Financial Development's Effect on Economic Growth in Saudi Arabia and the United States: A Comparative Analysis

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Abstract

Over the years, the association existing between the development of the financial institutions and markets along with the economic growth rate for both developed and emerging economies have been extensively researched. A strong financial sector is necessary for an economy to expand and the relationship between these variables are more complex in reality. The goal in this study is to check if the association between the development of the financial sector and the growth rate of per capita income measuring overall economic growth differs across economies that differ in their resource abundance. For this purpose, first, the study has developed a broad and multifaceted index for measuring the level of financial development for one oil exporting economy say Saudi Arabia and one oil importing economy say the United States. In the next step, the study uses time series data between 1970 and 2021 to check for the existing connection between the role of development of financial system in driving growth of the economy separately for the United States and Saudi Arabia. The key findings indicate that first, there is no difference in the average index of financial development in the oil exporting as well as oil importing economies. Second, the relationship between financial development and the growth rate of Saudi Arabia as well as the United States is both weak and insignificant.

Keywords: *Financial Development Index, Growth, Oil-Abundant Economies, VECM Model, Resource Abundance.*

Introduction

A strong financial sector is necessary for an economy to expand. The expansion of the financial sector is also aided by the markets, assets, and institutions that encourage significant investment, growth, and the eradication of poverty (Guru 2019). The following study focuses on examining the relationship between the level of financial development and the economic growth of the oil-exporting as well as oil-importing nations between 1980 and 2013 using a multifaceted financial development index. For this purpose, the study uses the case of the United States i.e. the oil-importing nation, and Saudi Arabia i.e. the oil-exporting nation using the data for banking, stock market, and financial institutions indicators used by Svirydzenka (Svirydzenka 2016) for measuring financial development in both economies. It is known that resource-rich countries run the risk of having the "curse" on their financial development since their economies suffer financial limits. It is important to ascertain whether the resource curse is true and whether economic and financial development responds differently depending on resource richness. Because it will quantify the impact that financial development plays in promoting economic growth in nations with various levels of resource availability (oil), the study will add to the body of knowledge.

Background

Over the years, extensive research has been done to find a connection between financial sector development and the overall growth of an economy. But first, it is essential to understand what financial development means and how it is measured. A strong financial sector is necessary for an economy to expand. The expansion of the financial sector is also aided by the markets, assets, and institutions that encourage significant investment, growth, and the eradication of poverty (Zhuang, Gunatilake et al. 2009). As a result, financial development promotes efficient capital allocation and offers more information about potentially profitable businesses. In other words, as financial institutions have grown, information-gathering costs have decreased and business transactions and contracts have become more efficient. By innovating and producing a structural

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change in the system, increasing financial access also implants dynamic efficiency in the financial system, which thereby helps the entire economy.

Since the 1970s, two indices of financial depth used by empirical research to assess financial expansion are the private credit to GDP ratio and, to a lesser extent, the stock market capitalization to GDP ratio. Financial progress, however, is a multifaceted process. The different elements that make up contemporary financial systems have expanded together with the global financial markets over time. Measures of financial development must consider a range of factors due to the diversity of financial systems seen in various nations. The study conducted by Muyambiri and Odhiambo (2018) shows that the shortcomings of estimating financial development using single indicators as proxies can be eliminated by combining and generating a multifaceted index. To create the final index of financial development, the study focuses on creating several indices that evaluate the breadth, accessibility, and effectiveness of both the financial institutions and the markets making up the financial system. The three elements that make up financial development are accessibility to financial services for individuals and businesses, depth (market size and liquidity), and efficiency (institutions' ability to offer financial services at prices that are reasonable and generate sustainable revenues, as well as the level of activity on capital markets).

The association between both financial development and the GDP per capita growth rate is complex and complicated in general and several theories and economists are offering separate views. According to the first point of view i.e. the supply leading channel, financial development thereby promotes economic expansion in the economy by serving as a useful input in providing economic stimulus. Many researchers have provided both theoretical and empirical support for this strategy. Schumpeter's assertion that the services offered by financial intermediaries aid in technological advancement and economic success is one of the earliest contributions to the topic (Sinha 2001). Demand-following is the second viewpoint. Robinson asserts that the formation of new financial institutions, financial instruments, and financial services follows economic expansion, which indicates that as an economy grows, there will be a larger need for financial services (Zang and Kim 2007). This is the exact reverse of what was said earlier. Thirdly, an alternate point of view emphasizes the possibility of causal bidirectional relationships between economic progress and growth. The idea that the expansion of the financial sector, also known as financial deepening, is a result of economic progress, which in turn catalyzes future expansion, was first put forth by Patrick in 1966 (Meresa 2009). Finally, the fourth viewpoint contends that there is no causal relationship between financial development and the level of economic expansion. This idea holds that neither economic growth nor financial development can be brought about by the other. The relationships between financial development, economic expansion, inequality, and stability have been the subject of several studies.

Financial growth entails enhancing the services offered by financial systems, including, among other things, pooling savings, distributing capital to profitable investments, monitoring investments, lowering risks, and trading goods and services. Every one of these financial decisions affects how much money is saved, distributed, invested, and spent (Kim 2016). Thus, the world of finance affects these three dimensions of economic growth namely the total factor productivity, the evolution of human as well as physical capital.

Motivation and Significance of the Study

Existing literature suggests that there are relatively fewer studies that estimate the correlation and causal association between the financial index measuring development and the economic growth measured in real terms for resource-dominant economies. The studies conducted by Nili and Rastad (2007) along with that of Beck (2011) are both among the most prominent studies that assess the underlying relationship between financial sectoral development and the economic growth of economies that are rich in oil or have an abundance of oil. These studies help in estimating whether there exists any resource curse present in estimating how financial development influences growth. Nili and Rastad (2007) look at how financial development affects countries that produce oil. They discover that the influence of financial development is less pronounced in oil-exporting countries than it is in those that import oil. They contend that this result is due to the former's substantial reliance on oil as well as the overall inefficiency of the financial system institutions in the case of oil-dependent economies. However, the study by Beck (2011) highlights that there is no evident or statistically significant difference in the association between both financial development and the growth

rate of income per capita among both oil-exporting as well as oil-importing economies. At the same time, it is also evident that countries that are more dependent on exports of natural resources tend to have relatively less developed financial systems. In other words, resource abundance countries have the possibility of being subjected to the curse in their financial development since such economies experience financial repression. Thus, it is important to check if financial development and economic growth have different relationships based on resource abundance and to check the existence of the natural resource curse. The study will be an addition to the existing literature since it will help in estimating how financial development helps in stimulating growth in economies that differ in resource abundance (Oil).

Research Aim and Objectives

This study's main goal is to assess how financial development influences economic growth and examine how this differs for nations that export and import oil globally. The underlying objectives will be used to achieve the following goals:

To establish a financial development index for Saudi Arabia and the United States using the current methodology and to determine whether the financial development of these two economies differs.

To evaluate the effect of the Financial Development Index on Saudi Arabia's economic growth.

To evaluate the effect of the Financial Development Index on the United States' economic growth.

To meet its aim and objectives a quantitative analysis will be performed and the study will focus on addressing these research questions:

- What is the most appropriate index to measure financial development for both the United States and Saudi Arabia and how does this differ in each of the economies?

- In the instance of Saudi Arabia, an economy that exports oil, what effect does the financial development index have on the level of economic growth?

- What effect does the financial development index have on the level of economic growth in the United States, an oil-importing country?

Literature Review

The economic theory related to financial development indicates that an efficient and sound financial system that helps in productively using capital is beneficial for economic growth in an economy. A sound financial system and its development are important for sustaining growth, especially in resource-based economies since existing studies find that oil-abundant economies experience financial repression (Ben-Salha 2021). The study will first discuss the theoretical and empirical framework associated with the financial development index. Furthermore, empirical analysis will also be conducted to assess the connection between the level of growth per capita as well as the level of financial development. Following this, the section that follows also covers the empirical analysis of research linking financial development to growth based on resource availability. Finally, the summary and research gap will also be discussed here.

Theoretical Framework for the Development of the Financial Development Index

System-wide assessments of the financial system's size, breadth, and composition as well as measurements of important factors including competition, concentration, efficiency, and access are among the indicators of the financial structure and its growth. As per Adnan (2011), the financial structure is referred to as the combination of the aggregate size of the financial sector, the sectoral composition, and the range of the attitudes of the individual sectors that help in determining the effectiveness of meeting the requirements of the users. According to historical statistics, the ratio of private lending to GDP and also the stock market capitalization

as a % of GDP has been used to measure financial depth since the 1970s (Adu, Marbuah, et al. 2013). However, later studies have explained that over time the financial sectors around the world have evolved and the modern financial system is indicative of the fact that the level of financial development is indeed a multifaceted process. For instance, in the current financial system, financial institutions that are not banks, such as insurance companies, mutual and pension funds, venture capital companies, and other non-banking financial organizations, also play a significant role in the overall development of the financial system (French 2015). Most generally, financial development is measured using the depth, access, and efficiency of the baking system. The final index, however, in the current complex index of financial development, is a synthesis of several indices based on the depth, openness, and potency of both financial institutions and financial markets.

The research conducted by Svirydzenka (2016) highlights that the index created for measuring the level of financial development is created using the conventional three-step procedure for condensing multidimensional data into a single summary index: Variables must first be normalized and then these normalized variables should be aggregated into sub-indices and finally the sub-indices are aggregated to construct the final index. To compare the degree of financial system development among different countries at different levels of abstraction, nine indices were established for this study. This is represented in the figure below. These six sub-indicators are constructed using a range of financial indices, and the financial development indicator is then obtained by combining the results of these two indices. The FD index has several drawbacks that must be considered when interpreting empirical findings (Senhadji 2000). Finding sufficiently thorough country and period data was not possible for several institutions and activities. However, there are currently no indicators with a long enough time horizon to support their inclusion in the FD index, even though various financial payment systems, such as credit transfers, direct debits, and mobile banking, are unquestionably important depth and access factors in many countries.

Even though creating the index is challenging, it is a crucial step toward assessing financial development more thoroughly than before and should help scholars who are looking at the numerous connections between financial development and economic consequences (Dalloshi 2022). Even though the financial development index is associated with several drawbacks it is still preferable since financial development in an economy is facilitated by financial institutions, banks, markets, and so on. It is important to measure financial development using the depth, access, as well as efficiency of both financial institutions and markets to get a better idea of how the financial sector develops in an economy (Estrada 2010). This is a better way to make conclusions regarding the role of financial development in facilitating the development of the economy since individual financial factors may not capture the multifaceted effects related to the financial development of both financial markets as well as financial institutions.
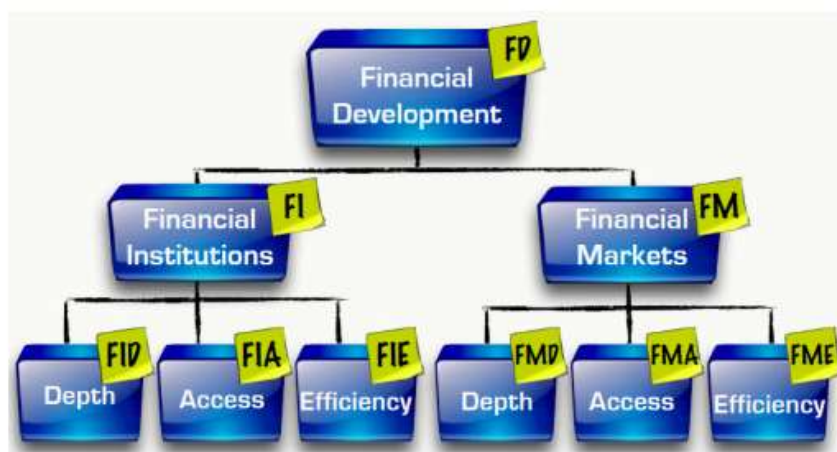

Figure 1. Financial Development Index;

Source: (Svirydzenka 2016)

Economic Growth and Financial Development: Relationships

A strong financial sector is necessary for an economy to expand. The expansion of the financial sector is also aided by the markets, assets, and institutions that encourage significant investment, growth, and the eradication of poverty (Levine 1996). Financial development, therefore, encourages effective capital allocation and provides more details about potentially successful ventures. To put it another way, the development of financial institutions helps to lower the cost of data collecting and guarantees the efficient execution of transactions and contracts. According to Guru and Yadav (2019), an economy may conserve money for profitable investments because of a thriving financial market, which also lowers the cost of corporate governance and lowers information costs for better capital allocation. Furthermore, by rewarding entrepreneurs, sophisticated financial intermediaries promote technological innovation. Financial systems facilitate commerce, diversification, hedging, and risk mitigation in addition to facilitating the exchange of goods and services. Two further connections between financial sector development and the growth in an economy are those between capital accumulation and technical innovation (Feyen 2021). In addition to what was just discussed, some economists hold different views on the connection between financial growth and economic expansion. This school of thinking was founded by Robinson, who argued that growth drives economic expansion more so than money does (Zang and Kim 2007). In other words, the financial development causes borrowers from the informal sector to switch to the formal sector, which reduces the overall amount of credit available and slows the growth of the economy in question. The 1997 Asian financial crisis, according to Shan (2005), threw even more doubt on the role of financial development in spurring economic growth and the fact that the financial markets were unable to deploy the sizeable inflow of capital into productive firms. Further proof of the breakdown of the financial markets comes from the 2008 global financial crisis, which was primarily caused by subprime mortgage lending. Because countries have struggled to keep up with financial innovation and to oversee and govern the shifting financial markets, the sensible and sound expansion of financial markets is essential. The entire health of an economy may suffer significantly as a result of this.

Although the link between finance and growth has drawn increased attention, a study by Nguyen, Le et al. (2022) by the World Bank shows that little or nothing is known about how the rise of the financial sector would impact growth in emerging countries. Instead of using a static panel model or a single country as the primary analytical unit, this work instead employs a panel Granger-causality test and the DCCE model to achieve its aims. The empirical findings of the study suggest that economic growth and financial progress are positively and linearly correlated. Furthermore, they find robust bidirectional Granger causation between both the level of financial development in an economy and its level of economic growth in all proxies used to measure financial sector development. Furthermore, the study conducted by Samargandi, Fidrmuc et al. (2014) explores the connection between financial development and growth in the case of an oil-exporting country i.e. Saudi Arabia. In doing so, the authors distinguish between how financial development affects the economy's oil and non-oil sectors. The following study under question finds that financial development has a favorable effect on the growth of the non-oil sector. However, the global GDP as well as the oil industry are either in decline or barely perceptible. This illustrates how, in countries with a wealth of natural resources, the relationship between financial development and the growth of GDP per capita in real terms may take on fundamentally different forms. Moreover, in another study by Ogbonna, Mobosi et al. (2020) the Zivot-Andrews unit root test along with the ARDL model is used to evaluate the consequences of the financial system's expansion on Nigeria's oil-based economy between 1981 and 2015. The findings show that, depending on several variables, the link between growth and finance may change. The results of the study show that while the growth of the development of the financial system has a favorable and large impact on the growth of non-oil industries, it has a significantly negative influence on the growth of the oil sector.

Among the studies estimating the nexus between the financial sector developments and the level of the growth rate of per capita income, there are several opposing views offered by the empirical studies and also by various economists through their schools of thought. An important point of view asserts that there is no connection between financial advancement and economic growth. Several economists suggest that the financial and economic advancement are interdependent. Both Lucas (1988) as well as Stern (1989) suggest that financial

development is nothing but an overly-stressed indicator of the level of growth in an economy and there exists no relationship between growth and financial development. Their theoretical findings and assertions show that any attempts to broaden the financial system would be fruitless because they would take attention away from other essential initiatives like boosting exports, implementing tax changes that encourage investment, and improving labor and productivity that are significant in providing stimulus to economic growth (Puatwoe and Piabuo 2017). Empirical evidence by Zang and Kim (2007) using a sizable panel data set, this study uses Sims-Geweke causality tests to examine the causal relationship between financial development indices and economic growth. Contrary to what existing studies have claimed, there was no evidence for a direct, positive causal relationship between the level of financial development measures and the economic growth measured by per capita real income (Bist 2018). Moreover, there is strong evidence to support the idea that economic expansion comes first, followed by financial development.

Summary and Research Gap

The present research on the connection between the level of financial development in an economy and the growth in per capita income yields conflicting findings. According to theoretical as well as empirical frameworks, the relationship between the growth in real GDP per capita or economic growth and the development of the financial system is either positive, non-existent, or two-way. Furthermore, studies on the connection between financial development and economic growth, especially in oil-rich nations, show that it is either non-existent or harmful in economies or industries that depend on the export of oil. The association between financial development and growth is shown to be favorable and statistically significant in the non-oil sectors or the oil-importing economies. According to the body of existing research, there aren't many studies that examine the connection between economic progress and countries with abundant natural resources (OECD 2011). So, the following study addresses the existing research gap in the study of the natural resource curse associated with financial development in the case of resources-based economies. Also, most of the research in this aspect is only conducted for oil-rich nations and their oil and non-oil sectors. However, the following study aims to eliminate the research gap by comparing the case of both oil-rich economies that export oil and the oil-importing economies and hence, will be an addition to the existing literature.

Methodology

Research Hypotheses

According to the research questions and the analysis of the literature, the following research hypotheses have been developed:

Hypothesis 1: Compared to oil-importing economies, oil-exporting economies have less financial development.

Hypothesis 2: The impact of financial development on Saudi Arabia's economic growth is either positive or insignificant

Hypothesis 3: In the United States, financial development and economic growth are positively and significantly related to each other

Data and Methodology

Hypothesis 1: Compared to oil-importing economies, oil-exporting economies have less financial development

For the first research objective, the research will adopt the methodology presented in the research conducted by Svirydzenka (2016) that takes annual data between 1980 and 2013 for 183 advanced economies, emerging economies, and low-income developing economies of the world. But to create a comprehensive financial development index for each of the two selected economies independently, this study will only use data for the US and Saudi Arabia for the previous 60 years. All of the data sources that will be used in this study include

the FinStats 2015 of the World Bank. A group of significant indicators is selected to adequately represent the financial system's diverse characteristics. The financial development index is created by first using the principle component analysis to create six sub-indices measuring the financial institution's depth, access, and efficiency along with the same for the financial markets. Finally, aggregating the sub-indices to form the overall financial development index for both economies.

The methodology in this case is driven in three steps. First, the data is available for each variable from different time periods in time and is not uniform for both the United States and Saudi Arabia. So, in the first, step the study will clean the data and make it applicable for analysis and creating a multifaceted financial development index for both the countries of interest. The data cleaning is done in two parts i.e. firstly, the values are set to the most recent observations (such as 2020) when data for the most recent year (such as 2021) is not yet available and this is done across all such cases for both countries. Secondly, combining series where the database collection began at various times leads to a more complex situation with missing variables. Even though assessments of credit to GDP have been accessible since the 1960s, statistics on financial access have only been gathered since 2004. Since there is no data in this specific instance of missing data, it is assumed that the market either doesn't exist, operates at a very low level of efficiency, or is highly challenging to access. In the next step, the second step, each series will be winsorized to prevent excessive values from affecting the 0-1 indicators. Finally, a principal component analysis will be performed when the indicators are combined into the six sub-indices.

The basic goal of PCA is to combine numerous indicators into a single index while preserving all of the data and variation already present in the dataset. Oftentimes, PCA is used to either minimize the number of variables in a model or to determine the kind and pattern of relationships between the variables. For each variable in the model, PCA builds mutually independent principle components from the data. The inner correlation of each variable is used to determine the weights that make up the new index. The weighted average of all the variables is used to determine each basic component. Like the study of Ogbonna, Mobosi et al. (2020), we establish a financial system development index using the PCA methodology between 1980 and 2020. Furthermore, the resulting financial development index for both the United States and Saudi Arabia will be compared using the independent samples t-test to check if the average financial development is higher in the United States (an oil-importing country) relative to Saudi Arabia or not.

Hypothesis 2: The impact of financial development on Saudi Arabia's economic growth is either positive or insignificant

The main dependent variable is the economic growth measured by the real GDP per capita extracted from the World Development Indicators between 2000 to 2021. The primary independent variable is the financial development indicator created for Saudi Arabia, a nation that exports oil, as part of the research's first purpose. To estimate the effect of financial development on economic growth the study will use control variables like FDI, Trade, and Population growth, and these will also be extracted from the World Development Indicators database for the period under question.

In time series analysis, stationarity is an essential component. Before applying multivariate time series models like VAR/VECM, data stationarity must be confirmed. To determine if the variables are stationary or not, a unit root test or stationarity test will be run first. For the Augmented Dickey-Fuller test for stationarity, the alternate and null hypotheses are as follows:

$$H_0: \text{series is non} - \text{stationary (series have a unit root)}$$

$$H_1: \text{series is stationary (series does not have a unit root)}$$

It is crucial to rule out non-stationarity as the null hypothesis before creating and using a time series model. The null hypothesis is disregarded if the p-value for the ADF test statistic is lower than the anticipated significance level of 0.05. The series is said to be stationary when the null hypothesis is shown to be false; otherwise, it is not. Either VAR or VECM multivariate time series models can be used to estimate the research issues. The results of the preliminary study, notably the stationarity test and cointegration test, determine

whether to use the VAR or VECM model. The VECM model allows us to interpret both long-term and short-term equations, in contrast to the other two models. The VECM model's coefficient computations are more precise since they are based on both long-term and short-term representations. When both requirements are met, the VECM model is the preferred model:

All variables are integrated in the stationary first order at the first difference.

Cointegration exists in at least one equation.

If either of the two requirements is not satisfied, VAR is an appropriate model to estimate. In the next phase of the inquiry, cointegration will be evaluated using the Johansen cointegration test. The two fundamental rounds of the Johansen test are the maximum eigenvalue and trace tests. The alternative and null hypotheses are as follows:

$$H_0: K = K_0$$

$$H_1: K > K_0$$

In the case of time-series data, the trace test counts the number of linear combinations that are present. The null hypothesis that K = K0 must be disproved to demonstrate the existence of a cointegrating relationship. The best model to utilize in place of the VAR/VECM model will be chosen using the findings of the preliminary analysis.

The general form of the VAR (p) model is given by:

$$Real\ GDPPC(GR)$$
$$= \beta_0 + \sum_{v=1}^{P} \beta_1\ Real\ GDPPC\ (GR)_{t-1} + \sum_{n=1}^{p} \beta_2\ Financial\ Dev_{t-1}$$
$$+ \sum_{r=1}^{p} \beta_3\ X_{t-1} + u_t$$

In this case, the dependent variable is established as a function of the independent variables' lagged values with an ideal lag p. Here, X(t-1) covers the control variables of the study and these are taken as foreign direct investment, trade openness, and population growth rate.

Hypothesis 3: In the United States, financial development and economic growth are positively and significantly related to each other

The main dependent variable is the economic growth measured by the real GDP per capita extracted from the World Development Indicators between 1970 to 2021. The primary independent variable is the financial development indicator created for the oil-importing nation, namely the United States, as part of the research's first objective. To estimate the effect of financial development on economic growth the study will use control variables like FDI, Trade, and Population growth and these will also be extracted from the World Development Indicators database for the period under question. The methodology adopted in research hypothesis 2 will be adopted here as well for the United States economy.

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In this case, the dependent variable is established as a function of the independent variables' lagged values with an ideal lag p. Here, X(t-1) covers the control variables of the study and these are taken as foreign direct investment, trade openness, and population growth rate.

Findings

Preliminary Analysis

To fulfill the aim of this study, annual data between 2000 and 2021 is used. First, the results of the preliminary analysis will be discussed with the descriptive statistics, correlation, and the preliminary analysis for time-series data i.e. the test for stationarity of variables. Table 1 shows the results of the descriptive statistics for all variables of interest for the US and Saudi Arabia.

Table 1 suggests that the average annual financial development index for the United States is 0.000000091 between 2000 and 2021 and the average financial development index for Saudi Arabia is 0.000000023 for the same period. A smaller value for average development index is because the combined index has both positive and negative values. The degree of variability in the financial development of both the US and Saudi Arabia is extremely high over the specified period since the standard deviation is close to 1 in both cases. Furthermore, the average growth rate in the US is 0.012 thereby suggesting that the following economy has grown by 1.2% on average between 2000 and 2021. Similarly, the average growth rate for Saudi Arabia in the same period is 0.009 thereby suggesting that this economy has grown at an average rate of 0.9% during the same period. In terms of variability, it is evident that there is higher variability in the economic growth of Saudi Arabia whereas in the US it is relatively less variable.

Table 1. Descriptive Statistics

Variable	Mean	Std. Dev.	Min	Max
FD_US	0.000000091	1.000	-1.210	1.523
POP_US	0.790	0.214	0.157	1.113
RealGDPUS	0.012	0.020	-0.037	0.058
FDI_US	1.749	0.661	0.707	3.406
Trade_US	26.683	2.640	22.286	30.842
FD_SA	0.000000023	1.000	-1.138	1.948
POP_SA	2.442	0.990	-0.130	3.959
RealGDPSA	0.009	0.040	-0.057	0.087
FDI_SA	2.141	2.689	-0.993	8.496
Trade_SA	73.695	12.974	49.713	96.103

Next, we look at the results of the correlation analysis to assess the strength and direction of financial development and other control variables with economic growth in both the US and Saudi Arabia as presented in Tables 2 and 3 respectively. Table 2 suggests that there exists a positive but weak association between financial development and growth, FDI and trade has a positive association too. However, there is a moderately negative association between population growth and economic growth. From Table 3 it can be inferred that the relationship of growth with financial development, population, and FDI is weak and negative. On the other hand, there exists a positive but moderate association between growth and Trade in Saudi Arabia.

Table 2. Correlation Matrix: United States

Variable	RealGDPUS	FD_US	POP_US	FDI_US	Trade_US
RealGDPUS	1				
FD_US	0.011	1			

POP_US	-0.477	0.704	1		
FDI_US	0.334	0.046	0.123	1	
Trade_US	0.114	-0.427	-0.258	0.281	1

Table 3. Correlation Matrix: Saudi Arabia

Variable	RealGDPSA	FD_SA	POP_SA	FDI_SA	Trade_SA
RealGDPSA	1				
FD_SA	-0.139	1			
POP_SA	-0.147	-0.565	1		
FDI_SA	-0.178	-0.256	0.623	1	
Trade_SA	0.199	-0.579	0.773	0.716	1

The augmented Dickey-Fuller test or ADF test is used as the first step in time-series analysis to see if the series has a unit root. The results for the ADF test on all variables of interest are shown in Table 4 below. From Table 4, it is evident that the null hypothesis of the presence of unit root or non-stationarity is rejected for the real GDP growth rate and FDI in the US and real GDP in Saudi Arabia at a 5% significance level. In other words, the real growth rate of GDP per capita is stationary for both economies and FDI in the US but all other variables are found to be non-stationary at level. So, a first-difference is taken for all non-stationary variables and the results of the ADF test for variable at first-difference is shown in Table 5. The p-values for all variables are less than the assumed significance level of 0.05, so the null hypothesis on non-stationarity is rejected for all variables. In other words, all variables are stationary at the first-difference level i.e. it is found to be integrated of order I (1) but real GDP and FDI are integrated of order I (0).

Table 4. ADF Test for Variables at Level

Null hypothesis for Unit Root Test (ADF Test)	**Test-stat**	**P-value**
FD_US has a unit root	-0.706	0.845
POP_US has a unit root	-2.159	0.222
RealGDPUS has a unit root	-4.930	0.000
FDI_US has a unit root	-4.591	0.000
Trade_US has a unit root	-1.818	0.372
FD_SA has a unit root	-1.249	0.652
POP_SA has a unit root	0.232	0.974
RealGDPSA has a unit root	-4.026	0.001
FDI_SA has a unit root	-1.534	0.517
Trade_SA has a unit root	-0.695	0.848

Table 5. ADF Test for Variables at First-difference

Null hypothesis for Unit Root Test (ADF Test)	Test-stat	P-value
dFD_US has a unit root	-4.687	0.000
dPOP_US has a unit root	-8.759	0.000
dTrade_US has a unit root	-4.857	0.000
dFD_SA has a unit root	-3.734	0.004
dPOP_SA has a unit root	-2.639	0.085
dFDI_SA has a unit root	-2.613	0.090
dTrade_SA has a unit root	-2.942	0.041

Comparing the Financial Development in the United States and Saudi Arabia

The principal component analysis is used to estimate the financial development index between 2000 and 2021 for the United States and Saudi Arabia and the indexes are plotted across time as shown in Figures 2 and 3. Figure 2 shows the financial development index for the United States between 2000 and 2021. It is evident from the figure that financial development in the US has declined over the past 22 years. The figure shows that on average financial development in the US has remained high between in the initial phase of 2000's and after 2010 but overall it shows a falling trend.
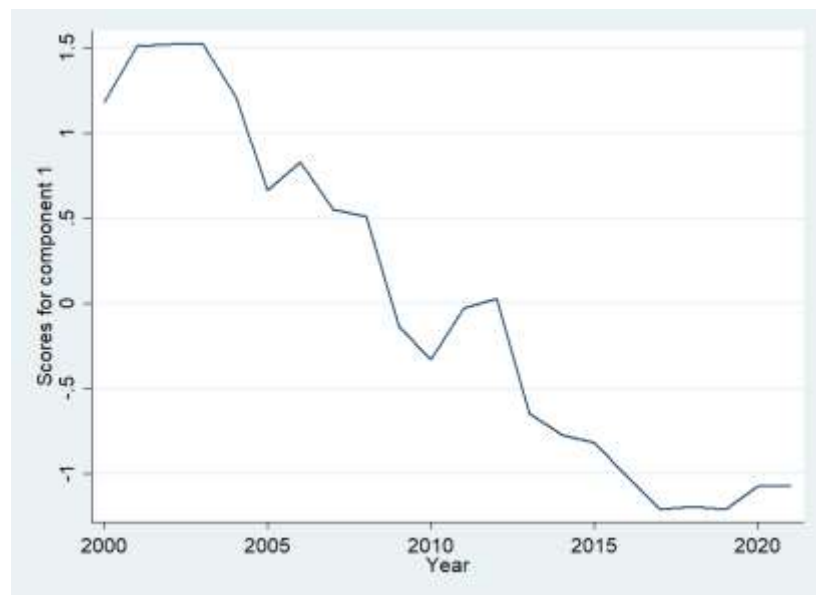
Figure 2. Financial Development Index for the United States

Similarly, Figure 3 shows that there is a steep rise in the financial development in Saudi Arabia post-2010. Between 2000 and 2021 there is a significant upward and downward movement in the financial development in Saudi Arabia and it exhibits higher variability relative to the US but overall it shows a positive trend.
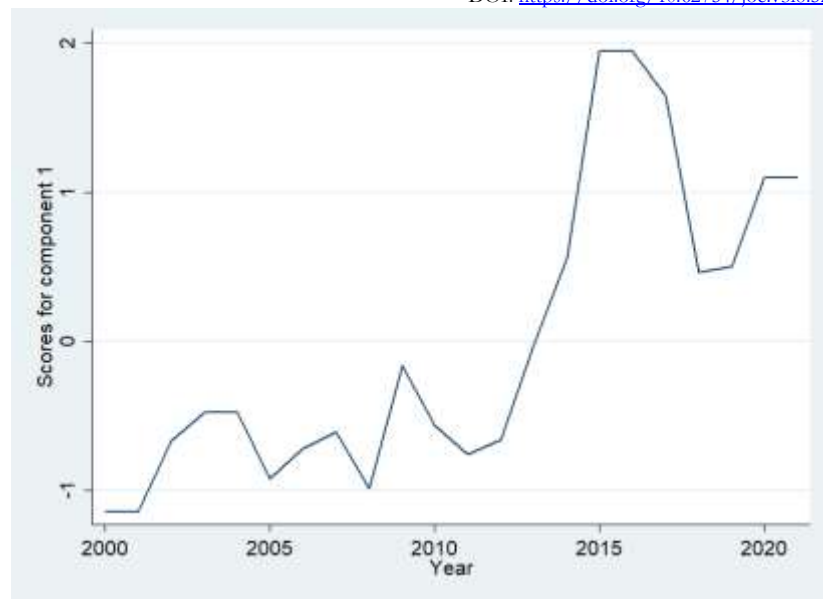
Figure 3. Financial Development Index for Saudi Arabia

Existing studies have shown that the financial development is higher for economies that import oil relative to those that export it and so the study used a t-test for mean comparison to test the first research hypothesis.

Hypothesis 1: Compared to oil-importing economies, oil-exporting economies have less financial development

The null and alternative hypotheses are:

$$H_0: \mu_{FD-US} = \mu_{FD-SA}$$

$$H_1: \mu_{FD-US} > \mu_{FD-SA}$$

The results in Table 6 show that the test statistic is equal to 0.0000 and its associated right-tailed p-value is 0.5. Since the p-value is greater than the assumed significance level 0f 0.05, we fail to reject the null hypothesis. Thus, at a 5% significance level, there is sufficient evidence to conclude that there exists no significant difference in the average financial development index for oil-exporting and oil-importing economies.

Table 6. Independent samples t-test for Comparison of Means

Variable	Obs.	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
FD_US	22	0.000000091	0.213	1.000	-0.443	0.443
FD_SA	22	0.000000023	0.145	1.000	-0.433	0.433

Diff = mean (FD_US) − mean (FD_SA)	Test-stat	P-value
Ha: diff > 0	0.0000	0.5000

Effect of the Financial Development Index on the Real GDP Growth Rate in Saudi Arabia

The results of the stationarity test reveal that all variables of interest are integrated into an order I (1) in the case of Saudi Arabia but real GDP is integrated of order I (0) so we use the VAR model as the appropriate one for making conclusions. The results of the VAR model are shown in the table below i.e. Table 7.

Table 7. Results of the VAR Model: Saudi Arabia

RealGDPSA	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
RealGDPSA						
L1.	0.000	(omitted)				
L2.	-0.515	0.000	-9.7E+13	0.000	-0.515	-0.515
L3.	0.000	(omitted)				
L4.	0.000	(omitted)				
dFD_SA						
L1.	0.011	0.000	2.9E+13	0.000	0.011	0.011
L2.	-0.002	0.000	-7.6E+12	0.000	-0.002	-0.002
L3.	0.062	0.000	9.7E+13	0.000	0.062	0.062
L4.	0.083	0.000	1.1E+14	0.000	0.083	0.083
dPOP_SA						
L1.	-0.093	0.000	-1.5E+14	0.000	-0.093	-0.093
L2.	-0.065	0.000	-6E+13	0.000	-0.065	-0.065
L3.	-0.068	0.000	-6.2E+13	0.000	-0.068	-0.068
L4.	0.000	(omitted)				
dFDI_SA						
L1.	-0.015	0.000	-9E+13	0.000	-0.015	-0.015
L2.	0.006	0.000	2.7E+13	0.000	0.006	0.006
L3.	0.018	0.000	1.1E+14	0.000	0.018	0.018
L4.	-0.018	0.000	-9.8E+13	0.000	-0.018	-0.018
dTrade_SA						
L1.	0.005	0.000	1.1E+14	0.000	0.005	0.005
L2.	0.004	0.000	9.2E+13	0.000	0.004	0.004
L3.	0.008	0.000	1.1E+14	0.000	0.008	0.008
L4.	0.000	0.000	-3.3E+11	0.000	0.000	0.000
_cons	-0.009	0.000	-5.9E+13	0.000	-0.009	-0.009

The result of optimal lag is equal to 4 and the VAR model can be used to estimate the validity of the second research hypothesis.

Hypothesis 2: The impact of financial development on Saudi Arabia's economic growth is either positive or insignificant

From Table 7, it is evident that the coefficient of financial development is 0.011 and this means that when the level of financial sector development rises by 1% in the (t-1) period there is a subsequent increase in the growth by 0.011% in the next period, ceteris paribus. Furthermore, this relationship is found to be statistically significant. The comparison of coefficients for financial development for all 4 lags suggest that the effect of

financial development on growth is positive and significant at lags 1, 3, and 4 but in case of lag 2 it is negative. This means that the hypothesis that a statistically significant and positive relationship between financial development and growth is valid and the data supports the existing claims.

Effect of the Financial Development Index on the Real GDP growth rate in the United States

The results of the stationarity test reveal that all variables of interest are integrated into order I (1) in the case of the US but FDI and growth rate are integrated of order I (0) and so VAR model is used. The result of optimal lag is equal to 4 and the VAR model can be used to estimate the validity of the third research hypothesis.

Hypothesis 3: In the United States, financial development and economic growth are positively and significantly related to each other

From Table 8, it is evident that the coefficient of financial development is -0.034 and this means that when the level of financial sector development rises by 1% in the (t-1) period there is a subsequent fall in the growth by 0.034% in the next period, ceteris paribus. Furthermore, the coefficient at lag 2 is equal to 0.109, which means that when the level of financial sector development rises by 1% in the (t-2) period there is a subsequent rise in the growth by 0.109% in the period (t), ceteris paribus. This means that the hypothesis that there exists a positive and significant relationship between financial development and economic growth in the US is valid and the claim is supported by the data.

Table 8. Results of the VAR Model: United States

RealGDPUS	Coef.	Std. Err	Z	P>|z|	[95% Conf.	Interval]
dFD_US						
L1.	-0.034	0.000	-1E+14	0.000	-0.034	-0.034
L2.	0.109	0.000	3.8E+14	0.000	0.109	0.109
L3.	-0.156	0.000	-6.6E+14	0.000	-0.156	-0.156
L4.	-0.006	0.000	-2.9E+13	0.000	-0.006	-0.006
dPOP_US						
L1.	0.102	0.000	2E+14	0.000	0.102	0.102
L2.	0.392	0.000	3.2E+14	0.000	0.392	0.392
L3.	0.047	0.000	3.7E+13	0.000	0.047	0.047
L4.	-1.035	0.000	-7.4E+14	0.000	-1.035	-1.035
FDI_US						
L1.	-0.040	0.000	-3.4E+14	0.000	-0.040	-0.040
L2.	0.020	0.000	1.5E+14	0.000	0.020	0.020
L3.	0.072	0.000	5.9E+14	0.000	0.072	0.072
L4.	0.003	0.000	3E+13	0.000	0.003	0.003
dTrade_US						
L1.	0.010	0.000	4.6E+14	0.000	0.010	0.010
L2.	-0.007	0.000	-2.3E+14	0.000	-0.007	-0.007
L3.	-0.003	0.000	-9E+13	0.000	-0.003	-0.003
L4.	0.008	0.000	4.4E+14	0.000	0.008	0.008

_cons	-0.115	0.000	-1.5E+14	0.000	-0.115	-0.115

Discussion

Measure of Financial Development and its Comparison across the US and Saudi Arabia

The financial development indices for the United States and Saudi Arabia are computed using the major component analysis in this study. The study finds that there is enough data to conclude that the average financial development index between oil-exporting and oil-importing economies does not significantly differ. This is contrary to the empirical evidence that economies that export oil have less developed financial systems than countries that import oil. Nili and Rastad (2007) investigate how financial development affects countries that produce oil. They discover that the influence of financial development is less pronounced in countries that export oil compared to those that import it. They contend that this result is due to the former's substantial reliance on oil as well as the overall inefficiency of financial institutions in oil-dependent countries. The study by Beck (2011) finds that countries with higher natural resource export dependence often have less advanced banking systems. In other words, resource-rich countries run the risk of having the "curse" on their financial development since their economies experience financial restrictions. However, the following study finds no evidence of financial repression, and hence, financial development does not differ across resource-abundance economies. From this, it can be inferred that even though financial repression is relevant in historical studies the recent empirical evidence is consistent with the finding that financial development does not differ based on resource abundance in economies, especially for oil.

The Influence of Financial Development in Saudi for Its Growth

From Table 7, it is evident that the coefficient of financial development is 0.011 and this means that when the level of financial sector development rises by 1% in the (t-1) period there is a subsequent increase in the growth by 0.011% in the next period, ceteris paribus. Furthermore, this relationship is found to be statistically significant. This association is also discovered to be statistically significant. The comparison of the financial development coefficients for the four lags indicates that the impact of financial development on growth is large and positive at lags 1, 3, and 4, but negative at lag 2. According to a statistical study of significance, there is no statistically significant relationship between financial development and economic growth. The statistics does not support the premise that it is not statistically significant and there is no association between financial development and growth in the case of Saudi Arabia i.e. oil-exporting economy. The research by Samargandi, Fidrmuc, and associates (2014) also looks at the connection between the financial development index and the level of economic expansion in the context of oil-exporting Saudi Arabia. The results demonstrate how the relationship between financial development and growth may take on fundamentally different forms in nations with a richness of natural resources and the global GDP and the oil sector, however, are either declining or hardly noticeable. Furthermore, in a separate study by Ogbonna, Mobosi, et al. (2020), the consequences of the financial system's expansion on Nigeria's oil-based economy between 1981 and 2015 are also evaluated using the ARDL model. The results show that while the expansion of the financial system influences the growth of non-oil enterprises favorably and significantly, it has a markedly adverse or insignificant effect on the growth of the oil sector. This is different from the underlying study since Samargandi, Fidrmuc, and associates (2014) have estimated the case of the influence of financial development on growth for oil and non-oil sectors and the distinction is this study is based on the abundance of the resource. This means that even though the study found insignificant differences it might not be in line with existing studies due to a lack of studies estimating this relationship especially based on resource-rich nations so the results might not be valid and thereby irrelevant for policymakers. So, the following study has several policy implications since it clearly explains that the impact of financial development on the growth in case of oil-exporting economies is positive at all levels i.e. immediate and also medium term and so the findings remain inconsistent with existing studies.

The Influence of Financial Development in the US for its Growth

According to the findings, Table 8 makes it clear that the financial development coefficient is -0.0.34, which means that, ceteris paribus, when the level of financial sector development grows by 1% in the (t-1) period,

there is a subsequent fall in growth by 0.034% in the next period. Further, the coefficient at lag 2 is equal to 0.109, which means that when the level of financial sector development rises by 1% in the (t-2) period there is a subsequent rise in the growth by 0.109% in the period (t), ceteris paribus. This association is also discovered to be statistically significant. This is consistent with the findings by Beck (Beck 2011) that the link between financial development and the rate of economic expansion is not significantly different between countries that export oil and those that import it and financial development is important for both types of economies. Also, the findings are inconsistent with the theoretical findings of different economists. Both Stern (1989) and Lucas (1988) argue that there is no connection between financial development and economic growth and that financial development is only an overly stressed indicator of an economy's level of growth. Their theoretical conclusions and assertions demonstrate that any attempts to broaden the financial system would be fruitless because they would divert attention away from other crucial initiatives like increasing exports, enacting tax changes that encourage investment, and improving labor and productivity, which are significant in providing stimulus to economic growth. In other words, the study's findings are consistent with the literature, since a positive and significant relationship is evident between the financial sector's development and the overall development of the oil-importing nations, especially the US. The data pattern implies that the idea that financial development is fruitful when it is complemented with crucial initiatives like increasing exports, enacting tax changes that encourage investment, and improving labor and productivity, which are significant in providing stimulus to economic growth.

Conclusion

Key Findings of the Study

This study's main objective was to assess how financial development influences economic growth and examine how this varies for nations that export and import oil. According to the analysis, there is sufficient data to infer that there is little difference in the average financial development index between oil-exporting and oil-importing economies. This runs counter to the empirical data showing that oil-exporting economies have less developed financial systems than oil-importing nations. Furthermore, the results clearly show that the financial development coefficient is small and insignificant in predicting the growth rate for the oil-exporting economy i.e. Saudi Arabia. According to the statistics in the case of Saudi Arabia, there is no statistically significant correlation, and no such relationship between financial development and growth exists in the oil-exporting economy under question. The findings show how, in countries with a wealth of natural resources, the relationship between financial development and growth may take on fundamentally different forms. The global GDP and the oil sector, however, are either decreasing or barely perceptible. Finally, the results clearly show that the financial development coefficient is small and insignificant in predicting the growth rate for the oil-importing economy i.e. United States. This is consistent with theoretical and empirical research that finds no noticeable variations in the relationship between both the level of financial development and the growth rate of economic expansion between countries that export and import oil.

Policy Implications

Empirical evidence suggests that resource-rich countries run the risk of having the "curse" on their financial development since their economies experience financial restrictions. It is vital to ascertain whether the curse of natural resource depletion exists and whether financial development and growth have distinct relationships depending on resource richness. Since the study aims to quantify the function that financial development plays in supporting economic growth in nations with varying levels of resource availability (oil), it adds to the body of literature and offers several policy implications. The key findings indicate that there is no appreciable difference in the average financial development index between oil-exporting and oil-importing economies. This means that the study finds no evidence of financial repression; as a result, financial development is the same in all economies and does not differ following the resource abundance of economies (Shahbaz 2018). Furthermore, it is also evident that the relationship between financial development and economic growth is positive and significant both in the case of oil-exporting and oil-importing nations i.e. the United States as well as Saudi Arabia (Murshed 2022). From this, it can be inferred that any effort on the part of the government to expand its financial system for the sole purpose of boosting growth would be beneficial and

generate desired results. On the other hand, efforts should be taken to expand exports, make tax changes that stimulate investment, and improve labor and productivity since financial development does not immediately affect economic growth in case of the US.

Limitations and Future Research

The following study has extensively added to the existing literature by developing a multifaceted financial development index and thereby trying to eliminate the existing research gap. However, the estimated financial development index for both the US and Saudi Arabia has several drawbacks that must be considered when interpreting empirical findings. Regarding data coverage, several institutions and initiatives lacked sufficiently extensive country and period data. One example of a problem is shadow banks, which have grown more substantial in several emerging markets but its data has not been incorporated in creating a globally acceptable financial index. Other than this the estimated scores i.e. FD_US and FD_SA do not consider the diversity of financial intermediaries and the organizational complexity of institutions and instruments, which may be important determinants in the development of the financial industry. Also, the chosen index only measures financial development through concepts like depth, access, as well as efficiency associated with the financial institutions and also markets. It disregards both their underlying causes—institutional, regulatory, and legal frameworks—and their results—measures such as those that promote financial stability. So, for future development of a more acceptable index, it is important to incorporate the missing elements. Another drawback is the lack of data availability across periods for both economies thereby suggesting a lack of efficient data keeping and does not give an overall picture of financial development over the years especially for some variables more than others. Finally, the findings of the study are also subjected to validity issues since the results of the VAR model are not stable and valid and this might be due to data unavailability since the data is only taken annually for 22 years. In the future, to make better and more accurate predictions the study should consider using panel data of oil exporting and oil importing economies. With a higher sample size and the ability to control for heterogeneity using panel data analysis, we will be able to make better conclusions in this field of financial economics.

References

Adnan, N. (2011). Measurement of financial development: A fresh approach. 8th International Conference on Islamic Economics and Finance. University of Surrey, United Kingdom and Comsats Institute of Information Technology, Islamabad, Pakistan.

Adu, G., et al. (2013). "Financial development and economic growth in Ghana: Does the measure of financial development matter?" Review of Development finance 3(4): 192-203.

Beck, T. (2011). "Finance and Oil: Is there a resource curse in financial development?" European Banking Center Discussion Paper.

Ben-Salha, O., et al. (2021). "Natural resource rents and economic growth in the top resource-abundant countries: a PMG estimation." Resources Policy 74: 101229.

Bist, J. P. (2018). "Financial development and economic growth: Evidence from a panel of 16 African and non-African low-income countries." Cogent Economics & Finance 6(1): 1449780.

Dalloshi, P. (2022). "Financial Development Measurement: Comparison of the High-and Low-Income Countries." Journal of Governance and Regulation 11(2).

Estrada, G. B., et al. (2010). "Financial development and economic growth in developing Asia." Asian Development Bank Economics Working Paper (233).

Feyen, E., et al. (2021). "Fintech and the digital transformation of financial services: implications for market structure and public policy." BIS Papers.

French, A., et al. (2015). "Insurance and financial stability." Bank of England Quarterly Bulletin: Q3.

Guru, B. K. and I. S. Yadav (2019). "Financial development and economic growth: panel evidence from BRICS." Journal of Economics, Finance and Administrative Science 24(47): 113-126.

Kim, J.-H. (2016). "A study on the effect of financial inclusion on the relationship between income inequality and economic growth." Emerging Markets Finance and Trade 52(2): 498-512.

Levine, R. (1996). "Foreign banks, financial development, and economic." International financial markets: Harmonization versus competition 224.

Lucas, R. (1988). "On the mechanics of economic development." Journal of monetary economics 22(1): 3-42.

Meresa, T. M. (2009). Financial Liberalization and Finance-Growth Nexus: An Empirical Assessment of the Ethiopian Economy.

Murshed, M. (2022). "The impacts of fuel exports on sustainable economic growth: The importance of controlling environmental pollution in Saudi Arabia." Energy Reports 8: 13708-13722.

Muyambiri, B. and N. Odhiambo (2018). "The causal relationship between financial development and investment: a review of related empirical literature."

Nguyen, H. M., et al. (2022). "Does financial development matter for economic growth in the emerging markets?" Borsa Istanbul Review 22(4): 688-698.

Nili, M. and M. Rastad (2007). "Addressing the growth failure of the oil economies: The role of financial development." The Quarterly Review of Economics and Finance 46(5): 726-740.

OECD, E. (2011). Natural Resource Tenure: Key Points for Reformers in Eastern Europe, Caucasus, and Central Asia, Organization for Economic Co-Operation and Development.

Ogbonna, O. E., et al. (2020). "Economic growth in an oil-dominant economy of Nigeria: The role of financial system development." Cogent Economics & Finance 8(1): 1810390.

Puatwoe, J. and S. Piabuo (2017). "Financial sector development and economic growth: evidence from Cameroon." Financial Innovation 3(1): 25.

Samargandi, N., et al. (2014). "Financial development and economic growth in an oil-rich economy: The case of Saudi Arabia." Economic modelling 43: 267-278.

Senhadji, A. and M. S. Khan (2000). "Financial development and economic growth: An overview." International Monatary Fund; working paper.

Shahbaz, M., et al. (2018). "Is natural resource abundance a stimulus for financial development in the USA?" Resources Policy 55: 223-232.

Shan, J. (2005). "Does financial development 'lead'economic growth? A vector auto-regression appraisal." Applied Economics 37(12): 1353-1367.

Sinha, T. (2001). "The role of financial intermediation in economic growth: Schumpeter revisited." Economic Theory in the light of Schumpeter's Scientific Heritage, India: Spellbound Publishers.

Stern, N. (1989). "The economics of development: a survey." Economic Journal 99(397): 597-685.

Svirydzenka, K. (2016). Introducing a new broad-based index of financial development, International Monetary Fund.

Zang, H. and Y. C. Kim (2007). "Does financial development precede growth? Robinson and Lucas might be right." Applied economics letters 14(1): 15-19.

Zhuang, J., et al. (2009). "Financial sector development, economic growth, and poverty reduction: A literature review." Asian Development Bank Economics Working Paper Series 173.