

# Financial development, oil dependence and economic growth

Oil dependence  
and economic  
growth

## Evidence from the Republic of Yemen

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### Abstract

**Purpose** – This paper aims to examine the validity of the question of whether oil dependence has a negative impact on the relationship between financial development and economic growth in Yemen.

**Design/methodology/approach** – The auto-regressive distributed lag approach for cointegration is used to examine the relationship between financial development and economic growth by capturing the impact of oil dependence on this relationship. The Granger causality test, based on a vector error correction model (VECM) framework, is used to investigate the causal relationships between financial development and economic growth.

**Findings** – The most interesting finding is the negative sign of interaction term between financial development and oil dependence, which implies that the positive effect of financial development on economic growth decreases with the increasing oil dependence. The result of the VECM Granger causality test revealed the existence of unidirectional causality running from financial development to economic growth.

**Research limitations/implications** – The short sample period and the worry of losing degrees of freedom limited us when including control variables in the model. If the data are available in the future, other control variables can be added.

**Practical implications** – The government should reduce the level of oil dependence in Yemen by diversifying the country's economy. Accelerating the pace and efficiency of the financial sector will bear fruitful returns in this regard. The government could achieve this strategy by playing a more proactive role in encouraging the expansion of credit to enable the financial sector to provide a more efficient intermediary role in mobilizing domestic savings and channeling them to productive investments across various economic sectors.

**Originality/value** – This is the first study to examine the impact of oil dependence on the finance-growth nexus in Yemen. A new indicator for oil dependence is also proposed.

**Keywords** Economic growth, Financial development, Republic of Yemen, Natural resources curse, Oil dependence

**Paper type** Research paper

### 1. Introduction

The relationship between financial development and economic growth has received considerable attention among economists (Beck and Levine, 2004; Demetriades and Hussein, 1996; Hassan *et al.*, 2011; Jalil *et al.*, 2010; King and Levine, 1993a, 1993b; Law and Singh, 2014; Levine, 1997, 2003; Levine *et al.*, 2000; Rajan and Zingales, 1998). Research concerning this relationship can be traced back to Schumpeter (1934), who stressed the role of banks in growth stimulating. Identifying entrepreneurs with good growth prospects can therefore help to reallocate resources to their most productive uses. Along the same line, Fry (1978), Mckinnon (1973) and Shaw (1973) asserted that the financial intermediation (i.e. banks) has an important role in the economy by raising saving and capital accumulation. This idea has been supported by a large body of empirical evidence (Beck, 2011; Bittencourt, 2012; Hassan *et al.*, 2011; King and Levine, 1993a; Levine, 1997, 2003; Pagano, 1993). Moreover, the



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financial sector has been considered a crucial building block for a healthy economy. The failure of one of its components can spill over to the whole sector and cause huge damage to the economy.

Given the importance of financial development, it is not surprising that determining financial sector development inhibitors to economic growth is often at the top of policy agendas. Accordingly, this paper investigates the dependence on natural resources that may be a crucial cause of financial development fragility in many developing countries. The harmful effects of high resource dependence on economic growth may arise from the impairment of the financial sector's ability to allocate funds and/or monitor projects effectively (Barajas *et al.*, 2013; Beck, 2011; Nili and Rastad, 2007). According to Van der Ploeg and Poelhekke (2009) and Kurronen (2012), the volatility hypothesis is an important explanation for the occurrence of underdevelopment of the financial sector in resource-dependent economies. Countries that are too solely dependent on natural resources are subjected to substantial price volatility, have been observed to encounter even more volatility in their gross development product (GDP) growth and suffer from disadvantaged terms-of-trade and the wide-range fluctuation of their real exchange rate[1]. This volatility could deter its financial sector development by substantially and consistently increasing the quantum of uncertainty for investment decisions and thereby subsequently depressing optimal growth and diversification of the economy.

How highly does a country's dependence on its natural resources affect the finance-growth nexus in that country needs to be carefully studied? Previous studies ignored the existence of large variations and local circumstances among countries in terms of the degree of dependence on natural resources and their evolving stages of financial development. Hence, we believe the finance-growth nexus and its interaction with the dependency on natural resources or, more specifically, their dependence on oil is very much an open question and needs to be studied and understood across different countries to fill this knowledge gap in the literature. Thus, in contrast to previous studies, this paper aims to investigate the relationship between financial development and economic growth, and its interaction with oil dependence in one of the Middle Eastern oil-based economies, Yemen.

Yemen is a country with a wide spectrum of economic potential for a number of industries[2] and shows a bright and promising future for its agriculture and fishery sectors. It has one of the best natural harbors in the world that has a unique strategic geographical location linking the East and the West (Burrowes, 2010). Despite these potentials, it has been widely observed that the economic performance of Yemen is accompanied by a surge in dependence on oil, where the economy is dominated by the production and export of oil, which generates around 70 per cent of government's revenues, contributes about 80-90 per cent of its exports and is responsible for building up most of the country's foreign exchange reserves. Before the discovery of oil in 1985, the agriculture and manufacturing sectors were the dominant sectors with a share of 24 and 14 per cent of the country's GDP, respectively (World Bank, 1989). However, after 1987, the structure of the economy underwent fundamental changes, with the share of these key sectors changing substantially. GDP shares have increased for the industrial (including oil and gas) and services sectors. Manufacturing and the agricultural sectors have declined significantly[3]. In addition to its increasing importance in relation to other sectors, the nature of the services sector has changed from being previously supporting the agriculture and manufacturing sectors to its current role of supporting the oil industry in response to the increasing demand fueled by oil revenues (Al-batuly *et al.*, 2011).

Furthermore, Yemen is a good example of a country that has experienced early financial sector activities since 1962 relative to the other countries in the region. The financial sector

was growing until the middle of the 1980s and has been gradually deteriorated during the rise of the oil era. The Yemeni government attempted an elaborate reform program for the financial sector in 1995. Despite these well-intended changes, the country's financial sector's performance remained on a low level and is the lowest in the region. Many features of what is known as the "oil curse" and its distinctive symptoms can be observed clearly in Yemen. Unfortunately, the impact of oil dependence on the relationship between financial development and economic growth is not well studied or exhaustively explored in Yemen, despite its obvious importance in the process of its national development.

To the best of our knowledge, this paper is the first to examine the financial development and economic growth nexus in Yemen. Furthermore, this paper is the first attempt to examine the existence of natural resources curse in Yemen by considering the role of financial development with time series analysis. Additionally, with the aim of making a new contribution to this academic discussion, we propose a new indicator for oil revenue dependence. This indicator goes beyond traditional indicators for natural resources dependence by measuring the real dependence of whole oil revenues (i.e. export, tax and grants). Finally, this paper also contributes to the better understand on how the volatility hypothesis could cripple wholesome macroeconomic goals and sour constructive trading, investment and financing relationships in oil-based economies such as that of Yemen.

The rest of this paper is organized as follows: the literature review is presented in Section 2. In Section 3, we provide a brief overview of the economy of Yemen and its financial and oil sectors. Section 4 focuses on data and methodology. The empirical results and discussion are presented in Section 5. Finally, Section 6 provides the conclusion, with implications.

## 2. Literature review

Literature related to the impact of financial development on economic growth is voluminous and can be categorized into different conflicting arguments. While [McKinnon \(1973\)](#), [Schumpeter \(1934\)](#) and [Shaw \(1973\)](#) argued that well-functioning and well-developed banks and financial markets were the best engines to foster economic growth, [Robinson \(1952\)](#), in contrast, pointed out that the economic growth promotes financial development by creating the demand for financial services, and the financial sector responds to this demand. However, [Abu-Bader and Abu-Qarn \(2008\)](#), [Demetriades and Hussein \(1996\)](#) and [Singh \(2008\)](#) argued that financial development and economic growth Granger cause each other. Financial intermediaries increase the amount of savings and the efficiency of capital accumulation that will in turn improve the aggregate productivity and thus heightening economic growth. On the other hand, economic growth increases the aggregate demand of the economic sectors for more financial services which will accelerate the pace and sophistication of financial development. This dual causality between financial institutions and economic growth is therefore mutually beneficial to all parties in the economy.

Contrary to all previous perspectives, [Lucas \(1988\)](#) claimed that the relationship between financial development and economic growth does not exist and considered the role of the financial sector in economic growth to be "over-stressed". Similarly, [Rousseau and Wachtel \(2011\)](#) recently documented that this relationship is not as strong in more recent data as it was in the original studies with data for the period 1960-1989. This is because the financial crises contributed toward dampening the effect of financial development in economic growth. Furthermore, the too-rapid growth of credit may have led to inflation and weakened banking systems, which in turn gave rise to the growth-inhibiting financial crisis ([Arcand et al., 2012](#); [Law and Singh, 2014](#)).

Empirically, the discussion about financial development and economic growth has been carried out in various dimensions; cross-sectional, panel and time series approaches. Most of

the studies mentioned earlier were conducted in cross-sectional and panel approaches, and their contradictory results encouraged the economists to investigate the relationship on a country-specific basis in a time series approach. This approach is considered more useful to test causality and the nature of relationship (Singh, 2008). Many economists identified this relationship on a country-specific basis, and Table I presents a summary of the recent single-country studies.

While there is no study discussing the role of financial development on economic growth in Yemen, a small amount of literature has been found in the case of Arab countries; Abu-Bader and Abu-Qarn (2008), and Al-Malkawi *et al.* (2012) among them. These two attempts supported the bidirectional causality relationship between financial development and economic growth in Egypt and the United Arab Emirates (UAE).

The successive financial crises in Latin America and East Asia, along with the recent global financial crisis and ensuing economic downturn, have kept this debate alive. Moreover, these crises have encouraged the economists to develop factors that influence the finance-growth nexus. Thus, an interesting dimension is also arising in the study of the finance-growth nexus, examining possible sources of heterogeneity in this relationship across countries. Pradhan (2011) and Rousseau and Yilmazkuday (2009) identified the role of inflation in the finance-growth relationship and found that a higher level of financial development combined with a low inflation rate was related to higher rates of economic growth. On the other hand, Law *et al.* (2013) found that the impact of finance on growth was positive and significant only after a certain threshold level of institutional development was attained. However, there is also increasing interests in another type of heterogeneity from the degree of dependence to natural resource revenues (Barajas *et al.*, 2013; Beck, 2011; Nili and Rastad, 2007). Several explanations have been presented for the impact of natural resource dependence on financial development. These explanations range from the supply-side and demand-side hypotheses that were introduced by Beck (2011), to the thesis by Gylfason and Zoega (2006) and Nili and Rastad (2007) that focused on financial sector efficiency and its ability to transform saving into investment. In fact, these studies fall under what it is called the Natural Resource Curse (NRC) literature. The "resource curse" refers to the negative externalities stemming from the dependence on natural resources to the rest of the economy. The high level of dependence on natural resources can damage the economic growth indirectly by releasing forces that hamper the development of the national economy through the Dutch disease [4], and the price volatility of natural resources and rent seeking, in addition to other economic and political reasons (Mehlum *et al.*, 2006; Gylfason *et al.*, 1999; Gylfason, 2001, 2006; Gylfason and Zoega, 2006; Sachs, 2007; Sachs and Warner, 1995, 1999, 2001).

In recent literature on the NRC, some economists found that economies that are more dependent on natural resources have lower levels of financial development. This negative relationship has been considered as evidence of new potential channel of the NRC in resource-based economies represented by financial development (Hattendorff, 2013). Nili and Rastad (2007) indicated that in oil-exporting countries, the low level of financial development is expected to weaken the investment-growth relationship. Similarly, Beck (2011) found that countries that depend more on natural resources tend to have underdeveloped financial systems, where both private credit and stock market activities tend to be weaker, and the access to credit for business is more limited. Thus, he concluded that these countries can be subject to the NRC in financial development. These results were also proven by Barajas *et al.* (2013) for the case of the Middle East and North Africa (MENA) region (including Yemen).

Even though the resource-finance nexus is crucial in MENA, the subject has never been discussed before on a single-country basis. This nexus must be taken seriously in the MENA region for two reasons. First, it would help to reveal reasons for weak economic performance

Author	Country	Period	Method	Findings
Khan <i>et al.</i> (2005)	Pakistan	1971-2004	ARDL	The economic growth is an outcome of the financial development. Financial development and economic growth are positively related with causality goes from growth to finance.
Ang and Mckibbin (2007)	Malaysia	1960-2001	VAR	
Ozturk (2008)	Turkey	1975-2005	VAR	No long run relationship and one-way causality running from economic growth to financial development.
Yang and Yi (2008)	South Korea	1971-2002	Causality	Financial development causes economic growth, but the reverse is not true.
Singh (2008)	India	1951-1996	VAR	There is a long-run equilibrium relationship between financial development and economic growth with bidirectional Granger causality.
Abu-Bader and Abu-Qarn (2008)	Egypt	1960-2001	VAR	Financial development and economic growth are mutually causal.
Vazakidis and Adamopoulos (2009)	Greece	1978-2007	Granger Causality	Economic growth has a positive effect on stock market development and credit market development through industrial production in Greece.
Odhiambo (2010)	South Africa	1969-2006	ARDL	Economic Growth has formidable influence on financial development.
Jalil <i>et al.</i> (2010)	China	1977-2006	ARDL	Financial development foster economic growth.
Al-Malkawi <i>et al.</i> (2012)	UAE	1971-2008	ARDL	Bidirectional causality relationship between financial development and economic growth.
Campos <i>et al.</i> (2012)	Argentina	1896-2000	ARCH	The long-run effect of financial liberalization on economic growth is positive while the short-run effect is negative. The financial development affects growth only directly.
Bojanic (2012)	Bolivia	1940-2010	Granger Causality	There is a long-run equilibrium relationship and that unidirectional Granger causality runs from financial development to economic growth.
Adu <i>et al.</i> (2013)	Ghana	1961-2010	ARDL	The growth effect of financial development is sensitive to the choice of proxy. Both the credit to private sector as ratio to GDP and total domestic credit are conducive for growth, while broad money stock to GDP ratio is not growth-inducing.
Salah Uddin <i>et al.</i> (2013)	Kenya	1971-2011	ARDL	The development of the financial sector has a positive impact on economic growth.

**Table I.**  
Summary of recent  
finance-growth  
literature (Single  
country studies)

in these countries, in general, and in the financial sector, in particular. Second, it would also open the door for further, deeper discussions among researchers to uncover the potential effects of natural resource dependence on other sectors.

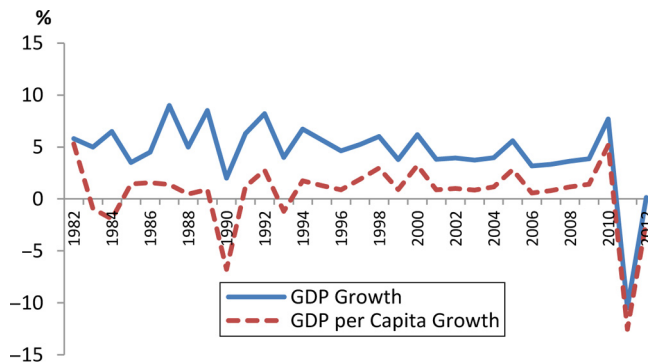
### 3. Overview of Yemeni economy

Yemen is one of the poorest countries in the Middle East and Arab region, where nearly 40 per cent of its population lives below the poverty line (World Bank, 2002). The Republic of Yemen was established in May 1990, after unification between the Yemen Arab Republic (YAR) and the Marxist People's Democratic Republic of Yemen (PDRY)[5]. In 1990, the new country confronted a difficult task by unifying two countries with different economic systems. Furthermore, the return of tens of thousands of Yemeni workers following the first Gulf war, the cessation of foreign aids, constant political turbulences and the ensuing civil war in 1994 increased the difficulties of the new country (United Nation Development Programme, 2006). During this period, however, the GDP growth averaged 6.2 per cent because of constantly increasing oil revenue. In 1995, Yemeni authorities initiated an economic reform program to achieve two sets of goals:

- (1) stabilization to restore macroeconomic balance and reduce the inflation rate; and
- (2) structural reform to foster economic growth and thereby reduce the high poverty rates.

According to United Nation Development Programme (2006), since initiating this reform program, Yemen has become one of the most open and trade-liberalized economies in the MENA region. However, economic liberalization has not been transformed into tangible benefits for the majority of the population. The economy remained vulnerable to price and demand fluctuation of oil exports, which became the main GDP contributor and exceeded the contribution of the agriculture sector[6]. Therefore, the growth rate has continued its volatile movement during subsequent years (Figure 1). It is worth mentioning that the high rate of economic growth in certain years transformed into a lower GDP per capita growth rate due to the high growth rate of the population.

As in the case of the most developing countries, the financial system in Yemen is dominated by the banking sector, with no existence of a stock market, and marginal roles for non-bank financial institutions such as insurance companies, money-changers and pension



**Figure 1.**  
GDP and GDP per  
capita annual growth

**Source:** World bank Data and Yemeni Central Statistical  
Organization



funds[7]. After achieving the unity in 1990 and the integration of the banking sector in both countries, several problems have appeared in the financial sector, such as bad loans, loan and client concentration, lack of investment opportunities, short-term contracts and weak regulatory and institutional frameworks (United Nation Development Programme, 2006). Therefore, in line with the early mentioned economic reform program, the Yemeni government elaborated a reform program focusing on the financial sector. This program comprised several fields, starting with monetary policy level by freeing all lending interest rates and establishing a minimum benchmark saving deposit rates. The second level of the reform program was focusing on the financial intermediation process by reforming the institutional, legal and regulatory framework comprising the review of the banking law and central bank law.

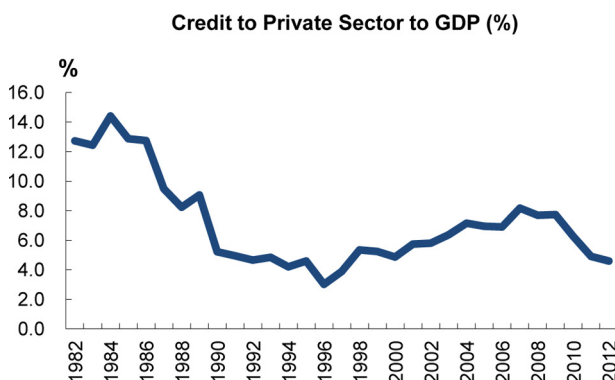
Following the reform process, the total assets of commercial banks increased from YR179bn in 1996 (24 per cent of GDP) to YR310bn in 2000 and YR1323bn in 2012 (30 per cent of GDP). The deposits also witnessed a significant increase from YR120bn in 1996 to YR250bn in 2000 (16 per cent of GDP) and YR1799bn in 2012 (23 per cent of GDP). However, the credit to the private sector represents only 29 per cent of these deposits and around only 5 per cent of GDP (Figure 2).

#### 4. Data, model and methodology

##### 4.1 Data and measurements

The study uses data for Yemen over the period of 1982-2012. Following Vetlov and Warmedinger (2006) for the Germany case, we use Northern Yemen data for the period prior to 1990 and united Yemen data after 1990, combined with a dummy variable to account for the unification[8][9]. Real GDP per capita in constant 2005 US\$ price is used as economic growth measurement. Due to the absence of a stock market in Yemen, we only use one proxy (domestic credit to private sector as share of GDP) to measure the level of financial intermediation. It is one of the best indicators to measure financial development and has been widely used in literature (King and Levine, 1993a; Nili and Rastad, 2007).

To gauge the reliance of the economy on natural resources, the ratio of oil resource export to GDP has been used widely in relevant literature since Sachs and Warner (1995). However, in Yemen, in addition to the export of the government's share of oil, oil revenue includes other grants and taxes[10]. Therefore, we use oil revenue (which includes the components mentioned above) relative to GDP as a proxy for oil dependence.



Source: WDIs, Central statistical Organization

Figure 2.  
Financial development  
in Yemen

In addition, two control variables are also introduced into our model. The first variable is government expenditure as a fiscal policy indicator. The second variable is human capital, which is considered an important determinant of economic growth (Barro, 1991; Lucas, 1988; Rebelo, 1991). The education index (expected and mean years of schooling) introduced by the United Nations is used as an indicator of human capital. Finally, we add a dummy variable to capture the unification period (1990-2012). This will take 1 if the observation is in the period 1990-2012 and 0 if the observation is in the period 1982-1989.

We obtain YAR's data for financial development, government expenditure and GDP per capita before unification (1982-1989) from the International Financial Statistics, while data for Republic of Yemen (1990-2012) is from the World Development Indicator (WDI). The data for oil revenue are sourced from the Yemeni Ministry of Finance and International Monetary Fund country reports. The education index is extracted from the United Nations Development Programme (UNDP) reports.

#### 4.2 Model

Our estimation equation, after being transformed into a natural logarithm form, will look as follows:

$$\ln GDPC_t = \beta_0 + \beta_1 \ln FD_t + \beta_2 \ln GOV_t + \beta_3 EDU_t + \beta_4 Dummy_t + \varepsilon_t \quad (1)$$

where  $GDPC$  is the real GDP per capita in constant 2005 USD price,  $FD$  is the domestic credit to private sector as share of GDP,  $GOV$  is government expenditure to GDP,  $EDU$  is the human capital indicator,  $Dummy$  is the dummy variable for unification period and  $\varepsilon$  is the error term.

To analyze the impact of oil dependence, we add the oil dependence indicator to equation (1). We capture the impact of the dependence of oil revenue on the finance-growth nexus by assuming that financial development is a function of oil revenue dependence. Therefore, our final estimation equation is as follows:

$$\begin{aligned} \ln GDPC_t = & \beta_0 + \beta_1 \ln FD_t + \beta_2 OILR_t + \beta_3 Interact_t + \beta_4 \ln GOV_t + \beta_5 EDU_t \\ & + \beta_6 Dummy_t + \varepsilon_t \end{aligned} \quad (2)$$

where  $OILR$  is the oil revenue as a share of GDP, and  $Interact$  is the interaction term between the financial development indicator and oil dependence.

#### 4.3 Methodology

The Dicky–Fuller GLS stationary test and Phillip–Perron (PP) test are used to examine time-series properties for each variable and determine its order of integration. This paper uses the auto-regressive distributed lag (ARDL) bound testing approach of cointegration by Pesaran *et al.* (2001). Most of the recent studies indicated that the ARDL model is preferable in estimating the cointegration relationship to the Engle and Granger (1987) method and the Johansen (1988) approach, as it is reliable and applicable irrespective of whether the underlying regressors are I(0) or I(1).

In addition, this approach is better and performs well for small sample size. The short-run and long-run effects of the independent variables on the dependent variables can be assessed at the same time from the model. Finally, all variables are assumed to be endogenous and thus the endogeneity problems associated with the Engle–Granger method are avoided.

The ARDL version of the estimation model can be specified as:



$$\begin{aligned}
\Delta \ln GDPC_t = & \beta_0 + \beta_1 \ln GDPC_{t-1} + \beta_2 \ln FD_{t-1} + \beta_3 \ln OILR_{t-1} + \beta_4 Interact_{t-1} \\
& + \beta_5 \ln GOV_{t-1} + \beta_6 EDU_{t-1} + \sum_{i=1}^o \beta_7 \Delta \ln GDPC_{t-i} + \sum_{i=0}^b \beta_8 \Delta \ln FD_{t-i} \\
& + \sum_{i=0}^q \beta_9 \Delta \ln OILR_{t-i} + \sum_{i=0}^r \beta_{10} \Delta Interact_{t-i} + \sum_{i=0}^s \beta_{11} \Delta \ln GOV_{t-i} \\
& + \sum_{i=0}^t \beta_{12} \Delta EDU_{t-i} + \beta_{13} Dummy_t + \varepsilon_t
\end{aligned} \tag{3}$$

where the coefficients ( $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$ ) of the first part of the model measure the long-run relationship, whereas the coefficients ( $\beta_7, \beta_8, \beta_9, \beta_{10}, \beta_{11}, \beta_{12}$ ) represent the short-run dynamics. The F-statistic is used for testing the existence of a long-run relationship among the variables. We test the null hypothesis,  $H_0: \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = 0$ , that there is no cointegration among the variables. The F-statistic is then compared with the critical value given by Narayan (2005), which is more suitable for small samples. If the computed F-statistic is greater than the upper-bound critical value, then we reject the null hypothesis of no cointegration and conclude that there exists steady state equilibrium among the variables. If the computed F-statistic is less than the lower-bound critical value, then the null hypothesis of no cointegration cannot be rejected. However, if the computed F-statistic lies between the lower- and upper-bound critical values, then the result is inconclusive.

Once cointegration is confirmed, we move to the second stage and estimate the long-run and short-run coefficients of the regressors. If the variables are cointegrated, we examine the Granger causality based on the vector error correction model (VECM).

The *GDPC* short run dynamic is as follows:

$$\begin{aligned}
\Delta \ln GDPC_t = & \varphi_0 + \sum_{i=1}^o \varphi_1 \Delta \ln GDPC_{t-i} + \sum_{i=0}^b \varphi_2 \Delta \ln FD_{t-i} + \sum_{i=0}^q \varphi_3 \Delta \ln OILR_{t-i} \\
& + \sum_{i=0}^r \varphi_4 \Delta Interact_{t-i} + \sum_{i=0}^s \varphi_5 \Delta \ln GOV_{t-i} + \sum_{i=0}^t \varphi_6 \Delta EDU_{t-i} \\
& + \varphi_7 Dummy_t + \varphi_8 EC_{t-1} + \zeta_t
\end{aligned} \tag{4}$$

where  $\Delta$  denotes the first difference,  $\zeta$  is the disturbance term and  $EC_{t-1}$  is the lagged error correction term.

The VECM representation suggests that the lagged dynamic regressors and the lagged cointegrating vector  $EC_{t-1}$  are the two possible sources of causality. Accordingly, the financial development causes economic growth if the null of  $\sum_{i=0}^b \varphi_2 = 0$  in equation (4) is rejected. Therefore, a major advantage of using the VECM to test Granger causality is that it is useful to distinguish between the “short-run dynamic” and “long-run equilibrium adjustment” sources of causality (Singh, 2008).

## 5. Empirical findings and discussion

### 5.1 Unit root test

Even though the ARDL model does not require pre-testing variables, the unit root test could indicate whether the ARDL model should be used, and to ensure that none of the variables are integrated in order two or beyond. All variables are integrated in order one, I(1). Hence,

the unit root tests confirm that the ARDL approach can be applied to analyze the long-run relationship (Table II).

### 5.2 Cointegration

After investigating the time series properties for all variables, the ARDL approach is used to examine the potential long-run equilibrium relationship. This test is sensitive to the number of lags used. Given the limited number of observations in this study, lags up to two years have been imposed on the first difference of each variable, and Akaike information criterion (AIC) is used to select the optimal lag length for each variable. The AIC suggests ARDL (2,1,1,1,1,0). The result of the ARDL bound test of cointegration is tabulated in Table III.

Table III shows that the calculated F-statistic is higher than the upper bound critical value. This result provides strong evidence for the existence of a long-run relationship among economic growth, financial development, oil dependence, government expenditure and human capital in Yemen.

As there is cointegration among the variables, we can derive the long-run coefficients as the estimated coefficient of the one lagged level independent variable divided by the estimated coefficient of the one lagged level dependent variable and multiply it with a negative sign. On the other hand, the short-run coefficients are the estimated coefficient of the first difference variables.

Table IV Panel A shows that financial development and economic growth are positively related in the long-run and statistically significant. This result comes in line with the supporters of "Schumpeterian" logic, which confirmed the vital role of financial development on economic growth. The interaction term between financial development and oil dependence is negative and statistically significant. Therefore, it can be inferred that the positive impact of financial development on economic growth is weakened by increasing the level of oil dependence in the Yemeni economy. The presence of such a negative link casts new light on the debate concerning the natural resource/oil curse. As the positive relationship between financial development and growth has previously been confirmed, our findings provide new support for the resource curse

**Table II.**

Unit root tests results

Variable	DF-GLS test		PP test	
	Level	1st difference	Level	1st difference
ln <i>GDPC</i>	-0.81195	-5.3402***	-1.9972	-5.3048***
ln <i>FD</i>	1.0755	-5.9101***	-1.4062	-5.7856***
ln <i>OILR</i>	-1.2320	-5.8860***	-1.4919	-4.9977***
ln <i>GOV</i>	0.6954	-5.8794***	-1.4908	-6.5463***
<i>EDU</i>	-0.4613	-4.7095***	-0.0102	-5.6319***

**Note:** \*\*\* Denotes the significance at 1% level

**Table III.**

Result from ARDL  
(2, 1, 1, 1, 1, 0)  
cointegration test

<i>F</i> -statistic	14.102***
Critical values	1% level                      5% level
Lower bound	4.537                              3.125
Upper bound	6.370                              4.608

**Notes:** \*\*\*Denotes the significance at 1% level; critical values bounds are from Narayan (2005) with unrestricted intercept and no trend

Variable	Coefficient	t-statistic
<i>Panel A: long run analysis</i>		
Constant	4.5281***	7.5358
lnFD	0.3633***	3.8624
lnOILR	0.1763**	2.9439
Interact	-0.0643**	-2.8536
lnGOV	0.1356	0.8875
EDU	0.0575	0.2171
Dummy	0.5835***	8.3107
<i>Diagnostic test</i>		
Adjusted R <sup>2</sup>	0.89	
Normality	2.8117 (0.2451)	
LM	0.9313 (0.335)	
ARCH	1.534 (0.234)	
RESET	0.9176 (0.338)	
<i>Panel B: short run analysis</i>		
$\Delta$ lnFD	0.1256***	3.5907
$\Delta$ lnOILR	0.0505**	2.5824
$\Delta$ Interact	-0.01824**	-2.4839
$\Delta$ lnGOV	-0.0812	-1.1999
$\Delta$ EDU	0.0361	0.21403
Dummy	0.3675***	9.7905
EC <sub>t-1</sub>	-0.6298***	-7.5134
<i>Diagnostic test</i>		
R <sup>2</sup>	0.96	
S.E of regression	0.0181	
Normality	2.0827 (0.353)	
LM	0.3663(0.552)	
ARCH	1.2677 (0.299)	

**Table IV.**  
Long run and short  
run analysis

**Note:** \*\*\* and \*\* denotes the significance at 1 and 5% levels, respectively

hypothesis. The findings suggest that a high dependence on oil can weaken the relationship between financial development and economic growth. This result is consistent with the findings of Barajas *et al.* (2013) and Nili and Rastad (2007).

In addition, we find a positive and significant sign of oil dependence to economic growth. This indicates that economic growth in Yemen is benefitting directly from the oil resources for fostering economic growth. However, the negative effect of oil dependence appears indirectly through the financial development channel.

Table IV Panel B shows the short-run results. The coefficient of the estimated lagged error correction term is negative and significant, confirming the existence of a long-run relationship among our variables. In addition, the coefficient suggests that a deviation from the long-run equilibrium following a short-run shock is corrected by about 63 per cent per year. Finally, our findings also reveal a positive relationship between financial development and economic growth, and between oil dependence and economic growth in the short run. Furthermore, the negative sign of interaction term between financial development and oil dependence confirms the weakening role of oil dependence on the finance-growth nexus in the short run.

Diagnostic tests in the same table point out that the model passes all tests for non-normality of error term, serial correlation, autoregressive conditional heteroskedasticity, model specification and the size of the adjusted  $R^2$ , indicating a good fit.

### 5.3 Granger causality

After examining the long-run relationship among variables, and taking into account that all variables are cointegrated, we can perform the Granger causality test to find the direction of causality between financial development and economic growth. The result of long-run causality in Table V suggests that financial development, oil dependence, human capital and government expenditure, jointly cause economic growth in Yemen. On the other hand, economic growth, oil dependence, human capital and government expenditure also jointly cause financial development.

The result from the short-run Granger causality test suggests that there is unidirectional causality from financial development to economic growth. This result infers that financial intermediation in Yemen contributes to economic growth by increasing the efficiency of capital accumulation and saving.

We also find that oil dependence Granger causes economic growth, while government expenditure, oil dependence and human capital Granger cause financial development in the short-run. This result infers the importance of the role played by the government in spending and supporting human development in fostering financial development in Yemen. Moreover, oil dependence can be considered an important determinant of financial development in Yemen. In fact, this result sheds new light on the direct effect of oil dependence on financial development.

### 5.4 Discussion

Theoretically, financial intermediation affects economic growth mainly by mobilizing savings and allocating funds to investment projects which support economic growth. Based on our findings, it seems that the financial intermediaries in Yemen have succeeded in financing different investment activities in sectors that have big contribution to the Yemeni GDP. However, our results also highlight an indirect negative effect caused by oil dependence that inhibits economic growth in Yemen by undermining the ability of the financial sector to translate its savings into positive and constructive investment and hence causing a damper on the optimum economic growth.

This adverse effect of oil dependence on the financial sector's development can be attributed to the volatility hypothesis. Economic instability, volatile exchange rate and interest rate fluctuations that are caused by uncertainty in oil prices could have and has indeed deterred the financial sector's abilities to harness non-speculative investment and savings or encourage it to be channeled toward lower risk activities such as consumption or housing loans that do not contribute effectively to economic growth. A quick look on the structure of investment in Yemeni banks reveals that these banks are heavily invested in zero risk-weighted government securities and hold about 50 per cent of all government

Dependent variable	Independent variables					
	$\Delta \ln GDP$	$\Delta \ln FD$	$\Delta \ln OILR$	$\Delta EDU$	$\Delta \ln GOV$	$EC_{t-1}$
$\Delta \ln GDP$	–	2.8306*	7.3251***	1.7541	0.1209	–0.3931***
$\Delta \ln FD$	0.0097	–	5.3981**	4.8252**	13.925***	–0.4725***

**Table V.**  
Results of the VECM  
granger causality test

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

securities (International Monetary Fund, 2013)[11]. Additionally, the high interest rate policy followed by the Central Bank of Yemen to reduce the inflation rates in Yemen attracted more Rial deposits but consequently reduced credit in Rials, and increased the banks' non-performing loans as more borrowers were not able to pay back their loans.

Furthermore, the causality findings highlight an important insight for the Yemeni economy in comparison to other regional economies. While Abu-Bader and Abu-Qarn (2008) and Al-Malkawi *et al.* (2012) found bidirectional causality between financial development and economic growth in Egypt and UAE, we find unidirectional causality from financial development to economic growth in Yemen. This finding goes in line with the Patrick (1966) argument[12]. This finding shows that Yemen is still under the preverbal early stages of development compared to the other regional countries.

## 6. Conclusion and policy implication

This paper examines the relationship between financial development and economic growth in Yemen and identifies the role of a high dependence on oil revenue in this relationship. The result reveals a positive impact of financial development in economic growth. The paper also found evidence concerning the negative impact of oil revenue dependence on the relationship between financial development and economic growth. This finding suggests that financial development can be considered a crucial channel for the NRC in Yemen. We also find unidirectional Granger causality running from financial development to economic growth.

The positive and significant effect of financial development on economic growth in the long run and short run reveals that the Yemeni government has succeeded to some extent in reforming the financial sector. Interest rate liberalization and the introduction of new financial laws and improved regulation attracted more inflow of funds into the financial system.

These measures were however insufficient to significantly grow and sustain the economy. The then unchecked high dependence on oil, its wild price fluctuations on the world market and the associated volatile investment climate prevalent in Yemen had hampered the financial intermediaries' abilities to transmit these funds into productive investments. Volatility and the associated uncertainty caused fluctuations in the short run that reduced most banks' willingness to hire and invest; suppressed consumers' and firms' willingness to spend and caused a depression of demand for financial services. This phenomenon is shown by the negative interaction existing between financial development and oil dependence especially in the short run. Therefore, it is not unfair to say that this paper provides a measure of further understanding of the volatility hypothesis and its disruptive and deconstructive effects on oil-based countries that are overtly dependent on the oil they produce. This study has also spotlighted on the key basic where strategically planned macroeconomic objectives are disrupted or even distorted.

The results offer a mix of policy implications in Yemen. On one hand, as the oil revenue may negatively affect the benefit of financial development on economic growth, some strategies are necessary to strengthen the pace and effectiveness of financial development to solve the resource curse problem. Developing a regulatory and supervisory framework and enhancing corporate governance is necessary. It would also be useful for the Central Bank of Yemen to undertake loan surveys to better understand credit conditions and reform the credit reporting sector.

On the other hand, efficient government expenditure in particular on human development will also be fruitful in this regard. Additionally, economic diversification by increasing the contribution of other sectors to GDP, such as the financial sector, could reduce the level of dependence on oil revenue in the country.

Therefore, oil revenue cannot be the most dominant source of income to achieve a long-term sustainable economic growth in spite of its direct positive impact on economic growth. A master plan strategy is needed to diversify the sources of income by taking up the advantages of a vibrant, sophisticated and developing financial sector. There must be a planned concerted effort to develop the financial sector into an efficient, effective and long-term trusted apparatus to harness aggregate savings into productive investments. The financial sector is therefore a key development industry which is strategically important and needed to develop other important industries and production sectors.

### Notes

1. The long-run volatility of real exchange rate of developing countries is approximately three times greater than that of industrialized countries (Hausmann *et al.*, 2006).
2. Saudi Arabia, Qatar, UAE, etc., do not have other important real sectors in their economy besides oil.
3. The contribution of agriculture sector to GDP declined in recent years to 10 per cent. Likewise, manufacturing sector also declined to 7 per cent (WDI, 2013).
4. The Dutch disease phenomena works when the natural resource booms increase domestic income; consequently, the demand for goods increases, which generates inflation and appreciation of the real exchange rate, making much of the manufacturing industry uncompetitive on the world market.
5. The two former countries followed completely different paths for their political and economic development. The northern Yemen or YAR was adopting a market-based economic system and the southern Yemen or PDRY was adopting a socialist command and control system.
6. Since 1986, the Yemeni oil production has increased, and the oil revenue to GDP increased more than sixfold over the period 1992-2000 (International Monetary Fund, 2001). After 2001, the oil production started to decline, driven by a fall in production from the country's maturing fields (EIA, 2013).
7. According to the Central Statistical Organization of Yemen, there were 18 Yemeni and international commercial and Islamic banks, 30 exchange companies and 19 insurance corporations and pension funds operating in Yemen in 2012.
8. Angelini and Marcellino (2011) argued that this simple treatment of the unification problem has been used widely in empirical macroeconomic analyses in Europe. It is based on the economic reasoning that East Germany's economy represented very small portion of the unified Germany economy in real GDP terms in 1991.
9. Evidence of the validity of this treatment comes from the fact that the economy of former Southern Yemen accounted for only 17.3 per cent of real GDP of united Yemen. Additionally, the economy of united Yemen is largely based on the market system which was followed by the Northern part before unification.
10. Oil revenues in Yemen include the concession commissions that the government receives from oil production companies, tax charges on foreign oil companies that operate in Yemen, and grants that the government receives from oil companies after signing contracts (Yemeni Ministry of Finance, 1995-1999).
11. Islamic banks do not participate in the government securities and bond markets and place their money mostly in foreign assets, which at end-2012 accounted for 64 per cent of their total assets.
12. In the early stage of development, financial development leads to economic growth. After the process of economic growth has occurred, economic growth leads to more financial development.



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