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COMMERCIAL BANKS AND GROWTH IN THE NONOIL SECTOR IN SAUDI ARABIA

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Abstract

The role of commercial banks in the economic growth of national economies has drawn considerable attention from the economics profession. This study specifically investigates the role played by the Saudi commercial banks in the economic growth of the nonoil sector in the Kingdom of Saudi Arabia. This issue assumes added importance in Saudi Arabia since the government is seeking to diversify the economic base of the country by enhancing growth in the nonoil sector. Using annual data for the period 1965-2016 and the(VEC) technique the results of the study indicated a negative relation between economic growth in the nonoil sector and the variables standing for commercial banks role namely commercial banks total deposits and credit implying that the banks have in fact played a negative role in the growth of the nonoil sector. The results may not be very surprising since Saudi commercial banks have been considerably involved in extending credit for commercial uses and household consumption rather than for productive activities in the economy. Policy makers in Saudi Arabia therefore have to design appropriate policies and take proper action to ensure that commercial bank deposit and credit activities serve the cause growth in the nonoil sector which is becoming increasingly the focus of attention for development in Saudi Arabia.

Keywords: Cointegration, growth, nonoil sector, commercial banks, Saudi Arabia

INTRODUCTION

The year 2014 marked the beginning of deep trouble for the Saudi economy as oil prices plummeted causing a sharp decline in the oil revenues which represent the main source of livelihood and welfare for the country as a whole. This sudden economic upheaval alerted the government to the perils of heavy dependence on the oil resource alone. In 2014 oil has constituted about 42 percent of the GDP of Saudi Arabia and more than 85 percent of its export revenues (Alkhateeb, Sultan, Mahmood 2017). Consequently, in its vision 2030 (initiated 2015) the Saudi government embarked on an extensive diversification program aimed at increasing the role of the non-oil sector in the economy and thus reducing the degree of the vulnerability of the economy to the fluctuations of oil prices which could destabilize the Saudi economy and hamper its economic development. This raises questions about the determinants of growth in the nonoil sector and how it might be effectively boosted in order to diversify the range of economic activities in the country and broaden its economic base. In particular, the present study aims at investigating the role of the banking system as one of the driving forces of economic growth in the nonoil sector in Saudi Arabia. This line of investigation has long been a focus of attention for many economists whose interest in the subject dates back to at least as early as the 1960s (e.g. Cameron (1967); Goldsmith (1969)). In view of the limited variety of financial institutions in developing countries , a phenomenon which is also shared by Saudi Arabia (Alyousfi, Saha, Md-Rus (2017); Almumani (2013)), commercial banks emerge as a major participant in the economic scene and much might be expected of them as a driving force in the economy. The present study thus poses the question about the nature of the role that the commercial banks are playing with respect to the growth of the nonoil sector in Saudi Arabia. Are Saudi commercial banks playing a positive role in supporting economic growth in the non-oil sector or are they falling short of expectations? This question is important in that if commercial banks are in fact playing a positive role in the non-oil sector growth, then they can be counted upon to enhance the diversification process in the Saudi economy for which the economy is in dire need. However if the reverse is true, then it may be necessary for policy makers to adopt appropriate policies to gear commercial banks' activities towards serving the diversification objectives by boosting growth in the nonoil sector. For the rest of the study, section 2 gives a description of the model and its variables as well as an outline of the (VEC) methodology used in the study and some of its features. Section 3 provides estimation for the model used in the study and discusses the results obtained while section 4 concludes the paper.

METHODOLOGY

As alluded to above, the present study investigates mainly the role of Saudi commercial banks in the growth of the non-oil GDP in Saudi Arabia. Therefore growth in the nonoil sector is the dependent variable of the model. Economists have long used GDP data in order to measure economic progress. Therefore we opt to represent the growth variable here by the non-oil GDP in Saudi Arabia.

In line with its stated objective, the study focuses on four variables that are postulated to influence nonoil GDP. These are total bank deposits, total bank credit, capital accumulation and world oil prices. Thus the model to be estimated is specified as follows:

$NGDP_t = \beta_0 + \beta_1 (CAPITAL)_t + \beta_2 (CREDIT)_t + \beta_3 (DEPOSITE)_t + \beta_4 (OP)_t + e_t$

Where; NGDP is nonoil GDP, CAPITAL is capital accumulation, CREDIT is total commercial bank credit, DEPOSITE is total commercial bank deposits, OP is world oil prices and e is an error term. Below is a brief account of the apriori theoretical relation between economic growth and each of the aforementioned explanatory variables.

Bank deposits constitute an important portion of the overall saving within an economy. Since alternative domestic financial assets are relatively limited in developing countries, bank deposits therefore assume added importance as a conduit for channeling the domestic saving of surplus units in those countries (Nishat, Bilgrami (1989); Sandhu, Goswami (1986)). But an increase in commercial bank deposits does not necessarily lead to a rise in the economic growth of the country concerned. The manner in which bank deposits impinge on economics growth depends on the nature of the composition of these deposits and the uses to which they are put. For example if the bulk of deposits attracted by commercial banks are demand deposits, it would be inappropriate to use them in long run growth enhancing economic activities. However, if the bulk of commercial bank deposits are time deposits, then it would indeed be prudent to employ them in long run growth enhancing activities. Time deposits would most probably be conducive to growth in this case. Nevertheless in the case of capital abundant countries where the cost of time deposits might be expected to be low and profits relatively high, the banks may elect to follow a conservative risk-averse policy such that their time deposits are channeled towards short run quick profit – yielding activities that are not really conducive to economic growth (Jensen, Meckling (1976); Acharya, Oncu (2013)). This account shows that the effect of total bank deposits on economic growth is indeterminate. It could be positive or negative.

As for commercial bank credit, it was also widely perceived by many as a driving force for economic growth (Levine (1997), Levine, Loyaza, Beck (2000); Kiran, Yarus , Guris, (2008)) although under inopportune conditions, it could work in the opposite direction. If the bulk of bank credit takes the form of long term advances (loans and overdrafts) to finance industrial plant and equipment or other long term assets in the productive sectors, this would presumably be conducive to economic growth. If on the other hand bank credit takes the form of short term investments or other short term financial tools, then it could adversely affect the growth of the economy.

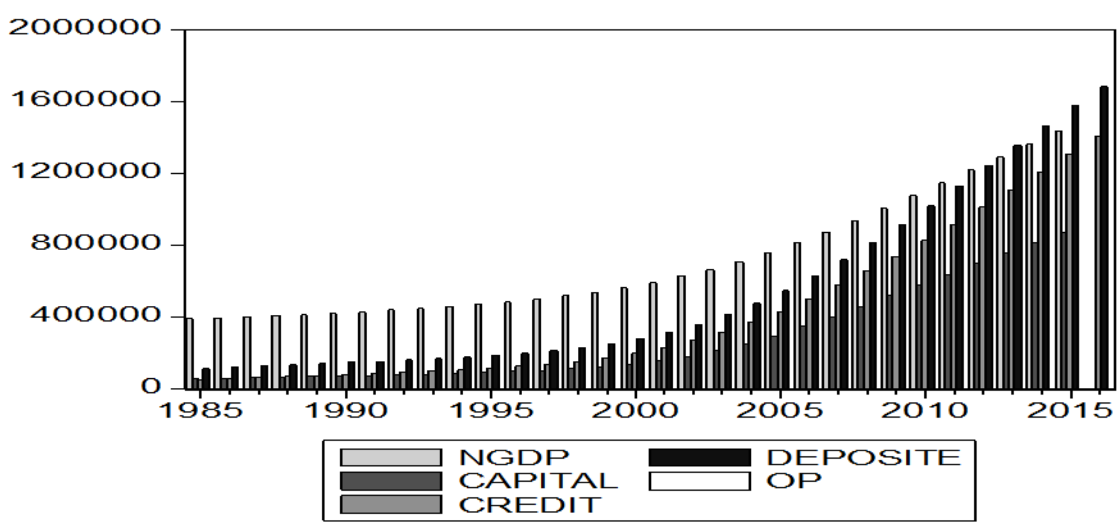
Capital accumulation refers to the continued process of the amassment of national fixed capital items (viz plant and equipment) in order to use them in the production process. The vital role of capital accumulation in economic growth is well recognized by economists (Ghura (1997), Beddies (1999)) although most economists would also recognize the importance of other highly relevant factors. Capital accumulation is generally expected to be unambiguously positively related to the process of economic growth .

Lastly, increases in world oil prices have largely been viewed as a factor which adversely affects growth in oil non producing (or importing countries) but which is positively related to growth in oil exporting countries (Ghalayini, 2011; Algahtani, 2016). According to this view and in a large oil exporting country higher oil revenues following world oil price increases would be a positive factor which would foster economic growth in the nonoil sector. But events may take a different direction since the higher oil revenues might cause the oil exporting country to be lax in diversifying its economy and boosting growth in the nonoil sector. Clearly the effect of world oil prices on growth in an oil exporting country could go both ways.

The Data

To estimate the model outlined above, data for the period 1985-2016 was used following the vector error correction (VEC) method as expounded below. All the required data were obtained from various issues of the annual reports of the Saudi Arabian Monetary Authority (SAMA), which is in effect the central bank of the Kingdom of Saudi Arabia. Below is an illustrative figure of the time trend of all the five variables of the study.

Figure 1. Trend of the study variables.



It is clear from figure (1) that there is a general tendency for all the study variables to increase over time. In table 1 below, we portray the descriptive statistics for these variables.

Table 1. Descriptive statistics of the study variables

OP	DEPOSITE	CREDIT	CAPITAL	NGDP	
41.38000	509424.9	391834.8	275852.6	702400.1	**Mean**
24.54217	281345.1	197317.0	137263.6	563635.7	**Median**
92.96586	1575060.	1304965.	874532.3	1435949.	**Maximum**
15.25879	115199.0	53414.50	56342.10	390293.0	**Minimum**
29.44892	452354.2	386570.3	258976.0	324249.8	**Std. Dev.**
0.689870	1.065671	1.052254	1.051169	0.927434	**Skewness**
1.817995	2.787170	2.772359	2.698746	2.540997	**Kurtosis**
4.263560	5.926062	5.787661	5.826167	4.716156	**Jarque-Bera**
0.118626	0.051662	0.055364	0.054308	0.094602	**Probability**
1282.780	15792171	12146878	8551430.	21774403	**Sum**
26017.17	6.14E+12	4.48E+12	2.01E+12	3.15E+12	**Sum Sq. Dev.**
31	31	31	31	31	**Observations**

It can be seen in table 1 that the kurtosis is just below 3 and that the skewness is positive for all the variables which shows that they are all mesokurtic and skewed to the right. Moreover, all the variables are normally distributed since the null hypothesis (that the variables are normally distributed) was accepted against the alternative hypothesis (that the variables are not normally distributed) based on the Jarque-Bera measure at the 5 percent level of significance.

Estimation

The vector error correction (VEC) integration technique has long been considered as a well established methodology for analyzing and estimating long run relation of economic variables. This methodology which was developed by Johansen (1988) and extended by Johansen and Juselius (1990) will be used in the present study in order to scrutinize the nature of the long run cointegration relation between the growth of the nonoil sector in Saudi Arabia and its explanatory variables, namely capital accumulation, commercial banks deposits, credit, and oil prices. A prerequisite for the application of the cointegration technique is that the time series variables must first be subjected to a stationarity test. The “stationarity “ concept stipulates that both the mean and variance of a series remain constant as time passes and also that the covariance over the time period under consideration should be dependent only on the time span between the two periods rather than on the specific instance in which the measurement of the covariance took place (Gujarati 2007). In the event that the time series are level stationary, the data can be modeled in their levels and the estimation carried out with the use of such procedures as the OLS. In case the level stationarity is not born out by the data, it would be necessary to take first differences and run the test for statonarity as appropriate.

Unit Root Tests

In testing for the stationarity of the time series variables, we opt for using the familiar augmented Dickey – Fuller (ADF) and the Phillips – Perron unit root tests. The tests are run both for the case of a constant (C) only and the case of a constant and trend (C&T).

In tables (2) and (3) below we report the estimates reached using the two types of unit root tests alluded to above.

Table 2. Tests of time series stationarity at level

Variables	Dickey and Fuller (C)	Dickey and Fuller (C&T)	Phillip-Perron (C)	Phillip-Perron (C&T)
NGDP	-	-2.198674	-8.22	1.525783
CAPITAL	-1.856961	-2.247509	5.374972	0.786931
CREDIT	1.274070	-0.652499	7.198548	1.614067
DEPOSITE	-	-	6.503930	1.238256
OP	1.795159	-0.368461	1.028136	-1.991070

Table 3. Tests of time series stationarity at first difference.

Variable	Dickey and Fuller (C)	Dickey and Fuller (C&T)	Phillip-Perron (C)	Phillip-Perron (C&T)
NGDP	3.000383	-3.412381*	0.145671	-2.010190
CAPITAL	0.635165	-2.817300	-0.240525	-1.865802
CREDIT	-1.447547	-4.147787**	0.359637	-2.128714
DEPOSITE	2.50059	-2.562074	0.032027	-2.016463
OP	-1.031092	-3.429078*	-1.384033	0.127232

*,**,*** : *,**,*** : statistically significant at the 10 percent, 5 percent and, 1 percent level respectively

Notes: 1-The time lag was chosen automatically through the Schwartz Info Criterion

It is noticeable from tables 2, 3 that for the Dickey-Fuller test, all the time series variables were non stationary at level and this goes for both the case of a constant (C) only and the case of a constant and trend (C&T). However after taking first differences, it was found that such variables as the nonoil gross domestic product (NGDP), total bank credit, and oil prices became stationary at the 1% level of significance. As for the Philip-Perron test, all the time series of the model invariably showed nonstationarity both at level and after taking first differences. This result was upheld in both the constant (C) only case as well as the constant and trend (C&T) case. Thus it became necessary to conduct a unit root test for the time series after taking the second differences. The results of the test are shown in table 4 below.

Table 4. Tests of time series stationarity at second difference

Variables	Dickey and Fuller(C)	Dickey and Fuller (C&T)	Phillip-Perron (C)	Phillip-Perron C&T)
NGDP	-5.195448***	-8.019996***	-1.296191	-0.306178
CAPITAL	-4.484916***	-4.709511***	-1.424467	-1.105985
CREDIT	-1.601178	-3.296426*	-1.315902	-0.211323
DEPOSITE	-2.641344*	-4.664251***	-1.225344	-0.342440
OP	-3.547309**	-3.088169	-1.036783	-1.527024

*,**,*** : *,**,*** : statistically significant at the 10 percent, 5 percent and, 1percent level respectively.

Apparently in table 4 all the variables turned stationarity after taking the second differences a' la the Dickey –Fuller measure. This makes it possible now to run a cointegration test for the time series variables of the study in order to determine the extent of the long run relationship between the non – oil GDP in Saudi Arabia and its explanatory variables (Kirchgassner, Wolters (2008); Gujarati, 2007). If it turns out that there is a cointegration relationship between the variables of the model, then it would be possible to use the vector error correction apparatus to characterize the nature of the relationship between these variables in the short as well as the long run.

EMPIRICAL RESULTS

Results of the Cointegration Tests

In running the cointegration tests among the time series variables of our model , we first address the issue of how many cointegration vectors there are in the series (Johansen, 1988; Johansen-Juselius,1990). If there is only one cointegrating vector in the series, this would be regarded as corroboration for the existence of a cointegration relation between the time series variables.

Taking the trace test first cointegration test results between the non –oil GDP and its explanatory variables which are reported in appendix (1) indicate the existence of five cointegration vectors among the time series at the 5 percent level of significance and four cointegration vectors at the 1 percent level of significance.

As for the maximum likelihood test, this also shows the existence of five cointegration vectors at the 5 percent level of significance and four cointegration vectors at the 1 percent level of significance this setting the stage for the estimation of a long run equilibrium relationship between the growth of non-oil GDP and its explanatory variable which are capital accumulation, commercial bank deposits, bank credit and world oil prices. These results also make it possible to use the vector error correction (VEC) to estimate short relations.

Vector Error Correction Results

As appendix (2) shows, there is a long run equilibrium relationship between nonoil GDP and its explanatory variables. This relationship is also indicated in equation (1) below:

NGDP=1.568129 CAPITAL-0.901648 CREDIT-0.679229 DEPOSITE-412.0461 OP (1)

The equation indicates the existence of a positive relation between nonoil GDP and capital accumulation in Saudi Arabia for the period of the study. A unit increase in the rate of capital accumulation would lead to a corresponding rise in nonoil GDP by 1,568 units which points to the importance of capital accumulation in raising nonoil GDP in Saudi Arabia.

As for bank deposits and bank credit, the results indicate that they both have a negative and statistically significant relation with nonoil GDP. This shows that Saudi commercial banks are poor contributors to economics growth in the non –oil sector. This may be due to the fact that much of the commercial bank lending activities are geared to household consumption needs rather than production activities. For example one would expect a high level of consumption to lower the rate of capital accumulation and the rate of economic growth in the nonoil sector, but the high consumption level would nevertheless boost bank lending and borrowing. It should be noted that somewhat similar results were obtained elsewhere in the literature. Other studies investigating the impact of the commercial banks activities on economic growth for Pakistan (Tahir, Shehzadi, Ali, RizwanUllah, 2015), Europe (Cottarelli, Dell-Ariccia, Vladkova-Hollar 2005), Saudi Arabia (Ramady, 2010), Nigeria (Olusegun, Akintoye, Dada 2014) have yielded similar or analogous results. The policy implication here is that appropriate policies need to be adopted to induce Saudi commercial banks to channel their banking activities towards developmental activities within the nonoil sector.

Results also indicate an inverse relation between nonoil GDP in the Kingdom of Saudi Arabia and world oil prices. This is to be expected since declining oil prices would tend to cause an oil country such as Saudi Arabia which is heavily dependent on oil production and export to enhance the diversification of the economic base of the country and thus boost the nonoil sector of the economy. It is also probably true that in the event of a sustained rise in world oil prices, an oil producing country would tend to allocate more resources to the oil sector at the expense of the non-oil sector. The coefficient of determination was found to be 99,99 which means that changes in the explanatory variables of the model account for 99,99 percent of the changes in the non-oil GDP in Saudi Arabia during the period of the study .

Testing the statistical significance of the long run relation in the (VEC)

The results of the test of the statistical significance of the long run relation in the model estimated above are reported in table (5) below.

Table 5. The statistical significance of the long run relation in the (VEC)

D(NGDP) = C(1)*(NGDP(-1) + 1.56812937*CAPITAL(-1) - 0.9016475499*CREDIT(-1) - 0.6792294329*DEPOSITE(-1) - 412.0461373*OP(-1) - 420203.2773) + C(2)*D(NGDP(-1)) + C(3) *D(NGDP(-2)) + C(4)*D(CAPITAL(-1)) + C(5)*D(CAPITAL(-2)) + C(6)*D(CREDIT(-1)) + C(7)*D(CREDIT(-2)) + C(8)*D(DEPOSITE(-1)) + C(9)*D(DEPOSITE(-2)) + C(10)*D(OP(-1)) + C(11)*D(OP(-2)) + C(12)

Prob.	t-Statistic	Std. Error	Coefficient	
0.0269	2.436464	0.099710	0.242940	C(1)
0.0001	4.935611	0.467644	2.308110	C(2)
0.0001	-5.081463	0.595218	-3.024577	C(3)
0.2708	-1.140667	0.278253	-0.317394	C(4)
0.2806	1.116779	0.331190	0.369866	C(5)
0.4250	0.818594	0.133100	0.108955	C(6)

Table 5...

0.0001	5.407247	0.076372	0.412962	C(7)
0.4448	0.783418	0.426014	0.333747	C(8)
0.7871	-0.274632	0.464971	-0.127696	C(9)
0.5918	0.547178	615.1668	336.6060	C(10)
0.6873	-0.409908	518.5796	-212.5701	C(11)
0.0311	2.364160	9746.169	23041.50	C(12)
36973.74	Mean dependent var		0.999997	R-squared
26071.07	S.D. dependent var		0.999995	Adjusted R-squared
11.31142	Akaike info criterion		59.62100	S.E. of regression
11.88236	Schwarz criterion		56874.63	Sum squared resid
1.957950	Durbin-Watson stat		-146.3599	Log likelihood

It is clear from table (5) above that the estimated long run relationship is statistically significant since the error correction coefficient is negative and statistically significant at -420203,2773. This confirms the robustness of the long run estimated results and their dependability.

VEC residual normality and heteroskedasticity tests

Appendices (3) and (4) below respectively show the results of (VEC)residual normality tests and the (VEC)residual Heteroskedasticity tests for the vector error correction model posing the relation between non-oil economic growth and its explanatory variables. The results indicate that residuals are normally distributed and are independent of each other. The null hypothesis (residuals are normally distributed and independent from one another) was accepted while the alternative hypothesis (residuals are not normally distributed and are correlated with each other) was rejected.

CONCLUSION

The present study aimed at investigating the nature of the role played by the Saudi commercial banks in so far as the growth of the non-oil sector in Saudi Arabia is concerned. The vector error correction model technique (VECM) was used along with annual data for the period 1965-2016.A cointegration relation was found to exist between growth in the non-oil sector of Saudi Arabiaand the explanatory variables included in the model , namely ,bank deposits , commercial bank credit, capital accumulation and world oil prices. Using the VECM approach , estimates were obtained of the long run relationship between growth in the nonoil sector in Saudi Arabia and its arguments with the error correction coefficient found to have a negative sign as expected and also found to be statistically significant. However, while capital accumulation was found to be a positive contributor to the economic growth of the non-oil sector with a positive and statistically significant coefficient, the commercial banking sector variables, namely total bank deposits and total bank credit, both turned out to have statistically significant but negative coefficients .In other words both variables were found adversely related to growth in the non-oil sector. This result is in fact not much of a surprise given that Saudi commercial banks are well known for being heavily involved in extending credit to household consumption rather than production activities in the economy. Therefore the results of this study indicate clearly that the performance of the Saudi commercial banks with respect to their contribution to growth in the non-oil sector leaves much to be desired. The relevant authorities in the kingdom of Saudi Arabia need to design appropriate policies and take proper action to ensure that both the deposit and lending activities of commercial banks serve the cause of economic growth in the non-oil sector which is becoming increasingly the center point for development in Saudi Arabia. To point the way for future policy action further research is needed and we suggest that future research in this regard should focus on the regulatory role of the central bank, the subsectoral contribution within the non-oil sector to the overall growth of the economy and identifying high growth subsectors to which bank credit could be directed. Bank deposit policies and the determinants of commercial bank deposits should also be studied to induce commercial banks hold an optimal composition of deposits and foster economic growth in the nonoil sector.

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APPENDICES

Appendix 1. Results of the cointegration between nonoil GDP and its explanatory variables.

Sample(adjusted): 1987 2015

Included observations: 29 after adjusting endpoints

Trend assumption: Linear deterministic trend (restricted)

Series: NGDP CAPITAL CREDIT DEPOSITE OP

Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test

1 Percent Critical Value	5 Percent Critical Value	Trace Statistic	Eigenvalue	Hypothesized No. of CE(s)
96.58	87.31	358.4234	0.993833	None **
70.05	62.99	210.8572	0.957599	At most 1 **
48.45	42.44	119.2004	0.911028	At most 2 **
30.45	25.32	49.03688	0.694891	At most 3 **
16.26	12.25	14.61139	0.395795	At most 4 *

*(**) denotes rejection of the hypothesis at the 5%(1%) level

Trace test indicates 5 cointegrating equation(s) at the 5% level

Trace test indicates 4 cointegrating equation(s) at the 1% level

1 Percent Critical Value	5 Percent Critical Value	Max-Eigen Statistic	Eigenvalue	Hypothesized No. of CE(s)
42.36	37.52	147.5662	0.993833	None **
36.65	31.46	91.65682	0.957599	At most 1 **
30.34	25.54	70.16349	0.911028	At most 2 **
23.65	18.96	34.42549	0.694891	At most 3 **
16.26	12.25	14.61139	0.395795	At most 4 *

*(**) denotes rejection of the hypothesis at the 5%(1%) level

Max-eigenvalue test indicates 5 cointegrating equation(s) at the 5% level

Max-eigenvalue test indicates 4 cointegrating equation(s) at the 1% level

Appendix 2. Results of (VEC) between nonoil GDP and its explanatory variables

Vector Error Correction Estimates

Sample(adjusted): 1988 2015

Included observations: 28 after adjusting endpoints

Standard errors in ( ) & t-statistics in [ ]

	CointEq1	CointegratingEq:
	1.000000	NGDP(-1)
	1.568129 (0.04463) [35.1325]	CAPITAL(-1)
	-0.901648 (0.02436) [-37.0204]	CREDIT(-1)
	-0.679229 (0.03201) [-21.2186]	DEPOSITE(-1)
	-412.0461 (113.804) [-3.62065]	OP(-1)
	-420203.3	C

D(OP)	D(DEPOSITE)	D(CREDIT)	D(CAPITAL)	D(NGDP)	Error Correction:
1.38E-05	-0.235525	-0.131563	-0.320548	0.242940	CointEq1
(8.1E-05)	(0.11316)	(0.22794)	(0.09533)	(0.09971)	
[0.16972]	[-2.08130]	[-0.57719]	[-3.36245]	[2.43646]	
0.001018	0.893511	2.764801	2.370410	2.308110	D(NGDP(-1))
(0.00038)	(0.53074)	(1.06904)	(0.44711)	(0.46764)	
[2.67606]	[1.68353]	[2.58624]	[5.30162]	[4.93561]	
-0.001145	0.629942	-1.893183	-0.598506	-3.024577	D(NGDP(-2))
(0.00048)	(0.67552)	(1.36068)	(0.56908)	(0.59522)	
[-2.36373]	[0.93253]	[-1.39135]	[-1.05170]	[-5.08146]	
-0.000441	-0.751687	-1.378225	-0.089095	-0.317394	D(CAPITAL(-1))
(0.00023)	(0.31579)	(0.63609)	(0.26604)	(0.27825)	
[-1.94986]	[-2.38030]	[-2.16671]	[-0.33490]	[-1.14067]	
0.000428	0.176177	1.285594	0.170294	0.369866	D(CAPITAL(-2))
(0.00027)	(0.37587)	(0.75711)	(0.31665)	(0.33119)	
[1.58834]	[0.46871]	[1.69804]	[0.53780]	[1.11678]	
-0.000143	-0.254035	1.319830	-0.369973	0.108955	D(CREDIT(-1))
(0.00011)	(0.15106)	(0.30427)	(0.12726)	(0.13310)	
[-1.32016]	[-1.68171]	[4.33771]	[-2.90732]	[0.81859]	
0.000196	-0.134126	-0.907065	0.136626	0.412962	D(CREDIT(-2))
(6.2E-05)	(0.08668)	(0.17459)	(0.07302)	(0.07637)	
[3.15712]	[-1.54744]	[-5.19548]	[1.87111]	[5.40725]	
0.000484	1.634165	1.483536	0.777272	0.333747	D(DEPOSITE(-1))
(0.00035)	(0.48349)	(0.97387)	(0.40731)	(0.42601)	
[1.39700]	[3.37993]	[1.52333]	[1.90832]	[0.78342]	
-0.000436	-0.558257	-1.164273	-0.643712	-0.127696	D(DEPOSITE(-2))
(0.00038)	(0.52770)	(1.06293)	(0.44455)	(0.46497)	
[-1.15142]	[-1.05790]	[-1.09534]	[-1.44799]	[-0.27463]	
1.133918	2708.187	-47.53326	26.25835	336.6060	D(OP(-1))

(0.50047)	(698.164)	(1406.28)	(588.155)	(615.167)	
[2.26572]	[3.87901]	[-0.03380]	[0.04465]	[0.54718]	
-1.170407	-2454.051	-3201.326	-1116.046	-212.5701	D(OP(-2))
(0.42189)	(588.545)	(1185.48)	(495.809)	(518.580)	
[-2.77421]	[-4.16969]	[-2.70044]	[-2.25096]	[-0.40991]	
0.023020	-22637.32	-16628.62	-31546.03	23041.50	C
(7.92896)	(11061.1)	(22279.9)	(9318.22)	(9746.17)	
[0.00290]	[-2.04657]	[-0.74635]	[-3.38541]	[2.36416]	
0.999801	0.999999	0.999992	0.999997	0.999997	R-squared
0.999665	0.999997	0.999986	0.999995	0.999995	Adj. R-squared
0.037643	73256.66	297219.2	51989.65	56874.63	Sum sq. resids
0.048504	67.66492	136.2945	57.00310	59.62100	S.E. equation
7319.707	977580.9	173755.7	447696.6	469341.4	F-statistic
52.83512	-149.9036	-169.5106	-145.1026	-146.3599	Log likelihood
-2.916794	11.56454	12.96504	11.22162	11.31142	Akaike AIC
-2.345849	12.13548	13.53599	11.79256	11.88236	Schwarz SC
2.678064	51663.94	44341.58	29035.95	36973.74	Mean dependent
2.649026	42702.64	36263.05	24344.76	26071.07	S.D. dependent
			2.93E+09	Determinant Residual Covariance	
			-464.6388	Log Likelihood	
			-503.8119	Log Likelihood (d.f. adjusted)	
			40.62942	Akaike Information Criteria	
			43.72204	Schwarz Criteria	

Appendix 3. Residual normality tests for the (VEC) between nonoil GDP and explanatory variables

VEC Residual Normality Tests

Orthogonalization: Cholesky (Lutkepohl)

H0: residuals are multivariate normal

Date: 12/02/17 Time: 09:53

Sample: 1985 2016

Included observations: 28

Prob.	df	Chi-sq	Skewness	Component
0.7706	1	0.085015	-0.134972	1
0.7904	1	0.070632	-0.123026	2
0.8945	1	0.017570	0.061360	3
0.8136	1	0.055580	-0.109133	4
0.9533	1	0.003425	0.027092	5
0.9987	5	0.232223		Joint

Prob.	df	Chi-sq	Kurtosis	Component
0.0191	1	5.489714	0.830791	1
0.0347	1	4.461361	1.044489	2
0.0351	1	4.439868	1.049205	3
0.0109	1	6.487143	0.641948	4
0.0106	1	6.534170	0.633417	5
0.0000	5	27.41226		Joint

Prob.	df	Jarque-Bera	Component
0.0616	2	5.574729	1
0.1037	2	4.531993	2
0.1077	2	4.457438	3
0.0380	2	6.542724	4
0.0381	2	6.537595	5
0.0021	10	27.64448	Joint

Appendix 4. Heteroskedasticity test for the (VEC) between nonoil GDP and its explanatory variables

VEC Residual Heteroskedasticity Tests: No Cross Terms (only levels and squares)

Date: 12/02/17 Time: 09:55

Sample: 1985 2016

Included observations: 28

Joint test:

Prob.	df	Chi-sq
0.4313	330	333.7975

Individual components:

Prob.	Chi-sq(22)	Prob.	F(22,5)	R-squared	Dependent
0.3190	24.55141	0.3126	1.618013	0.876836	res1*res1
0.6251	19.32686	0.8775	0.506445	0.690245	res2*res2
0.4329	22.45682	0.6045	0.920739	0.802029	res3*res3
0.8539	15.19077	0.9862	0.269528	0.542527	res4*res4
0.6348	19.17090	0.8856	0.493484	0.684675	res5*res5
0.4205	22.67088	0.5777	0.966852	0.809674	res2*res1
0.3606	23.74840	0.4304	1.269490	0.848157	res3*res1
0.4796	21.67224	0.6940	0.778397	0.774009	res3*res2
0.7025	18.05801	0.9320	0.412804	0.644929	res4*res1
0.8369	15.56532	0.9826	0.284492	0.555904	res4*res2
0.7195	17.77076	0.9410	0.394830	0.634670	res4*res3
0.5409	20.67431	0.7871	0.641401	0.738368	res5*res1
0.7481	17.27350	0.9543	0.365990	0.616911	res5*res2
0.6026	19.68688	0.8570	0.538221	0.703103	res5*res3
0.7179	17.79799	0.9402	0.396490	0.635643	res5*res4