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Financial development and economic growth in an oil-rich economy: The case of Saudi Arabia*

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Abstract

We investigate the effect of financial development on economic growth in the context of Saudi Arabia, an oil-rich economy. In doing so, we distinguish between the effects of financial development on the oil and non-oil sectors of the economy. Using the Autoregressive Distributed Lag (ARDL) bounds test technique, we find that financial development has a positive impact on the growth of the non-oil sector. In contrast, its impact on the oil-sector growth and total GDP growth are either negative or insignificant. This suggests that the relationship between financial development and growth may be fundamentally different in resource-dominated economies.

Keywords: Financial Development; Economic Growth; ARDL Method; Oil and Non-oil Sectors; Saudi Arabia.

JEL Codes: O11, O16, O47

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I. Introduction

In this paper, we explore the link between financial development and economic growth in an oil-rich economy, Saudi Arabia. To the best of our knowledge, our paper is one of the first studies to specifically consider the role that financial development plays in a resource-dependent economy, and the potentially different effects that it may have on the resource-extraction and conventional sectors of such an economy. Countries whose economies are dominated by oil or other natural resources possess specific features not shared either by industrialized or developing economies. A large fraction, often a lion's share, of economic activity is represented by resource extraction, characterized by low added value and often by a high degree of state regulation. Economic performance is predominantly driven by the prices of natural resources that are determined in world markers rather than by domestic economic developments.

The literature on the relationship between financial development and economic growth is voluminous. There is, however, no consensus view yet on either the nature of this relationship or the direction of causality. Four different hypotheses have been proposed.

The first view is that financial development is supply–leading, in the sense that it fosters economic growth by acting as a productive input. This view has been supported theoretically and empirically by a large number of studies. One of the earliest contributions is by Schumpeter (1911) who argues that the services provided by financial intermediaries encourage technical innovation and economic growth. McKinnon (1973) and Shaw (1973) were the first to highlight the importance of having a banking system free from financial restrictions such as interest rate ceilings, high reserve requirements and directed credit programs. Such policies tend to be prevalent in all countries, but are especially common in developing ones. According to their argument, financial repression disrupts both savings and investment. In contrast, the liberalization of the financial system allows financial deepening and increases the competition in the financial sector, which in turn promotes economic growth. Similar ideas are put forward by, among others, Galbis (1977), Fry (1978), Goldsmith (1969), Greenwood and Jovanovic (1990), Thakor (1996), and Hicks (1969). They view financial development as a vital determinant of economic growth, which increases savings and facilitates capital accumulation and thereby leads to greater investment and growth.

Empirically, several studies support the supply–leading view. A prominent contribution is King and Levine (1993). They study 80 countries by means of a simple cross-country OLS regression. Their findings imply that financial development is indeed an important determinant of economic growth. Similar results have been found by Chistopoulos and Tsionas (2004), who examine the long-run relationship between bank development and economic growth for 10 developing countries. They utilize panel cointegration techniques and find a uni-directional relationship going from financial development to economic growth. Atje and Jovanovic (1993) assess the role of the stock market on economic growth and find that the volume of transactions in the stock market has a fundamental effect on economic growth. Subsequent studies confirm these results by focusing on both market-based and bank-based measures of financial development (see for example, Levine and Zervos, 1998, and Kunt and Maksimovic, 1998).

The second view is demand-following. In contrast to the previous position, Robinson (1952) argues that financial development follows economic growth, which implies that as an economy develops the demand for financial services increases and as a result more financial institutions, financial instruments and services appear in the market. A similar view is expressed by Kuznets (1955), who suggests that as the real side of the economy expands and approaches the intermediate stage of growth, the demand for financial services begins to increase. Hence, financial development depends on the level of economic development rather than the other way around. This view has also been empirically confirmed by several studies such as Al-Yousif (2002) and Ang and McKibbin (2007).

The third view is one of bidirectional causality. Accordingly, there is a mutual or two-way causal relationship between financial development and economic growth. This argument was first put forward by Patrick (1966) who posits that the development of the financial sector (financial deepening) is as an outcome of economic growth, which in turn feeds back as a factor of growth. Similarly, a number of endogenous growth models such as Greenwood and Jovanovic (1990); Greenwood and Bruce (1997); and Berthelemy and Varoudakis (1997) posit a two-way relationship between financial development and economic growth. Additional support for this view can be found in the empirical study by Demetriades and Hussein (1996), who studied 13 countries and found very strong evidence supporting bidirectional causality.

Finally, the fourth view states that financial development and economic growth are not causally related. Based on this view, financial development does not cause growth or vice versa. This view was initially put forward by Lucas (1988) who states that "economists badly overstress the role of financial factors in economic growth". His view is also supported by Stern (1989).

In addition, some empirical studies of the effects of financial development on economic growth highlight the potential negative association between finance and growth. For example, De Gregorio and Guidotti (1995) find a negative impact of financial development on growth in some Latin American countries. Van Wijnbergen (1983) and Buffie (1984) also point out the potentially negative impact of finance on growth. They argue that the high level of liberalization of the financial sector (financial deepening) results in decreasing the total real credit to domestic firms, and thereby lowers investment and slows economic growth. Al-Malikawi et al (2012), who examine the short- and long-run relationship between financial development and economic growth in the United Arab Emirates (UAE), suggest the relationship between them is negative. They attribute this result to the transition phase of the UAE financial system during the period of study, as well as to the weak regulatory environment of the financial intermediaries.

To the best of our knowledge, only few studies attempt to investigate the relationship between financial development and economic growth in the context of a natural-resource dominated economy.[1] Nili and Rastad (2007), and Beck (2011), are among the few authors who consider how the abundance of oil can affect the relationship between financial development and economic growth, and whether there is any indication of a natural resource

[1] A number of studies provide evidence that countries endowed with natural resources have a tendency to grow more slowly than less resource-abundant countries. This phenomenon is known as resource curse thesis (see Sachs and Warner, 2001; Nankani, 1979). Resource curse refers to the negative externalities stemming from the abundance of natural resources to the rest of the economy. See van der Ploeg (2011) for a recent survey on the curse of natural resource abundance.

curse in the relationship between financial development and economic growth. Nili and Rastad (2007) examine the role that financial development plays in oil-rich economies. They find that financial development has a weaker effect in oil-exporting countries than in oil-importing countries. They suggest that this result is not only due to the high dependence on oil in the former but also because of the general inefficiency of financial institutions in oil-dependent countries. Beck (2011), in turn, argues that the ambiguity in the relationship between financial development and economic growth in oil-rich (or natural-resource-rich) countries in the previous literature reflects the fact that economic growth is driven by different forces in these countries, and that the financial sector has a different structure and plays a different role there. Nevertheless, his findings indicate, contrary to Nili and Rastad (2007), that there is in fact no significant difference in the impact of financial development on economic growth between resource-based countries and non-resource based countries. However, when he assesses the level of countries' reliance on natural resources, he finds that countries that depend more on exports of natural resources tend to have underdeveloped financial systems. This is despite the fact that banks in resource-based economies tend to display higher profitability and are more liquid and better capitalized. However, they offer less credit to the private sector, which he attributes to the incidence of financial repression in resource-based countries. Therefore, he concludes that resource-based countries can be subject to the natural resource curse in financial development.

We seek to contribute to this debate by considering the case of a resource-dominated country: Saudi Arabia.[2] The economy of Saudi Arabia is heavily dependent on oil revenue. Recently, however, the government has been promoting diversification towards the non-oil sector and reducing the country's dependence on the petroleum sector. Since the implementation of the fourth development plan (1985-1990), in particular, significant priority has been given to the financial sector. We investigate, therefore, the role that the financial sector plays in this

[2] Substantial literature focuses on single country studies, e.g., Murinde and Eng (1994) for Singapore; Abu-Bader,et al (2008) for Egypt; Lyons and Murinde (1994) for Ghana; Odedokun (1989) for Nigeria; Agung and Ford (1998) for Indonesia; Wood (1993) for Barbados; Khan, et al (2005) for Pakistan; Hondroyiannis , et al. (2005) for Greece; Ang, et al. (2007) for Malaysia; Majid (2007) for Thailand; Mohamad (2008) for Sudan; Singh (2008) for India; Safdari et al. (2011) for Iran; Thangavelu, et al. (2004) for Australia; Muhsin and Pentecost (2000) for Turkey; Qi Liang,et al (2006) for China; Ghatak (1997) for Sri Lanka and Al-Malikawi et al. (2012) for UAE.

country's economy, and whether this role differs between the traditional sector (petroleum) and the emerging non-oil sector.

To this effect, we collect time-series data from 1968 to 2010 and apply an ARDL bound test approach to cointegration to examine the long and short-run impact of the financial sector on economic growth. There are various methods for examining the existence of a long-run relationship between the variables of interest: Engle and Granger (1987) and Johansen (1988, 1991, 1995) are the most widely adopted approaches. We, however, follow the ARDL bound test approach for testing the finance and growth nexus due to the favorable features of this technique compared to the other conventional approaches, as discussed in more detail in the methodology section. Furthermore, we deviate from the usual approach by using principal component analysis (PCA) to build a single composite indicator of financial development.

Our findings indicate that financial development has a statistically significant and positive effect on the non-oil sector only. In contrast, the effect on overall GDP is either not statically significant or negative and significant. We consider this an important result, not only from the perspective of an oil-rich economy, but also in the general context of the financial development-growth debate.

The remainder of this paper is organized as follows. Section II provides a brief overview of the Saudi economy and discusses the key characteristics of its financial sectors. Section III describes the data and the construction of the measures of financial development used in the empirical analysis. Section IV explains the methodology and the econometric model used in our study. Section V reports the empirical results. Finally, section VI concludes, and provides some policy implications.

II. Overview of the Saudi Economy and its Financial Sectors

Saudi Arabia's economy depends heavily on the oil sector. The country is the world's leading exporter of petroleum and a very prominent member of the OPEC. The oil sector accounts for about 45 percent of the total GDP and 90 percent of the total export earnings. In order to reduce the dependence on the oil sector, 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 channeling 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.

There have been several signs that the economy has been switching from the oil to the non-oil sector over the last four decades.[3] During the 1970s, the share of the non-oil sector in overall GDP was very low, from 30% to 37%. However, at the beginning of the 1980s, the Saudi economy experienced a rapid shift in favour of the non-oil sector at the expense of the oil sector. In 1985, the non-oil output peaked at 77% of GDP. Thereafter, its share fluctuated between 60% and 72% during the following period (1986-2010).

Choudhury and Al-Sahlawi (2000) see this significant growth of the non-oil sector as a success of the emphasis on diversification made in the fourth development plan (1985-90) and all the subsequent plans. On the other hand, Al-Hassan et al. (2010) argue that these increases in the non-oil sector are merely the result of the fluctuation in the world's oil demand that reflects swings in world oil prices.

Although the financial sector in Saudi Arabia comprises both banks and non-bank financial institutions, it is dominated by the banking sector. This is because all other financial intermediaries and non-bank financial institutions, such as the stock market, Sukuk (Islamic bonds) and insurance companies, are either newly-established or underdeveloped. For example, the Saudi stock market was officially established only in 1984; until then it was just an informal market. Moreover, the number of listed companies was small: just 72 companies up to 2008.[4]

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[3] The oil sector refers to the production activity relating to the extraction and supply of crude oil. The non-oil activities include finance, trade, government services, construction, utilities, natural gas and petroleum-processing industries.

[4] However, the Saudi stock market has experienced tremendous development in the last five years due to the new rules allowing non-Saudi citizens to participate in shares trading in the stock market which used to be

Although the Saudi insurance industry is the largest insurance market among the Gulf Cooperation Council (GCC) countries, the regulation of this sector by the Saudi Arabian Monetary Agency (SAMA) only began in 2003 (The Saudi Insurance Market Report, 2009). In 2004, there was only one insurance company, but by the first half of 2008, the Council of Ministers approved the licensing of 22 insurance companies. As regards the Islamic Banking and Sukuk (Islamic bonds) sector, there are four Islamic banks in Saudi Arabia; in addition to them, there are Islamic windows in the conventional banks. According to a report issued by the World Islamic Banking Conference on the competitiveness of Islamic banks, Saudi Arabia ranks first, as measured by the earnings of Islamic Banks over the period 2000–2006. However, no data on this sector are publicly available.

The banking sector has fared well during the last four decades, no doubt favourably affected by the oil boom phase. Several Saudi commercial banks were established and the number of commercial banks has risen to 12. Out of those, five are entirely owned by Saudi shareholders while the rest are owned by a mix of Saudi and foreign shareholders (Ariss, et al., 2007). Table 1 shows some selected indicators of the banking sector. The ratio of liquid liabilities to GDP (M3/GDP) has increased moderately from 2005 to 2010, though it has fallen somewhat in 2008 and 2010 compared to the previous years. A higher liquidity ratio means that the banking system has grown in size. The ratio of the private sector credit to GDP has followed the same trend as the liquid liabilities to GDP ratio. Table 1 also shows that total bank assets have been increasing constantly over the years.

The Saudi commercial banks have expanded the amount of investment and consumer lending. The private sector in Saudi Arabia remains relatively small, possibly because it is constrained by the limited credit disbursement by the commercial banks to the private sector. However, more commercial banks entered into the money market and expanded their loans to the private sector from 1999 onwards so that the loan disbursements have increased sharply. Table 2 also shows that the total credit disbursement of commercial banks has increased moderately from 2006 to 2010, but has fallen slightly in 2009 as compared to the previous year.

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restricted only to Saudi citizens before 2008. As a result, more companies were encouraged to seek finance from the stock market and the number of listed companies increased to 172 companies in 2013.

III. Data and the construction of financial development variables

Data description

We use annual data for Saudi Arabia covering the period from 1968 to 2010. The data was collected from the World Development Indicators (WDI) dataset and the 47th annual report of the Saudi Arabian Monetary Agency (SAMA). The variables of interest include real gross domestic product per capita (GDP) as the dependent variable and potentially important determinants of economic growth as explanatory variables. We initially collected data on government expenditure (as a percentage of GDP), investment share in GDP, oil price, inflation, openness to trade and various measures of financial development (discussed in greater detail below).[5] However, when including all variables in the regression, several turned out to be insignificant. We, therefore, proceeded to omit the insignificant explanatory variables, one by one, until we were left with a model that contained only significant variables: the oil price (OILP), trade openness (TRD) and financial development (FD).[6] The fact that investment dropped out is particularly puzzling: it is typically a robust determinant of economic growth in most studies. The fact that it fails to feature significantly as a determinant of Saudi growth may be due to the overwhelming dominance of the oil sector in this country. It may also reflect the fact that a large fraction of investment in Saudi Arabia is related to oil exploration and thus may affect growth only with a substantial lag, likely to be several years.

We, therefore, estimate a model that includes only a relatively narrow set of core variables alongside our main variable of interest: financial development. This is in line with the literature arguing against controlling for a relatively extensive list of explanatory variables: the resulting coefficients then often depend crucially on the set of specific remaining variables included (see the discussion in, among others, Levine and Renelt, 1992, and Woo, 2009).

[5] We also sought to include some measure of human capital but were unable to do so because of a large number of missing values.
[6] This approach is equivalent to implementing the general-to-specific procedure.

Construction of financial development variables: Principal component analysis (PCA)

We collected information on the following three indicators of financial development:

1. The ratio of broad money (M2)[7] to nominal GDP.
2. The ratio of liquid liabilities (M3)[8] to nominal GDP.
3. The ratio of credit to private sector to nominal GDP.

We follow Ang and McKibbin (2007) in constructing a single measure of financial development by using principal component analysis. The justification for doing this is two-fold. First, it addresses the problem of multicollinearity, or the high correlation between the various financial development indicators. Second, there is no general consensus as to which measure of financial development is most appropriate. Therefore, having a summary measure of financial development that includes all the relevant financial proxies (data permitting) to capture several aspects of the financial sector at the same time, such as directed credit programs and liquidity, will provide better information on financial deepening.

Table 3 presents the results of principal component analysis with the logarithms of the three measures of financial development listed above. The eigenvalue associated with the first component is significantly larger than one. The first principal component explains approximately 97.3% of the standardised variance, the second principal component explains another 2.0%, and the last principal component accounts for only 0.5% of the variation. Clearly, the first principal component is the best measure of financial development in this case. Below, we denote this summary indicator of financial development as FD.

IV. Methodology and Model Specification

Methodology

The two commonly used techniques to test for cointegration between variables are the Engle and Granger method and the Johansen technique. The Engle and Granger method is a single-

[7] M2 = M1 (currency outside banks + demand deposits) + time and saving deposits.
[8] M3= M2 + other quasi monetary deposits.

equation technique and as such it can lead to contradictory results, especially when there are more than two cointegrated variables under consideration (see, Asteriou and Hall (2011); Ang (2010)). Another shortcoming of this method is in its implementation: in order to obtain the long-run equilibrium relationship, we need to estimate the Ordinary Least Squares (OLS) regression as a first step. This procedure, as pointed out by Banerjee et al. (1986), may generate a substantial bias owing to the omission of dynamics and this can undermine the performance of the estimator. Also, the two-step residual-based procedure uses the generated residual series in the first step to estimate a new regression model in the second stage, in order to see whether the residual series is stationary or not. Hence, the error introduced in the first step is carried forward into the second step (Enders, 2004; Asteriou and Hall, 2011).

The Johansen method, which is known as a system-based approach to cointegration, is considered to be a superior method over the Engle and Granger method, and offers a solution in the case of having more than two variables and multiple cointegration vectors that might exist between the variables. Furthermore, the Johansen approach mitigates the omitted lagged variable bias that affects the Engle and Granger approach by the inclusion of lags in the estimation. Even so, the Johansen method can be subject to criticism. The first drawback is the sensitiveness of the results to the optimal number of lags included in the test (Gonzalo, 1994). The second is that if there are more than one cointegrating vectors, it is often hard to interpret each implied economic relationship and to find the most appropriate vector for the subsequent test (Ang, 2010).

Both the Engle-Granger and Johansen techniques are criticised on the grounds that the validity of these methods requires that all the variables be integrated of order one, I(1). They cannot be employed, therefore, if we have a mixture of I(0) and I(1) variables, as in our case (see below).

In this study, we use the autoregressive distributed lag or Bounds testing approach to cointegration (ARDL) technique of Pesaran et al. (2001). This method has been used as an alternative cointegration test that examines the long-run relationships and dynamic interactions among the variables and as such addresses the above issues. This approach has several desirable statistical features. First, the cointegrating relationship can be estimated easily using OLS after selecting the lags order of the model. Second, it allows to test simultaneously for the long and short-–run relationship between the variables in a time series model. Third, in contrast to the Engle-Granger and Johansen methods, this test procedure is valid irrespective of whether the variables are I(0) or I(1) or mutually co-integrated, which means that no unit root test is required. However, this test procedure will not be applicable if an I(2) series exists in the model. Fourth, in spite of the possible presence of endogeneity, ARDL model provides unbiased coefficients of explanatory variables along with valid t-statistics. In addition, ARDL model corrects the omitted lagged variable bias (Inder, 1993). Furthermore, Jalil et al. (2008) and Ang (2010) argue that the ARDL framework includes sufficient numbers of lags to capture the data generating process in general to specific modelling approach of Hendry (1995). Finally, this test is very efficient and consistent in small and finite sample sizes.

Model specification:

Following Ang and McKibbin (2005), Khan and Qayyum (2005) and Fosu and Magnus (2006), the ARDL version of the vector error correction model (VECM) can be specified as:

$$\Delta \ln Y_t=\beta_0+\beta_1 \ln Y_{t-1}+\beta_2 \ln X_{1\,t-1}+\beta_3 \ln X_{2t-1}+\beta_4 \ln X_{3t-1}+\sum_i^p \gamma_i \Delta \ln Y_{t-i}+ \sum_j^q \delta_j \Delta \ln X_{1t-j}+\sum_l^q \varphi_l \Delta \ln X_{2t-l}+\sum_m^q \eta_m \ln X_{3t-m}+\varepsilon_t, \quad (1)$$

In equation (1), Y is the real gross domestic product per capita, X1 stands for financial development, X2 is the oil price, X3 is trade openness, and ε is the error term.

Using the ARDL approach we estimate three models with the dependent variable being real GDP per capita (GDP), real GDP per capita of Non Oil Sector (GDPN) and real GDP per capita of Oil Sector (GDPO). Each of these is regressed on Financial Development (FD), Oil Price (OILP), and Trade Openness (TRD).

Estimation procedure

We first estimate equation (1) using OLS and then conduct the Wald Test or F-test for joint significance of the coefficients of lagged variables for the purpose of examining the existence of a long-run relationship among the variables. We test the null hypothesis, (H_0): $\beta_1 = \beta_2 = \beta_3 = \beta_4 = 0$, that there is no cointegration among the variables, against the alternative hypothesis (H_a): $\beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq 0$. The F-statistics is then to be compared with the critical value (upper and lower bound) given by Pesaran et al. (2001). If the F-statistic is above the upper critical value, the null hypothesis of no cointegration is rejected which indicates that long-run relationship exists among the variables. Conversely, if the F-statistic is less than the lower critical value the null hypothesis cannot be rejected, implying no cointegration among the variables. However, if the F-statistic lies between lower and upper critical values, the test is inconclusive.

In the second step, after testing the relationship among the variables, the long-run coefficients of the ARDL model can be estimated:

$$\ln Y_t = \beta_0 + \sum_{i=1}^{p} \gamma_i \ln Y_{t-i} \sum_{j=0}^{q1} \delta_j \ln X_{1t-j} + \sum_{l=0}^{q2} \varphi_l \ln X_{2t-l} + \sum_{m=0}^{q3} \eta_m \ln X_{3t-m} + \varepsilon_t, \quad (2)$$

In this process, we use the SIC criteria for selecting the appropriate lag length of the ARDL model for all four variables under study. Finally, we use the error correction model to estimate the short run dynamics:

$$\Delta \ln Y_t = \beta_0 + \sum_{i}^{p} \gamma_i \Delta \ln Y_{1t-i} \sum_{j}^{q} \delta_j \Delta \ln X_{1t-j} + \sum_{l}^{q} \varphi_l \Delta \ln X_{2t-l} + \sum_{m}^{q} \eta_m \Delta \ln X_{3t-m} + \vartheta emc_{t-1} + \varepsilon_{t.} \quad (3)$$

Cusum and cusumsq test (stability tests)

We perform two tests of stability of the long-run coefficients together with the short run dynamics, following Pesaran (1997), after estimating the error correction model: the cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squares of recursive residuals (CUSUMSQ) tests.

V. Results and Discussion

Unit-root test

Prior to testing for cointegration, we conduct a test of the order of integration for each variable using the Augmented Dickey-Fuller test (Table 4). Even though the ARDL framework does not require the pre-testing of variables, the unit root test could indicate whether or not the ARDL model should be used. As can be seen from Table 4, only some of the variables, in particular real GDP per capita in the non-oil sector (GDPN), real GDP per capita in the oil sector (GDPO) and the oil price (OILP), are stationary at the 5 percent or 10 percent significance level, whereas all variables are stationary after first differencing. Hence, the results of the unit root test demonstrate that the ARDL model is more appropriate to analyze the data than the Johansen cointegration model.

Cointegration test

The calculated *F*-statistics for the cointegration test are displayed in Tables 5, 9 and 13. The *F*-statistic for the first model (7.5803, Table 5) is higher than the upper bound critical value at the 1 percent level of significance, using restricted intercept and no trend. This implies that the null hypothesis of no cointegration cannot be accepted, therefore there is a cointegrating relationship among the variables. Through normalization process we find that there is cointegration at 5% when financial development and the oil price are the dependent variables but not when we consider openness to trade. The same procedure has been applied to analyze the other two models (for the oil and non-oil sectors). The results suggest the presence of cointegration between GDPN and all explanatory variables, and also cointegration between GDPO and the explanatory variables.

Long- run impact

The empirical results are reported in Tables 6, 10 and 14. They show that trade openness has a positive and significant effect on overall economic growth as well as on the growth of both oil and non-oil sectors. This result is consistent with theoretical and empirical predictions. In addition, the oil price has a positive and significant impact on overall GDP growth but an insignificant impact on the non-oil sector in the long-run.

Financial development has a negative but insignificant impact on economic growth, indicating that the Saudi economy has not benefitted from financial development. This result is in line with Barajas, Chami and Yousefi (2012), who find that financial development has lower if not negative effect on economic growth in oil-rich and Middle Eastern and North African (MENA) countries. This finding may be attributed to the fact that during the period under analysis, the financial sector was still relatively under-developed, and below a certain threshold, beyond which it would be capable of promoting economic growth (Al-Malkawi et al., 2012). Ram (1999) also found a negligible or weak negative impact of financial development on economic growth. Jalil and Ma (2008), similarly, argue that inefficient allocation of resources by banks coupled with the absence of favourable investment environment in the private sector slow the overall economic growth in China. The findings of Jalil and Ma would be applicable to Saudi Arabia where, as in China, most economic decisions are directed by the government. Barajas et al. (2011) argue that the impact of financial deepening on economic growth disappears in the case of an oil-based economy like Saudi Arabia. Our findings are in line also with Ang and McKibbin (2006) who find no evidence of economic improvement due to expansion of the financial sector in Malaysia. Ang and McKibbin suggest that the returns from financial development depend on the mobilization of savings and allocation of funds to productive investment projects. However, due to information gaps, high transaction costs and improper allocation of resources, the interaction between savings and investment and its link with economic growth is not strong in developing countries. According to Beck (2011), the existence of natural resource curse in financial development might be another reason for this insignificant impact of financial development on growth in oil-rich economies.

In contrast, the effect of financial development (FD) on the non oil sector in Saudi Arabia is positive and statistically significant at 10%. The magnitude of this impact is not sufficient to ensure a positive relationship for the overall economy since the non-oil sector constitutes only a relatively small part of the Saudi economy. This finding is consistent with Nili and Rastad, (2007) who find that financial markets in resource-rich countries are relatively weak. They attribute their results to three reasons, a possible natural resource curse in financial development, the dominant role of government in total investment and the poor performance of the private sector in these countries.

In contrast, the third model shows that FD does not have any impact on the oil sector of Saudi Arabia. Since the oil sector is exclusively controlled by the government, it is not surprising that financial development does not significantly contribute towards its growth.

Short run impact and adjustment

The coefficients of the error correction model for all three specifications are presented in Tables 7, 11 and 15. The negative signs of each coefficient of the ECM variable reveal that short-run adjustment, which occurs at a high speed in the negative direction, is statistically significant. Moreover, this is an indication of cointegration relationship among GDP (both oil and non-oil), financial development, oil price, and trade openness. The values of ECM coefficients strongly suggest that the disequilibrium caused by previous year's shocks dissipates and the economy converges back to the long-run equilibrium in the current year (see Dara and Sovannroeun, 2008; and Hossein, 2007).

Diagnostic test

The overall goodness of fit of the estimated models shown in Tables 8, 12 and 16 is quite high, with R^2 values of 96%, 99% and 77% for the first, second and third model, respectively. This is not surprising, given that the ARDL model includes the lagged dependent variable. We applied a number of diagnostic tests to the ARDL model. We found no evidence of serial correlation, multicollinearity, and error in the functional form, but found heteroskedasticity in model 2 and model 3 (Tables 12 and 16). However, as Shrestha and Chowdhury (2005) and Fosu and Magnus (2006) point out, it is natural to detect heteroskedasticity in the ADRL approach, since the model mixes time series data integrated of order I(0) and I(1). Figures 1, 2 and 3 show the CUSUM and the CUSUMSQ stability test results to the residuals of equation (1): the CUSUM and CUSUMSQ remain within the critical boundaries for the 5% significance level. These statistics confirm that the long-run coefficients and all short-run coefficients in the error correction model are stable and affect growth.

Robustness checks

Although the three previous models have passed all diagnostic and stability tests successfully, we also carry out a number of robustness checks in order to examine the sensitivity of our findings to alternative model specifications. In this section, we report the core results of these robustness checks.

First, we re-estimate all models with the individual measures of financial development variables (M2, M3 and credit to the private sector, all as fractions of GDP) individually rather than as a composite index. The results are similar to those reported above in that the effect of the financial development variable on growth is either negative and significant or insignificant. Most notable result with the separate measures of financial development is that the impact of claims on the private sector to GDP always appears to have a negative and significant effect on economic growth. This finding suggests that there are fundamental problems of credit allocation in the Saudi financial sector, due to the inefficient financial regulation and supervision in the banking sector in Saudi Arabia, along with the lack of an appropriate investment climate required to foster private investment and promote economic growth in the long-run. Using (M3/GDP) and (M2/GDP) each in separate models along with claims on private sector and other controls, we obtained positive and significant coefficients in the long-run only for the growth of non-oil GDP model. To save space, we are not reporting these results but they are available upon request as a supplementary appendix.

As a second robustness exercise, we consider another (non-money stock) variable used in the literature as measure of financial development: total banks assets to GDP ratio. This variable is a comprehensive measure of the size of the financial sector relative to the size of the economy as whole (Levine and Beck, 1999). The total banks assets include claims on the government, public enterprises and the private sector. Since we use claims on the private sector as another measure of financial development, we exclude this variable from the total banks assets. We denote the resulting measure as TBA.

We use TBA to replace M2/GDP. As discussed before, monetary aggregates such as M2 and M3 as ratios of nominal GDP are the two most commonly used measures to capture the depth of the financial sector, as used in the empirical literature. The reason for dropping M2/GDP is that it has been argued in the literature that M2/GDP might not be that good a proxy for financial development in the case of developing countries (e.g., Demetriades and Hussein, 1996; and Luintel and Khan, 1999) because currency held outside the banking system is a large component of the broad money stock (M2) in these countries. If this is the case, an increase in the ratio of broad money to GDP may reflect more extensive use of currency rather than an increase in the volume of bank deposits. As a result, M2 mostly represents the ability of the financial systems to provide transaction services rather than their ability to link up surplus and deficit agents in the economy. Therefore, we omit M2/GDP and replace it with TBA/GDP.

We apply the same principal component analysis procedure as before to construct a new aggregate index of financial development. We denote this new summary indicator as FD2. Hence, we aggregate the following three different measures of financial development into a single index:

1- The ratio of liquid liabilities (M3) to nominal GDP.
2- The ratio of credit to private sector to nominal GDP.
3- The ratio of the total banks assets to nominal GDP.

Table 17 presents the results obtained from principal component analysis of the three measures of financial development listed above. The first component explains 96% of the variance in the data and its eigenvalue is larger than one. The second and third principal component each explain only a negligible share of the variation. As before, we therefore, use only the first principal component as a measure of financial development.

Robustness checks using FD2 index. [9]

Cointegration test

The F-statistics for the cointegration tests are presented in table 18, 22 and 26. The F-statistic of the models estimated with GDP, GDPN and GDPO are 6.763, 7.4093 and 4.837, respectively, greater than the upper bound Pesaran critical value (4.37) at the 1 percent

[9] We also carry out separate analyses using each of the original financial development indicators. The results are similar to those in Tables 18 to 29. In order to conserve space, we drop them from this version and make them available upon request.

significance level for the overall GDP and the non-oil sector and at 5 percent significance level for the oil sector, using restricted intercept and no trend. This suggests that there is a long-run relationship among the total GDP and the two sub-components of the total GDP; GDPN and GDPO with the financial development index and the other two controls variables: oil price and trade. Thus, the results imply that there is a unique cointegrating relationship among the three dependant variables; GDP, GDPN, GDPO, and the explanatory variables.

Long- run impact

The existence of a long run relationship among GDP (both oil and non-oil) and the explanatory variables allows the estimation of long run coefficients and short run dynamic parameters. The empirical results of the long-run impact are presented in Tables 19, 23 and 27. The results for the control variables, oil price and trade confirm our previous findings. The new financial development index displays a negative impact on long-run overall growth and the growth of the oil sector, but this is now statistically significant. This finding is in line with Mahran (2012), who finds a negative impact of the banking sector on the overall GDP growth. In contrast, financial intermediation positively affects the growth rate of the non-oil sector.

Short-run impact and adjustment

The results of the short-run and the lagged error correction term (ECM) are reported in tables 20, 24 and 28. The coefficient of the ECM for GDP and GDPN models; -0.164 abd -0.366, respectively, are negative and statistically significant at the 1 percent level. The coefficient for GDPN is also negative but significant at 10% only. The significant negative signs of all ECM coefficients are an indication of a cointegrating relationship among real GDP (both GDPN and GDPO) and financial development, oil price and trade and any disequilibrium caused by previous year's shocks converges back to the long-run equilibrium in the current year for all models.

Diagnostic tests

Tables 21, 25 and 29 display the diagnostic test results for the underlying ARDL equation. The results suggest again that all models pass the diagnostic tests against serial correlation, functional form misspecification and non-normal errors. However, the GDPN and GDPO models fail the heteroscedasticity test at 5%. As discussed earlier, it is natural to detect heteroscedasticity when we have mixed time series data integrated of order I(0) and I(1). The plot of the cumulative sum of recursive residuals (CUSUM) and cumulative sum of squares recursive residuals (CUSUMQ) for the three robustness models presented in Fig. 4, 5 and 6 also indicate stability in the coefficients over the sample period as they fall within the critical bounds.

As discussed before, financial systems in Saudi Arabia can be broadly classified as bank-dominated. However, following the preceding robustness checks, we investigate how our benchmark results change when we consider not only bank sector effects but also stock market effects in our models. We carried out these estimations on shorter time span (1985-2010) as this is the period for which the data on the stock market are available. We add the market value of shares/GDP as a stock market variable measuring the development in the financial sector along with the other financial development variables used in the main analysis. The results show that the inclusion of stock market development does not remarkably change our results. This indicates that financial development has a positive short-run impact on the growth of the non-oil sector in Saudi Arabia. However, this impact disappears in the long-run. In contrast, the impact of financial development on total GDP growth and oil-sector growth are negative but insignificant. The control variables have the expected sign with more or less minor changes.[10]

In summary, we confirm that our previous results are robust to alternative model speciations. Moreover, we can conclude that financial development has a positive impact on the growth of the non-oil sector in Saudi Arabia. In contrast, its impact on the oil sector and overall GDP growth is negative and significant.

[10] The results on bank and market sectors are provided in a supplement that can be obtained from the authors upon request.

VI. Conclusions

This paper contributes to the literature on financial development and growth by focusing on the financial sector of an oil-rich economy, Saudi Arabia, which has not been studied extensively thus far. The results of this empirical study, based on the ARDL approach, suggest that financial development has a positive impact on economic growth of the Saudi non-oil sector in the long-run. In contrast, we find a negative or insignificant impact of financial development on the economy as a whole, and on the oil sector, which we believe is a significant finding.

These results can be interpreted from two angles. First, they reflect the inherent economic nature of Saudi Arabia, which is predominantly an oil-dominated economy. Second, they could be indicative of relative under-development of the Saudi banking system, which could lead to imbalances between saving and investment and may distort investment decisions. This is in line with Malkawi et al. (2012), who argue that the financial sector in Saudi Arabia is still in the transition stage. Hence, it needs to go beyond a certain threshold before it can be instrumental in promoting economic growth.

These findings also highlight the specific nature of oil and resource-rich economies like Saudi Arabia. Resource-driven economies do not necessarily follow the same patterns of development as manufacturing economies. The economy crucially depends on price fluctuations and foreign markets, as documented by the strong role played in our analysis by the oil price and openness to trade. Financial development does not play as prominent a role as in industrialized economies, or may not even play any role at all. The two arguments mentioned in the preceding paragraph may therefore be related: the fact that the Saudi banking sector is underdeveloped may itself be due to 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.

Our results suggest, nevertheless, that the Saudi non-oil sector is favourably affected by financial development. Hence, from a policy perspective, it is useful to further develop the Saudi banking system with a view to aiding the growth of the non-oil sector, given that the impact of financial development on the latter is positive and significant. In that way, and 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.

References

Atje, Raymond and Boyan Jovanovic. (1993). Stock Markets and Development. *European Economic Review*, 37, 632-640.

Abu-Bader, S., and Abu-Qarn, A.S. (2008). Financial Development and Economic Growth: The Egyptian Experience. *Journal of Policy Modeling*, 30 (5), 887–898.

Albatel, A.H. (2000). Financial Development and Economic Growth in Saudi Arabia. *Journal of Economic & Administrative Sciences*, 16, 162-188.

Al-Hassan, A., Khamis,M. and Oulidi.N. (2010). The GCC Banking Sector: Topography and Analysis, *International Monetary Fund*, *IMF Working Paper, 10-87*.Al-Malkawi, H., and Abdullah, N. (2012). Finance-Growth Nexus: Evidence from a Panel of MENA Countries. *International Journal of Economics and Finance*, 4 (5), 129-139.

Al-Yousif, Y. K. (2002). Financial Development and Economic Growth: Another Look at the Evidence from Developing Countries. *Review of Financial Economics*, 11(2), 131–150.

Ang, J. B., and McKibbin,W.J. (2007). Financial development and Economic Growth: Evidence from Malaysia. *Journal of Development Economics*, 84, 215-233.

Ang,James B ,(2010) financial development and economic growth in Malaysia. Routledge Studies in the Growth Economies of Asia.

Agung, F. and Ford, J. (1998). Financial Development, Liberalization and Economic Development in Indonesia, 1966-1996: Cointegration and Causality. *University Of Birmingham, Department of Economics Discussion Paper No: 98-12.*

Asterious, Dimitrios and Stephen Hall, 2011, Applied Econometrics: A Modern Approach, Palgrave Macmillan. Second edition.

Balajas, A., Chami, R., and Yousefi, R.S. (2011). The Finance-Growth Nexus Re-Examined: Are There Cross-Region Differences? *IMF Working Paper,* 48(3).

Beck, Thorsten. (2010). Finance and Oil: Is There a Resource Curse in Financial Development?. *European Banking Centre Discussion Paper No. 2011-004.* (Tilburg, The Netherlands: Tilburg University).

Berthelemy, J.C., and Varoudakis, A. (1997). Economic Growth, Convergence Clubs, and the Role of Financial Development. *Oxford Economic Papers* 48, 300–328.

Buffie, E. F. (1984). Financial Repression, the New Structuralists, and Stabilization Policy in Semi-Industrialized Economics, *Journal of Development Economics*, 14, 305-22.

Choudhury, M.A and Al-Sahlawi, M. A. (2000).Oil and Non-oil Sectors in the Saudi Arabian Economy. *OPEC Review*, 24 (3), 235–250.

Christopoulos, D. K. and Tsionas, E. G. (2004) 'Financial development and economic growth: Evidence from panel unit root and cointegration tests', *Journal of Development Economics*, 73, 55-74.

Demirguc-Kunt, Asli and Vojislav Maksimovic. (1998). Law, finance and firm growth, *Journal of Finance*, 53(6), 2107-2137.

Dara, L. and Sovannroeun, (2008) "*The Monetary Model of Exchange Rate: Evidence from the Phillipines using ARDL Approach*", Munich Personal RePEc Archive (MPRA).

De Gregorio, J., and Guidotti, P. (1995). Financial Development and Economic Growth. *World Development*, 23, 433-448.

Demetriades, P. and Law, S.H. (2006). Finance, Institutions and Economic Performance. *International Journal of Finance and Economics*, 11, 1 – 16.

Demetriades, P., and Hussein, K. (1996). Does Financial Development Cause Economic Growth? Time Series Evidence from Sixteen Countries. *Journal of Development Economics*, 51(2), 387–411.

Doing Business in Saudi Arabia 2012. World Bank. Available at http://www.doingbusiness.org/data/exploreeconomies/saudi-arabia/. (Accessed 22 November 2011).

Durlauf, Steven, Paul Johnson, and Jonathan Temple, "Growth Econometrics" (pp. 557–677), in Philippe Aghion and Steven Durlauf (Eds.), *Handbook of Economic Growth* (Amsterdam: North-Holland, 2005).

Fry, M.J. (1978). Money and capital or financial deepening in economic development. *Journal of Money, Credit and Banking* 10, 464–475.

Galbis, V., (1977). Financial Intermediation and Economic Growth in Less-Developed Countries: A Theoretical Approach. *Journal of Development Studies,* 13(2), 58-72.

Ghatak, S. (1997) Financial Liberalisation: The Case of Sri Lanka. *EmpiricalEconomics,* 22(1), 117–131.

Greenwood, J., Bruce, S. (1997). Financial Markets in Development, and the Development of Financial Markets. *Journal of Economic Dynamic and Control,* 21(1), 145–181.

Greenwood, J., Jovanovic, B. (1990). Financial Development, Growth and the Distribution of Income. *Journal of Political Economy*, 98 (5), 1076–1107.

Hondroyiannis, G., Sarantis, L., and Evangelia, P. (2005). Financial Market and Economic Growth in Greece, 1986-1999*. Journal of International Financial Market, Institution and Money*, (15),173-188.

Hosein, S. (2007) '*Demand for money in Iran: An ARDL approach*', Department of Economics, Islamic Azad University, Khorasgan Branch, Isfahan, Iran.

Hicks, J. (1969). A Theory of Economic History. *Clarendon Press, Oxford*.

Hendry, D. F. (1995a) Dynamic Econometrics, Oxford University Press, Oxford.

Inder, B. (1993). Estimating Long-Run Relationship in Economics: A Comparison of Different Approaches. *Journal of Econometrics*, 57: 53-68.

Jalil, A., and Ma, Y. (2008). Financial Development and Economic Growth: Time Series Evidence from Pakistan and China*. Journal of Economic Cooperation*, 29(2), 29-68.

King, R. G. and Levine, R. (1993). Finance and growth: Schumpeter Might Be Right. *Quarterly Journal Economics*, 108: 717-37.

Kenny, C., and Williams, D. (2001). What Do We Know about Economic Growth? Or, Why Don't We Know Very Much? *World Development,* 29(1), 1–22.

Khan, M. A., Qayyum, A. and Saeed, A. S. (2005). Financial Development and Economic Growth: The Case of Pakistan", *The Pakistan Development Review 4. 44, 819-837.*

Krugman, P.R. (1979). Increasing Returns, Monopolistic Competition and International Trade. *Journal of International Economics*, 9 (4), 469-479.

Krugman, P.R. (1980). Scale Economies, Product Differentiation, and the Pattern of Trade. *American Economic Review*, 70 (5), 950-959.

Kuznets, S. (1955). Economic Growth and Income Inequality. *The American Economic Review*, 45(1), 1–28.

Levine, Ross and Zervos, Sara (1998), "Stock Markets, Banks, and Growth," *American Economic Review*, 88(3), 537-558.

Levine, R., and Beck, T. (1999). A new database on financial development and structure. *Research Working papers*, *1*(1), 1-69.

Levine, R. and Renelt, D. (1992), “A Sensitivity Analysis of Cross-Country GrowthRegressions,” *American Economic Review* 82 (4), 942-963.

Lyons, S.E. and Murinde, V. (1994) .Cointegration and Granger-Causality Testing of Hypotheses on Supply-Leading and Demand-Following Finance. *Economic Notes*. 23 (2), 308-316.

Loayza, N. V., and Ranciere, R. (2006). Financial Development, Financial Fragility, and Growth. *Journal of Money, Credit and Banking*. 38(4), 1051-1076.

Lucas, R. (1988). On the Mechanics of Economic Development. *Journal of Monetary Economics* 22, 2-42.

Luintel, K. B., Khan, M. 1999. A quantitative reassessment of the finance-growth nexus, Evidence from a multivariate VAR, Journal of Development Economics, 60, 381-405.

Majid, M. S. (2007). Does Financial Development and Inflation Spur Economic Growth in Thailand? *Chulalongkorn Journal of Economics*, *19*, 161–184.

Mahran, H. A. (2012). Financial Intermediation and Economic Growth in Saudi Arabia: An Empirical Analysis, 1968-2010. *Modern Economy*, *3*.

McKinnon R. (1973) Money and Capital in Economic Development (Washington: The Brookings Institute).

Mohamad, S. E. (2008). Finance-Growth Nexus In Sudan: Empirical Assessment Based on an Application of the Autoregressive Distributed Lag (ARDL) Model. *Working Paper, No.API/WPS 0803, Arab Planning Institute, Kuwait.*

Murinde, V., and Eng, F.S.H. (1994). Financial Development and Economic Growth in Singapore: Demand-Following or Supply-Following. *Applied Financial Economics*, 4 (6), 391-404.

Muhsin, K. and Eric, J. P. (2000). Financial Development and Economic Growth in Turkey: Further Evidence on the Causality Issue. *Centre for International, Financial and Economics Research Department of Economics Loughborough University*.

Nili, M. and M. Rastad. (2007). Addressing the Growth Failure of the Oil Economies: The Role of Financial Development. *The Quarterly Journal of Economics and Finance*, 46, 726–40.

Odedokun, M.O. (1989). Causalities between Financial Aggregates and Economic Activities: The Results from Granger's Test. *Savings and Development*, 23 (1), 101- 111.

Patrick, H.T. (1966). Financial Development and Economic Growth in Underdeveloped Countries. *Economic Development and Cultural Change*, 14(2), 174-189.

Pesaran, H. M. (1997). The Role of Economic Theory in Modelling the Long-Run. *Economic Journal*, 107, 178-191.

Pesaran, M. H., Shin, Y., and Smith, R. J. (2001). Bounds Testing Approaches to the Analysis of Level Relationships. *Journal of Applied Econometrics*, 16, 289-326.

Ram, R. (1999). Financial Development and Economic Growth: Additional Evidence. *The Journal of Development Studies*, 35 (4), 164-174.

Qi, L. and Teng, J. Z. (2006). Financial Development and Economic Growth: Evidence from China. *China Economic Review*, 17(3), 395-411.

Robinson, J. (1952). The Generalization of the General Theory. In The Rate of Interest, and other Essays. *London: McMillan, 67–146.*

Safdari, M., Mehrizi, M.A., and Elahi, M. (2011). Financial Development and Economic Growth in Iran. European Journal of Economics, Finance and Administrative Sciences, 36, 115-122.

Singh, T. (2008). Financial Development and Economic Growth Nexus: A Time-Series Evidence from India. *Applied Economics* 40, 1615-1627.

Schumpeter, J. A. (1934). The Theory of Economic Development. *Translated by Redvers Opie, Cambridge MA: Harvard University Press.*

Shaw, E. S. (1973). Financial Deepening in Economic Development. *Oxford University Press, New York.*

Shrestha, M.B. and Chowdhury, K. (2005). ARDL Modelling Approach to Testing the Financial Liberalization Hypothesis. *Economics Working Paper Series 2005, University of Wollongong*.

Stern, N. (1989). The Economics of Development: A Survey. *The Economic Journal*, 99(397), 597-685.

Thangavelu, S.M. and Ang, B. J. (2004). Financial Development and Economic Growth in Australia: *An Empirical Analysis, Empirical Economics, 29, 247-260*.

Thakor, A.V. (1996). The design of financial systems: An Overview. *Journal of Banking and Finance*, 20, 917-948.

The Political Risk Services Country Reports (PRS)Group Saudi Arabia Country Forecast, May 2010 The Saudi Insurance Market Report 2009.

van der Ploeg, F. (2011). Natural Resources: Curse of Blessing? *Journal of Economic Literature,* 29 (2), 366-420.

Van Wijnbergen. S. (1983). Credit Policy, Inflation and Growth in a Financially Repressed Economy. *Journal of Development Economics*, 3(1-2), 45-65.

Woo, J. (2009). Why Do More Polarized Countries Run More Procyclical Fiscal Policy? *The Review of Economics and Statistics, 91(4), 850-870.*

Wood A. (1993). Financial Development and Economic Growth in Barbados: Causal Evidence. *Savings and Development*, 17 (4), 379-389.

Wu, J., Hou, H., and Cheng, S. (2010). The Dynamic Impacts of Financial Institutions on Economic Growth: Evidence from the European Union. *Journal of Macroeconomics*, 32, 879-891.

Xu, Z. (2000). Financial Development, Investment and Growth. *Economic Inquiry* 38(2), 331-344.

Tables

Table 1: Selected Indicators of Banking Sector

Year	M3/GDP	PRIVATE/GDP	Total Bank Asset
2005	46.8218	36.8644469	759075
2006	49.4604	35.64138057	861088
2007	54.7463	40.05913986	1075221
2008	52.0185	41.12532216	1302271
2009	72.8406	52.53976349	1370258
2010	64.3419	47.59243453	1415267

Sources: SAMA 48th Annual Report.

Table 2: Bank Credit to the Private Sector by economic Activity (In Million Riyals)

	2006		2007		2008		2009		2010	
	Amount	% Share	Amount	% Share	Amount	% Share	Amount	% Share	Amount	% Share
Agriculture & Fishing	6802	1.5	8636	1.5	10980	1.5	8731	1.2	10269	1.4
Manufacturing & Processing	37566	8.1	54339	9.7	79333	11.1	75044	10.6	90082	12.1
Mining & Qurrying	1802	0.4	3897	0.7	4265	0.6	5337	0.8	5818	0.8
Electricity, Water & Gas	3598	0.8	5878	1.1	10629	1.5	13365	1.9	19243	2.6
Building & Construction	37845	8.2	43421	7.8	54371	7.6	44741	6.3	55644	7.5
Commerce	111511	24.1	127473	22.9	176858	24.8	169220	23.9	181132	24.4
Transport & Communication	6875	1.5	20989	3.8	37814	5.3	38415	5.4	42992	5.8
Finance	61828	13.4	62632	11.2	16812	2.4	21258	3.0	17756	2.4
Services	16735	3.6	28286	5.1	32324	4.5	46123	6.5	35660	4.8
Miscellaneous	177539	38.4	201854	36.2	289351	40.6	286536	40.4	284461	38.3
Total	462,103	100	557,405	100	712,737	100	708,769	100	743,057	100

Sources: SAMA 47th Annual Report.

Table 3: Principal Components Analysis

Number of Obs = 41 Number of comp. = 3

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	2.912	2.840	0.971	0.971
Comp2	0.072	0.0569	0.024	0.995
Comp3	0.015	.	0.005	1.000

Table 4: Unitroot Test

Variables	ADF test		ADF test	
	In level I(0)		First difference I(1)	
	Intercept	Intercept & trend	Intercept	Intercept &trend
GDP	-2.598	-3.078*	-2.997**	-3.463*
GDPN	-3.15**	-3.371*	-2.47	-2.82
GDPO	-2.659*	-3.450*	-5.335***	-5.394***
FD	-0.250	-2.621	-6.999***	-7.004***
OILP	-2.631*	-2.401	-6.028***	-6.022***
TRD	-1.555	-1.491	-9.097***	-9.001***

Note:*, **, and *** indicate significance at* 10 %, ** at 5 % and *** at 1.

Table 5: Result from Bound test

Dep. Var.	SIC Lag	F-statistic	Probability	Outcome
F_{GDP}(GDP|FD, OILP, TRD)	1	7.580	0.000***	Cointegration
F_{FD}(FD|GDP, OILP, TRD)	1	3.636	0.015**	Cointegration
F_{OILP}(OILP| FD, GDP, TRD)	1	3.355	0.021**	Cointegration
F_{TRD}(TRD| FD, GDP, OILP)	1	1.254	0.308	No Cointegration

Notes: Asymptotic critical value bounds are obtained from Table F-Statistic in appendix CI, Case II: intercept and no trend for k=4 (Pesaran et al (2001) p.300).

Table 6: Estimated Long Run Coefficients using the ARDL Approach

ARDL(2,0,1,1) selected based on Schwarz Bayesian Criterion, Dependent variable is GDP

Regressor	Coefficient	Standard Error	T-Ratio	Probability
C	-6.950	12.390	-0.560	0.579
FD	-0.033	0.035	-0.962	0.342
OILP	0.133***	0.023	5.690	0.000
TRD	2.14***	0.088	24.310	0.000

Note:*, **, and *** indicate significance at* 10 %, ** at 5 % and *** at 1.

Table 7: Error Correction Representation for the Selected ARDL Model

ARDL(2,0,1,1) selected based on Schwarz Bayesian Criterion. Dependent variable is ΔGDP

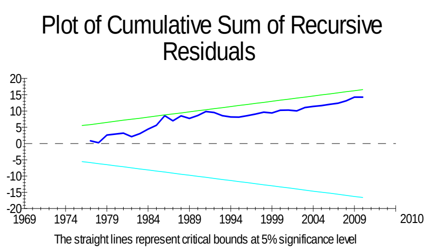
Regressor	Coefficient	Standard Error	T-Ratio	Probability
C	1.750**	0.805	2.173	0.037
ΔFD	-0.004	0.004	-0.993	0.327
ΔOILP	0.001	0.004	0.252	0.802
ΔTRD	0.118*	0.058	1.74	0.089
ecm(-1)	-0.128***	0.023	-5.47	0.000

Note:*, **, and *** indicate significance at* 10 %, ** at 5 % and *** at 1.

Table 8: ARDL-VECM Model Diagnostic Tests

R^2=0.96, Adjusted R^2=0.95	
Serial Correlation $\mathcal{X}^2(1)$=0.001[0.972]	Normality $\mathcal{X}^2(2)$=1.687[0.43]
Functional Form $\mathcal{X}^2(1)$= 0.559[0.454]	Heteroscedasticy $\mathcal{X}^2(1)$=1.640[0.199]

Figure 1: Plot of Cusum and Cusumq for coefficients stability for ECM model (1)



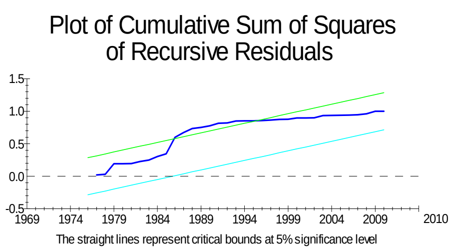


Table 9: Result from Bound test

Dep. Var.	SIC Lag	F-statistic	Probability	Outcome
F_{GDPN} (GDPN| FD, OILP, TRD)	2	10.381	0.000***	Cointegration
F_{FD} (FD| GDPN, OILP, TRD)	1	4.199	0.007**	Cointegration
F_{OILP}(OILP| FD, GDPN, TRD)	1	5.996	0.001**	Cointegration
F_{TRD}(TRD| FD, GDPN, OILP)	1	2.770	0.042*	Cointegration

Notes: Asymptotic critical value bounds are obtained from Table F-Statistic in appendix CI, Case II: intercept and no trend for k=4 (Pesaran et al (2001) p.300).

Table 10: Estimated Long Run Coefficients using the ARDL Approach

ARDL(2,0,1,1) selected based on Schwarz Bayesian Criterion, Dependent variable is GDPN

Regressor	Coefficient	Standard Error	T-Ratio	Probability
C	1.25**	0.600	2.070	0.040
FD	0.184*	0.106	1.730	0.091
OILP	0.078	0.046	1.660	0.104
TRD	2.14***	0.088	24.310	0.000

Note:*, **, and *** indicate significance at* 10 %, ** at 5 % and *** at 1.

Table 11: Error Correction Representation for the Selected ARDL Model

ARDL(2,0,1,1) selected based on Schwarz Bayesian Criterion. Dependent variable is ΔGDPN

Regressor	Coefficient	Standard Error	T-Ratio	Probability
C	1.918***	0.702	2.729	0.010
ΔFD	0.111	0.008	1.390	0.172
ΔOILP	0.110***	0.004	2.570	0.014
ΔTRD	0.061	0.062	0.980	0.333
ecm(-1)	-0.06***	0.174	-3.450	0.001

Note:*, **, and *** indicate significance at* 10 %, ** at 5 % and *** at 1.

Table 12: ARDL-VECM Model Diagnostic Tests

R^2=0.99, Adjusted R^2=0.98

Serial Correlation $\mathcal{X}^2(1)$=.010[0.91]	Normality $\mathcal{X}^2(2)$=0.053[0.97]
Functional Form $\mathcal{X}^2(1)$= .016[0.89]	Heteroscedasticy $\mathcal{X}^2(1)$=4.65[0.031]

Figure 2: Plot of Cusum and Cusumq for coefficients stability for ECM model (2)

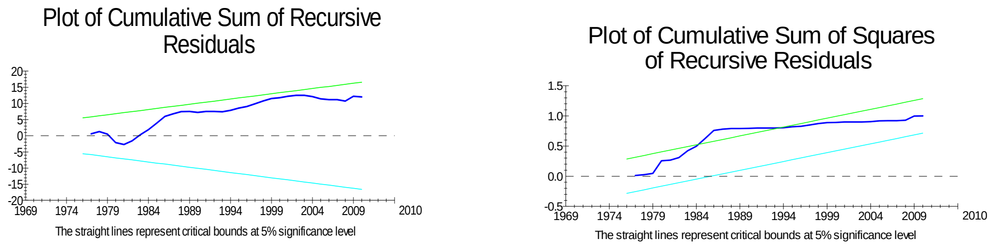


Table 13: Result from Bound test

Dep. Var.	SIC Lag	F-statistic	Probability	Outcome
F_{GDPO}(GDPO|FD, OILP, TRD)	1	3.840	0.017**	Cointegration
F_{FD}(FD|GDPO, OILP, TRD)	1	1.313	0.297	No Cointegration
F_{OILP}(OILP| FD, GDPO, TRD)	1	2.504	0.068	Inconclusive
F_{TRD}(TRD| FD, GDPO, OILP)	1	1.959	0.138	No Cointegration

Notes: Asymptotic critical value bounds are obtained from Table F-Statistic in appendix CI, Case II: intercept and no trend for k=4 (Pesaran et al (2001) p.300).

Table 14: Estimated Long Run Coefficients using the ARDL Approach

ARDL(1,1,0,0) selected based on Schwarz Bayesian Criterion, Dependent variable is GDPO

Regressor	Coefficient	Standard Error	T-Ratio	Probability
C	4.100	6.060	.676	0.504
FD	0.170	.123	1.44	0.157
OILP	0.193**	.082	2.35	0.025
TRD	3.140***	.158	19.87	0.000

Note:*, **, and *** indicate significance at* 10 %, ** at 5 % and *** at 1.

Table 15: Error Correction Representation for the Selected ARDL Model

ARDL (1,1,0,0) selected based on Schwarz Bayesian Criterion. Dependent variable is ΔGDPO

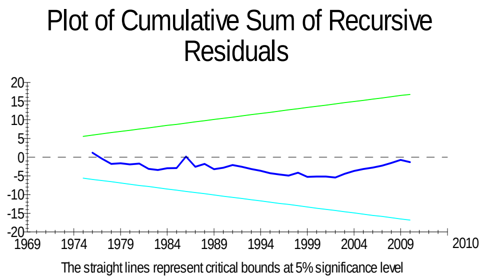
Regressor	Coefficient	Standard Error	T-Ratio	Probability
C	3.584**	1.744	2.054	0.048
ΔFD	-0.088**	0.044	-2.004	0.053
ΔOILP	0.021***	0.007	2.954	0.006
ΔTRD	0.349**	0.149	2.340	0.025
ecm(-1)	-0.111**	0.051	-2.155	0.038

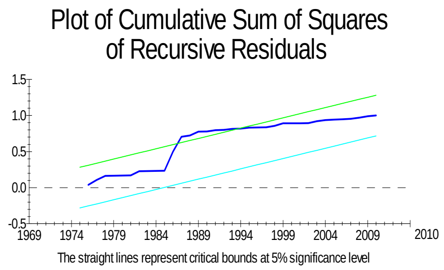
Note:*, **, and *** indicate significance at* 10 %, ** at 5 % and *** at 1.

Table 16: ARDL-VECM model diagnostic tests

R^2=0.77, Adjusted R^2=0.73	
Serial Correlation $\chi^2(1)$=2.049[0.152]	Normality $\chi^2(2)$=.0211[0.989]
Functional Form $\chi^2(1)$= 2.291[0.130]	Heteroscedasticy $\chi^2(1)$=14.860[0.00]

Figure 3: Plot of Cusum and Cusumq for coefficients stability for ECM model (3)





Robustness check tables results:

Table 17: Principal Components Analysis

Number of Obs = 41 Number of comp. = 3

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	2.907	2.853	0.969	0.969
Comp2	0.539	0.015	0.018	0.987
Comp3	0.038	.	0.012	1.000

Table 18: Results from Bound test

Dep. Var.	SIC Lag	F-stat.	Probability	Outcome
F_{GDP}(GDP|FD2, OILP, TRD)	1	6.763	0.000***	Cointegration
F_{FD2}(FD2|GDP, OILP, TRD)	1	1.825	0.148	No Cointegration
F_{OILP}(OILP| FD2,GDP, TRD)	1	3.861	0.011**	Cointegration
F_{TRD}(TRD|FD2, GDP, OILP)	1	2.924	0.304	Inconclusive

Notes: Asymptotic critical value bounds are obtained from Table F-Statistic in appendix CI, Case II: intercept and no trend for k=4 (Pesaran et al (2001) p.300).

Table 19: Estimated Long Run Coefficients using the ARDL Approach

ARDL(2,0,1,1) selected based on Schwarz Bayesian Criterion, Dependent variable is GDP

Regressor	Coefficient	Standard Error	T-Ratio	Probability
C	4.588	3.334	1.375	0.178
FD2	-0.399**	0.172	- 2.313	0.027
OILP	0.053**	0.023	2.326	0.026
TRD	0.028**	0.013	2.205	0.035

Note:*, **, and *** indicate significance at* 10 %, ** at 5 % and *** at 1.

Table 20: Error Correction Representation for the Selected ARDL Model

ARDL(2,0,1,1) selected based on Schwarz Bayesian Criterion. Dependent variable is ΔGDP

Regressor	Coefficient	Standard Error	T-Ratio	Probability
C	0.752	0.762	0.986	0.331
ΔFD2	- 0.094 *	0.052	-1.796	0.082
ΔOILP	0.007**	0.003	1.994	0.054
ΔTRD	0.004**	0.002	2.305	0.027
ecm(-1)	-0.164***	0.053	-3.085	0.004

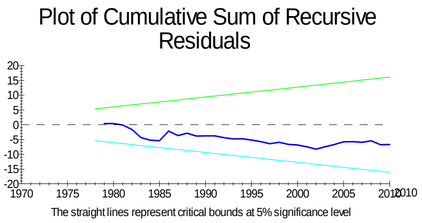
Note:*, **, and *** indicate significance at* 10 %, ** at 5 % and *** at 1.

Table 21: ARDL-VECM Model Diagnostic Tests

R^2=0.97, Adjusted R^2=0.96

A:Serial Correlation χ^2 (1)= 0.128[0.720]	C:Normality χ^2 (2)= 0.894[0.639]
B:Functional Form χ^2 (1)= 2.526[0.112]	D:Heteroscedasticity χ^2 (1)= 0.135[0.712]

Figure 4: Plot of Cusum and Cusumq for coefficients stability for ECM- Robustness model (1)



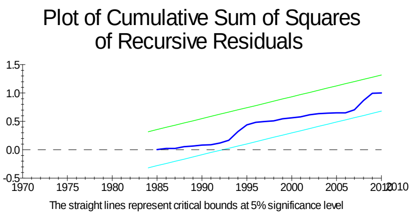


Table 22: Results of Bound test

Dep. Var.	SIC LaG	F-stat.	Probability	Outcome
F_{GDPN}(GDPN|FD2, OILP, TRD)	2	7.4093	0.001***	Cointegration
F_{FD}(FD2|GDPN, OILP, TRD)	2	3.084	0.030	No Cointegration
F_{OILP}(OILP|GDPN, FD2, TRD)	2	3.322	0.022	No Cointegration
F_{TRD}(TRD|GDPN, FD2, OILP)	2	5.835	0.001***	Cointegration

Notes: Asymptotic critical value bounds are obtained from Table F-Statistic in appendix CI, Case II: intercept and no trend for k=4 (Pesaran et al (2001) p.300).

Table 23: Estimated Long Run Coefficients using the ARDL Approach

ARDL(2,0,1,1) selected based on Schwarz Bayesian Criterion, Dependent variable is GDPN

Regressor	Coefficient	Standard Error	T-Ratio	Probability
C	0.492***	0.122	4.049	0.000
FD2	0.014*	0.007	1.879	0.077
OILP	0.010	0.082	0.121	0.904
TRD	0.015***	0.003	4.592	0.000

Note:*, **, and *** indicate significance at* 10 %, ** at 5 % and *** at 1.

Table 24: Error Correction Representation for the Selected ARDL Model

ARDL(2,0,1,1) selected based on Schwarz Bayesian Criterion. Dependent variable is ΔGDP

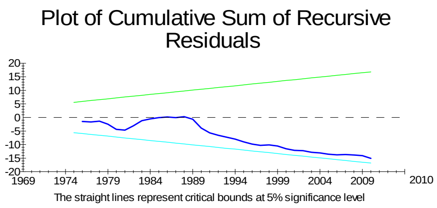
Regressor	Coefficient	Standard Error	T-Ratio	Probability
C	0.535	0.577	0.928	0.359
ΔFD2	0.106***	0.024	4.296	0.000
ΔOILP	0.101 *	.056973	1.7901	0.082
ΔTRD	0.010***	0.002	3.897	0.000
ecm(-1)	-0.066*	0.037	-1.768	0.086

Note:*, **, and *** indicate significance at* 10 %, ** at 5 % and *** at 1.

Table 25: ARDL-VECM Model Diagnostic Tests

R^2=0.99, Adjusted R^2=0.98	
Serial Correlation $\chi^2(1)$= 0.454 [0.50]	Normality χ^2 (2)= 0.972[0.97]
Functional Form $\chi^2(1)$= 0.972 [0.61]	Heteroscedasticity χ^2 (1)= 3.203[0.07]

Figure 5: Plot of Cusum and Cusumq for coefficients stability for ECM- Robustness model (2)



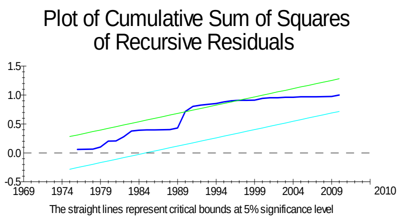


Table 26: Results of Bound test

Dep. Var.	SIC Lag	F-stat.	Probability	Outcome
F_{GDPO}(GDPO|FD2, OILP, TRD)	2	4.837	0.007**	Cointegration
F_{FD2}(FD2|GDPO, OILP, TRD)	2	2.266	0.084	No Cointegration
F_{OILP}(OILP|GDPO, FD2, TRD)	2	3.467	0.018	No Cointegration
F_{TRD}(TRD|GDPO, FD2, OILP)	2	0.764	0.556	No Cointegration

Notes: Asymptotic critical value bounds are obtained from Table F-Statistic in appendix CI, Case II: intercept and no trend for k=4 (Pesaran et al (2001) p.300).

Table 27: Estimated Long Run Coefficients using the ARDL Approach

ARDL(1,1,0,0) selected based on Schwarz Bayesian Criterion, Dependent variable is GDPO

Regressor	Coefficient	Standard Error	T-Ratio	Probability
C	9.587***	1.882	5.093	0.000
FD2	-0.435***	0.128	-3.400	0.002
OILP	0.053**	0.028	1.875	0.069
TRD	0.060***	0.014	4.172	0.000

Note:*, **, and *** indicate significance at* 10 %, ** at 5 % and *** at 1.

Table 28: Error Correction Representation for the Selected ARDL Model

ARDL (1,1,0,0) selected based on Schwarz Bayesian Criterion. Dependent variable is ΔGDPO

Regressor	Coefficient	Standard Error	T-Ratio	Probability
C	3.515**	1.411	2.490	0.018
ΔFD2	-0.159***	0.057	-2.770	0.009
ΔOILP	0.019**	0.007	2.584	0.014
ΔTRD	0.022***	0.007	3.086	0.004
ecm(-1)	-0.366***	0.106	-3.455	0.001

Note:*, **, and *** indicate significance at* 10 %, ** at 5 % and *** at 1.

Table 29: ARDL-VECM Model Diagnostic Tests

R^2=0.84, Adjusted R^2=0.81	
Serial Correlation χ^2 (1)= 0.638[1.00]	Normality χ^2 (2)= 0.233[0.890]
Functional Form χ^2 (1)= 0.130[0.718]	Heteroscedasticity χ^2 (1)= 7.605[0.006]

Figure 6: Plot of Cusum and Cusumq for coefficients stability for ECM- Robustness model (3)