strengthening the financial system can serve as a major driver of economic development, particularly for developing countries [2].

The existence of effective policies and regulatory frameworks within a country can guide individuals and firms in making sound investment decisions. In this context, the institutional quality-financial development link becomes particularly important [1]. Building on this premise, the present study focuses on this link. In addition, drawing on the existing literature, it incorporates fixed capital, trade openness, and foreign direct investment as additional determinants of financial development. Accordingly, the study represents one of the limited empirical efforts that jointly examine the relationships among institutional quality, capital formation, trade openness, foreign direct investment, and financial development in developing economies. This constitutes the first contribution of the study to the literature.

A second contribution lies in the methodological approach adopted in the analysis. Specifically, the study employs second-generation panel data techniques, including the CADF unit root test, the AMG estimator, and the Dumitrescu–Hurlin causality test, to investigate the link among the variables. Furthermore, long-run coefficients are estimated using both the panel AMG and panel FMOLS estimators, thereby ensuring more robust and reliable results. Based on these consistent findings, the study also offers policy recommendations aimed at enhancing financial sector development in less developed economies, which represents its third contribution. Finally, the study supports its findings with causality analysis results, providing a comprehensive empirical framework.

The remainder of the study is organized as follows. The second section presents the literature review. The third section introduces the empirical model, data, and methodology. The fourth section reports the empirical findings, while the final section concludes with policy implications.

Literature Review

The literature on the determinants of financial development highlights a wide range of factors that may contribute to financial sector advancement, including institutional quality, trade openness, financial liberalization, macroeconomic stability, economic growth, population dynamics, and cultural factors. For instance, Dosso [2] focuses on institutional quality, Caporale, et al. [3] on trade openness, Ilyina and Samaniego [4] on economic growth, and Tran and Huynh [5] on foreign direct investment as key drivers of financial development.

Ilyina and Samaniego [4] test the link

among institutions, governance and financial development. Their findings suggest that institutional quality plays a crucial role in supporting stock market development; however, this link depends on the institutional performance. In low-income countries, institutional quality often remains below this threshold.

Le, et al. [6] analyze the factors affecting financial development in the Asia-Pacific region over the period 1995–2011. Applying a dynamic GMM approach to a panel dataset covering 26 economies, the authors find that improved governance and institutional quality significantly promote financial development, while growth and openness are more dominant drivers in developed economies.

Aibai, et al. [7] focus on FDI as a source of financial development in Belt and Road Initiative countries. Their empirical results indicate that FDI significantly enhances financial sector development, particularly by fostering financial market expansion. The study also reveals that the positive impact of FDI is stronger in countries with higher institutional quality.

Khan, et al. [8] revisit the natural resource-financial development link in the United States, emphasizing the critical role of institutional quality. Using IMF data and a robust cointegration framework, the study finds that institutional quality is a key determinants, while natural resource rents exert a negative effect. Importantly, institutional quality mitigates this adverse relationship.

Khan, et al. [9] investigate the institutional quality-financial development link in 15 emerging countries. Their findings, based on the estimation, indicate that trade openness, national culture, and economic growth influence financial development through their positive interactions with institutional quality.

Khan, et al. [10] also explore the natural resource-financial development link in a broader sample of 87 economies over the period 1984–2018. The results support the resource curse hypothesis, suggesting that natural resource rents weaken financial development. However, institutional quality not only positively affects financial development but also moderates the negative impact of resource rents, with evidence of threshold effects.

Hussain, et al. [11] examine the links among natural resource revenues, institutional quality, human capital, and financial development. Their findings indicate that both human capital and institutional quality contribute positively to financial development, highlighting the importance of efficient resource utilization.

Kim [12] investigates the effects of remittances and institutional quality on financial development in several economies. Using a dynamic factor model for 46 countries over the period 1996–2016, the study shows that both remittances and institutional quality promote financial development. Moreover, institutional quality expands the positive impact of remittances, particularly when it reaches higher levels.

Tran and Huynh [5] analyze the FDI-financial development link in Asian economies using a fixed effects model. Their results reveal that FDI positively affects financial development, alongside positive contributions from trade openness and population growth, while inflation negatively affects financial development.

Dosso [2] examines the institutional quality–financial development nexus in resource-rich countries using panel data techniques. The findings suggest that although natural resources may negatively affect financial development, improvements in institutional quality can significantly reduce this adverse effect, depending on initial institutional conditions.

Bayraktar, et al. [13] investigate the financial development–economic growth link. Their

results indicate two-way causal linkage between financial development indicators and economic growth.

Mawardi, et al. [1] analyze the relationships among institutional quality, economic freedom, technological progress, and Islamic financial development in OIC economies. The results show that most institutional quality indicators raise financial development, while exchange rates have a positive effect and interest rates a negative effect.

Javed, et al. [14] explore the financial development-energy security risk link in Belt and Road Initiative economies, integrating human capital and institutional quality. Their findings indicate that financial development significantly affects energy security risk, with economic growth reducing risk and trade openness increasing it.

Nam, et al. [15] examine the effects of financial openness, institutional quality, and trade openness on financial development in Eastern European countries using a fixed effects model. Financial openness and institutional quality boost financial development, while population has a negative effect.

Finally, Abaidoo, et al. [16] investigate the impact of macroeconomic instability, financial market uncertainty, and institutional quality on financial institution development in developing economies. Using panel estimators such as PW-PCSE, Driscoll-Kraay, and POLS, the study finds that macroeconomic uncertainty negatively affects financial development, whereas institutional quality plays a supportive role.

Model, Data and Methodology

In the empirical framework of the study, financial development is specified as the dependent variable, while institutional quality, fixed capital, openness, and FDI are included as independent variables. These relationships are modeled using the following linear regression specification:

$$LNFIN_{it} = \alpha + \gamma_1 LNIQ_{it} + \gamma_2 LNCAP_{it} + \gamma_3 LNTRADE_{it} + \gamma_4 LNFDI_{it} + \varepsilon_{it} \quad (1)$$

In the linear regression model, FIN_{it} represents financial development, IQ_{it} denotes institutional quality, , CAP_{it} refers to fixed capital, $TRADE_{it}$ indicates trade openness, and FDI_{it} stands for FDI. The availability of institutional quality data starting from 2002 determines the sample period of the study as 2002-2023. Since all variables are modeled in logarithmic form, the coefficients can be explained as elasticities. In this context, $\gamma_1, \gamma_2, \gamma_3$ and γ_4 measure the elasticities of financial development with respect to institutional quality, fixed capital, trade openness, and FDI, respectively. All variables are based on annual data obtained from the World Bank's database [17]. Detailed information on the variables, including their symbols, definitions, and data sources, is provided in the corresponding table 1. In addition, the time-series behavior of the variables over the period 2002–2023 can be evaluated with the help of figure 1.

The vast majority of panel data studies begin their empirical analysis by examining cross-sectional dependence and slope heterogeneity. The primary reason for this approach is that these tests are considered preliminary diagnostics, providing guidance for selecting appropriate methodologies in subsequent unit

Table 1: Information on the Variables.

Variables	Symbol	Description	Source
Financial Development	FIN	Domestic credit to the private sector by banks (% of GDP)	WB
Institutional Quality	IQ	Rule of Law Index	WB
Gross Fixed Capital Formation	CAP	Gross fixed capital formation (% of GDP)	WB
Trade Openness	TRADE	Trade Openness (% of GDP)	WB
Foreign Direct Investment	FDI	Foreign direct investment, net inflows (% of GDP)	WB

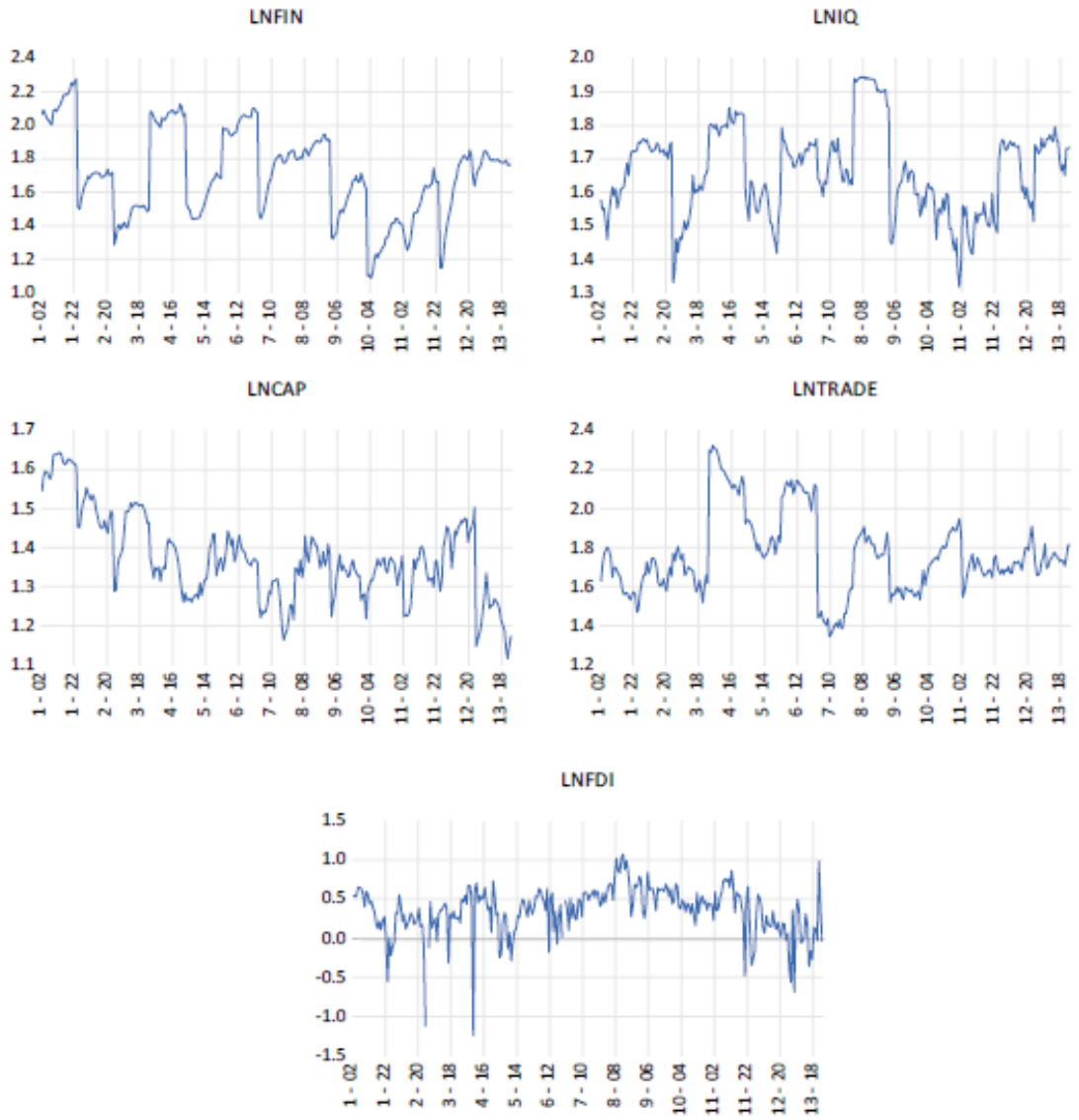

Figure 1 Time-Series Trends of the Variables (2002–2023).

root, cointegration, and coefficient estimation procedures. In this context, Cross-Sectional Dependence (CSD) is tested using different LM-based approaches developed by Breusch and Pagan [18] and Pesaran [19]. For slope heterogeneity, the delta tests proposed by Pesaran and Yamagata [20] are employed.

Following the assessment of slope heterogeneity, the stationarity properties of the variables are analyzed using the CADF unit root test developed by Pesaran [21]. Subsequently, the existence of a cointegration among the variables is investigated through the cointegration tests proposed by Pedroni [22] and Westerlund [23]. Long-run coefficients are then estimated using the panel AMG estimator introduced by Chudik and Pesaran [24] and the FMOLS estimator developed by Pedroni [25]. Finally, the analysis is complemented by a causality examination based on the Dumitrescu and Hurlin [26] approach. The use of two cointegration tests and two long-run estimators in the study aims to ensure more robust and reliable results.

Findings

In the empirical findings of the panel data

Table 2: Descriptive Statistics.

	LNFIN	LNIQ	LNCAP	LNTRADE	LNFDI
Mean	1.709	1.661	1.375	1.759	0.354
Median	1.706	1.662	1.363	1.733	0.399
Max.	2.277	1.944	1.644	2.322	1.075
Min.	1.086	1.317	1.115	1.344	-1.246
Standard error	0.265	0.131	0.110	0.203	0.316
Skewness	-0.063	0.090	0.410	0.696	-1.261
Kurtosis	2.304	2.671	2.969	3.235	6.719
Obs.	284	284	284	284	284

Table 3: Correlation Matrix.

	LNFIN	LNIQ	LNCAP	LNTRADE	LNFDI
LNFIN	1.000				
LNIQ	0.514	1.000			
LNCAP	0.318	0.002	1.000		
LNTRADE	0.380	0.254	0.001	1.000	
LNFDI	0.107	0.130	0.035	0.053	1.000

analysis, summary statistics are first considered, and the results are reported in table 2. Among the variables, LNTRADE exhibits the highest mean, median, maximum, and minimum values, whereas LNFDI records the lowest values across these statistics. In terms of distributional properties, LNFIN and LNFDI are found to be negatively skewed, while LNIQ, LNCAP, and LNTRADE display positive skewness.

The correlation results, presented in table 3, provide further insights into the relationships among the variables. A positive correlation is observed between LNIQ and LNFIN. Similarly, LNFIN is also positively correlated with LNCAP, LNTRADE, and LNFDI.

Table 4 reports the results of the CSD tests. According to the empirical findings obtained from the Breusch–Pagan LM and Pesaran scaled LM tests, the presence of CSD is confirmed for each variable.

On the other hand, table 5 presents the results of the slope heterogeneity tests. The findings indicate that the delta statistics are statistically significant, implying the existence of slope heterogeneity. This suggests that the analysis is based on a heterogeneous panel data structure.

The unit root test results are reported in table 6. The findings from the CADF test, including both the constant and constant-with-trend specifications, indicate that all series contain a unit root in their levels but become stationary after first differencing in both models. Therefore, it is possible to proceed with cointegration analysis among these first-difference stationary variables.

On the other hand, the results of the cointegration analysis are presented in table 7. The findings based on the Pedroni approach indicate the presence of cointegration in two of the test statistics. Moreover, the results obtained from the Westerlund cointegration test support the Pedroni findings. Accordingly, there exists a cointegration among LNIQ, LNCAP, LNTRADE, LNFDI, and LNFIN. In other words, a long-term equilibrium relationship is identified between institutional quality, fixed capital, trade openness, foreign direct investment, and financial development.

Cointegration analysis establishes the existence of a relationship among the variables; however, it does not provide information regarding the direction or magnitude of this relationship. For this purpose, long-run estimators are employed. Accordingly, the panel AMG and FMOLS estimators are utilized in this study. The results obtained from the panel AMG

Table 4: CSD Results.

	Breusch-Pagan LM	Pesaran scaled LM
LNFIN	974.887***	71.808***
LNIQ	388.813***	24.884***
LNCAP	323.715***	19.672***
LNTRADE	430.129***	28.192***
LNFDI	112.937***	2.797***

Table 5: Slope Heterogeneity Results.

	Test Statistic	*p*-value
Delta	10.592***	0.000
Delta Adj.	12.436***	0.000

Table 6: CADF Unit Root Test Results.

	Constant		Constant and Trend	
	Level	First Difference	Level	First Difference
LNFIN	2,610	-3.298***	-2.582	-3.491***
LNIQ	-0.982	-2.809***	-1.992	-2.980***
LNCAP	-2.086	-2.728***	-2.644	-2.685*
LNTRADE	-1.572	-2.806***	-2.404	-2.984***
LNFDI	-0.455	-3.676***	-0.876	-4.560***

Table 7: Cointegration Analysis Results.

Panel A. Pedroni [22]		Test Statistic	*p*-value
Modified PP t		3.713***	0.000
PP t		0.987	0.161
Augmented DF t		1.462*	0.071
Panel B. Westerlund [23]			
Variance Ratio		3.712***	0.000

Table 8: AMG Estimation Results.

Variables	Coefficients	z- statistic	*p*-value
LNIQ	0.318**	2.35	0.019
LNCAP	0.378* 0.067)	1.88	0.060
LNTRADE	0.261** (0.124)	2.50	0.012
LNFDI	0.018	0.93	0.354
Constant	0.100	0.29	0.7719
Wald χ^2	16.21		
Prob.	0.002		
RMSE	0.042		
Obs.	284		
Countries	13		

estimations are reported in table 8. The X^2 and RMSE statistics indicate the adequacy of the model, thereby allowing the interpretation of the estimated coefficients.

The coefficient of LNIQ, estimated at 0.318, is found to be positive and significant. This result implies that a 1% increase in LNIQ leads to a 0.318% increase in LNFIN. Thus, institutional quality emerges as an important determinant that promotes financial development, indicating a positive relationship between institutional quality and financial development.

The coefficient of LNCAP, estimated at 0.378, is also positive and significant. This suggests that a 1% increase in LNCAP leads to a 0.378% increase in LNFIN. Accordingly, the positive relationship between LNCAP and LNFIN indicates that fixed capital contributes to the enhancement of financial development.

Similarly, the coefficient of LNTRADE, estimated at 0.261, is positive and significant. This result can be interpreted as a 1% increase in LNTRADE being associated with a 0.261% increase in LNFIN. Therefore, trade openness also plays a positive role in promoting financial development.

Finally, the coefficient of LNFDI, estimated at 0.018, is positive but statistically insignificant. This finding indicates that no statistically significant relationship is detected between FDI and financial development. Table 8 also presents the long-run results obtained from the FMOLS estimator. The FMOLS results are found to corroborate the long-run findings derived from the AMG estimations.

Figure 2 illustrates the long-run impact of institutional quality, fixed capital, trade openness, and FDI on financial development based on panel AMG estimates. The results

Table 9: FMOLS estimation results.

Variables	Coefficients tsayılar	t- statistic	*p*-value
LNIQ	0.350***	2.960	0.003
LNCAP	0.288*	1.896	0.059
LNTRADE	0.292**	2.248	0.025
LNFDI	0.013	0.439	0.660

Table 10: Causality analysis results.

Hypotheses	z-bar statistic	*p*-value	Causality
LNIQ ≠> LNFIN	6.237***	0.000	Yes
LNFIN ≠> LNIQ	6.062***	0.000	Yes
LNCAP ≠> LNFIN	3.829***	0.000	Yes
LNFIN ≠> LNCAP	2.112**	0.034	Yes
LNTRADE ≠> LNFIN	8.292***	0.000	Yes
LNFIN ≠> LNTRADE	5.725***	0.000	Yes
LNFDI ≠> LNFIN	0.031	0.974	No
LNFIN ≠> LNFDI	1.173	0.240	No

clearly indicate that institutional quality, fixed capital, and trade openness exert statistically significant and economically meaningful positive effects on financial development, highlighting their central role in strengthening financial systems. In contrast, FDI does not exhibit a statistically significant effect, suggesting that its contribution to financial development remains limited within the sample period.

The final empirical findings of the study pertain to the causality analysis, and the corresponding results are presented in table 9. The causality results indicate a bidirectional causal relationship between LNIQ and LNFIN, i.e., between institutional quality and financial development. The findings also reveal a two-way causality between LNCAP and LNFIN, suggesting a bidirectional relationship between gross fixed capital formation and financial development.

According to table 10, a bidirectional causality is likewise identified between LNTRADE and LNFIN, implying a mutual relationship between trade openness and financial development. Finally, the results show that there is no evidence of causality between LNFDI and LNFIN (Figure 3).

Conclusion

This study examines the institutional quality-financial development link for a sample of 13 developing countries. In addition to institutional quality, fixed capital, trade openness, and FDI are included in the financial development model as additional independent variables. The relationships among the variables over the period 2002–2023 are analyzed using CADF unit root tests, Westerlund and Pedroni cointegration tests, AMG and FMOLS long-run estimators, and the Dumitrescu–Hurlin causality method.

The findings provide evidence of CSD and slope heterogeneity. The results further indicate that the series are stationary in first differences and that a cointegration relationship exists among institutional quality, fixed capital, trade openness, FDI, and financial development. The AMG and FMOLS estimations reveal that institutional quality positively contributes to financial development. Similarly, fixed capital and trade openness are found to have positive effects on financial development. In contrast, no statistically significant relationship is identified between FDI and financial development. The causality analysis confirms bidirectional causality between institutional quality, fixed capital, trade openness, and financial development, while no causal relationship is detected between FDI and financial development.

Based on these findings, several policy implications can be drawn. First, the positive impact of institutional quality on financial development suggests that governments should continue to improve institutional frameworks

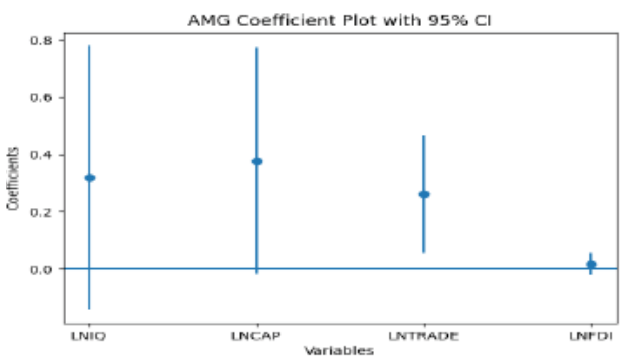

Figure 2 AMG Long-Run Coefficient Estimates with 95% Confidence Intervals.

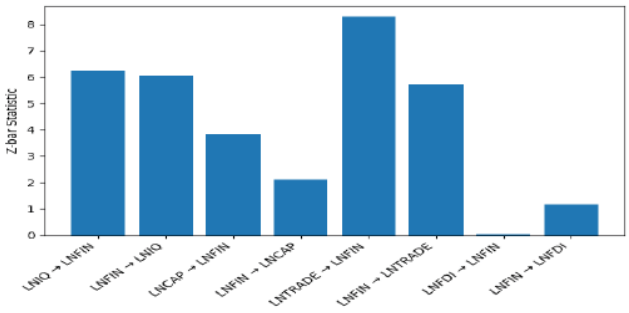

Figure 3 Cousality Analysis (Z-bar statistic).

and strengthen their underlying components. Second, the role of fixed capital in enhancing financial development implies that investments in financial infrastructure and digital sectors should be further encouraged and expanded. Third, the positive relationship between trade openness and financial development indicates that trade liberalization—an important dimension of globalization—should be supported and further accelerated.

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