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Finance–Growth Nexus in OIC Economies: Financial Development, Institutions and Long-Run Growth

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Abstract:
The paper examines the relationship between financial development, institutional quality, and economic growth in a group of sampled OIC (Organisation of Islamic Cooperation) countries. The empirical study utilises the data of Malaysia, Indonesia, Turkey, Saudi Arabia, and Pakistan between 1990 and 2019 and implements the pooled mean group (PMG) panel ARDL model to describe the characteristics of both the short-run dynamics and the long-run impacts. It reveals that in the long-run financial development proves to be the strongest determinant of economic growth and has a strong and highly significant effect; short-run effects, in their turn, are relatively weak and experience the adjustment process to equilibrium. In addition, the findings show that good governance exists and the existence of a good governance is one of the key triggers within which financial development has a positive impact on economic growth. On the contrary, trade openness and government spending also play a significant part in maintaining the long-run economic growth. Overall, the research suggests that the member states of OIC are supposed to perfect their regulatory frameworks so that financial deepening can be converted to the long-term economic growth.
Keywords: Financial development, Institutional quality, Economic growth, OIC economies, Panel ARDL, Pooled mean group, Governance, Trade openness, Financial inclusion, Islamic finance.

1. Introduction

Economic growth remained as a central discussion in development economics. As it determines a country's capacity to create job opportunities, fight poverty, build fiscal sustainability, and overall welfare in the long-run. In this broad discourse, the finance–growth nexus has played an instrumental role for several decades. The main argument is that a better-developed financial system enhances savings mobilization, capital allocation efficiency and risk diversification as well as productive investment, hence accelerating economic performance. But the weight of evidence has increasingly contradicted the simplistic view that financial development (FD) promotes growth in all countries and institutional settings. In fact, current analysis indicates that the effect of finance on growth is conditioned by the institutional quality (IQ) as broader governance environment indicator in which financial institutions and markets will function. As a result, one should conceive FD not as an independent engine of growth but rather mechanisms conditioned by, inter alia IQ (Svirydzenka, 2016), regulatory credibility (Kaufmann et al., 2011) and the state´s ability to enforce rules and maintain market confidence (Pradhan et al., 2023).

This issue is especially relevant in the case of Organisation of Islamic Cooperation economies. Collectively, OIC countries constitute an extremely heterogeneous set of economies characterized by considerable differences in income level, quality of governance, financial architecture, and reform path. Also, they have a strategically significant role to play in the current financial landscape as most of them are becoming leading hubs for Islamic finance. According to recent industry evidence, these global Islamic finance assets reached around US$4.9 trillion in 2023, with most of this growth occurring within OIC member nations which largely contribute to the continuous expansion of Islamic banking, capital markets and their accompanying regulatory ecosystems (LSEG, 2024). At the same time, economic assessments continue to perpetuate an emphasis on uneven structural transformation, persistent governance asymmetries and differences in IQ among member states (SESRIC, 2024); all factors with salient implications for the developmental character of finance. Yet, these realities provide OIC economies with an interesting context in which to review the finance growth nexus, specifically from an institutional viewpoint.

Institutional factors are key in this relationship. Thus IQ which comprising the dimensions of government effectiveness, regulatory quality, rule of law, control of corruption and political stability and accountability matters not just for the safety of transactions but also the extent to which funds are intermediately and allocated effectively into productive uses. If the institutions are weak, rapid FD may lead to rent-seeking, diseconomies of credit allocation, regulatory arbitrage and lending that is politically connected as opposed to fostering broad-based development. In stronger institutional contexts, however, FD is relatively more likely to enhance entrepreneurship, stimulate innovation and support long-term investment leading to sustainable growth. This perspective has received considerable validation through recent empirical research. Cross-country evidence suggests that IQ and FD reinforce each other, whereas the long-term growth effect of FD is strong where IQ structures are credible and effective (see Uzar et al., 2023; Pradhan et al., 2023). Also, recent research specifically involving OIC and Muslim-majority economies as well has confirmed the positive effects of IQ on FD (Muhammed et al., 2024; Mawardi et al., 2024).

Moreover, empirical analyses confirm that financial development (FD) may act as an economic growth driver in settings with a good governance context, especially in terms of legal system and quality of regulation but does not affect the growth in settings where there is a lack of good governance (Bayraktar et al., 2023). This study is mainly focusing on two unresolved issues in the historical works dealing with OIC economy. First, does FD have different growth implications in the short versus the long run when one controls for global shocks and cross-sectional dependence. Second, does the IQ structure those effects dynamically revving up the growth engine in financially sound democracies and throttling it in weak ones? Given the presence of resource-rich and resource-poor countries as well as bank-oriented and market-oriented financial systems, Islamic and conventional finance, the diverse OIC countries comprise a unique group for studying the impact of dynamic resource-shrinking global financial conditions on economic development (Ameziane, 2024). Addressing these questions poses significant research opportunities and practical implications for the diverse OIC countries. This paper determines the effect of FD on the economic growth of a limited sample of OIC countries in the short and long-run. Moreover, it looks at the moderating role of IQ on this relationship. Within this context, this study used second-generation panels that address common shocks, heterogeneity, and endogeneity so that outputs would have credibility and relevancy in terms of recommended reforms on the priorities of financial sector deepening and institutional upgrading (Pradhan et al., 2023; Bayraktar et al., 2023; Uzar et al., 2023)

Given these, this paper investigates the finance-growth nexus in OIC economies by analyzing the interrelationship between IQ, FD and economic growth. It works on the hypothesis that without an institutional framework to enforce contracts and deter opportunism, reduce information asymmetries and enhance trust in financial intermediation, only developing of finance is not sufficient to guarantee sustainable growth. Through combining FD and IQ in a single analytical framework, this paper aims at providing a more theory-driven and empirically relevant interpretation of growth performance for OIC countries. This is especially relevant for economies where the expansion of the financial sector has outstripped institutional reform and for those seeking to deepen the developmental impact of both conventional and Islamic finance. Hence, the contribution of this paper is not just in reinvestigating the finance-growth nexus rather it suggests that the growth effect of finance for OIC economies is essentially contingent upon the strength of institutions.

2. Data and Variables

The empirical analysis uses a balanced panel of five purposively selected member countries of the Organisation of Islamic Cooperation, namely: Malaysia, Indonesia, Turkey, Saudi Arabia and Pakistan. There are several grounds on which this selection is analytically justified. First, these

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economies are highly heterogeneous within the OIC as they differ in income levels, financial structures, institutional quality and importance of Islamic finance vis-a-vis conventional finance. First, these countries are some of the most extensively explored in discussion within the finance and development literature regarding the OIC context. They also offer relatively stable macroeconomic, financial and governance variables over sufficiently long time span to support coherent panel estimation with reduced methodological issues, such as missing observations and unbalanced samples. The use of a balanced panel is especially important since it improves cross-country comparability and better supports the persistence of estimated long-run relationships. The sample period is determined by the annual availability of all variables for all chosen countries, allowing for consistent and comparable estimation throughout the entire analysis period.

The dependent variable under analysis is economic growth which can be measured in terms of annual growth rate of real gross domestic product (GDP). This measure is common in the growth empirical literature because of its ability to capture year-on-year variations in aggregate economic performance and allowing for meaningful cross-country comparisons. According to the World Bank Metadata, annual percentage growth rate of GDP at market prices based on constant local currency is used as a closer proxy for real economic growth rate because it encompasses price angular changes. Its tool is widely used in studies of financial growth, thus it aligns with empirical literature.

The key explanatory variable considered is FD. This study takes a more nuanced view of FD, extending beyond a single banking measure (e.g., private sector credit) to incorporate the general state of maturity and functioning of the financial system. This inclusive point of view follows the International Monetary Fund (IMF) structure that describes a FD by depth, access, and efficiency from respective financial institutions and markets and aggregates these three into one common index. This multidimensional dimension approach is methodologically preferable because it recognizes that financial systems support development not only through their size, but by widening outreach, enhancing intermediation quality and improving allocative efficiency. As a result, a composite FD index offers a richer and more theoretically robust interface that captures the finance-growth nexus than narrow credit-based measures alone.

Besides FD, another interest variable for this paper is IQ which measures formal and informal governance structures shaping rights, enforcement, policy credibility and stability; and supports development and growth. The Composite IQ index aggregated from WGI dimensions namely voice & accountability, political stability/no violence, government effectiveness, regulatory quality, rule of law, control of corruption. Other control variables used in this paper is described in Table 1 as follows:

Table 1: Variable and data description.

Variable	Definition, Measurement and Data Source	Previous Studies
Trade Openness (TO)	**Definition:**Degree of international trade participation and openness to global markets and competition. **Measurement:**Trade-to-GDP ratio: (Exports + Imports) / GDP, typically % of GDP. **Data Source:**World Bank WDI: Trade (% of GDP).	Edwards (1998); Frankel & Romer (1999); Yanikkaya (2003); Sachs & Warner (1995); Wacziarg & Welch (2008).
Government Expenditure (GE)	**Definition:**Total government spending on goods, services and transfers; reflects state involvement and fiscal stance. **Measurement :**Government expenditure as % of GDP (series must be chosen consistently, e.g., general government final consumption % of GDP, or total government expenditure % of GDP). **Data Source:** MF Government Finance Statistics (GFS) and/or World Bank WDI.	IMF (2018); Devarajan, Swaroop & Zou (1996); Kneller, Bleaney & Gemmell (1999); Barro (1991); Ram (1986); Landau (1983); Cooray (2009).
Population Growth (PG)	**Definition:**Annual population increase affecting labour supply, dependency ratios, demand and resource pressures. **Measurement:**Population growth (annual %). **Data Source** :IMF Government Finance Statistics (GFS) and/or World Bank WDI	World Bank (2020); Bloom & Williamson (1998); Mankiw, Romer & Weil (1992); Kelley & Schmidt (1995); Simon (1981); Brander & Dowrick (1994).
Interaction term (FD × IQ)	**Definition :**Joint effect capturing how governance quality conditions the growth payoff of financial maturity; institutions moderate finance-led growth. **Measurement :**Interaction constructed from the finance index and the institutional index (common approach: multiplicative term after standardisation; your text also mentions a residual/factor-based approach). **Data Source** :Constructed from the study's computed FD Index and IQ Index series (no separate dataset beyond underlying indices).	Čihák et al. (2012); Kaufmann et al. (2011); Beck & Levine (2004); Law & Azman-Saini (2012); Acemoglu & Johnson (2005); Huang (2010); Demetriades & Law (2006).

3. Methodology

The Pooled Mean Group (PMG) estimator which is also known as panel ARDL approach is used in this study to suit situations where countries may portray heterogeneous short-run behaviour but a shared long-run equilibrium relationship among panels. Developed by Pesaran et al. 1999), the PMG estimator allows short-run coefficients, adjustment speeds and error variances to differ across countries but constrains homogeneity on long-run coefficients. The premise behind this framework is that although the response of each selected country may be different to short-term shocks, its long-run relationship between variables remains constant across all cross-section units. The general formulation for the model used in this study is as follows:

$$EG_{i,t} = \beta_0 + \beta_1 FD_{i,t} + \beta_2 IQ_{i,t} + \beta_3 TO_{i,t} + \beta_4 GE_{i,t} + \beta_5 PG_{i,t} + \beta_6 FD * IQ_{i,t} + \varepsilon \quad [1]$$

where:

EG	=	Economic growth (percent)
FD	=	Financial development (point)
IQ	=	Institutional quality (point)
TO	=	Trade openness (percent)
GE	=	Government expenditure (percent)
PG	=	Population growth (percent)
FD*IQ	=	Interaction between FD and IQ
β_j	=	Coefficient value for each variable, (i = 0, 2, … ,5)
ε	=	Error term.

The error in this model is considered as white – noise where the mean is equal zero and variance is constant, σ_ε^2 or $\varepsilon \sim iid(0, \sigma_\varepsilon^2)$. The panel unit root acts as pre-test to the PMG estimation. This test is taken in order to test order of integrated data of each variable, panel series whether I(0) or I (1), stationary or not stationary. Namely, the panel root test according to Levin, Lin and Chu, (LLC) unit root test is carried out, whereby unit root process is assumed to be common, and the heterogeneity of the autoregressive coefficient is not allowed. After Equation 2, the expression of LLC unit root test is depicted.

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$$\Delta y_{it} = \alpha_i + \rho_i y_{i,t-1} + \sum_{j=1}^{p} \emptyset_{ij} \Delta y_{i,t-j} + \varepsilon_{i,t-1} \quad i = 1,2,\ldots,N;\ t = 1,2\ldots,T, \quad [2]$$

where $y_{i,t}$ is panel series for each variable and α_i is the individual fixed effect. The number of lags, P is selected to make the residual uncorrelated over time. The hypothesis can be constructed as following:

$H_0: \rho_i = 0$ (the variable series is not stationary)

$H_1: \rho_i < 0$ (the variable series is stationary)

Im, Pesaran and Shin (IPS) unit root test, which takes into account an individual process of unit roots was used to conclude on the stationarity of the variable. This test is conducted by averaging Augmented Dickey - Fuller (ADF) statistic.

$$\bar{t} = \frac{1}{N} \sum_{i=1}^{N} t_{iT} \quad [3]$$

where t_{iT} is the ADF t- statistic for country i based on the country – specific ADF regression in Equation 3.1 Therefore, IPS unit root test can be written as following Equation 3.19:

$$\Delta y_{it} = \alpha_i + \rho_i y_{i,t-1} + \delta_i \bar{y}_{t-1} + \sum_{j=0}^{k} \delta_{ij} \Delta \bar{y}_{i,t-j} + \sum_{j=0}^{k} \Delta y_{i,t-j} + \varepsilon_{i,t} \quad [4]$$

where $\bar{y}_{t-1} = (\frac{1}{N}) \sum_{j=0}^{k} y_{i,t-1}$, $\Delta \bar{y}_t = (\frac{1}{N}) \sum_{j=0}^{k} y_{i,t}$ and $t_i(N,T)$ is the t-statistic of the estimate of ρ_i in Equation 3.2 used for computing the individual ADF statistics. Based on both LLC and IPS unit root test, this study can deduce the integrated order of each variable. In this respect, Pesaran et al. (2001) suggested ARDL approach in PMG estimation allows variables to be mutually cointegrated regardless of whether the panel series is I(1) or I(0). The lag selection for these unit root tests is based on Akaike Info Criterion and PP with bandwidth selection based on Newey – West bandwidth. This study uses PMG approach in modeling the dynamic causal chain between economic growth, foreign direct investment (FD) and institutional quality. Thus, the model in Equation 1 can be constructed as Equation 5:

$$\Delta(LEG_i)_t = \sum_{j=1}^{p-1} \gamma_j^i \Delta(Y_i)_{t-1} + \sum_{j=1}^{q-1} \delta_j^i \Delta(X_i)_{t-1} + \phi^i \varepsilon_{it} [(Y_i)_{t-1} - \{\beta_0^i + \beta_0^i (X_i)_{t-1}\}] + \varepsilon_{it} \quad [5]$$

where LEG indicates the economic growth and X_i represents a set of independent variables which are LFD, LIQ, LTO, LEG and LPG for country i. γ and δ are short -term coefficients of dependent and independent variables, respectively. Meanwhile, β, ϕ and ε the long-term coefficient, the coefficient of the speed of adjustment to long – term relationship and time varying error term, respectively. The term inside square bracket, $[(Y_i)_{t-1} - \{\beta_0^i + \beta_0^i (X_i)_{t-1}\}]$ denotes. Based on the equation above, the panel ARDL method of PMG estimator will be adopted. The applicability of ARDL model has to be determined first before conducting PMG estimation via the ARDL model bound test. The tests in this procedure evaluate whether there exists cointegration among the variables in the model or not based on joint F statistics. They are compared against each other to determine the null hypothesis which is H_0 which treats of there existing no cointegration against the alternative hypothesis which is H_1 that there exists cointegration.The null hypothesis is rejected when the calculated value of the F-statistic exceeds the upper critical value; simultaneously, when the F-statistic estimate is less than the lower critical value, the null hypothesis that long-run relationship does not take place is also rejected. In case however, the F-statistic estimate falls between the upper and lower critical values, one cannot reject or accept the hypothesis of cointegration.

4. Results

This section reports the results for the PMG estimation. Unit root test is performed at first place to evaluate the stationarity of each data series in the model. Results are reported in Table 2. Table 2 presents the results of panel unit root test. The LLC test result revealed mixed integrated order for all variables with or without time trend. At level, some of variables such as LFD, LIQ and LTO are found to be significant at 10, 5 and 1 percent, highlighting that this variable is stationary at level or integrated order of zero, I (0) without or with time trend. On contrary, LEG, LGE and LPG are integrated order of one, I(1) as LLC test suggested that these variables are significant at 5 percent either with or without time trend. Meanwhile, IPS unit root found that LEG, LFD, LGE and LPG are significance at 5 percent and first difference regardless with or without time trend. Hence, these variables are I(1). On other hand, LIQ and LTO are considered as I(0) as these variables significance at 5 percent at level for both with and without time trend.

Table 2: LLC and IPS Panel Unit Root Test Result

Test	Variable	Level		First Difference	
		Constant	Constant + trend	Constant	Constant + trend
LLC	LEG	-1.893[2]	2.393[3]	-8.093[1]***	-4.817[4]***
	LFD	-1.283[2]*	-2.320[2]**		
	LGE	-0.885[4]	-0.131[4]	-5.301[3]***	-4.840[3]***
	LIQ	-2.714[1]***	-2.389[3]***		
	LPG	3.273[4]	3.562[3]	-2.254[3]***	-2.632[3]***
	LTO	3.105[1]***	2.862[2]***		
IPS	LEG	0.712[2]	2.201[3]	-7.674[1]***	-6.082[4]***
	LFD	-0.117[2]	-1.246[1]	-9.318[1]***	-6.369[1]***
	LGE	-1.132[4]	-0.116[1]	-7.559[3]***	-7.274[3]***
	LIQ	-3.996[1]***	-2.862[2]***		
	LPG	2.998[4]	0.770[3]	-2.407[3]***	-2.185[3]***
	LTO	3.197[2]***	2.566[2]***		

Note: ***, ** and * indicates rejection of the null hypothesis at 1,5 and 10 percent significant level. Figures in parenthesis represent the number of lags included

With this mixed I(0) and I(1) result, panel ARDL model can be constructed for PMG estimation. The next step is to perform bound test estimation. The result of bound test on PMG model is presented in Table 3.

Table 3: Bound test on PMG Estimation

Country	F -Statistic					
Malaysia	8.117					
Indonesia	7.467					
Turkey	7.245					
Saudi Arabia	9.899					
Pakistan	8.600					
Significant level	**10 percent**		**5 percent**		**1 percent**	
Bounds Critical Value	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
F -statistic	2.977	4.260	3.576	5.065	5.046	6.930

Note: I(0) and I(1) are respectively and non- stationary bounds. Null hypothesis: No cointegration relationship among the variable.

Based on the results, the calculated F-statistics for five countries: Malaysia (8.117), Indonesia (7.467), Turkey (7.245), Saudi Arabia (9.899), and Pakistan (8.600), all of which exceed the 1 percent level upper-bound critical value of 6.930. Hence, the null hypothesis of no cointegration for all these countries can be confidently rejected. The effect of this conclusion suggests the existence of long-run cointegrating relationships, implying that the financial development, institutional quality, and economic growth of the countries in question move together over time. Short-run shocks or disequilibria must restore or converge to long-run equilibrium. The existence of strong cointegration evidence for all sample countries allows the use of the PMG-ARDL framework, suitable for

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heterogeneous panels consisting of mixed I(0) and I(1) variables, which allows for short-run heterogeneity and long-run homogeneity. Hence, the PMG estimation that proceeds can be considered valid in capturing the transitory dynamics and long-run causal linkages within the finance–growth–institution nexus for OIC economies. The results of PMG estimation for short-run are reported as follows:

Table 4: PMG Estimation for Short Run Relationship Result.

Dependent Variable: LEG				
Variable	**Coefficient**	**Standard Error**	**t- Statistic**	**Probability**
LFD	0.252	0.320	0.787	0.433
LGE	-0.323**	0.161	-2.008	0.047
LTO	-0.153	0.264	-0.577	0.565
LFD*LIQ	-0.129	0.201	-0.641	0.523
Constant	-0.513*	0.290	-1.768	0.080
Time Trend	0.007**	0.003	2.494	0.014
ECT	-0.110*	0.066	-1.678	0.096

Note: ECT is error correction term and ***, ** and * indicates significance at 1%, 5 and 10 levels, respectively. The number of lags included in PMG is (1,1,0,0,1,1,1) for each variable based on Akaike Info Criterion (AIC). Thus, the relationship short run LIQ and LPG do not appear due to number of lags included is zero.

Table 4 provides the PMG short run dynamics for LEG. When considering the results within the PMG framework, due to how the short run coefficients can differ across countries, the model constrains a common long run relationship. This makes the short run estimates especially useful for transitional adjustments rather than steady state effects (Pesaran, Shin, & Smith, 1999; Pesaran & Smith, 1995). The short run impact of LFD has a positive but statistically insignificant effect ($\beta = 0.252$, $p = 0.433$). Given the selected sample period and the lag structure, it implies that the impact of varying levels of finance on growth does not take effect almost immediately. This phenomenon can be explained due to the growth financing benefits that occur through investment allocation and productivity, for finance to be effective, it has to be accompanied by screening, monitoring and reallocating capital toward higher productivity channels (Beck, Levine, & Loayza, 2000; Levine, 2005; King & Levine, 1993).Similarly, the interaction term (LFD × LIQ) has a negative but statistically insignificant effect ($\beta = -0.129$, $p = 0.523$) which suggests that there is no evidence of the short run impact of the moderating role of institutions. The empirical pattern fits institutional finance literature, which emphasizes the institutional framework of quality of intermediation and investor protection, places strongest impact through long term credibility and enforcement mechanisms rather than annual variances (Demetriades & Law, 2006; Law & Azman-Saini, 2012; La Porta et al., 1998). On the control variables, government expenditure (LGE) has a statistically significant negative short run impact on growth ($\beta = -0.323$, $p = 0.047$). In a log specification, a 1 percent increase in government expenditure estimates a 0.32 percent decrease in LEG in the short run, ceteris paribus. This finding corroborates the cross country literature where the government consumption share of the economy is inversely related to growth, especially when government spending is distortionary or less productive in the short run (Barro, 1991). This also concurs with the literature that the structure and the efficiency of public spending is important whereby spending reallocations to less productive components can slow growth, even when total spending is higher (Devarajan, Swaroop, & Zou, 1996).This is not to say that fiscal policy is always contractionary, rather the short run output reactions in the absence of financing, in the absence of allocational efficiency, and in the absence of productive versus non productive expenditures, as this distinction is made in the fiscal growth literature (Kneller, Bleaney, & Gemmell, 1999). The negative and statistically insignificant Open Trade (LTO) ($\beta = -0.153$, $p = 0.565$) indicates the absence of relationship between LTO and growth. LTO's the absence of relationship exists because the LTO and the growth relationship is moderated by finance, institutions, and fiscal controls. This is in line with the LTO and growth literature where trade openness has been shown to only influence other longer run growth mechanisms such as the technological diffusion and scale effects (Frankel & Romer, 1999; Wacziarg & Welch, 2008) with empirical evidence describing high levels of structural and instrumental rather than short run correlation). There are two additional factors that enhance the short run model's explanation. The time trend is the first of these, and it is positive and statistically significant ($\beta = 0.007$, $p = 0.014$) which indicates that the sample has been characterized by sustained positive growth. The is neglected by the time varying covariates and is consistent with the advancement of technology, human capital, or structural changes and improvements of the sample. Second, we note that the error correction term (ECT) is negative and weakly significant (ECT = −0.110, $p = 0.096$), suggesting that the economy converges towards long run equilibrium at close to 11 percent per annum. Such a sign is in line with the error correction representation under PMG, suggesting that there are some positive signs to deviations from the long run relationship, which are corrected over time (Pesaran et al., 1999). The evidence, albeit limited, points to the fact that the sample growth adjustments are more a function of fiscal and secular trends, rather than the finance and institutional frameworks and the immediacy of their interactions. In this regard, the negative ECT, if nothing else, proposes that there is a long run equilibrium that is meaningful, and which the sampled countries are likely to revisit, albeit slowly.Specifically, Table 5 breaks down the country-specific short-run coefficients for Malaysia, Indonesia, Türkiye, Saudi Arabia, and Pakistan within the PMG-ARDL error-correction model, with LGDP as the dependent variable. This is in line with PMG logic, which offers heterogeneous short-run dynamics across countries with a single long-run structure, making cross-country short-run response differences economically meaningful as opposed to "noise" (Pesaran & Smith 1995; Pesaran, Shin & Smith 1999).

Table 5: The result of PMG estimation for individual country in short run.

Dependent Variable: LGDP						
Country	**Variable**	**Coefficient**	**Stnd. Error**	**t- Stat**	**Prob.**	**Total Effect**
Malaysia	LFD	0.971***	0.33	2.945	0.009	
	LGE	-0.317	0.523	-0.606	0.552	
	LTO	-0.435*	0.233	-1.865	0.079	
	LFD*LIQ	0.191**	0.078	2.429	0.026	LFD=0.971+0.191LIQ
	Constant	-0.825**	0.373	-2.212	0.040	
	Time Trend	0.010*	0.005	2.097	0.050	
	ECT	-0.164**	0.071	-2.297	0.034	
Indonesia	LFD	0.556**	0.226	2.462	0.024	
	LGE	0.13	0.314	0.412	0.685	
	LTO	-0.875**	0.342	-2.559	0.020	
	LFD*LIQ	0.087***	0.023	3.827	0.001	LFD =0.556+0.087LIQ
	Constant	-0.917**	0.349	-2.627	0.017	
	Time Trend	0.008**	0.003	2.483	0.023	
	ECT	-0.140**	0.052	-2.693	0.015	
Turkey	LFD	-0.824***	0.255	-3.233	0.005	
	LGE	-0.278	0.17	-1.63	0.121	
	LTO	-0.364	0.21	-1.732	0.100	
	LFD*LIQ	0.026**	0.011	2.364	0.021	LFD= -0.824+0.026LIQ
	Constant	-1.023***	0.16	-6.401	0.000	
	Time Trend	0.014***	0.003	5.247	0.000	
	ECT	-0.287***	0.042	-6.843	0.000	
Saudi Arabia	LFD	0.413*	0.227	1.816	0.094	
	LGE	-0.273*	0.146	-1.862	0.079	LFD =0.413+0.116LIQ
	LTO	0.384***	0.109	3.53	0.002	
	LFD*LIQ	0.116**	0.047	2.467	0.029	

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	Constant	-0.358***	0.112	-3.196	0.005	
	Time Trend	0.002**	0.001	2.321	0.032	
	ECT	-0.071***	0.02	-3.485	0.003	
Pakistan	LFD	0.655*	0.375	1.747	0.098	
	LGE	-0.879***	0.206	-4.262	0.000	
	LTO	0.528***	0.157	3.36	0.003	
	LFD*LIQ	-0.092**	0.045	-2.042	0.043	LFD=0.644-0.092LIQ
	Constant	0.555**	0.221	2.508	0.022	
	Time Trend	-0.001	0.001	-0.808	0.43	
	ECT	-0.112**	0.048	2.313	0.033	

Note: ***, ** and * indicates significance at 1%, 5 and 10 levels, respectively. Thus, the relationship short run LIQ and LPG do not appear due to number of lags included is zero.

For the entire sample, the error-correction term (ECT) is negative and statistically significant for all countries, which confirms convergence towards the long-run equilibrium. The implied speed of adjustment varies considerably in magnitude and direction. These figures indicate that Türkiye has the highest rate of short-run adjustment towards the long-run equilibrium, while Saudi Arabia is at the other end of the spectrum. This is consistent with differing macro-financial structures and policy transmission across economies (Pesaran et al. 1999).

Evaluating financial development (LFD), the short-run impact is both positive and significant for Malaysia ($\beta = 0.971$, $p = 0.009$) and Indonesia ($\beta = 0.556$, $p = 0.024$), while in Saudi Arabia ($\beta = 0.413$, $p = 0.094$) and Pakistan ($\beta = 0.655$, $p = 0.098$) it is positive and only marginally significant. From the given results, the finance-growth view holds that credit and resource allocation increases economic output, though the degree of impact relies on domestic frictions and adjustment costs (Beck, Levine, & Loayza, 2000; Levine, 2005). Conversely, in the case of Türkiye, short-run results illustrate an apparent negative impact; with ($\beta = -0.824$, $p = 0.005$) it can be asserted that there is a negative correlation, suggesting that dimension expansions of financial services, in the short run, are correlated with less economic output. From the given results, the finance-growth view holds that credit and resource allocation increases economic output, though the degree of impact relies on domestic frictions and adjustment costs (Beck, Levine, & Loayza, 2000; Levine, 2005).

Among the interaction terms, the most pertinent from a policy perspective is (LFD*LIQ), as it investigates the extent to which the quality of institutions alters the marginal return of financing. Positive and statistically significant results were recorded for the interaction in Malaysia ($\beta = 0.191$, $p = 0.026$), Indonesia ($\beta = 0.087$, $p = 0.001$), Türkiye ($\beta = 0.026$, $p = 0.021$), and Saudi Arabia ($\beta = 0.116$, $p = 0.029$), suggesting that, in these countries, the marginal improvement of institutions increases the short-run impacts of financial development. Formally, the marginal effect of finance is expressed as $\partial LGDP/\partial LFD = \beta(LFD) + \beta(LFD \times LIQ) \cdot LIQ$, which for the purpose of the table, is ascribed to the "total effect." This complementarity is consistent with the (law–finance) institutional view that a greater extent of the rule of law, regulatory quality, and corruption control increases the effectiveness of all the elements of screening, enforcement, and governance, thereby facilitating the allocation of finance to productive investments (La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 1998; Law & Azman-Saini, 2012). The case of Pakistan is interesting, as it stands out from the rest with an interaction that is both negative and significant ($\beta = -0.092$, $p = 0.043$), which suggests that the quality of institutions in Pakistan diminishes the short-run finance–output nexus, in line with the assertion that an institutional vacuum may cause the financial system to funnel credit to unproductive and downward in the structural real sector (Demetriades & Law, 2006).

Control variables underline the heterogeneity across countries. Trade openness (LTO) is negative and significant in both Malaysia ($\beta = -0.435$, $p = 0.079$) and Indonesia ($\beta = -0.875$, $p = 0.020$), whereas it is positive and strongly significant in Saudi Arabia ($\beta = 0.384$, $p = 0.002$) and Pakistan ($\beta = 0.528$, $p = 0.003$). This shows that trade exposure can be supportive of growth in some structures and contractionary in others, implying the possibility of vertical import dependence, terms of trade sensitivity, or adjustment costs of trade. Government expenditure (LGE) is particularly negative and highly significant in Pakistan ($\beta = -0.879$, $p < 0.001$), and somewhat negative in Saudi Arabia ($\beta = -0.273$, $p = 0.079$). This is in line with the findings that the growth effect of public expenditure is framed by efficiency and structure, in that unproductive public spending can stifle output dynamics in the short run (Barro, 1991; Devarajan, Swaroop, & Zou, 1996).

Taken together, short-run finance-output effects are heterogeneous across OIC member countries; however, in most countries, the institutional context substantially influences the returns to financial development, thereby corroborating that the centrality of strengthening governance is not peripheral. The next estimation result in Table 6 reports the estimation for long-run relationship for group country. The results are as follows:

Table 6: PMG estimation for long run relationship result.

Dependent Variable: LEG				
Variable	**Coefficient**	**Stdr. Error**	**t- Stat.**	**Prob.**
LFD	1.569**	0.623	2.518	0.013
LGE	1.026**	0.481	2.132	0.035
LIQ	-0.512	0.47	-1.09	0.278
LPG	-0.256	0.26	-0.985	0.326
LTO	2.799***	0.687	4.076	0.000
LFD*LIQ	0.251***	0.09	2.786	0.006

Note: ***, ** and * indicates significance at 1%, 5% and 10% levels, respectively

Table 6 presents the estimates of the where short run dynamics are allowed to vary by country (Pesaran, Shin, & Smith, 1999; Pesaran & Smith, 1995). Based on the table, it shows that LFD is positive and statistically significant ($\beta = 1.569$, $p = 0.013$). The positive value of LFD and the results in the literature suggest that FD is positively correlated with output in the long run, as a 1 percent increase in FD leads to a 1.57 percent increase in output. The results indicating the positive relationship of FD and output are in line with the literature that documents the positive relationship of FD with economic growth through enhancement of productive efficiency in the economy (King & Levine, 1993; Beck, Levine, & Loayza, 2000; Levine, 2005). The most significant result for policy is the positive and significant (LFD*LIQ) ($\beta = 0.251$, $p = 0.006$) showing that there is a positive relationship between FD and the IQ. The positive FD*IQ relationship indicates that, in the long run, as the IQ improves, the positive relationship of FD and economic growth (LEG) is enhanced. Thus, $\partial LEG/\partial LFD = 1.569 + 0.251 \cdot LIQ$.

This quote contours the complementarity for the stronger rule of law and the effectiveness of regulation, the greater the financial deepening and growth by strengthening enforcement and diminishing rent-seeking will be (La Porta et al., 1998; Demetriades & Law, 2006; Law & Azman Saini, 2012).Also, the most notable is the direct effect of IQ which is negative and statistically insignificant ($\beta = -0.512$, $p = 0.278$), indicating that, in this specification, the institutions in effect, do not matter much as a level effect, and more so in how they shape the productive capacity of finance, a tendency that is common when institutional variables are included alongside interactive variables.

Among others, LTO is the most strongly positive and significant predictor ($\beta = 2.799$, $p < 0.001$), which is in line with the literature as more integrated economies tend to have higher long-term incomes due to greater market access and diffusion of technology (Frankel & Romer, 1999). LGE is positive and significant as well ($\beta = 1.026$, $p = 0.035$), suggesting that, on average, public expenditure is growth stimulating in

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the long run. This is consistent with the literature where the growth effect is said to depend on the expenditure's compositional and overall productive deployment (Devarajan, Swaroop, & Zou, 1996).

The impact of Government expenditure (LGE) is also positive and significant (β = 1.026, p = 0.035) which means, on average, and in the long run, spending by the Government positively impacts growth and this can be seen in the Devarajan, Swaroop, and Zou (1996) literature where the impact of growth is positive and negative depending on the structure and productivity of the various expenditures made. Last, the effect of population growth (LPG) is negative and statistically insignificant (p = 0.326) suggesting that, in the long run, there is no negative demographic effect until finance, institutions and openness are considered. The evidence from the long run is unambiguous where the FD is growth promoting and the IQ fortifies that impact materially, suggesting that, in OIC countries, finance led growth strategies are most plausible accompanied with substantial strengthening of the institutions (Levine, 2005; Demetriades & Law, 2006).

Table 7: Homogeneity Hausman Test on PMG estimation result.

Variable	Mean Group (a)	Pool Mean Group (b)	Var Difference	p-value
LFD	0.270	1.569	4.766	0.552
LGE	1.188	-0.512	8.451	0.559
LIQ	-0.936	-0.256	0.737	0.428
LPG	-1.879	-1.742	10.219	0.965
LTO	1.143	1.026	0.215	0.801
LFD*LIQ	3.732	0.251	11.499	0.305

Note: Null hypothesis which shows that PMG is the most efficient estimator where this hypothesis supports the homogeneity across countries. Comparing MG and PMG, with Hausmann test above, PMG is selected since the p-value is greater than 0.05.

Based on the Hausman Test, if there is no difference between PMG and MG estimators thus, allowing heterogeneity (as MG does) does not improve the robustness of model, suggesting long run coefficient should be considered as homogenous. In Hausman test, if there are significant difference between PMG and MG estimators thus, coefficients are rather heterogenous in long run where PMG estimator is not preferred. However, based on Table 4, it is reported that *p* -value for each variable are greater than 0.05 or 5 percent significant level, highlighting PMG is preferred in this study.

5. Conclusion

This study focus on the effect of FD, IQ and its interaction on economic growth in selected OIC countries. The PMG ARDL approach with second generation panel estimators shows that FD has a long-run positive and meaningful impact, although its short-run effects are mild and primarily function through the speed of adjustment toward economic equilibrium. The impact of IQ on the finance-output nexus is positive and significant, which concurs with the argument that well governed financial systems provide credit to more productive uses, and the main results survive various alternative specifications, additional controls, and robustness diagnostics. The recommendation is straightforward and feasible. First, these OIC countries should broaden the dimensions of financial depth, access, efficiency, and inclusion while improving the quality of governance in regulation and the enforcement and supervision of contracts, as the economic growth dividend is dependent on the IQ of the finance system. Also, additional trade liberalization and strategically directed public spending will further stimulate private investment and strengthen the long-term economic outlook. As the OIC economies are heterogeneous, and the region will benefit from coordinated approaches on cross-border prudential frameworks, they should revise the circulation of Shariah-compliant liquidity to lower the costs of reform and foster cross-border financial intermediation. This will help position these economies along a viable path of sustainable growth.This study suggests that future research can consider to include or utilize a time variation model with Bayesian time varying parameter ie. VARs that include global and regional common factors.

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