Exploring the Nexus Between Financial Deepening and Economic Performance: Evidence from Saudi Arabia

Somaiyah Alalmai[1]

Abstract

This study examines the impact of financial deepening on the rate of economic growth in Saudi Arabia using the autoregressive distributed lag (ARDL) co-integration approach. Unlike previous studies, this paper captures the effects of Vision 2030 reforms and provides updated empirical evidence on how financial deepening, government expenditure, and trade openness interact with economic growth. The sample includes time series data covering the period between 1989 to 2023. Our results reveal that financial deepening promotes Saudi Arabia growth, but only in the long run. Government expenditure has a significant impact on economic growth over time, with both positive and negative effects. Trade openness has significant and positive effects, underlining the relevance of global market integration in economic development. The long-term relationship is confirmed by the negative and highly significant error correction (ECT) term. It implies that any temporary deviation from equilibrium returns to normal in a short period, demonstrating a quick process for adjustment. These findings are valuable for policymakers navigating economic diversification in oil-dependent economies.

---

[1] Finance Department, Faculty of Economics and Administration, King Abdulaziz University, Jeddah, Saudi Arabia.

1. Introduction

The focus of this analysis is to estimate the impact of financial deepening on the rate of economic growth in Saudi Arabia over the last three decades. This novel approach uses an auto-regressive distributed lag (ARDL) with a model error correction term to reveal both the long term and the short-term influences of financial deepening on economic growth while controlling for the potential influences of trade openness and government expenditures. By using data covering a period of multiple major Saudi financial reforms that have occurred since 1990, the model specification can create trustworthy results that yield insights for policymakers seeking to optimize economic growth. However, many theoretical and analytical challenges remain.

For example, the direction of the causal relationship between financial deepening and economic performance remains unsettled. Since the ground-breaking work of Schumpeter (1911), which was followed upon by Shaw (1973), extensive empirical research has been conducted seeking to uncover the connection between a nation's financial development and rate of economic growth Schumpeter (1911) was among the first to argue that the development of financial intermediaries' services supports investment in technological development, which then drives economic growth. In his seminal review of the relevant literature, Levine (1997) acknowledges that the development of the financial sector plays an essential role in economic growth.

Numerous empirical studies link various metrics of financial development to economic growth, often using financial depth as a key indicator. Financial depth has typically been measured by the quantity of domestic credit available to the private sector, or by the quantity of broad money supply relative to GDP. Both metrics represents the size and the liquidly of a nation's financial system. For instance, Shapoval (2021) and Mero (2004) emphasize that economies with deeper financial sectors tend to experience higher growth rates due to enhanced resource mobilization and risk management. These findings support the view that financial deepening plays a crucial role in promoting economic development.

However, Robinson (1952) posits that financial development follows economic growth, suggesting that the dynamic financial needs of the growing real economy create demand for financial services to facilitate risk management and coordinate savings with sector-specific investment. This creates demand for financial services, which leads to the broader development of the financial sector. In contrast, Lucas (1988) asserts that any inferences about the relationship between financial depth and economic growth have been "over-stressed." He points out that the existing empirical literature offers only mixed findings on the finance-growth nexus. This analysis uses Granger Causality tests revealing how changes in financial deepening cause economic growth.

Additionally, the more recent Saudi experience with financial deepening remains under-explored. Since the launch of Vision 2030 in 2016, Saudi Arabia has made significant progress in implementing financial sector reforms that have been guided by the Financial Sector Development Program (FSDP). Key reforms include the

expanding banking services, supporting the growth of insurance and financial institutions, developing of deeper capital markets, launching derivatives markets, strengthening financial regulations and the regulatory role of SAMA, as well as implementing Basel III standards. These and other reforms reflect a growing recognition that economic growth is often linked to increased financial deepening. To the best of our knowledge, it appears that only Marashdeh and Al-Malkawi (2014) and Darrat, A. F. (1999) have attempted to focus on the relationship between financial deepening and economic growth within Saudi Arabia. However, the data used in these studies predates the implementation of Vision 2030 and therefore does not capture its potential impact. Further, most existing empirical studies on the finance-growth nexus within the context of Saudi Arabia cover shorter or outdated periods. Thus, unlike earlier studies, this article aims to capture recent economic reforms and heir subsequent external shocks occurring during the period. This study aims to fill this gap by providing empirical evidence of how the structural changes, institutional quality, and policy environments can all shape the finance growth nexus in Saudi Arabia. These findings will account for the ongoing economic reforms and diversification goals under Vision 2030, thereby adding to the limited literature on Saudi Arabia's growth dynamics.

Therefore, the main objective of this research paper is to investigate the long-run and the short-run relationships between financial depth, government expenditure, trade openness, and economic growth in Saudi Arabia. The study utilizes an "Autoregressive Distributed Lag (ARDL) bounds testing approach" to address co-integration while using annual time series data over the period between 1989 and 2023. Following previous research, the dependent variable is represented by GDP per capita growth, which is a commonly used proxy for economic growth (Calderón and Liu, 2003; Darrat, 1999; Marashdeh and Al-Malkawi, 2014; Al-Malkawi and Abdullah, 2011; Le et al., 2019). Financial deepening is proxied as the ratio of broad money (M2) to gross domestic product (GDP). Likewise, the ratio of total imports and exports to GDP reflects the degree of trade openness. Further, an error correction term will be included.

This research effort answers three important questions about the Saudi Arabia economy:

1. What is the nature of the relationship between financial deepening and economic growth?
2. Does financial deepening have a short-run or long-run effect on economic growth?
3. What role does government expenditure and trade openness play in influencing this relationship?

Ultimately, this study aims to provide recommendations for policymakers in Saudi Arabia. Examining the long-run and the short-run relationship between financial depth, government expenditure, trade openness and economic growth will shed light on the nature timing in policy design and implementation in an oil-dependent country. These findings will assist policymakers to better understand the long-term impact of the options for implemented strategies. Saudi Policymakers will be

enabled to formulate better policies in the future that support technological development, optimize public sector spending, and ultimately promote economic growth.

The research findings show that financial depth, trade openness, and government spending, all have significant impacts on GDP per capita growth. Financial depth promotes economic growth, albeit only in the long run. Government expenditure has a significant impact on economic growth over time, however, our results show both positive and negative effects. Openness to trade has a positive, significant, and immediate impact on economic growth, underlining the relevance of global market integration in economic development.

This following analysis is organized as follows: Section 2 provides a review of the relevant literature and outlines the theoretical framework. Section 3 describes the data sample and the methodological approach to address the research questions. Section 4 provides an overview of the descriptive statistics and discusses the empirical findings, while Section 5 concludes the study.

2. Literature Review

Many important aspects of the finance-growth nexus inform the design and execution of this empirical analysis. First, the existing literature on the relationship between financial sector development and economic growth can be classified into four distinct theoretical perspectives: The supply-leading Hypothesis (Finance-led Growth), the Demand-Following Hypothesis (Growth-led Finance), the Feedback Hypothesis (Bidirectional Causality), and the independent Hypothesis (No Causal Relationship). Second, the existing empirical literature has largely examined this issue across the developed countries or the broader MENA regions (Estrada et al., 2010; Shapoval, 2021; Al-Zubi et al., 2006; Moosa, 2018). Only a limited body of research has addressed Saudi Arabia's macroeconomic dynamics. Third, Saudi Arabia has undergone multiple major financial reforms since 1990. This includes the strengthening of the regulatory rule of the Saudi Monetary Agency (SAMA), the establishment of capital market authority in 2003, the launching of the Saudi Stock Exchange Tadawul as a joint stock company (Electronic system) in 2007, the development of financial Islamic instruments (2004-2007), the opening the Saudi capital market to qualified foreign investors in 2015, and most importantly, Vision 2030 along with many financial and structural reforms.

2.1   The supply-leading hypothesis (finance-led growth)

The supply-leading hypothesis (finance-led growth) suggests that developments within a country's financial institutions, intermediation services, and financial markets can lead to an increase in the supply of financial services, which will then foster economic growth. In this view, a well-functioning financial intermediaries can allocate resources more effectively through more efficient capital allocation, enhanced risk management vehicles, and create more technology investment opportunities. Further, financial depth assists in corporate governance

implementation, diversification, risk management, mobilize savings, and allocate capital efficiently, all of which can promote economic growth (King and Levine, 1993; Greenwood and Jovanovic, 1990; Estrada et al., 2010; Marashdeh and Al-Malkawi, 2014;, Le et al., 2019).

Financial intermediation can facilitate investment, enhance diversification, risk management, mobilize savings, and allocate capital efficiently, leading to economic growth (King and Levine, 1993; Estrada et al., 2010; Le et al., 2019). According to Greenwood and Jovanovic (1990), greater financial intermediation enables higher return on capital, which stimulates growth. This growth in turn stimulates more investment projects that stimulate capital investment, creating a virtuous cycle. Demirgüç-Kunt and Levine (2008) find empirical evidence on the finance-growth nexus shows that better-functioning financial systems are positively correlated with better economic performance.

The pioneering work of King and Levine (1993) uses data on 80 countries over the period between 1960–1989 to find empirical support for the view of finance-led growth. Their findings show that various measures of financial development, such as physical capital accumulation, and improvements in the efficiency in physical capital, have a strong positive link with GDP per capita growth. Likewise, Estrada et al. (2010) used panel data for 125 Asian developing countries to find that financial development has a significant positive effect on growth across developing Asian countries.

However, the study finds that the positive impact of financial deepening on growth has weakened since the Asian Financial Crisis of 1997-1998. Likewise, Le et al. (2019) use a Cobb-Douglas theoretical framework to investigate the impact of financial depths on economic growth among the ASEAN+3 nations between 2000 and 2014. Their study finds a positive link between financial deepening, stock market capitalization, and economic growth. While the study reports that the impact of "domestic credit to private enterprises and M3" is negative in the short term, they report a positive influence on economic growth in the long run. These studies find empirical support the "finance-led growth hypothesis," suggesting that the financial sector development leads to economic growth in the long run.

Marashdeh and Al-Malkawi (2014) employ an Autoregressive Distributed Lag (ARDL) bounds testing approach using time series data from Saudi Arabia between 1970 and 2010. Their findings support the finance-led growth hypothesis within the long run time frame, yet they find no evidence that such an association exists in the short run. Likewise, Darrat, A. (1999) examines the impact of financial deepening on economic growth in Saudi Arabia, the United Arab Emirates and Turkey as well. The study utilized a "multivariate Granger-causality tests within an error-correction framework." The findings are mixed, depending on the country examined or the proxy used, but the study reports a positive, long run relationship.

Empirical research by Shapoval, Y. (2021) utilizes "pooled OLS and fixed effect panel regression analysis" among 22 OECD countries over the period between 2007–2018 to focus on the link between financial depth, financial innovation opportunities and economic growth. The study utilizes "pooled OLS and fixed

effect panel regression analysis" among 22 OECD countries over the period between 2007–2018. Their results highlight that financial depth is a strong estimator of economic growth in a nation, particularly among high- and upper-middle-income economies. The study concludes that growth in developed countries can be reached through (1) financial depth and financial innovation, then (2) through institutional development. The author suggests that financial deepening creates the foundation for financial innovation, opening up opportunities for economic growth. Meanwhile, institutional development establishes the structure for such interaction.

2.2 Demand-Following Hypothesis (Growth-Led Finance)

Fewer studies have found evidence supporting the demand-following hypothesis, which suggests that economic growth enhances financial development by generating greater demand for financial services. This perspective posits that as economies expand and businesses grow, their demand for financial services subsequently increase. This in turn motivates development of the financial sector. Xu (2000) uses a "multivariate vector-autoregressive (VAR) approach" to investigate the impact of financial development across 41 countries between 1960 and 1993 and finds "that financial development follows economic growth and has minimal effect on it." Likewise, Chukwu and Agu (2009), Liang and Teng (2006), Ang and McKibbin (2007), Jung (1986), and Ireland (1994) all find evidence to support this view.

2.3 The Feedback Hypothesis (Bidirectional Causality)

The third view is 'the bidirectional causality' hypothesis, which posits that financial development can enhance economic growth, and economic growth can stimulate financial sector development. For example, Jun (2012) applied a panel co-integration technique to investigate data from 27 Asian countries between 1960-2009. The study examined the long-term relationship between several financial development variables and real GDP. The findings propose that financial development fosters growth, and in turn, growth enhances financial development.

Likewise, as Borlea et al. (2016) used a large empirical data set of developing countries from 1988 to 2011 to estimate the association between financial development and economic growth. The results vary depending on the type of indicator for financial development, as well as the country, but the findings were consistent with both finance-led and growth-led feedback. Calderón and Liu (2003) investigated the relationship between financial development and economic growth employing a "Geweke decomposition test" on pooled data of 109 developing and industrial countries over the period between 1960 and 1994. The findings support that a positive, bi-directional and co-integrating association exists between financial development and growth. Nonetheless, the author states that "financial deepening contributes more to the causal relationships in the developing countries than in the industrial countries."

Others, such as Afzalet al. (2023) uses integration and co-integration techniques to examine the association between financial development and economic growth in

Poland from 1995 to 2019. The study finds that a bidirectional causal relationship between financial depth and economic growth exists for the nation, but only in the short run. However, in the long run, the study reports a positive association between economic growth and other investigated factors, such as government spending and volatility in oil prices and inflation.

2.4   Independent Hypothesis (No relationship)

While some research papers support the existence of a feedback causality relationship, others fail to find evidence for either "finance-led growth or growth-led finance." Perhaps the least supported perspective within the literature, this fourth view suggests that changes in the financial sector are unrelated to economic growth, and that the relationship between these two variables is unimportant. According to Lucas (1988) researchers overestimate the impact of financial sectors, arguing that financial development and economic growth are unrelated. Al-Zubi et al. (2006) used data from 11 Arab countries from 1980-2001 in a fixed-effects panel data specification, and by employing ECM approaches developed by Levine in 1997. The study concludes that no significant association between economic growth and financial development exists in either direction.

2.5   Others

However, numerous studies have demonstrated that a negative link exists between financial depth and economic growth. For instance, Moosa (2018) utilizes a fully modified OLS method on time series data for a large sample of counties over the period 2001–2014. The author finds that excessive financialization can negatively impact growth and concludes that the negative impact is due to a high portion of credit is being used to service existing debts rather than finance productive investment. Furthermore, Moosa (2017) suggests a U-shaped relationship between financial development and economic growth, consistent with the concept of the Financial Kuznets curve. According to this concept, at early stages, financial development will delay growth until a certain point, then further development and as the financial system advances, it will positively influence economic growth in the long run.

Similarly, Isiaka et al. (2021) use the "Least Squares Dummy Variables (LSDV) technique" on a panel of 40 middle-income countries over the period 2005–2017. They find a negative relationship between financial deepening and economic growth, indicating that financial resources are directed toward unproductive activities and do not contribute to economic growth. The authors suggest implementing regulations to channel the credit facilities of financial institutions toward productive investments. Moreover, Ardıc and Damar (2006) GMM technique to examine data from Turkey over the period 1996–2001 and find a significant association between financial deepening, in both private and public sectors and economic performance.

A substantial body of literature covers the finance-growth nexus. The broadest collection of empirical studies support the theory that a deeper financial system

enhances economic growth, and it does so by reducing transaction costs, encouraging investment, and facilitating capital allocation. However, the relationship is not universally linear; it is influenced by the level of development within a country, the efficiency of financial markets, the efficiency of financial institutions, intermediation services, and regulations.

3. Data and Research Methodology

A comprehensive dataset has been compiled for this research effort to better understand the long-term and short-term association between financial depth, government expenditure, trade openness and economic growth in Saudi Arabia. This study explores the impact of financial deepening rather that the broader financial development. Financial depth represents the size and the liquidity of the financial intermediaries and it focuses on the expansion of financial services. The sample includes annual time series data covering the period between 1989 to 2023. Variable selection and the study period is primarily guided by data availability, as Saudi Arabia has undergone major financial reforms. This includes the expansion of banks, development of capital markets, and implementation of new regulations, which makes it suitable for our analysis. The data set has been assembled using the World Development Indicators of the World Bank and the Saudi Central Bank (SAMA) statistical reports. Stata statistical software is used to conduct the analysis. A summary of the descriptive statistics for the sample is shown in Table 2.

Numerous studies investigating the finance-growth nexus use a Granger causality model to assess the nature of the relationship. The most common model proposed:

Definition 3.1 *Common Model.*

$$Y = \alpha + \beta\, FD_{i,t} + \lambda(CV)_{i,t} + \varepsilon_{i,t}$$

where Y is the dependent variable vector that refers to economic growth in GDP per capita, FD is financial depth, and CV refers to a vector of control variables. The subscript i refers to the country and the subscript t refers to the year.

However, in this research paper, we adopt an "Autoregressive Distributed Lag (ARDL) with a bounds testing approach to co-integration." This approach, which was introduced by Pesaran and Shin (1995) and re-assessed by Pesaran et al. (2001), is preferable to conventional approaches for several reasons. Firstly, this approach to co-integration allows mixing between I(0) and I(1) variables, while conventional co-integration tests require regressors to be of the same order. This makes ARDL preferable when dealing with integrated or different order variables. Second, unlike conventional co-integration tests, this approach is applicable to small samples. Third, the approach can estimate the long-term and the short-term dynamics of the causal influence. Finally, the Error Correction Term (ECT) can capture the correction mechanism if the system strays from equilibrium (how quickly the dependent variable will adjust to equilibrium after short term deviation).

Following studies such as Gregory and Hansen (1996) and Marashdeh and Al-

Malkawi (2014), and in connection with the previous discussion, the regression model specification can take the following form:

Definition 3.2 *Regression Model Specification.*

$$GDPP_t = \alpha_0 + \alpha_1\ t_t + \alpha_2\ FD_t + \alpha_3\ TOPEN_t + \alpha_3\ GOVEX_t + \varepsilon_t$$

where GDPP is the dependent variable per-capita economic growth, and FD, TOPEN and GOVEX are independent variables. FD is financial depth, as calculated by the ratio M2/ GDP. GOVEX is government expenditures expressed as a percentage of GDP, and TOPEN is trade openness expressed as total trade as a percentage of GDP. ε_t is the error term. The subscript i refers to the country and the subscript t refers to the year. Table 1 presents the set of examined variables.

Table 1: List of Variables and expected relationship

Variable	Expected Relationship	Definition
Financial Depth	(+)	Financial depth (FD) is defined as improvement of services provided by financial institutions and intermediaries. In short it is about enhancing the financial system in a country to provide a better quality and quantity in financial services (Calderón and Liu 2003). Financial depth represents the size of the financial intermediaries (size financial institutions, banks, and financial markets) in a country relative economic output. A well-developed financial sector can enhance investment, diversification, risk management, mobilizing savings, allocate capital more efficiently, which in turn can lead to economic growth. Following (Calderón and Liu 2003; King and Levine 1993; Levine 1997), financial depth is measured as broad money M2 divided by Gross domestic product (M2/GDP). $$FD = \frac{Broad\ Money\ M2}{GDP}$$
Trade Openness	(+)	Trade openness (TOPEN) represents the degree by which a country is involved in international trade. Higher trade opened is often associated with higher economic growth, since it facilitates access to foreign and larger markets. This will allow a flow of services, goods, and capital. Usually trade openness is measured by the ratio of exports plus imports over gross domestic product (GDP), (see for instance, Fujii, E. (2019), Malefane, M. R., & Odhiambo, N. M. (2018). $$TOPEN = \frac{Exports + Imports}{GDP}$$
Government expenditure	(+)	Government expenditure (GOVEX) refer expenditure over gross domestic product (GDP) An increase in government expenditure is expected to stimulate growth in the economy, since it will promote infrastructure, support key services. $$GOVEX = \frac{government\ expenditures}{GDP}$$

Given the general model outlined, the ARDL model can be formulated in its error correction form and can be presented as follows:

Definition 3.3 *ARDL Model Specification*

$$GDPP_t = \alpha + \beta_1 GDPP_{t-1} + \beta_2 GDPP_{t-2} + \sum_{i=0}^{4} \gamma_i \, \Delta FD_{t-i} + \sum_{j=0}^{4} \delta_j \, GOVEX_{t-j}$$

$$+ \sum_{K=0}^{4} \theta_K \, \Delta TOPEN_{t-k} + \varepsilon_t$$

Where:
- $GDPP_t$ = Change in GDP per capita growth at time t
- $GDPP_{t-1}$, GDP_{t-2} = Lagged levels of GDP per capita growth at time t−1 and t−2
- ΔFD_{t-i} = Change (first difference) in Financial Depth at lag i
- $GOVEX_{t-j}$ = Government Expenditure at lag j
- $\Delta TOPEN_{t-k}$ = Change (first difference) in Trade Openness at lag k α\alpha$\alpha$ = Constant term
- ε_t = Error term at time t
- Coefficients β1, β2, γi, δj, θk measure short-term and lagged effects of respective variables on GDPPt.

The ARDL model defines GDP per capita growth in terms of its own historical values as well as the lagged effects of financial depth, government spending, and trade openness. The model includes the first and second lags of GDP per capita growth as explanatory variables to account for the autoregressive character of economic growth over time. Financial depth and trade openness are included into the model as initial differences to account for changes rather than levels, with lags of up to four periods to capture delayed effects. Government spending is incorporated with up to four time period delays, representing its changing impact on growth over time. This structure enables the model to estimate the immediate and lagged effects of these major economic variables on GDP per capita growth, revealing how previous values and changes in financial development, fiscal policy, and trade openness interact to influence present economic performance.

4. Empirical Evidence and Discussion
4.1   Data Suitability Testing

Table 2 summarizes the primary statistics, based on 35 observations, for four critical economic variables: GDP growth, measures of financial depth, government spending, and trading openness. The average GDP per capita decreased by 0.195%, showing that the economy either grew slowly or shrank throughout the years of the sample period. This variable exhibits a wide range of variation (standard deviation = 3.830), with values ranging from -8.131% to 7.697%. This indicates a regular distribution with just slightly lower than predicted extreme deviations.

Table 2: Descriptive Statistics of Data

	GDP Per Capita Growth	Financial Depth	Government Expenditure	Trade Openness
Mean	-0.195	54.487	24.654	70.817
Median	-0.742	50.993	24.209	68.166
Maximum	7.697	72.724	34.155	96.103
Minimum	-8.131	42.600	17.704	49.713
Std. Dev.	3.830	10.498	3.717	11.483
Skewness	0.159	0.670	0.632	0.492
Kurtosis	2.312	1.934	3.372	2.454
Observations	35	35	35	35

Financial depth ranges from 42.60 to 72.72, with an average of 54.49. The high positive skewness (0.670) and platykurtic character (kurtosis = 1.934) reveal that the distribution is slightly right-skewed and not as peaked as a regular normal curve. The government spends approximately 24.6% of its budget, with minimal fluctuation, skewness, and a slightly leptokurtic distribution, indicating that there are years when public spending is especially high. The mean value for trade openness is 70.81, with a large dispersion and a somewhat skewed distribution. Overall, these statistical metrics indicate that the variables do not significantly vary from normalcy and that variability is generally moderate.

The Jarque-Bera Normality Test, which is used to determine whether a dataset is normal, produces a statistic of 1.059 and a corresponding p-value of 0.589. These results support the claim that this distribution is normal at the 5% level of confidence. This suggests that the assumption of normality is reasonably satisfied for further statistical analysis and that the data do not substantially depart from a normal distribution.

Table 3 Summarizes the results of the Augmented Dickey-Fuller (ADF) unit root test, which assesses whether each variable is stationary over time. The p-values indicate that GDP per capita growth and government expenditure are stationary at the level, as their p-values are below 0.05. In contrast, financial depth and trade openness become stationary only after first differencing. Since some variables are stationary at the level and others after differencing, the results highlight differences in the integration order among the variables.

Table 3: ADF Unit Root Test

		t-Statistic	P-value
GDP Per Capita Growth		-5.756	0.000
	1% level	-3.639	
	5% level	-2.951	
	10% level	-2.614	
Δ Financial Depth		-7.029	0.000
	1% level	-3.646	
	5% level	-2.954	
	10% level	-2.616	
Government Expenditure		-3.119	0.035
	1% level	-3.639	
	5% level	-2.951	
	10% level	-2.614	
Δ Trade Openness		-4.472	0.001
	1% level	-3.646	
	5% level	-2.954	
	10% level	-2.616	

4.2   Autoregressive Distributed Lag (ARDL) Results

Table 4 presents the results of the Autoregressive Distributed Lag (ARDL) Model, which show a variety of short-term factors influencing GDP per capita growth. Growth in period t-2 is found to have a significant negative impact, indicating that current economic growth rates are influenced by historical rates with a time lag. The results indicate the sensitivity of the economy to past performance. This may be attributable to Saudi Arabia's a resource driven economy being heavily depends on highly cyclical demand for oil exports. Thus, cyclical oil price fluctuations would likely impact the nation's economy.

These results also indicate that the change in the nation's financial depth (t-2) is positive and statistically significant, which implies the changes in financial reforms to strengthen the financial sector takes about two years to impact economic growth. The delayed effect may be due to inefficient in credit allocation, as a high portion of credit may be used to service existing debts rather than finance productive investments. This finding suggests that financial deepening leads to economic growth in Saudi Arabia in the long term. While the results show a significant positive association in period t-2, there is no evidence that such a relationship exists in the short run. The results for the immediate and first lag impact of financial deepening are insignificant, indicating that the effects take time to become apparent. Financial depth leads to economic growth, although the effect is delayed, with the second lag of the initial difference being significantly positive. That is increasing financial deepening in Saudi Arabia will contribute to growth in a positive way, but the effect is delayed.

However, financial reforms under Vision 2030, such as capital market liberalization, expansion of banking services, support the growth of insurance and financial institutions, are starting to show their delayed effects via the impact of public expenditures. Saudi Arabia is now directing its resources towards productive, non-oil sectors to diversify its economy, particularly in technology, tourism, and manufacturing, which are identified as pillar sectors of Vision 2030. This implies that policy makers in Saudi Arabia should aim to improve financial system depth to foster greater economic growth. Our findings are consistent with that of Marashdeh and Al-Malkawi (2014), who show a significant positive link between financial depth and GDP growth in the long run. However, our findings reveal no evidence that such a relationship exist in the short run. Other analyses, such as Albatel (2000), Darrat (1999) and Azmeh (2021), provide similar results.

Even though government spending fluctuates between positive and negative impacts on economic growth across the many lags, most of these influences are statistically significant. This suggests that historical levels of government spending can have a major impact on growth. Landau (1983) examined 96 countries and found that a larger government size is positively correlated with economic growth. However, other studies have found a negative relationship between government expenditures and growth (Al-Yousif, 2000; Marashdeh and Al-Malkawi, 2014). The fluctuating impact of lagged government expenditures may reflect some additional influence from government budgets that the total spending variable does not capture. Perhaps the composition of spending has changed across the years, causing government expenditures to exert a fluctuating influence on growth. These results is consistent with the findings of numerous studies that demonstrate the different rates and timing of fiscal policy's effects on the economy (Barro, 1990).

As Saudi Arabi has been heavily dependent on Oil revenue, the negative impact may be due to oil price shocks which lead to adjustments, change in public plans or unfinished projects which will impact growth. The results suggest that government expenditure has a complex influence on growth. This is why Saudi Arabia is aiming to address this exact problem under Vision 2030.

As for trade openness, the results indicate a positive, significant, and immediate impact on economic growth. This positive link reflects enhanced trade integration and globalization effects occurring post-2015. Our results contradict the findings of Marashdeh and Al-Malkawi (2014), where they record an insignificant impact of trade openness. Increased market efficiency and competitiveness result from more trade openness (Nam & Ryu, 2024), and our findings indicate that it boosts growth in the current period and in the fourth lag.

With an R-squared of 0.816, the model performs well in explaining the data, showing that the included indicators account for about 82% of the variation in GDP per capita growth. The model verifies that each regressor is jointly meaningful based on the F-statistic. Furthermore, the results are more reliable because the Durbin-Watson statistic of 2.677 suggests that there are no significant issues with autocorrelation in the residuals.

Table 4: Results of The ARDL Model

	Coefficient	Std. Error	t-Statistic	P-value
GDP Per Capita Growth(t-1)	0.224	0.233	0.965	0.354
GDP Per Capita Growth(t-2)	-0.633	0.247	-2.564	0.025*
Δ Financial Depth	-0.011	0.146	-0.073	0.943
Δ Financial Depth(t-1)	0.070	0.162	0.430	0.675
Δ Financial Depth(t-2)	0.427	0.172	2.486	0.029*
Δ Financial Depth(t-3)	0.140	0.142	0.989	0.342
Δ Financial Depth(t-4)	-0.191	0.161	-1.187	0.258
Government Expenditure	-0.993	0.410	-2.424	0.032*
Government Expenditure(t-1)	1.167	0.487	2.397	0.034*
Government Expenditure(t-2)	-2.260	0.595	-3.797	0.003*
Government Expenditure(t-3)	1.437	0.531	2.706	0.019*
Government Expenditure(t-4)	-0.874	0.348	-2.513	0.027*
Δ Trade Openness	0.481	0.173	2.770	0.017*
Δ Trade Openness(t-1)	-0.007	0.150	-0.044	0.966
Δ Trade Openness(t-2)	-0.163	0.152	-1.076	0.303
Δ Trade Openness(t-3)	0.197	0.149	1.319	0.212
Δ Trade Openness(t-4)	-0.646	0.228	-2.832	0.015*
Constant	35.607	8.913	3.995	0.002*
R-squared	0.816			
F-statistic	3.137			
Prob (F-statistic)	0.025			
Durbin-Watson stat	2.677			

Note: * indicates the significance level at a 5% confidence interval.

4.3 Bonds Test

Table 5 displays the findings of the Bounds Test, which determines if GDP per capita growth and the explanatory variables—trade openness, government spending, and financial depth—have a long-term equilibrium connection. The computed F-statistic is 6.612, above the upper threshold values for conventional significance levels. A statistically significant long-term link between the variables is thus confirmed, indicating that the null hypothesis of no long-term association is rejected.

Table 5: Results of the Bounds Test

Equation	F-Statistics
F(FD, GOVEX, TOPEN)	6.612

4.4   ARDL Co-integrating and Long Run Relationship

Table 6 present the results for ARDL Co-integrating and Long Run Relationship. Table 6 reveals both the short-run and long-run impacts in GDP per capita growth arising from government expenditure, financial depth, and trade openness. There appears to be a positive link from the lagged first difference of GDP per capita to current growth that is statistically significant. This implies that earlier economic growth advances continue to spur current growth. Alternating types of lags in government expenditure are also significant, which may demonstrate the strong and persistent effect of fiscal policy on the economy. The findings agree with Keynesian thinking, which focuses on how the government spends money to boost the economy and encourage growth (Barro, 1990). The results indicate that while spending can stimulate growth, timing and efficiency are critical.

It is evident from the initial difference in the lagged value of financial depth that the latest advancements in financial development that affect growth did not have had an immediate effect. In contrast, trade openness has both short-term and long-term impacts, suggesting that economies gain from global market integration by becoming more competitive and efficient with their resources.

The long-term relationship between these variables is confirmed by the negative and highly significant error correction (ECT) term. It implies that any temporary deviation from equilibrium returns to normal in a short period, demonstrating a quick process for adjustment. This support the idea that government spending, financial development, and trade openness are drivers of economic growth in the long run. However, as for the mixed short run results for government expenditure and financial depth emphasize that not all policies yield an immediate result and that the timing and institutional reform are essential.

Table 6: Results of ARDL Co-integrating and Long Run Form Model

	Coefficient	Std. Error	t-Statistic	p-value
Δ (GDP Per Capita Growth$_{(t-1)}$)	0.633	0.247	2.564	0.025*
Δ (Government Expenditure)	-0.993	0.410	-2.424	0.032*
Δ (Government Expenditure$_{(t-1)}$)	2.260	0.595	3.797	0.003*
Δ (Government Expenditure$_{(t-2)}$)	-1.437	0.531	-2.706	0.019*
Δ (Government Expenditure$_{(t-3)}$)	0.874	0.348	2.513	0.027*
Δ (Δ Financial Depth)	-0.011	0.146	-0.073	0.943
Δ (Δ Financial Depth$_{(t-1)}$)	-0.427	0.172	-2.486	0.029*
Δ (Δ Financial Depth$_{(t-2)}$)	-0.140	0.142	-0.989	0.342
Δ (Δ Financial Depth$_{(t-3)}$)	0.191	0.161	1.187	0.258
Δ (Δ Trade Openness)	0.481	0.173	2.770	0.017*
Δ (Δ Trade Openness$_{(t-1)}$)	0.163	0.152	1.076	0.303
Δ (Δ Trade Openness$_{(t-2)}$)	-0.197	0.149	-1.319	0.212
Δ (Δ Trade Openness$_{(t-3)}$)	0.646	0.228	2.832	0.015*
Error Correction Term$_{(t-1)}$	-1.408	0.314	-4.488	0.001*

Note: * indicates the significance level at a 5% confidence interval.

4.5   Heteroskedasticity Test

The "Breusch-Pagan-Godfrey test" is used to detect heteroskedasticity, and the results appear in Table 7. These results reveal an F-statistic of 1.192 and a p-value of 0.386, indicating significance at the 0.05 significance level. Thus, there is no reason to reject the null hypothesis of homoskedasticity, and we can assume that the variance of the error terms is constant, supporting the reliability of the regression results.

Table 7: Results of Breusch-Pagan-Godfrey

F-statistic	1.192
P-value	0.386

4.6   Granger Causality Test

ARDL approach shows the long run and the short run relationships between economic growth and financial deepening, however, it does not show which variable cause the other. Thus, the Granger Causality Test will fill this gap by showing the directional predictability. The Pairwise Granger Causality Test with two lags is used to examine the causal relationship between financial depth and economic growth. The findings in table 8 indicate that financial depth does not drive GDP per capita growth (F = 0.2176, p = 0.8059), nor does GDP per capita growth cause financial depth. Both p-values above the 5% significance level, hence the null hypotheses in both directions are not rejected. This suggests that there was no statistically significant causal association between financial depth and economic growth over the given time period. The results support ARDL results, which indicates a weak effect of financial depth on economic growth in the short run. Meaning that there are no immediate effects. However, this does not mean that there is no long-run association. The presence of a long-run relationship is confirmed by the Bounds Test and significant ECT. Moreover, the lagged value of financial depth is significant in the ARDL model, this indicate that the past value of financial depth has a meaningful influence on economic growth. This suggests a dynamic relationship where changes in financial depth take time to affect economic growth.

Table 8: Granger Causality Test

Null Hypothesis	Obs	F-Statistic	Prob.
DFD does not Granger Cause GDPP	32	0.218	0.806
GDPP does not Granger Cause DFD		0.792	0.463

5. Conclusion

This study examines the finance-growth nexus in Saudi Arabia using an "autoregressive distributed lag (ARDL) co-integration approach." We create a model built on previous literature examining the association between financial development and economic growth, and supplement it by controlling for

government spending and trade openness. This empirical analysis investigates the individual and combined impacts on per capita economic growth arising from these selected variables, within the context of Saudi Arabia's ongoing economic reforms and diversification goals under Vision 2030. The extant literature on Saudi Arabia, a high-income, oil-exporting economy, is relatively scarce. Therefore, this study aims to fill this gap by providing empirical evidence of whether financial deepening (increased credit or financial services) promotes or hinders economic growth, and whether structural changes, such as Vision 2030 reforms and financial sector development programs shape the finance growth nexus in Saudi Arabia.

Our research findings show that financial depth, government spending, and trade openness all have a significant impact on over-time GDP per capita growth. All variables used in the analysis exhibited stationarity and moderate variability. The dependent variable appears to be normally distributed, making the econometric analyses more reliable.

Our findings indicate that financial depth promotes annual economic growth, albeit this effect is delayed. Government expenditure has a significant impact on economic growth over time, though the lagged impacts vary in both positive and negative values. Openness to trade has uniformly favourable effects, underlining the relevance of global market integration in economic development. The bounds test indicates a long-run equilibrium exists among the variables while a negative and significant error correction term demonstrates the Saudi economy's rapid return of economies to normalcy. Durbin-Watson and Breusch-Pagan-Godfrey tests show that autocorrelation and heteroskedasticity have no significant impact the model's performance. The research concludes that economic growth is helped by financial deepening over time, along with the effects of fiscal policy and openness in trade.

The limitations of this study include the limited capacity of the proxy that was used to reflect financial depth. While the ratio of M2 to GDP is a commonly used proxy in most other studies, it does not fully represent efficiency, stability, or financial inclusion. Thus, Future research may incorporate IMF's Financial Development Index to provide a more holistic analysis. Further, while the level of aggregate government spending was used to proxy the level of government investment in the Saudi economy, this variable could be supplemented by an index that reflected the composition of that spending, to reflect the ratio of budget allocations across competing public programs.

The financial reforms under Vision 2030 are starting to show their delayed effects on economic growth. Saudi Arabia is now directing its resources to productive, non-oil sectors, to diversify its economy especially, technology, tourism, and manufacturing, which are Vision 2030 pillars. This analysis is among the first to examine the potential impact of this recent public program in light of financial development and trade openness in both the short run and the long run. Our findings imply that policy makers in Saudi Arabia should continue to focus on efficient public investment, trade diversification, and further deepening of the financial sector to maintain the nation's positive economic growth into the future.

References

[1] Afzal, A., Firdousi, S. F., & Mahmood, K. (2023). The links between financial depth and economic variables: evidence from Poland. The Journal of Risk Finance, 24(4), 449-463.

[2] Albatel, A.H. (2000), 'Financial Development and Economic Growth in Saudi Arabia', Journal of Economic and Administrative Sciences, 16: 162–88.

[3] Al-Malkawi, H.N. and N. Abdullah (2011), 'Finance-Growth Nexus: Evidence from a Panel of MENA Countries', International Research Journal of Finance and Economics, 63(3): 129–39.

[4] Al-Yousif, Y.K. (2000), 'Do Government Expenditures Inhibit or Promote Economic Growth: Some Empirical Evidence from Saudi Arabia', The Indian Economic Journal, 42(2): 92–96.

[5] Al-Zubi, K. M., Al-Rjoub, S. A., & Abu-Mhareb, E. (2006). Financial development and economic growth: A new empirical evidence from the MENA countries, 1989-2001. Applied Econometrics and International Development, 6(3).

[6] Ang, J. B., & McKibbin, W. J. (2007). Financial liberalization, financial sector development and growth: Evidence from Malaysia. Journal of development economics, 84(1), 215-233.

[7] Ardic, O. P., & Damar, H. E. (2006). Financial sector deepening and economic growth: Evidence From Turkey.

[8] Azmeh, C. (2021). The effect of financial development on economic growth in developing countries. SSRN. https://doi.org/10.2139/ssrn.3899159

[9] Barro, R. J. (1990). Government spending in a simple model of endogenous growth. Journal of Political Economy, 98(5, Part 2), S103–S125. https://doi.org/10.1086/261726

[10] Borlea, S. N., Mare, C., Achim, M. V., & Puscaș, A. (2016). Direction of causality between financial development and economic growth. Evidence for developing countries. Studia Universitatis Vasile Goldiș Arad, Seria Științe Economice, 26(2), 1-22.

[11] Calderón, C., & Liu, L. (2003). The direction of causality between financial development and economic growth. Journal of development economics, 72(1), 321-334.

[12] Chukwu, J. O., & Agu, C. C. (2009). Multivariate causality between financial depth and economic growth in Nigeria. African Review of Money Finance and Banking, 7-21.

[13] Darrat, A. F. (1999). Are financial deepening and economic growth causally related? Another look at the evidence. International Economic Journal, 13(3), 19-35.

[14] Demirguc-Kunt, A., & Levine, R. (2008). Finance, financial sector policies, and long-run growth. https://hdl.handle.net/10986/6443

[15] Estrada, G. B., Park, D., & Ramayandi, A. (2010). Financial development and economic growth in developing Asia. Asian Development Bank Economics Working Paper, (233).

[16] Fujii, E. (2019). What does trade openness measure?. Oxford Bulletin of Economics and Statistics, 81(4), 868-888.

[17] Gregory, A. W., & Hansen, B. E. (1996). Residual-based tests for co-integration in models with regime shifts. Journal of econometrics, 70(1), 99-126.

[18] Greenwood, J., & Jovanovic, B. (1990). Financial development, growth, and the distribution of income. Journal of political Economy, 98(5, Part 1), 1076-1107.

[19] Ireland, P. N. (1994). Money and growth: an alternative approach. The American Economic Review, 47-65.

[20] Isiaka, A., Isiaka, A., Isiaka, A., & Adenubi, O. (2021). What is the impact of financial depth on economic growth within middle income countries?. International Journal of Research in Business and Social Science, 10(1), 122-130.

[21] Jung, W. S. (1986). Financial development and economic growth: international evidence. Economic Development and cultural change, 34(2), 333-346.

[22] Jun, S. (2012). Financial development and output growth: A panel study for Asian countries. East Asian Economic Review, 16(1), 97-115.

[23] King, R. G., & Levine, R. (1993). Finance and growth: Schumpeter might be right. The quarterly journal of economics, 108(3), 717-737.

[24] Landau, D. (1983). Government Expenditure and Economic Growth: A Cross-Country Study. Southern Economic Journal, 49(3), 783–792.

[25] Le, Q. H., Ho, H. L., & Vu, T. D. (2019). Financial depth and economic growth: Empirical evidence from ASEAN+ 3 countries. Management Science Letters, 9(6), 851-864.

[26] Levine, R. (1997). Financial development and economic growth: views and agenda. Journal of economic literature, 35(2), 688-726.

[27] Liang, Q., & Teng, J. (2006). Financial development and economic growth: Evidence from China. China Economic Review, 17(4), 395-411.

[28] Lucas Jr, R. E. (1988). On the mechanics of economic development. Journal of monetary economics, 22(1), 3-42.

[29] Marashdeh, H. A., & Al-Malkawi, H. A. N. (2014). Financial deepening and economic growth in Saudi Arabia. Journal of Emerging Market Finance, 13(2), 139-154.

[30] Malefane, M. R., & Odhiambo, N. M. (2018). IMPACT OF TRADE OPENNESS ON ECONOMIC GROWTH: EMPIRICAL EVIDENCE FROM SOUTH AFRICA. International Economics/Economia Internazionale, 71(4).

[31] Mérő, K. (2004). Financial depth and economic growth-the case of Hungary, the Czech Republic and Poland. Acta Oeconomica, 54(3), 297-321.

[32] Moosa, I. A. (2018). Does financialization retard growth? Time series and cross-sectional evidence. Applied Economics, 50(31), 3405-3415.

[33] Moosa, I. A. (2017). Confirmation Bias, Data Manipulation and the Kuznets Curve: Original, Environmental and Financial. Working Paper. School of Economics, Finance and Marketing, RMIT. Melbourne.

[34] Nam, H., & Ryu, D. (2024). Does trade openness promote economic growth in developing countries?
Journal of International Financial Markets, Institutions and Money, 93, 101985. https://doi.org/10.1016/j.intfin.2024.101985

[35] Pesaran, M. H., & Shin, Y. (1995). An autoregressive distributed lag modelling approach to co-integration analysis (Vol. 9514, pp. 371-413). Cambridge, UK: Department of Applied Economics, University of Cambridge.

[36] Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. Journal of applied econometrics, 16(3), 289-326.

[37] Robinson, J. (1952). The rate of interest and other essays (p. 67). London: Macmillan.

[38] Saudi Central Bank (SAMA).
https://www.sama.gov.sa/en-US/EconomicReports/Pages/AnnualReport.aspx

[39] Shapoval, Y. (2021). Relationship between financial innovation, financial depth, and economic growth. Investment Management & Financial Innovations, 18(4), 203.

[40] Schumpeter, J.A. (1911). The Theory of Economic Development. Harvard University Press, Cambridge.

[41] Shaw Jr, F. D. (1973). A model on the differential effects of household capital formation on optimal economic growth. Purdue University.

[42] World Bank. (2025). World Development Indicators. The World Bank. https://databank.worldbank.org/source/world-development-indicators

[43] Xu, Z. (2000). Financial development, investment, and economic growth. Economic inquiry, 38(2), 331-344.