The Impact of Oil Dependence on the Finance-Growth Nexus:

Evidence from Saudi Arabia

Ramez Abubakr Badeeb and Lean Hooi Hooi
Economics Program, School of Social Sciences
Universiti Sains Malaysia

Abstract

This paper aims to examine empirically the validity of the question of whether or not oil dependence has a negative impact on the relationship between financial development and economic growth in one of the Middle Eastern oil-rich countries, Saudi Arabia. Using time series data over the period 1975-2013 and ARDL approach for cointegration, the paper found evidence that financial development has a positive impact on economic growth, but the effect depends on the level of oil dependence. Increasing this level reduces positive effect of financial development which implies that oil rent has a weakening indirect impact on the finance-growth nexus. The paper urges that policy makers maintain the degree of oil dependence at a low level and enhance economic diversification activities. Accelerating the pace and efficiency of the financial sector will bear fruitful returns in this regard. Moreover, financial sector should be more involved in productive investment activities which can strengthen its role in economic growth.

Keywords: Oil Curse; Financial Development; Economic Growth; Saudi Arabia.

JEL Classification: O13; O16; C22
1. Introduction

The relationship between financial development and economic growth has received considerable attention among economists (Beck and Levine, 2004; Demetriades and Hussein, 1996; Hasan et al., 2009; Jalil et al., 2010; King and Levine, 1993; 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), Mackinnon (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, 1993; Levine, 1997, 2003; Pagano, 1993). Moreover, the 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 maybe 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).

Most of the research dealing with this issue discussed the finance-growth nexus across a wide selection of countries. These researches ignored the existence of large variations among
countries in terms of their degree of dependence on oil, and in terms of financial development. Hence, we believe the finance-growth nexus and its interaction with natural resources or more specific oil dependence is very much an open question and needs to be studied across different countries to fill this 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 MENA oil-rich economies, Saudi Arabia.

The country is the world’s leading exporter of oil and a very prominent member of the OPEC. The oil sector contributes to about 40% of the total GDP and 90% of central government fiscal revenue (IMF, 2015). As a result, the Saudi fiscal position and economic output are highly vulnerable to international commodity prices and domestic oil outputs. Dealing with oil price volatility and uncertainty is a key challenge facing Saudi Arabia, therefore, in order to reduce the dependence on the oil sector and its risks, the government has, over the last couple of decades, been trying to diversify the economy by promoting the non-oil sector. Efforts have been made to diversify into power generation, telecommunications, natural gas exploration, and petrochemical sectors. What is more, in order to foster economic growth, the government has recognized the important role of the financial sector in mobilising savings and channelling funds to economic activities. To this effect, it has been promoting the development of an efficient banking system, well-developed financial markets and comprehensive and competitive insurance services. Despite the fact that the financial sector in Saudi Arabia comprises banks and non-bank financial institutions, it is dominated by the banking sector (Samargandi et al. 2014).

To the best of our knowledge, this paper is the first attempt to examine the existence of oil curse in Saudi Arabia considering the role of financial development within time series analysis.
The rest of this paper is organized as follows: the literature review is presented in section two. Section three focuses on data and methodology. The empirical results and discussion are presented in section four. Finally, section five 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 Mackinnon (1973), Schumpeter (1934), and Show (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 (2008a), Demetriades and Hussein (1996), and Singh (2008) argued that financial development and economic growth Granger cause each other. Financial development promotes growth by allowing a higher rate of return to be earned on capital and economic growth, which in turn provides the means to implement well-developed financial structures.

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 1960–89. 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 (see also Arcand et al., 2011; 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 for example, Khan et al. (2005) for Pakistan; Liang and Teng (2006) and Jalil et al. (2010) for China; Ang and McKibbin (2007), Anwar and Sun (2011) for Malaysia; Abu-Bader and Abu-Qarn (2008b) for Egypt; Singh (2008) for India; Yang and Yi (2008) for Korea; Ozturk (2008) for Turkey; Vazakidis and Adamopoulos (2009) for Greece; Odhiambo (2010) for South Africa; Campos et al. (2012) for Argentina; Al Malikawi (2012) for United Arab of Emirates; Bojanic (2012) for Bolivia; Shahbaz and Lean (2012) for Tunisia; Adu et al. (2013) for Ghana and Salah Uddin et al. (2013) for Kenya among many other studies.

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. Pradhann (2011), and Rousseau and Yalmazkuday (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 rents (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,¹ and the price volatility of natural resources and rent seeking, in addition to other economic and political reasons (see Mehlum et al. 2006; Gylfason 1999, 2001; Gylfason and Zoega, 2006; Sachs and Warner, 1995, 2001, 2007) (Figure 1 illustrate the natural resource curse hypothesis). The oil curse has often been used as a synonym for a resource curse because it is primarily observed in oil-dependent economies.

---

¹The 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.
**Figure 1** Explaining the Oil Curse Hypothesis
In recent literature on the natural resource curse, 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 natural resource curse 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 natural resource curse in financial development. These results were also proven by Barajas et al. (2013) for the case of the MENA region.

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 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. Data, model and methodology

3.1 Data and measurements

The study employs data for Saudi Arabia over the period of 1975–2013. Real GDP per capita in constant 2005 USD price is used as economic growth measurement. 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, 1993; Nili and Rastad, 2007). To gauge the reliance of economy on oil resource, the ratio of oil export to GDP was used widely in the literature since Sachs and Warner (1995). However, due to data availability, in this paper, we follow Bhattachravaya and Hodler (2014) to use natural resource rent (which includes oil and gas rent) to GDP as oil dependence indicator. According to World Bank, the oil rent is the difference between the value of production for oil and gas at world prices and their total costs of production.

In addition, two control variables are also introduced into our model. The first variable is government expenditure as a fiscal policy indicator because of its important role in the oil-based economies (Sachs, 1999). The second variable is trade openness, which is considered an important determinant of economic growth (see Barro and Sala-i-Martin, 1995 and Chang et al., 2005).

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

\[
\ln Y_t = \beta_0 + \beta_1 \ln FD_t + \beta_2 \ln GOV_t + \beta_3 TO_t + \varepsilon_t
\]  

(1)

where \(\ln Y\) is the natural logarithm of real GDP per capita in constant 2005 USD price, \(\ln FD\) is the natural logarithm of the domestic credit to private sector as share of GDP, \(\ln GOV\) is the natural logarithm of government expenditure to GDP, \(\ln TO\) is the natural logarithm of trade openness.

In order 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 rent on the finance-growth nexus by assuming that financial development is a function of oil rent dependence. Therefore, our final estimation equation is as follows:

\[
\ln Y_t = \beta_0 + \beta_1 \ln FD_t + \beta_2 \ln OD_t + \beta_3 \text{Interact}_t + \beta_4 \ln GOV_t + \beta_5 \ln TO_t + \varepsilon_t
\]  

(2)

where \(OD\) is the natural logarithm of oil rent as a share of GDP, and \(\text{Interact}\) is the interaction term between the financial development and oil rent dependence. This interaction term is expected to shed light on the impact of natural resource dependence on the finance-investment nexus. At the margin, the total effect of increasing \(\ln OD\) can be calculated by examining the partial derivatives of economic growth with respect to financial development.

\[
\frac{\partial \ln Y_t}{\partial \ln FD_t} = \beta_1 + \beta_3 \ln OD_t
\]  

(3)

Eq. (3) indicates how the marginal effect of the financial development on economic growth changes with the level of oil dependence. The negative sign of the coefficients of the interaction term means that a small increase in oil dependence would then result in a weaker finance-growth nexus. This would certainly be the case if \(\beta_1\) is positive. If, conversely, the coefficient
of the interaction term is positive, a small increase in oil dependence would then result in a stronger finance-growth nexus.

4.3 Methodology

The Dicky Fuller GLS stationary test and Phillip-Perron (PP) test are employed 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 method (1987) 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:

\[
\Delta \ln Y_t = \beta_0 + \beta_1 \ln Y_{t-1} + \beta_2 \ln FD_{t-1} + \beta_3 \ln OD_{t-1} + \beta_4 \Delta \ln \text{Interact}_{t-1} + \beta_5 \ln \text{GOV}_{t-1} + \beta_6 \ln \text{TO}_{t-1} + \sum_{i=1}^{d} \beta_7 \Delta \ln Y_{t-i} + \sum_{i=0}^{d} \beta_8 \Delta \ln FD_{t-i} + \sum_{i=0}^{d} \beta_9 \Delta \ln OD_{t-i} + \sum_{i=0}^{r} \beta_{10} \Delta \text{Interact}_{t-i} + \sum_{i=0}^{r} \beta_{11} \Delta \ln \text{GOV}_{t-i} + \sum_{i=0}^{r} \beta_{12} \Delta \ln \text{TO}_{t-i} \nonumber + \epsilon_t
\]  

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 a 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:

\[
\Delta \ln Y_t = \varphi_0 + \sum_{i=1}^{g} \varphi_i \Delta \ln Y_{t-i} + \sum_{i=0}^{r} \varphi_2 \Delta \ln FD_{t-i} + \sum_{i=0}^{q} \varphi_3 \Delta \ln OD_{t-i} + \sum_{i=0}^{q} \varphi_4 \Delta \text{Interact}_{t-i} + \sum_{i=0}^{f} \varphi_5 \Delta \ln GOV_{t-i} + \sum_{i=0}^{f} \varphi_6 \Delta \ln TO_{t-i} + \varphi_7 ECT_{t-i-1} + \zeta_t
\]  

\( 4 \)

\[5. \text{ Empirical findings and discussion} \]

\[5.1 \text{ Unit root test} \]

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 1: Unit root tests results

<table>
<thead>
<tr>
<th>Variable</th>
<th>DF-GLS Test</th>
<th>PP Test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Level</td>
<td>1st difference</td>
</tr>
<tr>
<td>ln Y</td>
<td>-1.7235</td>
<td>-1.9938***</td>
</tr>
<tr>
<td>ln FD</td>
<td>-0.1643</td>
<td>-6.2172***</td>
</tr>
<tr>
<td>ln OD</td>
<td>-1.9025</td>
<td>-5.7936***</td>
</tr>
<tr>
<td>ln GOV</td>
<td>-1.5506</td>
<td>-2.8884***</td>
</tr>
<tr>
<td>ln TO</td>
<td>-1.4117</td>
<td>-4.0096***</td>
</tr>
</tbody>
</table>

Note: *** and ** denote the significance at 1% and 5% level respectively.

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 SBC criterion is used to select the optimal lag length for each variable. The SBC suggests ARDL (1,0,2,2,2,2). The result of the ARDL bound test of cointegration is tabulated in Table 2.

Table 2: Result from ARDL (1,0,2,2,2,2) Cointegration Test

<table>
<thead>
<tr>
<th>F-statistic</th>
<th>3.4423**</th>
</tr>
</thead>
</table>
Table 2 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 trade openness in Saudi Arabia.

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>
<thead>
<tr>
<th>Table 3: Long Run and Short Run Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Panel A: Long Run Analysis</strong></td>
</tr>
<tr>
<td>Variable</td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>Constant</td>
</tr>
<tr>
<td>lnFD</td>
</tr>
<tr>
<td>lnOD</td>
</tr>
<tr>
<td>Interact</td>
</tr>
<tr>
<td>lnGOV</td>
</tr>
<tr>
<td>lnTO</td>
</tr>
<tr>
<td><strong>Panel B: Short Run analysis</strong></td>
</tr>
<tr>
<td>ΔlnFD</td>
</tr>
<tr>
<td>ΔlnOD</td>
</tr>
</tbody>
</table>

Note: ** denotes the significance at 5% level. Critical values bounds are from Narayan (2005) with unrestricted intercept and no trend.
Table 3 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 Saudi 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 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). This adverse effect of oil dependence on financial development can be attributed to the volatility hypothesis. Economic instability, exchange rate and interest rate volatility that are caused by uncertainty in oil prices, could and has deterred the financial sector’s abilities to invest or encourage it to go towards
lower risk activities such as consumption or housing loans that does not contribute effectively to economic growth.

Table 3 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 45 percent 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, Panel C point out that the model passes all tests for non-normality of error term, serial correlation, autoregressive conditional heteroskedasticity and model specification. Furthermore, the stability of the model was supported because the plots of both CUSUM and CUSUMQ fell inside the critical bounds of five percent significance level (Figure 2). Finally, the size of the adjusted $R^2$ indicated a good fit.

Figure 2: Plots of Cumulative Sum of Recursive Residuals and Cumulative Sum of Squares of Recursive Residuals

6. Conclusion and policy implication
This paper examines the relationship between financial development and economic growth in Saudi Arabia, and identifies the role of a high dependence on oil rent 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 rent dependence on the relationship between financial development and economic growth. This finding suggests that financial development can be considered as a crucial channel for the oil curse in Saudi Arabia. This reveals the fact that the Saudi banking sector is still underdeveloped and affected by the dominant role of oil in the economy. Banking plays an important role in industrialized and agricultural economies alike, in that it improves allocation of resources to firms and helps these firms stay afloat until their goods are sold. This role is less important when the economy is dominated by extraction of a highly liquid (in financial sense) and easily marketable commodity (Samargandi et al., 2014).

The results offer a mix of policy implications. On one hand, as the oil rent 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 financial authorities to undertake loan surveys to better understand credit conditions and reform the credit reporting sector. In addition, any future boom of oil rent needs to be harnessed to finance efficient public investment and build a financial system to adequately fund private investment. This will help accumulate permanent productive wealth to compensate for any decline in oil prices or production. Such productive wealth will generate increased and sustainable flows of income. On the other hand, efficient government expenditure in particular on human development will also be fruitful in this regard. Additionally, enhancing 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. If the diversification of the Saudi economy continues, we can anticipate that financial development will play a more prominent role in the country’s overall economic performance in the future, provided the expansion of the non-oil sector is not hampered by the underdevelopment of the financial sector.

References


Gylfason, T., 2006. Natural resources and economic growth: From dependence to diversification (pp. 201-231). Springer Berlin Heidelberg.


20


