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Interaction between financial institution development and financial market development in MENA region: Its effect on economic growth

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Abstract: This study examines the impact of financial development on economic growth in twelve Middle East and North Africa (MENA) countries—Saudi Arabia, United Arab Emirates, Qatar, Oman, Kuwait, Bahrain, Lebanon, Turkey, Tunisia, Egypt, Jordan, and Morocco—over the period from 1990 to 2023. The interaction between financial institution development and financial market development is used as a proxy for overall financial development. Employing panel data techniques, including pooled ordinary least squares, fixed effects, and Driscoll–Kraay robust fixed effects models, the analysis highlights the positive role of the joint development of financial markets and institutions. Results reveal that the interaction between financial institution development and financial market development contributes to a 1.39 percentage point increase in economic growth. This finding underscores the synergistic effect of simultaneous advancement in both financial sectors in promoting growth across MENA economies. The study introduces an innovative measure of financial development by incorporating an interaction term between institutional and market development, offering new insights into the finance–growth nexus in the region.

Keywords: *Driscoll-Kraay fixed effects, Economic growth, Financial development, Middle East and North Africa (MENA), Panel data.*

1. Introduction

The financial sector plays a pivotal role in driving economic growth by mobilizing savings, allocating capital, facilitating investment, and reducing informational frictions [1, 2]. Financial market development is typically assessed through indicators reflecting the size and activity of capital markets—encompassing both equity and debt instruments—as well as the performance of the banking sector, which together capture the breadth and liquidity of market-based financing channels [3]. In contrast, financial institution development is often evaluated using multidimensional measures such as stability, depth, efficiency, and access, which collectively reflect the ability of financial intermediaries to mobilize savings, allocate capital, and provide inclusive services [4]. This distinction enables a more comprehensive analysis of the financial system, recognizing that well-functioning markets and robust institutions contribute differently yet complementarily to economic growth dynamics in various economies.

In the Middle East and North Africa (MENA) region, financial systems remain predominantly bank-centric, with underdeveloped capital markets and limited non-bank financial intermediation [5, 6]. This structural imbalance constrains the ability to provide diverse financing instruments needed for sustainable and inclusive growth [7]. Financial institutions and markets serve complementary functions—liquidity provision, credit allocation, price discovery, and risk sharing—yet in MENA, low market depth, regulatory constraints, and slow technological adoption weaken their potential synergies [14].

Recent scholarship emphasizes the importance of integrated reforms that simultaneously develop both financial institutions and markets to harness their combined potential [8]. Moreover,

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technological innovation, particularly FinTech, has emerged as a catalyst for improving access, reducing costs, and enhancing financial inclusion [9, 10]. Understanding the joint dynamics of financial institutions and markets in the MENA context is therefore essential for crafting effective policy interventions that foster inclusive and sustainable economic growth.

Despite the extensive literature on the finance–growth nexus, most studies adopt aggregate indicators or examine financial institutions and markets separately, overlooking the potential synergies of their joint development [10]. This gap is particularly relevant in MENA economies, where the financial landscape is dominated by banks and constrained by underdeveloped capital markets, regulatory limitations, and slow technological adoption [11]. The resulting structural imbalance restricts efficient resource allocation, innovation financing, and inclusive growth.

Addressing this gap, the present study empirically examines how the interaction between financial institution development and financial market development—used jointly as a proxy for financial development—affects economic growth in 12 MENA countries over the period 1990–2023. By applying robust econometric techniques that account for cross-sectional dependence and other panel data challenges, this research provides evidence-based insights to inform policymakers on integrated strategies for fostering a balanced, resilient, and growth-enhancing financial system in the region.

2. Literature Review

The nexus between financial development and economic growth remains a central theme in economic research, reflecting the crucial yet distinct contributions of financial institutions and markets. Classical perspectives, drawing on Schumpeter's seminal insights, emphasize finance as a catalyst for innovation and capital accumulation, which underpin economic expansion [12, 13]. Empirical investigations by King and Levine [14] robustly established that well-developed financial systems facilitate growth by mobilizing savings, allocating capital efficiently, and mitigating information asymmetries.

Financial markets play a complementary role to institutions by enhancing liquidity, enabling risk diversification, and reducing transaction costs through mechanisms such as stock market trading and bond issuance [14, 15]. Recent empirical evidence underscores the synergistic effect arising from the joint development of financial institutions and markets, which often produces growth outcomes exceeding the sum of their individual impacts [16]. This interplay is particularly salient in regions like MENA, where the financial landscape remains heavily bank-centric and capital markets are relatively shallow, thereby constraining the overall effectiveness of financial intermediation [8, 17].

Beck, et al. [18] highlight that financial development is a multifaceted process, where financial institutions and financial markets do not operate in isolation but rather interact to influence economic outcomes. Their framework demonstrates that accounting for the interaction between these components uncovers synergies that amplify the positive effects on growth, which traditional models using only individual indicators may fail to detect. Specifically, financial institutions contribute to reducing information asymmetries and allocating credit efficiently, while financial markets enhance liquidity and facilitate risk-sharing. The interplay between these functions creates an environment conducive to investment, innovation, and productivity improvements. This perspective is particularly pertinent for emerging and developing economies, such as those in the MENA region, where financial systems are often bank-centric and capital markets underdeveloped. Incorporating an interaction term in empirical models thus provides a more nuanced and realistic representation of financial development's role in growth, enabling policymakers to design integrated financial reforms that leverage the complementarities between institutions and markets [18].

A diversified financial structure that balances robust banking systems with vibrant capital markets supports more inclusive and sustainable economic growth by broadening access to finance and fostering innovation [4]. For MENA economies, deepening capital markets and embracing financial innovation, including FinTech solutions, have been identified as critical avenues to overcome persistent financing gaps and stimulate entrepreneurship [19]. Empirical studies confirm that improvements in financial

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inclusion and credit availability are positively correlated with higher GDP per capita and poverty reduction in the region [20].

However, many studies rely on aggregate proxies for financial development, such as broad measures of credit or stock market capitalization, which may mask the nuanced interactions between institutions and markets. Incorporating interaction terms between financial institution development and market development provides a more accurate understanding of their joint contribution to economic growth [21]. This approach highlights the complementary mechanisms by which institutions improve credit allocation and reduce risks, while markets enhance liquidity and foster efficient price discovery—jointly facilitating productivity gains and technological advancement [14]. Such insights are especially relevant to MENA's bank-dominated economies striving to diversify and modernize their financial sectors amidst ongoing structural reforms [9].

Beyond financial factors, several macroeconomic determinants continue to shape growth trajectories in the MENA region. Public expenditure, particularly capital investment in infrastructure, education, and health, plays a crucial role in underpinning long-term growth, often exhibiting higher returns compared to recurrent spending on subsidies or transfers [11, 22]. Meanwhile, foreign direct investment (FDI) is recognized for facilitating technology transfer, enhancing productivity, and integrating economies into global value chains. However, FDI's effectiveness varies widely across MENA countries due to heterogeneity in institutional quality, governance standards, and political stability [23]. Trade openness remains a vital growth driver by expanding market access, stimulating competition, and accelerating innovation diffusion [6]. Ultimately, sustainable economic growth in the MENA region depends on harmonizing these factors within coherent policy frameworks that strengthen institutions, promote financial sector diversification, and foster economic resilience through structural reforms and diversification strategies [5].

3. Materials and Methods

This study builds on the framework developed by Beck and Levine [2] which highlights the importance of the joint effect of financial institution development and financial market development for understanding financial development's impact on economic growth. By incorporating an interaction term between these two components, the model captures potential synergies that might be overlooked when considering each separately, a particularly relevant approach in emerging regions such as the MENA countries.

3.1. Model Specification

The model is specified as follows:

$$GDP=f(INTER, TR, FDI, GOVEX) \quad (1)$$

$$LNGDPPC_{it}=\alpha+\beta_1 INTER_{it}+\beta_2 TR_{it}+\beta_3 GOVEX_{it}+\beta_4 FDI_{it}+\varepsilon_{it} \quad (2)$$

The equation above describes the dependent variable, independent variable, and control variables. GDPPC is the gross domestic product per capita, dependent variable, expressed in percentage, and considered as a proxy of economic growth. The independent variable is the interaction term between financial institution development (FID) and financial market development (FMD) affecting economic growth (measured by log GDP per capita), and the control variables are the foreign direct investment (FDI) (expressed in percentage), trade (TR) expressed in percentage, and government expenditure (GOVEX) expressed in percentage. Financial market development is typically assessed through indicators reflecting the size and activity of capital markets as well as the performance of the banking sector, which together capture the breadth and liquidity of market-based financing channels [3]. In contrast, financial institution development is often evaluated using multidimensional measures such as stability, depth, efficiency, and access, which collectively reflect the ability of financial intermediaries to mobilize savings, allocate capital, and provide inclusive services [4].

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3.2. Estimation Methods

To address potential non-normality and heteroscedasticity, all variables are transformed logarithmically where appropriate to stabilize variance and reduce skewness [24]. Initial analysis uses the Pooled Ordinary Least Squares (POLS) approach, which pools cross-sectional and time-series data but assumes homogeneity across entities. To control for unobserved heterogeneity, Fixed Effects (FE) and Random Effects (RE) models are also estimated. The FE model accounts for time-invariant country-specific effects by allowing intercepts to vary, isolating the influence of time-varying regressors [25]. Driscoll-Kraay standard errors are applied to correct for cross-sectional dependence, heteroskedasticity, and serial correlation, ensuring robust inference in the panel data context [26].

4. Results

This section contains the results of the analysis composed of descriptive statistics, correlation matrix, estimation models, and diagnostic tests.

4.1. Descriptive Statistics

This metric summarizes the data, represented in mean, standard deviation, minimum, and maximum value [27].

Table 1.
Descriptive statistics.

Variables	Mean	SD	Minimum	Maximum
GDPPC	19465.294	18904.061	1680.71	81608.572
TRADE	88.475	34.266	29.857	202.333
GOVEX	17.575	6.632	2.36	76.222
FDI	2.722	3.595	-4.651	29.52
INTER	0.126	0.079	0.010	0.321

Source: Author's calculation using STATA.

The descriptive statistics shown in Table I above indicate that the mean of GDPPC per capita is 194965.294, which is higher than its standard deviation (18904.061). This indicates that the data is clustered around the mean and reliable. Trade openness (TRADE) is relatively high, averaging 88.48% of GDP, but also shows wide dispersion (SD = 34.27), with values ranging from 29.86% to 202.33%, reflecting differing levels of global economic integration. Government expenditure (GOVEX) averages 17.58% of GDP, with a wide range (2.36% to 76.22%) and a standard deviation of 6.63, indicating substantial heterogeneity in fiscal policy. Foreign Direct Investment (FDI) averages 2.72% of GDP, but spans from -4.65% to 29.52%, with a standard deviation of 3.60, revealing both inflows and net disinvestment in some countries. In addition, the interaction term between the Financial Market Development (FMD) and Financial Institutions Development (FID) show relatively low average values of 0.126, suggesting moderate financial development across countries. However, it displays a moderate standard error value (SD=0.079), with a range between 0.010 and 0.321, indicating a substantial spread in the degree of financial development, which influences economic growth.

4.2. Correlation Matrix

The correlation matrix displays the relationship between variables. It shows the association between the dependent and independent variables and between the independent variables themselves [28].

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Table 2.
Correlation matrix.

Variables	GDPPC	TRADE	GOVEX	FDI	INTER
GDPPC	**1**				
TRADE	0.3781*	1			
GOVEX	0.0713	0.0865	1		
FDI	-0.105*	0.3181*	-0.1470*	1	
INTER	0.4409*	0.4125*	0.1003	0.0795	1

Source: Author's calculation using STATA.

Table 2 above denotes the correlation matrix, which explains the association between variables. It shows a positive and weak correlation between the interaction term and GDP per capita (r=0.4409), which is considered a positive correlation and moderate. Likewise, trade showed a positive association with Gross domestic product per capita (GDPPC) (r=0.3781). In contrast, financial development showed a negative impact on Gross domestic product per capita (GDPPC), where this correlation is negative and weak (r=-0.105), explaining the decrease of foreign direct in the MENA region, owing to the political stability and the presence of war in some countries, which makes the foreign direct investment negative.

4.3. Regression Analysis

This research employs a panel analysis, where the data is extracted from the World Bank and the International Monetary Fund (IMF), for 12 countries in the MENA region, covering the period 1990-2023, using the software of statistical analysis STATA.

Table 3.
Estimation models- Dependent variable GDP per capita.

Variable	POLS	Panel FE Driscoll Kraay	Panel RE Driscoll Kraay
INTER	5.9194***	1.3864**	1.4033**
	(0.000)	(0.001)	(0.001)
TRADE	0.0093***	-0.0011	-0.0010
	(0.000)	(0.376)	(0.430)
GOVEX	0.1841	-0.0104***	-0.0103**
	(0.135)	(0.000)	(0.001)
FDI	-0.0509***	0.0088	0.0086
	(0.000)	(0.065)	(0.105)
Constant	7.490***	9.332***	9.379***
	(0.000)	(0.000)	(0.000)
R squared	0.3864	0.2277	0.2276
F-statistic	0.0000	0.0000	0.0000

Note: *, **, *** denotes the significance level at 5%, 1% and 0.1% respectively
Source: Author's calculation using STATA.

Table 3 presents the estimation results examining the impact of the interaction between financial institution development and financial market development (INTER) on GDP per capita, alongside control variables such as trade openness, government expenditure, and foreign direct investment (FDI). The Pooled Ordinary Least Squares (POLS) model indicates a strong positive effect of the interaction term on economic growth, with a 5.91 percentage point increase in GDP per capita per unit rise in INTER. Trade openness also positively correlates with growth, while FDI shows a negative association in this specification.

Using Driscoll-Kraay standard errors to correct for cross-sectional dependence and heteroskedasticity, the interaction term remains positively significant, though with a smaller magnitude (1.39 percentage points). Control variables exhibit weaker or insignificant effects; notably, government expenditure has a small but significant negative impact on growth, possibly reflecting inefficient fiscal allocation or crowding out of private investment.

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The model explains approximately 23% of the variance in GDP per capita, which is consistent with expectations for macroeconomic panel regressions where low R^2 values are common due to multifactorial growth determinants [29]. Overall, findings reinforce the synergistic role of financial markets and institutions in promoting economic growth while highlighting the nuanced effects of fiscal policy in the MENA context [5].

4.4. Diagnostics

Diagnostic tests indicate the soundness of the model and the reliability of a dataset. There are several diagnostic tests used such as serial correlation, multicollinearity, heteroscedasticity, and the cross-section dependency.

4.5. Multicollinearity

Multicollinearity is the test that studies the association between the independent variables, where it is shown by the value of variance influence factors (VIF), if the value of VIF is greater than 10, it indicates the presence of multicollinearity, in contrast, if the value of VIF is less than 10, it indicates the absence of multicollinearity [30].

Table 4.
Multicollinearity.

	VIF
INTER	1.21
TR	1.35
FDI	1.15
GOVEX	1.05
Mean VIF	1.19

Source: Author's calculation using STATA.

Table 4 presents the VIF results for the independent variables included in the model. The VIF values range from 1.05 for government expenditure (GOVEX) to 1.35 for trade openness (TR), with a mean VIF of 1.19. These values are substantially below the critical threshold of 10, indicating the absence of multicollinearity.

4.6. Cross-Section Dependency

In panel data models covering multiple countries, cross-sectional dependence can arise when countries are exposed to shared shocks. If left unaddressed, cross-sectional dependence can bias standard errors and lead to invalid inferences [31].

Table 5.
Cross section dependency-CD test.

Pesaran's test	
CD-test	3.334
P-value	0.0009

Source: Author's calculation using STATA.

Table 5 above shows the presence of cross-section dependency, where P-value=0.0009<α=0.05, the study addressed it by applying the Driscoll-Kraay robust standard error estimator, which is specifically designed to correct for heteroskedasticity, autocorrelation, and cross-sectional dependence in panel settings [32].

4.7. Heteroskedasticity-Breusch Pagan test

Heteroskedasticity refers to a condition in which the variance of the error term is not constant across observations. This can lead to inefficient estimates and invalid hypothesis testing if not properly accounted for [33].

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Table 6.
Heteroskedasticity- Breusch Pagan test.

Breusch Pagan test	
Chi2(1)	44.80
Prob>chi2	0.0000

Source: Author's calculation using STATA.

As reported in Table VI, the test yielded a Chi-square value of 44.80 with a p-value of 0.0000, indicating evidence against the null hypothesis of constant variance. In line with this, the model was estimated using Driscoll-Kraay standard errors, which adjust for both heteroskedasticity and other common violations of classical assumptions. This approach enhances the reliability of statistical inference drawn from the regression coefficients [32].

4.8. Serial Correlation

Serial correlation, or autocorrelation, occurs when the residuals of a regression model are correlated over time. This violates the assumption of independence in the error terms and may lead to underestimated standard errors, especially in panel models with temporal structure [34].

Table 7.
Serial correlation.

Lagrange Multiplier test	
F(1,11)	256.680
Prob> F	0.0000

The Lagrange Multiplier test was applied to detect the presence of first-order serial correlation in the panel data. As shown in Table 7, the test reports an F-statistic of 256.68 with a p-value of 0.0000, leading to a rejection of the null hypothesis of no serial correlation. The result confirms that autocorrelation is present, justifying the use of the Driscoll-Kraay fixed effects estimator, which is robust to such time-dependent errors.

5. Conclusions, Findings, and Recommendations

This study examined the impact of the interaction between financial institution development (FID) and financial market development (FMD) on economic growth across twelve MENA countries over the period 1990–2023. Utilizing the Driscoll-Kraay fixed effects estimator to address potential cross-sectional dependence, heteroskedasticity, and serial correlation, the analysis reveals that a one-unit increase in the interaction term (INTER) is associated with a statistically significant 1.39 percentage point increase in GDP per capita. This finding highlights the critical role of the simultaneous advancement of banking institutions and capital markets in driving economic growth within the region.

These results corroborate recent empirical literature emphasizing the complementary and mutually reinforcing functions of financial institutions and markets in fostering economic development [35]. Coordinated strengthening of both sectors facilitates more efficient capital allocation, risk sharing, and ultimately supports sustained productivity improvements. Given the predominance of banking institutions in MENA economies, enhancing capital market infrastructure—such as developing corporate bond markets and improving investor protections—can unlock new growth pathways and diversify financing sources [8]. Regarding control variables, trade openness exhibited only a weak and statistically insignificant association with growth in the fixed effects specification, consistent with findings that trade liberalization alone does not guarantee growth without complementary policies such as institutional strengthening and export diversification [6, 36]. Foreign direct investment (FDI) also showed no significant effect, reflecting evidence that FDI's growth contributions are conditional on host countries' absorptive capacities and institutional quality [37]. Government expenditure emerged as the

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only control variable with a statistically significant negative impact on growth, possibly attributable to inefficiencies in public spending or crowding-out effects on private sector investment [22, 38].

In conclusion, the findings underscore the importance of integrated financial sector strategies that simultaneously promote the development of financial institutions and markets to foster inclusive, diversified, and sustainable economic growth in the MENA region. Policymakers should prioritize reforms that deepen financial markets alongside enhancing banking sector efficiency to capitalize on their synergistic growth effects. Future research could extend these insights by incorporating measures of institutional quality, governance, and technological innovation to better understand the evolving dynamics of financial development in emerging economies.

Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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