THE ROLE OF SAVING ON ECONOMIC GROWTH IN UNITED ARAB EMIRATES, 1980-2013: GRANGER CAUSALITY AND CO-INTEGRATION ANALYSES

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ABSTRACT

The objective of the paper is to study of the role of savings on economic growth in UAE. The controversy surrounding the direction of causality between saving and economic growth motivated this study. The study employed the Granger-causality and co-integration techniques to analyse the relationship between saving and economic growth in UAE during the period 1980-2013.The study methodology is based on the econometrics analytical approach to estimate the parameters' value and the trends of the economic relations between the study variables by using the cointegration and Granger causality techniques. Johansen cointegration test indicates that a positive long run relationship between the study variables, while Granger causality test reveals that significant bilateral causality between the savings and the economic growth, this means that the economic growth Granger causes saving in the short run, and also the savings Granger cause the economic growth in the long run. Thus, we reject the Keynesian theory that it is economic growth that leads to higher saving, and accept the solow's theory that it is saving that leads to economic growth. These results indicate that the saving could stimulate the economic growth, and the savings could accelerate the economic growth in the long run. The study recommends that government and policy makers in UAE should employ policies that would attract more savings in order to accelerate economic growth which would lead to raise GDP per capita and UAE standard of living.

KEYWORD: *Private Savings, Economic growth, Econometrics, Kingdom of Bahrain.*

1.1.INTRODUCTION

The relationship between savings and economic growth is not only an important but also a controversial issue for both academicians and policy makers. Many internationally reputed economists have analysed this phenomenon as cause and effect relationship. A group of economists favour capital fundamentalists point of view that savings cause growth but others are in favour of Keynesian theory that savings depend upon the level of output.

Solow (1956) suggested that savings affected the economic growth because higher savings led to capital accumulation, which in turn led to economic growth. Deaton (1995) argued that, "causation is important not just for understanding the process, but for the design of the policy." He provided support for the idea that savings was an important force for economic stability as well as growth. Hussein (1995) suggested that much of the differences in economic performance between Pakistan and the rapidly growing Southeast Asian countries, over

the last two decades, were because of the low rates of savings and investment in Pakistan. Hence, it was emphasized that difference in the growth rate of developed and developing countries was primarily because of the difference in savings rates. Consequently, World Bank asked the developing countries to adopt policies which were conducive to savings in order to boost the economic growth (see Sinha and Sinha, 1998, p. 43). According to this view, savings is one of the key determinants of economic growth and it occurs before growth.

The importance of investigating the causal relationship lies in the fact that it can be useful in isolating those variables which policy makers need to control in order to obtain the desired values of target variables such as economic growth. It might also be helpful in developing the econometric models and designing policies. If it turns out to be the case that savings causes economic growth then it is necessary to enhance savings rate for achievement of high growth targets. If the results turn out the other way round that high growth leads to more savings then the Keynesian point of view is dominating: savings depends on income. Hence in order to enhance growth, the policy prescriptions will be to emphasize the demand side of the economy. However, such a prescription according to Cohen (1997) is misleading and dangerous that government needs not promote savings.

The purpose of this study is to examine the impact of saving on economic growth in UAE. Using annual data from 1980 to 2013 The rest of the paper is organized as follows: Section two consists of literature review. Model, data, and the empirical methodology used in the study discussed in section 3. Estimation procedures and empirical results are discussed in section 4. Finally, section 5 consists of conclusions and policy implications.

1.2.LITERATURE REVIEW AND THEORETICAL FRAMEWORK

There have been extensive theoretical and empirical researches examine the relationship between saving and economic growth both in the context of developed and developing countries. Although the relationship between saving and economic growth is an important one, the direction of causality between the two variables has continued to generate series debate among scholars. Some theories and empirical studies point to savings led growth such as :(Harrod1939,Solow1956, Romer1986, Sinha and Sinha1998, while others show evidence for growth driven savings such as:(Keyns1936, Saltz1999, Agarwal2001, Nurudeen2012, Pinchawee 2011), and some suggest there is bilateral causality between the

two variables such as: (Jappelli and Padula1994, Abu Al-Foul 2010), while few studies found ambiguous or no relationship between the two variables such as: (Sinha1998, Andersson1999, Mohan2006).

Some authors have attempted to examine the causal relationship between saving and economic growth. For example, Bassam Abu AL-Foul (2010) employed an econometric technique to investigate the long-run relationship between real gross domestic product and real gross domestic saving for Morocco and Tunisia during the period 1965-2007 and 1961-2007, respectively. The regression exercise reveals interesting results. For instance, it was shown that whereas a long-run relationship exists between gross domestic product and gross domestic saving in Morocco, there was no such evidence for Tunisia. Secondly, the Granger causality test indicates the existence of a two-way causal relationship between gross domestic product growth and gross domestic saving growth in Morocco. Lastly, the author observed a unidirectional Granger causality between real gross domestic product and real gross domestic saving as causality runs from gross domestic saving growth to gross domestic product growth in Tunisia. Sinha and Sinha (2007) examined the relationship between per capita saving and per capita GDP for India during the 1950-2004 period. The authors employed the Toda and Yamamoto tests of Granger causality and discovered that there is no causal relationship between per capita GDP and per capita household saving/per capita corporate saving. on the contrary, the results show the existence of a bi-directional causal relationship between per capita household saving and per capita corporate saving.

Aswini and Mohit(2012) found the same results when they studied the pattern between savings, investment and economic growth and the policies which led to such changes and estimating and forecasting the policy implications which would affect these variables in India for the period(1950-2011). They found that the direction of causality was from savings and investment to economic growth collectively as well as individually and there was no causality from economic growth to savings and/or investment.

A study by Bassam, Abu AL-Foul (2010) employed the Granger causality and co-integration techniques to analyze the relationship between saving and economic growth in Nigeria during the period 1970-2007. The Johansen co-integration test was used to test if long-run equilibrium exists between them (economic growth and saving) (Johansen, 1988). In addition, the Granger causality test revealed that causality runs from economic growth to

saving, implying that economic growth precedes and Granger causes saving. Thus, the study rejected the Solow's hypothesis that saving precedes economic growth and accepts the Keynesian theory that it is economic growth that leads to higher saving. The researcher recommended that government and policy makers should employ policies that would accelerate economic growth so as to increase saving.

Bassam Abu AL-Foul (2010) employed an econometric technique to investigate the long-run relationship between real gross domestic product and real gross domestic saving for Morocco and Tunisia during the period 1965-2007 and 1961-2007, respectively. The regression exercise reveals interesting results. For instance, it was shown that whereas a long-run relationship exists between gross domestic products and savings in Morocco, there was no such evidence for Tunisia. Secondly, the Granger causality test indicates the existence of a two-way causal relationship between gross domestic product growth and gross domestic saving growth in Morocco. Lastly, the researcher observed a unidirectional Granger causality between real gross domestic product and real gross domestic saving as causality runs from gross domestic saving growth to gross domestic product growth in Tunisia

Piotr (2010) analyzed the cause and effect relationship between economic growth and savings in advanced economies and in emerging and developing countries. In this work he used cointegration models and Granger's causality test. The results confirmed the existence of one way casual relationship from domestic savings to GDP in the case of developed countries as well as in developing and transition countries. The same results found by Ramesh (2001), when he investigated the relationship between savings, investment and economic growth for India over the period 1950-51 to 2007-08. He found that the cointegration analysis suggested that there was a long-run equilibrium relationship.

Sajid and Sarfraz (2008) investigated the causal relationship between savings and output in Pakistan by using quarterly data for the period of 1973:1-2003:4. The researchers employed both co-integration and the vector error correction techniques and discovered that bi-directional long run relationship exists between savings and output level. Moreover, the results showed that there is a unidirectional long run causality from public savings to output (GNP and GDP) and private savings to Gross National Product (GNP). Furthermore, the long run results favour the capital fundamentalist's point of view that savings precede the level of output in case of Pakistan. In

addition, the results showed that unidirectional short run causality runs from Gross National Product (GNP) to national and domestic savings and from Gross Domestic Product (GDP) to public savings. Besides, short run causality was shown to run from national savings to Gross Domestic Product (GDP). Finally, the overall short run results favour Keynesian point of view that savings depend upon level of output.results of Granger causality test showed that higher savings and investment led to higher economic growth, but the reciprocal causality is not observed. Further, it was empirically evident that savings and investment led growth is coming from the household sector. Also, Aswini and Mohit(2012) found the same results when they studied the pattern between savings, investment and economic growth and the policies which led to such changes and estimating and forecasting the policy implications which would affect these variables in India for the period(1950-2011). They found that the direction of causality was from savings and investment to economic growth collectively as well as individually and there was no causality from economic growth to savings and/or investment.

verma (2007) found that the regression results support the carroll-weil hypothesis that it is not savings that causes economic growth, but instead, it is growth that causes savings in india. Alguacil et al (2004) investigated the saving-growth nexus by taking into account the impact of foreign capital in complementing domestic saving and the beneficial effects of FDi on domestic investment and income. The Granger non-causality test revealed that higher saving precedes economic growth. Sajid and Sarfraz (2008) investigated the causal relationship between savings and output in Pakistan by using quarterly data for the period of 1973:1 to 2003:4. The authors employed both co-integration and the vector error correction techniques and discovered that bi-directional long run relationship exists between savings and output level. Moreover, the results showed that there is a unidirectional long run causality from public savings to output (GNP and GDP), and private savings to gross national product (GNP). Furthermore, the long run results favour the capital fundamentalist's point of view that savings precede the level of output in case of Pakistan. in addition, the results showed that a unidirectional short run causality runs from gross national product (GNP) to national and domestic savings; and from gross domestic product (GDP) to public savings. Besides, a short run causality was shown to run from national savings to gross domestic product (GDP).

Finally, the overall short run results favour Keynesian point of view that savings depend upon level of output.

Agarwal (2001) investigated the causality between gross domestic product (GDP) and saving for a sample consisting Asian economies. The author discovered that, in most economies causality runs from GDP to saving. In Mexico, Sinha and Sinha (1998) employed econometric techniques to validate or invalidate the claim that higher saving rate leads to high growth rate. The empirical results did not support the view that higher saving rate causes higher economic growth. The authors concluded that causality runs from economic growth to saving

Anderson (1999) Found that the results of the Granger non causality test indicated that the direction of causal relationship between savings and output differ across the countries, when he analyzed the relationship between savings and GDP for a group of countries that include Sweden, UK, and USA.

From previous discussion, we argue that, there are different conclusions about the relationship between savings and economic growth in empirical analysis. Different countries also have different effect of saving. In most developing countries, the economic growth Granger causes the private saving, whereas in most developed countries the private savings leads to economic growth. On the other hand, the negative economic effect of high savings rate cannot be excluded from the discussion too.

1.3 MODEL SPECIFICATION, METHODOLOGY AND DATA
MODEL SPECIFICATION

The econometric model to be used has its basis in the Keynesian model and the Solow hypothesis. For example, the Keynesian model states that saving 'S' is a function of income (output) 'Y'. Thus,

$$S = a_o + a_1 Y + \varepsilon_1 \qquad (1)$$

However, for the purpose of this study, we modified the equation above to derive the one below:

$$GNS = a_o + a_1 GDP + \varepsilon_2 \qquad (2)$$

Where GNS and GDP denote saving and economic growth, respectively. However, Solow argued that higher saving preceded economic growth. Therefore, the growth model specifies economic growth as a function of saving. Thus,

$$GDP = Co + C_1 GNS + \varepsilon_3 \qquad (3)$$

Where a_o, a_o and c_o represent constants, and a_1, a_1 and C_1 are the slope coefficients, respectively. ε_1, ε_2 and ε_3 refer to the disturbance term in the respective equations. The variables used in the paper are annual data (time series. The variables are measured as follows. GDS is measured as the growth of gross Domestic saving, while GDP is measured as the growth of gross domestic product. Thus the study tests the following hypotheses

Hypothesis testing
H_N: GDP growth does not Granger cause savings in UAE
H_A: GDP growth does Granger cause savings in UAE, and
H_N: savings does not Granger cause GDP growth in UAE
H_A: savings does Granger cause GDP growth in UAE

Accordingly, if both null hypotheses are rejected, it indicates that bilateral causality exists between GDP growth and Gross Domestic savings. If the first null hypothesis (H_N) is rejected and the second null hypothesis is accepted, it means that there is unidirectional causality from GDP growth to saving (GDP ⟶ saving). On the contrary, if the second null hypothesis is rejected and the first null hypothesis is accepted, it shows a unidirectional causality from savings to GDP growth (Saving ⟶ GDP). Finally, if both null hypotheses are accepted, then independence is suggested and means no causality between the two variables.
To assess the relation between economic growth and savings, two econometric models centered on the basis of equation. 1 and 2 were used:

$$RGDS_t = \beta_0 + \sum_{i=0}^{n} \beta 1\, RGDS_{t-1} + \sum_{i=0}^{n} \beta 2\, RGDP_{t-1} + \varepsilon_1 \qquad (4)$$

$$RGDP_t = \alpha_0 + \sum_{i=0}^{n} \alpha 1\, RGDP_{t-1} + \sum_{i=0}^{n} \alpha 2\, R GDS_{t-1} + \varepsilon_2 \qquad (5)$$

Where: RGDS= Real Gross Domestic Savings relation to GDP as a percentage.
RGDP= Real Gross Domestic Product as a percentage changes in fixed prices.
α and β are coefficients. ε_1 and ε_2 are the disturbance terms, or residuals components.,t is period of analysis, t-1 is lagged one period

ECONOMETRIC METHODOLOGY

Examining the linkages between Gross Domestic Saving and economic growth involves three main steps. First, the study examines the existence of unit root in each of the two variables. If unit roots are detected in the variables, the study will proceed to test for a long-run cointegration relationship among the variables. Finally, vector error correction model will be estimated in order to test Granger causality among these variables, if the study is able to establish the existence of long run cointegration relationship among the variables.

Data:-

The purpose of this study is to investigate whether the direction of causality runs from Gross Domestic savings to economic growth or vice versa during the period 1980-2013.All data came from the International Monetary Fund (IMF) and World Development Indicators (WDI)) 2014, and from the central bank of UAE statistical bulletin (various issues) .WDI.Variables used in this study and the definitions are RGDS (Real Gross Domestic Savings), and RGNP (Real Gross Domestic Product). RGDS rate is calculated residually as GDS/ GDP-Deflator. RGDP is the Nominal GDP / GDP-Deflator. All the data used are in us$ millions and are measured in real terms the aim of this study is to identify the causality between the two variables.

1.4. UNIT ROOT TEST: THE AUGMENTED DICKEY-FULLER (ADF) TEST

The econometric methodology first examines the stationarity properties of each time series of consideration. The present study uses Augmented Dickey-Fuller (ADF) unit root test to examine the stationarity of the data series. It consists of running a regression of the first difference of the series against the series lagged once, lagged difference terms and optionally, a constant and a time trend.

The first step of the testing procedure is to determine whether the data contain unit roots indicating the data is non-stationary or not. A number of tests are available in the literature to check the existence of the unit root problem both in the level of the variables as well as in their first difference, *i.e.* to determine the order of integration. The unit roots begin with the following:

$$Y_{it} = \phi_i + Y_{it-1} + X_{it} + \epsilon_{it} \qquad (6)$$

If $\phi_i < 1$, Y_{it} weakly (Trend) stationary .On the other hand,

If $\phi_i = 1$, Y_{it} then contains a unit root .This can be specified further by subtracting Y_{it-1} on both sides so that:

$$\Delta Y_{it} = (\phi_{i-1})Y_{it-1} + X_{it} + \epsilon_{it} \qquad (7)$$

The Dickey Fuller (DF) test is applicable if error terms *(ϵ_{it})* are uncorrelated. In case the error terms *(ϵ_{it})* are correlated, DF test is useless. Augmented Dickey Fuller (ADF) test takes care of this problem by "augmenting" the equation(s) of DF test by adding the lagged values of the dependent variable(s). To test the unit root property of the variables, we employed Augmented Dickey Fuller test (ADF).[1]([1]We also applied Phillip-Perron test. The results of both tests (ADF and Phillip-Perron) were same so we reported the results only of ADF test.)

The equation for ADF test is as follows:

$$\Delta Y_{it} = (P_{i-1}) Y_{it-1} + X_{it} + \sum_{j=1}^{pi} \lambda\, Yit - 1 + \epsilon_{it} \qquad (8)$$

Before estimating the model, it was essential to determine the stationariness of the analysed time series. To do so, we used the ADF test (Augmented Dickey-Filler). The results of the augmented test showed lack of stationaries of analysed variables (GDP and GDS). However, if we replaced the levels of analyzed variables with their first differences, such modification would result in stationaries of both time series.

1.5.CO-INTEGRATION

.Once the unit roots are confirmed for data series, the next step is to examine whether there exists a long-run equilibrium relationship among the variables. This calls for cointegration analysis which is significant so as to avoid the risk of spurious regression. Cointegration analysis is important because if two non-stationary variables are cointegrated, a Vector Auto-Regression (VAR) model in the first difference is miss-specified due to the effects of a common trend. If cointegration relationship is identified, the model should include residuals from the vectors (lagged one period) in the

dynamic VECM system. In this stage, Johansen's cointegration test is used to identify cointegrating relationship among the variables. The Johansen method applies the maximum likelihood procedure to determine the presence of cointegrated vectors in non-stationary time series. The testing hypothesis is the null of non-cointegration against the alternative of existence of cointegration using the Johansen maximum likelihood procedure.

The concept of co-integration was introduced by Granger (1981) to protect the loss of long run information in the data due to differencing the series. If the linear combinations of variables of I (1)), then the variables are said to be co-integrated. Co-integration is the statistical implication of the existence of a long run relationship between economic variables. From statistical point of view, a long run relationship means that the variables move together over time so that short-term disturbances from the long-term trend will be corrected.

The procedure involves the identification of rank of the m-by-m matrix Π in the specification given by:

$$\Delta X_t = \delta + \sum_{i=1}^{k-1} \Gamma_i \, \Delta X_{t-i} \, \Pi \, \Delta X_{i-k} + u_i \qquad (9)$$

Where ΔX_t a column vector of the m variables is, $\Gamma \, and \, \Pi$ represents coefficient matrices, Δ is a difference operator, k denotes the lag length, and δ is a constant. If Π has zero rank, no stationary linear combination can be identified. In other words, the variable X_t are non-coin grated. If the rank r and Π is greater than zero, however, there will exist r possible stationary linear combinations and Π may be decomposed into two matrices α and β, (each $m \times r$) such that $\Pi = \alpha \, \beta'$ In this representation b contains the coefficient of the r distinct co integrating vectors that render $\beta' \, X_t$ stationary, even though X_t is itself non-stationary α contains the speed of the adjustment coefficients for the equation. Johansen and Juselius (1990), using maximum likelihood, have developed two Statistics to test the null of no cointegration. These statistics are the Trace statistic and the maximal eigenvalue statistic (Max-L), and computed as follow

1.5.1. Trace Test Statistic:-

The trace test statistic can be specified as:

$$T_{race} = T \sum_{i=r+1}^{N} \ln(1 - \lambda_t) - (10)$$

Where λ_i is the ith largest eigenvalue of matrix Π and T is the number of observations. In the trace test, the null hypothesis is that the number of distinct cointegrating vector(s) is less than or equal to the number of cointegration relations (r).

1.5.2. Maximum Eigenvalue Test:-

The maximum eigenvalue test examines the null hypothesis of exactly r cointegrating relations against the alternative of(r + 1) cointegrating relations with the test statistic:

$$^T Max - L = T \ln(1 - \lambda_{r-1}) - (11)$$

Where r -1 is the (r +1)th largest squared eigenvalue. In the trace test, the null hypothesis of r = 0 is tested against the alternative of(r + 1) cointegrating vectors. It is well known that Johansen's cointegration test is very sensitive to the choice of lag length. So, at first a VAR model is fitted to the time series data in order to find an appropriate lag structure (Table 3).

1.6 GRANGER CAUSALITY

For all other reasons, the paper employs a dynamic Granger causality test to examine the causal relationship between GDP and GDS,. The main reason why the Granger causality test is favored among other test procedures is due to its robust response to both large and small samples. The Granger causality test based on error-correction model can be expressed as follows:

$$RGDS_t = {}_0 + \sum_{i=0}^{n} \beta 1\, RGDS_{t-1} + + \sum_{i=0}^{n} \beta 2\, RGDP_{t-1} + {}_3 EC_{t-1} + {}_1 \qquad (9)$$

$$RGDP_t = 0 + \sum_{i=0}^{n} \alpha 1\, RGDP_{t-1} + \sum_{i=0}^{n} \alpha 2\, R\, GDS_{t-1} + {}_3 EC_{t-1} + {}_2 \qquad (10)$$

Where

GDP and GDS are the underlying variables in the casual relationship. Restricted in this way, in the current situation.RGDPt represents economic growth and GDSt and represents Gross Domestic Saving. ECt-1 is one period lagged error correction term captured from the cointegration regression. $_1$ and $_2$ are mutually uncorrelated white noise residuals

The error-correction model has an interesting temporal causal interpretation in the sense that a bivariate cointegrated system must have a causal ordering in at least one direction (Engel and Granger, 1987). A thing about cointegrating relationship is that, though it reveals the presence of Granger causality, it does not point the direction of causality between variables. This is why an appropriate Granger causality test procedure is justified after testing for cointegration.

Again, the use of an error-correction model in the Granger causality test allows the

researcher to differentiate between short-run and long-run Granger causality. Specified in this way, the F-test on the regressors provides the short-run causal effects, whiles the significance of the t-test of the lagged error-correction term indicates the long-run causal effects. In this particular case, we can say GDP Granger causes GDS in the long-run if and $_2 \neq 0$ and $_3 \neq 0$.

1.7.EMPIRICAL RESULTS
Stationarity tests (Unit Root Tests):-

The results of Table 1 show that all variables are non-stationary in levels, but stationary in first difference. Since the variables are 1(1) the next step is to test if they are cointegrated using the Johansen full information maximum likelihood

Table: 1 Unit Root Tests (ADF, PP) on RGDP and RGDS: 1980-2013

Variables	ADF		PP		Order of integration
	Level	First Difference	Level	First Difference	
RGDP	0.9994	0.0036***	0.0000 ***	0.0035***	I(1)
RGDS	0.7100	0.0000***	0.3800	0.0000***	I(1)

*Note: (1) *** denotes significant at 1% level respectively. and in PP test it is based on Newey-West using Bartlett kernel*

Table 2 Show that LR, FPE, AIC, SC, HQ and HQ statistics are chosen lag 1for each endogenous variable in their autoregressive and distributed lag structures in the estimable VAR model. Therefore, lag of 1is used for estimation purpose

Table 2:VAR Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-3.036559	NA	0.004697	0.314785	0.406393	0.345151
1	77.28231	145.5779*	3.99e-05*	-4.455144*	-4.180319*	-4.364047*
2	80.77445	5.892987	4.13e-05	-4.423403	-3.965361	-4.271575

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

COINTEGRATION TEST

Having confirmed the stationarity of the variables at 1(1), we proceed to examine the presence or nonpresence of cointegration among the variables. When a cointegration relationship is present, it means that GDP and GDS share a common trend and long-run equilibrium as suggested theoretically. We started the cointegration analysis by employing the Johansen and Juselius multivariate cointegration test . The cointegration results between GDP and GDS are presented in Table 3 and 4. The results show that there are 1 cointegrating vectors between the three variables

Table 3 :Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.412749	17.36037	15.49471	0.0259
At most 1	0.010156	0.326668	3.841466	0.5676

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Table 4:Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.412749	17.03371	14.26460	0.0178
At most 1	0.010156	0.326668	3.841466	0.5676

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

VECTOR ERROR CORRECTION MODEL (VECM) TEST

The estimation of a Vector Error Correction Model (VECM) requires selection of an appropriate lag length. The number of lags in the model is determined according to the Schwarz Information Criterion (SIC). The lag length that minimizes the SIC is 1. Then, an error correction model with the computed t-values of the regression coefficients is estimated and the results are reported in Table 5.

The estimated coefficient of error-correction term (EC_{t-1}^I) in the RGDP equation is statistically significant and has a negative sign, which confirms that there is notonly any problem in the long-run equilibrium relation between the independent and dependent variables at 5 per cent level of significance, but its relative value (-0.116) for UAE shows the rate of convergence to the equilibrium state per year. Precisely, the speed of adjustment of any disequilibrium towards a long-run equilibrium is that about 11.6 per cent of the disequilibrium in exports is corrected each year. Furthermore, the negative and statistically significant value of error correction coefficient indicates the existence of a long-run causality between the variables of the study. And, this causality is unidirectional in our model being running from the real GDP to real GDS. In other words, the changes in real GDS can be explained by real GDP.

Table 5: Dependent Variable: D(RGDP)				
Method: Least Squares				
Sample (adjusted): 1983 2013				
Included observations: 31 after adjustments				
D(RGDP) = C(1)*(RGDP(-1) + 4.67199946785*RGDS(-1) - 4.20574060151) + C(2)*D(RGDP(-1)) + C(3)*D(RGDP(-2)) + C(4)*D(RGDS(-1)) + C(5) *D(RGDS(-2)) + C(6)				
	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.116377	0.037939	-3.067505	0.0051
C(2)	0.152676	0.194730	0.784039	0.4404
C(3)	0.054188	0.177809	0.304752	0.7631
C(4)	0.253735	0.235635	1.076812	0.2918
C(5)	-0.092965	0.199629	-0.465688	0.6455
C(6)	0.056474	0.023653	2.387560	0.0248
R-squared	0.390460	Mean dependent var		0.065024
Adjusted R-squared	0.268552	S.D. dependent var		0.091151
S.E. of regression	0.077957	Akaike info criterion		-2.093341
Sum squared resid	0.151931	Schwarz criterion		-1.815795
Log likelihood	38.44679	Hannan-Quinn criter.		-2.002868
F-statistic	3.202911	Durbin-Watson stat		1.967460
Prob(F-statistic)	0.022714			

Hence, we can analyze the long run cointegration equation of GDP with their independent variable of saving with VECM. The equation can be written as follow.

RGDP=-4.205741 + 4.671999 RGDS

Se	0.688
t-value	6.787

Form the above equation, we argue that private savings is significantly positive related to the economic growth in UAE during the period under consideration.which leads to test the hypotheses whether the direction of causality runs from RGDS to RGDP or the opposite. The results suggest that the RGDS Granger causes RGDP .

Granger Causality:-

Granger Causality test is used to determine the causal relationship among the variables. This test has other advantages that it also specifies the direction of the causality. Having found cointegration among the variables (RGDP and RGDS) we carried out the Granger-causality by the mean of VECM. The results are reported in Table 6 support the result obtained from VECM that there is long-run causality from RGDS to RGDP at 5 per cent level of significance and RGDS dose granger cause RGDP in the short run. Based on this causality tests, changes in the RGDS cause changes in RGDP in the long-run, and in the short-run.

Table 6: Pairwise Granger Causality Tests			
Sample: 1980 2013			
Lags: 2			
Null Hypothesis:	Obs	F-Statistic	Prob.
RGDS does not Granger Cause RGDP	32	7.09441	0.0033
RGDP does not Granger Cause RGDS		2.76598	0.0808

To test SR causality from RGDP to RGDS. We shall use Wald statistics to check SR Causality from RGDP to RGDS. The result of Wald test indicates that all the RGDS having 2 lags. Jointly cannot cause RGDP, meaning that there is no SR causality coming from RGDS to RGD (table 7).

WALD TEST

Table 7: Wald Test:			
Equation: Untitled			
Test Statistic	Value	df	Probability
F-statistic	1.064524	(2, 25)	0.3600
Chi-square	2.129048	2	0.3449
Null Hypothesis: C(4)=C(5)=0			
Null Hypothesis Summary:			
Normalized Restriction (= 0)		Value	Std. Err.
C(4)		0.253735	0.235635
C(5)		-0.092965	0.199629
Restrictions are linear in coefficients.			

VECM STABILITY TEST

Figure 1 and 2 is a graphical representation of CUSUM and CUSUMSQ plots which are applied to the VECM model. CUSUM and CUSUMSQ plots do not cross critical bounds; accordingly the null hypothesis would be rejected at the 5% significant level, indicating the stability of VECM parameters. The test results show that the Modulus of all roots are less than unity and lie within the unit circle. Accordingly we can conclude that our model the estimated VECM is stable or stationary.

Figure 1 and 2
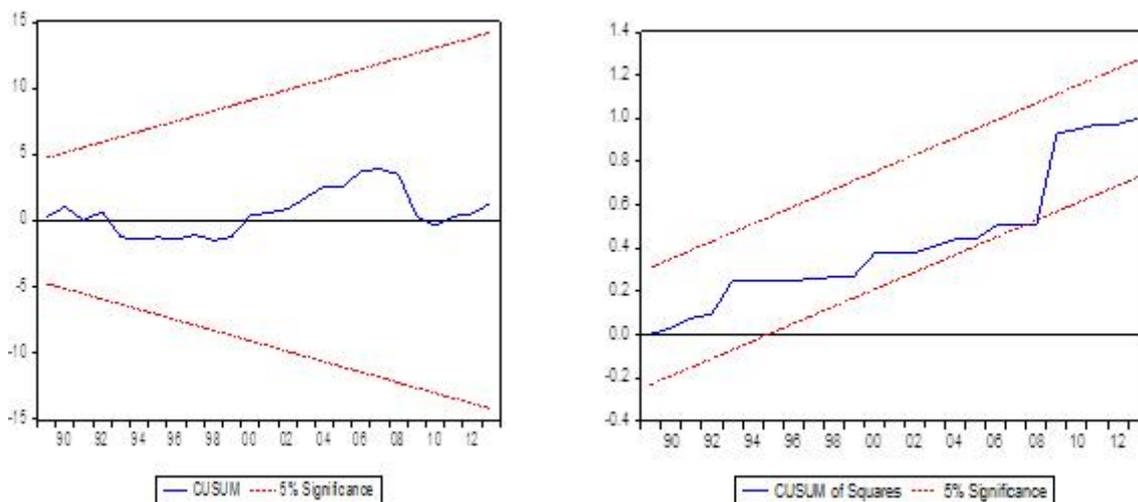
for serial correlation, functional form, parameter stability, normality and heteroscedasticity were conducted . These tests show us that short run model passes through all diagnostic tests. The results also indicate that there is no suspicion of multicolinearity among variables as functional form of the model is well specified and there is no evidence for heteroscedasticity as well.

1.8.CONCLUSION AND IMPLICATION

The objective of the paper is to investigate causal relationship between savings and Economic growth in UAE. Using time series annual data from 1980 to 2012. The co-integration and vector error correction techniques are used to explore direction of causality for the period 1980-2012. The results of ADF test show that all measures of

savings and level of output are integrated of order one. It means that these variables are stationary at their first differences. Once it is found that all the variables used in the analysis are integrated of the same order, we apply Johansen's co-integration test to check whether the variables have long run relationship. The results of the co-integration test show that there is long run equilibrium relationship between different measures of savings and level of output. The residuals obtained from these co-integrating vectors are also stationary at their levels.

The results of the VECM suggest a long run bi-directional relationship between different measures of savings and economic growth. The unidirectional short run causality runs from RGDS to RGDP.

Based on the results, the study favors to reject null hypotheses, which indicates that bilateral causality exists between RGDS and RGDP.

The finding is that the coefficient of error correction model (ECM) is negative and significant because p-value =0.0051< 0.01, then when the p-value < 0.01 becomes significant, it means that RGDP has long run causality on RGDS. It means that RGDS causes RGDP in the long run. It suggests the validity of long run association among variables, which means that the speed of adjustment towards long run equilibrium state is 11.637%.

The main conclusion drawn from this analysis indicates that the occurrence of causal links between savings and economic growth is determined significantly by the level of economic development. Moreover, if domestic savings are invested efficiently and are therefore an important factor of economic growth, the main objective of national economic policy should be to encourage the people to save. In addition, national economic authorities should create appropriate conditions for the reallocation of national resources from traditional (non-growth) sectors to the so-called modern (growth-led) sectors of the economy, stimulating economic growth.

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