The Impact of Stock Market and Banking Sector Development and Economic Growth in an Oil-Rich Economy: The Case of Saudi Arabia

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Abstract

This paper empirically investigated the separate effects of banking sector and stock market development on economic growth in Saudi Arabia using data covering the span of 1997Q1 to 2017Q2 employing the Autoregressive Distributed Lag (ARDL) approach to co-integration analysis. Fixing the potential effects of trade openness and the oil price on Saudi economic activities, we find that the banking sector development has a negative highly significant effect on economic growth. In contrast, the impact of stock market development is either positive or insignificant. The findings suggest that the Saudi Arabian financial sector can be positively motivated through the allocation and mobilisation of resources. The results, however, indicate that economic growth is affected and dominated by the crude oil sector in Saudi Arabia. In general, the results suggest that the relationship between economic growth and financial development may differ in resource-dominated and oil exporting economies and countries.

Key Words: Economic growth; stock market; bank sector; oil price; Saudi Arabia; ARDL method.

JEL Classifications: G10; G20; O11; Q32.
1. Introduction

Recent years have observed a growing interest among academia and researchers in understanding the linkage between financial sector development and economic growth in oil-exporting countries see among others Nili and Rastad, (2007); Beck (2011); Barajas Chami and Yousefi (2013); Cevik and Rahmati (2013); Samargandi Fidrmuc and Ghosh (2014), Eugene (2016) and Lotfali and Golan (2017). However, most of these studies did not include stock market development indicators. This is because stock markets represent a small proportion of financial sector while the banks dominate the activities of financial sectors in most countries, see, Naceur Cherif and Kandil (2014). Levine (2004) found that stock markets are one of the factors that promote economic growth through the stock market’s role in liquidity creation, management and diversification of risk and foreign capital inflow in most countries. Lin et al., (2009) and Kurronen (2015) notes that the structure of the financial sector pursues the structure of the economy production. Based on this countries have the ability to have different levels of stock market development and banking sector development. So the economy uses different instruments and channels to allocate financial resources. Levine (1996) states that the impact of the separation process of the banking sector and stock market development on economic growth may illustrate the effect of the financial sector development in stimulating economic growth.

Barajas et al., (2013) found that in oil rich countries the banking sector has a minor effect on the economic growth as the country increases its dependence on oil. On other hand, the effect of stock market development may be higher in oil-exporting countries than in oil-importing countries. Kurronen (2015) used a sample of 128 countries over the span of 1995 to 2009 and found that resource dependent economies have smaller banking sectors compared to market-based economies that are more dependent on financing. Mohammed Aljebrin (2018) investigates the relationship between non-oil openness and financial development impact on economic growth in Saudi Arabia, he found a positive relationship between financial development and economic growth. Mohammed Rehman (2018) examines the linkage between financial development - through banking sector and stock market - and economic growth, the study found that there was no long run co-integration between financial development and economic growth.

Naceur and Ghazouani (2007) investigated the role of the banking sector and stock market development on economic growth in the region of Middle East and North Africa (MENA) over the period 1979–2003. They used oil price and other control variables to examine the impact of the oil sector on the economic activities, as the region dominated by major oil-exporting countries that involve some OPEC countries member like Saudi Arabia, Kuwait and Iran. The results of the study showed that stock market development has a negative impact on
economic growth when liquid liabilities is used to represent banking sector development and positive when banking sector development is examined using domestic credit to private sector. Generally, the study results show the insignificant effect of banking sector and stock market development on economic growth in the MENA region. In contrast the oil price has a significant positive effect on economic growth in the region, which means that economic growth is driven by the oil sector in the region.

Controlling for the possible impact of trade openness and oil price on economic growth in Saudi Arabia, this study aims to empirically investigate the independent effects of the banking sector and stock market development on economic growth in Saudi Arabia employing the autoregressive distributed lag (ARDL) approach to cointegration analysis.

To the best of our knowledge, a limited number of studies have attempted to examine the interaction between financial sector development and economic growth in the case of an economy dominated by natural resources. Nili and Rastad (2007), Beck (2011) and Eugene (2016), are among the few authors who deal with how the redundancy of oil can impact the relationship between financial sector development and economic growth, and whether there is any sign of a natural resource effect in the relation between financial sector development and economic growth. In the context of Saudi Arabia as one of the oil-rich economies a few studies investigated the relationship between financial sector development and economic growth see among other Ibrahim (2013), Samargandi et al. (2014), Alghfais (2016) and Nasir et al. (2017). In contrast none has investigated the stock market development indicators in the relationship between financial sector development and economic growth in Saudi Arabia. This study is therefore an attempt to fill this gap in the literature. The outcome of the study reaches important results for policy-makers and researchers in Saudi to consider, as well as for other oil-rich economies that are trying to figure out the separate impact of the stock market and banking sectors on economic growth.

The remainder of this paper is organized as follows. Section 2 presents the methodology and the econometric models used in the study. Section 3 describes the data and the construction of stock market and banking sector indicators used in empirical analysis. Section 4 reports and discusses the empirical results. Finally, section 5 provides the conclusion and some final remarks.

2. Methodology
2.1 Empirical Methodology
To investigate the links and effects of the banking sector and stock market development on economic growth in Saudi controlling for the influence of trade openness and crude oil price, the study employs the long-linear empirical model specified below:

\[ \ln RgdP = \beta_0 + \beta_1 \ln BSD + \beta_2 \ln SMD + \beta_3 \ln trdeopen + \beta_4 \ln Oilp + \varepsilon_t \]
where $RGDP$ is the real GDP, $SMD$ is the stock market indicators that includes (STMindex, MCgdp, VTgdp and Turn), $BSD$ is the banking sector development indicators (Bnkindex, CPgdp, M2gdp, and DBAgdp), $Oilp$ is the international crude oil price, $trdopen$ is the trade openness and $\varepsilon_t$ is the error term.

Following Nwani and Bassey Orie (2016) this study uses the Autoregressive Distributed Lag (ARDL-Bounds) testing approach to co-integration introduced by Pesaran et al. (2001). This approach provides some attractive and practical statistical advantages compared to other co-integration methods. As other co-integration methods need all the variables to be integrated of the same order, the ARDL test procedure produces valid results even if the order of the variables is different. In addition the ARDL procedure provides consistent and efficient results in the cases of small and large sample sizes, for more details see, Pesaran et al., (2001). The ARDL model can be specified as:

$$
\Delta \ln RGDP_t = \beta_0 + \sum_{i=1}^{n} \beta_{1i} \Delta \ln GDP_{t-i} + \sum_{i=0}^{n} \beta_{2i} \Delta \ln SMD_{2t-i} + \sum_{i=0}^{n} \beta_{3i} \Delta \ln BSD_{2t-i} \\
+ \sum_{i=0}^{n} \beta_{4i} \Delta \ln Oilp_{3t-i} + \sum_{i=0}^{n} \beta_{5i} \Delta trdopen_{3t-i} + \beta_6 \ln GDP_{t-1} \\
+ \beta_7 \ln SMD_{t-1} + \beta_8 \ln BSD_{2t-1} + \beta_9 \ln trdopen_{t-1} + \beta_{10} \ln Oilp_{t-1} + \varepsilon_t
$$

where $\Delta$ is the difference operator and $\varepsilon_t$ the white noise error term. The test includes conducting F-test for joint significance of the coefficients of lagged variables for the purpose of investigating the presence of a long-run relationship among the variables. The null hypotheses of no long-run relationship existence among the variables ($H_0$: $\beta_7=\beta_9=\beta_{10}=0$) is investigated. The rejection and acceptance of $H_0$ is based on following criterions; if the F-value is greater than the upper bound then reject $H_0$ so the variables are co-integrated, if the F-value is less than the lower bound then accept $H_0$ so the variables are not co-integrated, the decision is inconclusive if the F-value is between upper and lower bounds. The estimation of the error correction model of the short-run relationships is as follows:

$$
\Delta \ln RGDP_t = \beta_0 + \sum_{i=1}^{n} \beta_{1i} \Delta \ln GDP_{t-i} + \sum_{i=0}^{n} \beta_{2i} \Delta \ln SMD_{2t-i} + \sum_{i=0}^{n} \beta_{3i} \Delta \ln BSD_{2t-i} \\
+ \sum_{i=0}^{n} \beta_{4i} \Delta \ln Oilp_{3t-i} + \sum_{i=0}^{n} \beta_{5i} \Delta trdopen_{3t-i} + \lambda_1 ECM_{t-1} + u_{1t}
$$

A negative and significant ECM$_{t-1}$ coefficient ($\lambda_1$) indicates that any short term disequilibrium between the dependent and independent variables will converge back to the
long-run equilibrium relationship. This study implements the ARDL bounds cointegration analysis using Eviews 9.

3. Data Description

This study uses quarterly data covering the span of 1997Q1 to 2017Q2 which provides the longest reliable and available data-set for financial and stock market development in Saudi Arabia. Economic growth is defined as the real GDP (RGDP). Two control variables are included to capture other components of the Saudi macroeconomic environment that could influence the growth of the Saudi economy. The variables include: Global price of Brent Crude (in US dollars per barrel) and the ratio of total trade (exports plus imports) to GDP which explains the degree of the Saudi economy openness to trade. Three widely used measures of financial sector development; Domestic credit to private sector over GDP (CPGDP), Liquid Liabilities over GDP (M2GDP) and Deposit money bank assets to GDP (DBAGPD) are employed to capture different characteristics of Saudi’s financial sector activities. In addition, three stock market development indicators are employed to capture different components of the development of Saudi’s stock market. The ratio of stock market capitalisation to GDP (MCgdp) measures the magnitude of the Saudi stock market; value of trades of domestic stocks over GDP (VTgdp) captures the liquidity of the stock market while turnover ratio (Turn) captures the effectiveness of the stock market in resource allocation. Note that none of these indicators could be viewed as the best or overall indicator of development of the stock market. Due to the high association between the development indicators (see Table 1), a composite index is constructed from these indicators using principal component analysis (PCA). Principal component analysis (PCA) has commonly been employed to address the problem of multicollinearity by reducing a large set of correlated variables into a smaller set of uncorrelated variables see, Stock and Watson, (2002), and has been extensively employed in the construction of financial development indices in recent studies, see for instance, Samargandi et al. (2014). Table 2 shows that the first principal component accounts for about 88% of the total variation in the three stock market indicators. STMindex is constructed as a linear combination of the three stock market indicators with weights given as the first eigenvector.

Three indicators are employed to measure the development of the Saudi banking sector. The ratio of private credit to GDP (CPgdp) which measures the role of the banking sector in private sector activities; broad money (M2) over GDP (M2gdp) which explains the capability of the banking sector to endure sudden demand for withdrawal of deposits by clients, Naceur et al. (2014), while the ratio of bank assets to GDP (DBAsgdp) gauges the size of the banking sector. Table 1 shows the high correlation between the three indicators of banking sector development. Using principal component analysis (PCA), the banking sector development
index (Bnkindex) is formulated as a linear combination of the three indicators of banking sector development (CPgdp, M2gdp and DBAgdp) with weights given as the first eigenvector, which capturing approximately 99% of the total variation in the three indicators (see Table 2). Time series data on the variables are obtained from Saudi Arabian Monetary Agency, Saudi General Authority for Statistics and Economic Data of Federal Reserve Bank of St. Louis.

Table 1: The correlation matrix

<table>
<thead>
<tr>
<th>Indicators of Banking Sector Development</th>
<th>CPgdp</th>
<th>DBAgdp</th>
<th>M2GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPgdp</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DBAgdp</td>
<td>0.99</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>M2GDP</td>
<td>0.99</td>
<td>0.99</td>
<td>1.00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Indicators of Stock Market Development</th>
<th>VTGDP</th>
<th>TURN</th>
<th>MCGDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>VTGDP</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TURN</td>
<td>0.89</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>MCGDP</td>
<td>0.85</td>
<td>0.70</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Table 2: Eigenvalues, proportion and eigenvectors of each first principal component

<table>
<thead>
<tr>
<th></th>
<th>STMindex</th>
<th>Bankindex</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eigenvalues</td>
<td>2.6270</td>
<td>2.9683</td>
</tr>
<tr>
<td>Proportion</td>
<td>0.8757</td>
<td>0.9933</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Eigenvectors (Loadings)</th>
<th>VTgdp</th>
<th>Turn</th>
<th>MCGdp</th>
<th>CPgdp</th>
<th>DBAgdp</th>
<th>M2gdp</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.602468</td>
<td>0.569281</td>
<td>0.559421</td>
<td>0.577688</td>
<td>0.577178</td>
<td>0.577184</td>
</tr>
</tbody>
</table>

3.1 Unit Root Test

The ARDL-bounds test is not a condition for the same order of integration. Stationarity test are therefore performed first in levels and then in first difference to investigate the presence of unit roots and the order of integration in all the variables. The results of the Phillips-Perron (PP) and Augmented Dickey-Fuller (ADF) stationarity tests presented in Table 3 below show that all the variables are nonstationary in level but are stationary of first difference at 1% significance, thus, all variables are integrated of order one I(1).
Table 3: ADF and PP unit root tests

<table>
<thead>
<tr>
<th>Variable</th>
<th>Level I(0)</th>
<th>First difference I(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ADF</td>
<td>PP</td>
</tr>
<tr>
<td>lnRGDP</td>
<td>-1.5488</td>
<td>-1.6825</td>
</tr>
<tr>
<td>lnSMindex</td>
<td>-2.0422</td>
<td>-2.0981</td>
</tr>
<tr>
<td>lnBnkindex</td>
<td>-0.7350</td>
<td>-0.0365</td>
</tr>
<tr>
<td>lnMCgdp</td>
<td>-1.6415</td>
<td>-2.0057</td>
</tr>
<tr>
<td>lnVTgdp</td>
<td>-2.0422</td>
<td>-2.0981</td>
</tr>
<tr>
<td>lnTurn</td>
<td>-2.5638</td>
<td>-2.4162</td>
</tr>
<tr>
<td>lnCPgdp</td>
<td>-0.0782</td>
<td>0.0710</td>
</tr>
<tr>
<td>lnM2gdp</td>
<td>0.2214</td>
<td>0.3419</td>
</tr>
<tr>
<td>lnDBAgdp</td>
<td>-0.3117</td>
<td>-0.5386</td>
</tr>
<tr>
<td>lnOilp</td>
<td>-1.5782</td>
<td>-1.6370</td>
</tr>
<tr>
<td>lntrdopen</td>
<td>-1.5741</td>
<td>-1.4434</td>
</tr>
</tbody>
</table>

Notes: All the variables are in the natural log form. ***Level of significance at 1%.

4. Empirical results

4.1 Co-Integration Analysis

Using financial and stock market development indicators and two indices which one constructed from bank sector development indicators and the other from the stock market development indicators using PCA, this study tested for co-integration on eight alternative specifications employing different indicators for stock market and banking sector development. The results of the co-integration test based on the ARDL-bounds testing method, applied using Eviews 9 software are showed in Table 4. The results indicate that in all the specifications, the F-statistic is greater than the upper critical bound at 1% significance level for all specification except 2 and 4 which are greater than the upper critical bound at 5% significance level. Thus, this study rejects the null hypothesis of no co-integration. This indicates that there is a long-run causal relationship among the variables between banking sector development, stock market development, crude oil price, trade openness and economic growth in Saudi.

Table 4: ARDL-bounds cointegration test

<table>
<thead>
<tr>
<th>Functions</th>
<th>F-statistic</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. F RGDP</td>
<td>RGDP</td>
<td>SMindex, Bnkindex, Oilp, trdopen) ARDL(1, 1, 0, 0, 0)</td>
</tr>
<tr>
<td>2. F RGDP</td>
<td>RGDP</td>
<td>SMindex, M2gdp, Oilp, trdopen) ARDL(1, 0, 1, 0, 1)</td>
</tr>
<tr>
<td>3. F RGDP</td>
<td>RGDP</td>
<td>MCgdp, Bnkindex, Oilp, trdopen) ARDL(1, 1, 0, 0, 1)</td>
</tr>
<tr>
<td>4. F RGDP</td>
<td>RGDP</td>
<td>MCgdp, CPgdp, Oilp, trdopen) ARDL(1, 0, 1, 1, 1)</td>
</tr>
<tr>
<td>5. F RGDP</td>
<td>RGDP</td>
<td>MCgdp, M2gdp, Oilp, trdopen) ARDL(1, 0, 1, 0, 1)</td>
</tr>
<tr>
<td>6. F RGDP</td>
<td>RGDP</td>
<td>VTgdp, DBAgdp, Oilp, trdopen) ARDL(1, 0, 1, 0, 1)</td>
</tr>
</tbody>
</table>
Notes: Restricted intercept and no trend \( (k = 4) \). **Level of significance at 5%. ***Level of significance at 1%. Source of Asymptotic critical value bounds: Pesaran et al. (2001)

### 4.2 Estimates of Long-Run

The long-run estimated coefficients of the eight ARDL specifications are provided in Table 5. The results show that in all the eight specifications, the coefficients of long-run models of the banking sector development are negative and highly significant. This shows that the banking sector development has a significantly negative long-run effect on economic growth, indicating that the banking sector development does not stimulate economic growth in Saudi. Regarding the stock market development, the long-run coefficient is positive but only specification 4, 6 and 8 are significant, while specifications 1, 2, 3, 5 and 7 are insignificant. Among the two control variables the empirical results show that in all the specifications, the oil price coefficient is positive and highly significant at (1% and 5%), this is evidence that the oil price is the long-run main factor of economic growth in Saudi. On the other hand, for trade openness all specifications were found to be insignificant except specification 4 which is significant at 5% level. The long-run coefficients in Table 5 provide a clear understanding of an economy significantly dominated by activities in the oil sector. A 1% rise in oil price increases the growth of the economy on average by 0.27% in the long-run. Given that the oil price is significantly determined in the international oil market and not by internal performance and activities, see among other, Quixina and Almeida (2014) and Samargandi et al., (2014). Thus, a drop in crude oil price would oppositely affect the economy performance. Specifically, a 1% decrease in crude oil price would produce a reduction in the level of economic growth by around 0.27%.

#### Table 5: Estimates of long-run coefficients

<table>
<thead>
<tr>
<th>C</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>7. F RGDP(RGDP</td>
<td>Turn, M2gdp, Oilp, trdopen) ARDL(1, 1, 1, 0, 1)</td>
<td>7.4319***</td>
<td>7.3901***</td>
<td>7.6013***</td>
<td>7.3274***</td>
<td>7.4899***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. F RGDP(RGDP</td>
<td>MCgdp, DBAgdp, Oilp, trdopen) ARDL(1, 0, 1, 1, 1)</td>
<td>7.4319***</td>
<td>7.3901***</td>
<td>7.6013***</td>
<td>7.3274***</td>
<td>7.4899***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>lnSMindex</td>
<td>0.0094</td>
<td>0.00683</td>
<td>[0.5471]</td>
<td>[0.8378]</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>lnMCgdp</td>
<td>0.0429</td>
<td>0.1812***</td>
<td>0.0229</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>lnBTgdp</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>lnTurn</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>lnBnindex</td>
<td>-0.473***</td>
<td>-0.410***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Critical Value Bounds

<table>
<thead>
<tr>
<th>1%</th>
<th>2%</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.06</td>
<td>4.15</td>
</tr>
<tr>
<td>3.29</td>
<td>3.38</td>
</tr>
</tbody>
</table>
4.3 Estimates of Short-Run

Table 6 presents the estimated coefficients of the short-run error correction. The ECM (−1) coefficients are negative and significant at a high significance level. These coefficients indicate that the short-run equilibrium is adjusted in long-run equilibrium. The short-run coefficient of banking sector development for all the eight specifications is negative and significant at a high level of 1%. The effect of the negative significance short-run estimates of banking sector development on economic growth in Saudi, indicates the high degree of inefficiency in resource allocation and mobilization of the Saudi banking sector. On the other hand, the short-run stock market effect on the economic growth is positive and significant at the 5% level for 63% of specifications, namely, (1, 4, 6, 7 and 8), while specifications (2, 3 and 5) realise highly insignificant positive short-run coefficients for half the specification of the ratio of stock market capitalisation to GDP (MCgdp) as an indicator of stock market development in Saudi. The results reveal that the oil price short-run coefficient is positive and significant at the 1% level in all the eight specifications. These results confirm the role of the oil sector that drives economic activities in Saudi. Unpredictably, the trade openness coefficient is negative and insignificant for 6 out of 8 specifications.

Table 6: Estimates of short-run error correction

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECM(-1)</td>
<td>0.0892**</td>
<td>0.294***</td>
<td>0.0982**</td>
<td>-0.167***</td>
<td>0.293**</td>
<td>0.295***</td>
<td>0.297***</td>
<td>0.257***</td>
</tr>
<tr>
<td>ΔlnSMindex</td>
<td>0.0071**</td>
<td>0.00203</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>[2.2329]</td>
<td>[0.4091]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ΔlnMCgdp</td>
<td>0.0042</td>
<td>0.0303**</td>
<td>0.0067</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.0127**</td>
</tr>
<tr>
<td></td>
<td>[1.1966]</td>
<td>[4.7369]</td>
<td>[1.2068]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[2.0402]</td>
</tr>
</tbody>
</table>
\[ \Delta \ln V_{Tgdp} \]

\[ 0.0070^{**} \]

\[ [2.6982] \]

\[ \Delta \ln Turn \]

\[ 0.01550^{*} \]

\[ [2.5699] \]

\[ \Delta \ln Bnkindex \]

\[ 0.317^{***} \]

\[ -0.317^{*} \]

\[ [-17.579] \]

\[ [-17.897] \]

\[ \Delta \ln CP_{gdp} \]

\[ -0.525^{**} \]

\[ [-8.3878] \]

\[ \Delta \ln M2_{gdp} \]

\[ -0.576^{***} \]

\[ -0.585^{*} \]

\[ -0.629^{***} \]

\[ [-8.6382] \]

\[ [-8.7256] \]

\[ [-9.0363] \]

\[ \Delta \ln D_{BAgdp} \]

\[ 0.604^{***} \]

\[ -0.605^{*} \]

\[ [-9.0429] \]

\[ [-8.8273] \]

\[ \Delta \ln Oilp \]

\[ 0.0544^{**} \]

\[ 0.0413^{*} \]

\[ 0.1038^{*} \]

\[ 0.4435^{*} \]

\[ 0.0388^{*} \]

\[ 0.0532^{**} \]

\[ 0.3697^{**} \]

\[ 0.0534^{**} \]

\[ [2.4306] \]

\[ [2.6918] \]

\[ [2.3513] \]

\[ [2.7616] \]

\[ [2.5101] \]

\[ [3.6095] \]

\[ [2.6709] \]

\[ [3.5329] \]

\[ \Delta \ln trdopen \]

\[ 0.0372 \]

\[ -0.357^{***} \]

\[ 0.0226 \]

\[ -0.1604 \]

\[ -0.0505 \]

\[ -0.0279 \]

\[ -0.0454 \]

\[ -0.037^{**} \]

\[ [1.1749] \]

\[ [-4.4261] \]

\[ [0.7294] \]

\[ [-0.2430] \]

\[ [-0.8832] \]

\[ [-0.5127] \]

\[ [-0.8195] \]

\[ [-2.0335] \]

**Diagnostic tests**

<table>
<thead>
<tr>
<th>Adj $R^2$</th>
<th>0.9941</th>
<th>0.9852</th>
<th>0.9947</th>
<th>0.9857</th>
<th>0.9853</th>
<th>0.9859</th>
<th>0.9866</th>
<th>0.9854</th>
</tr>
</thead>
<tbody>
<tr>
<td>BG</td>
<td>0.1191</td>
<td>1.0606</td>
<td>0.5639</td>
<td>1.5840</td>
<td>1.8155</td>
<td>0.9171</td>
<td>1.4549</td>
<td>0.9344</td>
</tr>
<tr>
<td></td>
<td>(0.9422)</td>
<td>(0.3031)</td>
<td>(0.7533)</td>
<td>(0.4529)</td>
<td>(0.1707)</td>
<td>(0.4047)</td>
<td>(0.2409)</td>
<td>(0.3979)</td>
</tr>
<tr>
<td>Hetero</td>
<td>0.1691</td>
<td>0.0239</td>
<td>0.5448</td>
<td>0.3157</td>
<td>0.01533</td>
<td>0.1506</td>
<td>0.0017</td>
<td>0.0593</td>
</tr>
<tr>
<td></td>
<td>(0.6809)</td>
<td>(0.8771)</td>
<td>(0.4604)</td>
<td>(0.854)</td>
<td>(0.9015)</td>
<td>(0.6945)</td>
<td>(0.9671)</td>
<td>(0.8083)</td>
</tr>
<tr>
<td>RESET</td>
<td>0.0468</td>
<td>0.7885</td>
<td>0.5650</td>
<td>1.4400</td>
<td>1.6917</td>
<td>1.5301</td>
<td>1.3819</td>
<td>0.8882</td>
</tr>
<tr>
<td></td>
<td>(0.8295)</td>
<td>(0.3777)</td>
<td>(0.4549)</td>
<td>(0.1580)</td>
<td>(0.0893)</td>
<td>(0.1307)</td>
<td>(0.1621)</td>
<td>(0.3776)</td>
</tr>
<tr>
<td>Theil Co.</td>
<td>0.0054</td>
<td>0.0088</td>
<td>0.0055</td>
<td>0.0091</td>
<td>0.0089</td>
<td>0.0085</td>
<td>0.0083</td>
<td>0.0086</td>
</tr>
</tbody>
</table>

Notes: Adj. $R^2$ means Adjusted R-squared. BG is the Breusch–Godfrey serial correlation LM test. Hetero is the ARCH test for heteroscedasticity, RESET is the Ramsey RESET test; Theil Co is Theil inequality coefficient. t-statistics in [ ], p-values in ( ).

*** Level of significance at 1%, ** Level of significance at 5% and * Level of significance at 10%.

### 4.4 Diagnostic tests

The diagnostic test results at the bottom of Table 6 for the underlying ARDL models suggest that all models’ specifications pass the diagnostic test against serial correlation, functional form misspecification and heteroscedasticity in each of the ARDL models specified. Table 7 provides the cumulative sum of recursive residuals (CUSUM) for each specification which is within the critical boundaries for the 5% significance level. These results confirm that the long-run coefficients and all short-run coefficients in the error correction model are stable. The overall goodness of fit of the estimated models is very high.
ranging from 98% to 99% for all models that are the expected results for ARDL as the models involve the dependent variable lags. Finally, the table includes the Thiel inequality coefficient that indicates the goodness of the models for forecasting abilities.

**Table 7: cumulative sum of recursive residuals CUSUM**

![CUSUM for coefficient stability of ECM specification 1](image1)

![CUSUM for coefficient stability of ECM specification 2](image2)

![CUSUM for coefficient stability of ECM specification 3](image3)

![CUSUM for coefficient stability of ECM specification 4](image4)

![CUSUM for coefficient stability of ECM specification 5](image5)

![CUSUM for coefficient stability of ECM specification 6](image6)

![CUSUM for coefficient stability of ECM specification 7](image7)

![CUSUM for coefficient stability of ECM specification 8](image8)
5. Conclusions and Recommendations

This paper contributes to the literature on financial development and growth by investigating the independent effects of the stock market and banking sector of an oil-rich economy, Saudi Arabia, which has not been studied in such a context. The empirical study results, based on the ARDL approach to cointegration analysis over the period 1997Q1 to 2017Q2 indicated that both the banking sector and stock market are not significant drivers of the Saudi economy. The results reveal that the banking sector development has a negative significant impact on economic growth, while the stock market has 5 out of 8 specifications (about 63%) indicating a positive significant effect on the Saudi economic growth and the remaining 3 specifications have an insignificant impact on growth. On the other hand, the oil price has a highly significant positive effect on Saudi economic growth.

These results also show the specific nature of resource-rich and oil economies such as Saudi Arabia. Thus the economies that depend on resources do not need to follow the same manner of development of manufacturing economies. The economy critically depends on foreign markets and price, as shown in our analysis of the strong role played by the oil price. In general, the role of the financial sector development is notable in industrialized and developed economies. The dominant role of oil in the Saudi economy may be the reason behind the underdevelopment of banking sector. In fact, the banking sector plays a notable and important role in agricultural and industrialized economies, where banking sector provides a good channel for allocation of resources amongst firms, so this role is less effective when the economy depends on a commodity that has a features that are easy to market and highly liquid. Thus, the findings of this study shed light on the need to improve efficiency of resource allocation and mobilisation in the financial sector in Saudi Arabia. Our results suggest that the growth of the Saudi economy is negatively affected by banking sector development. Thus, from a policy view, a more develop of Saudi banking system with aiming to encourage economy growth is needed. If the current running strategy for economic diversification continues, we can expect that banking sector will contribute and stimulate
economic growth by encouraging economic activities of other sector and reducing economic dependence on oil in future. In contract, Saudi’s great dependency on the oil indicates that the economy will be highly affected by international oil prices shocks.

References


