

Original Research Article

An Investigation of the Long-run Dynamic Interrelationship of GDP, Production Sectors and FDI in the UAE

Abstract

This paper examines a 238 cointegrated stationary observation for the United Arab Emirates (UAE) over the period 1978-2011. It employs a restricted Vector Autoregressive (VAR) model, and the estimation method is based on seemingly unrelated regression (SUR) model for a complete system of equations. The empirical results reveal that the agriculture sector has a negative interrelationship with FDI and GDP. While the industrial sector achieved a positive linkage with agriculture, export and service sectors. Furthermore, the FDI inflows have led to reduced levels of imports.

Key words: GDP, FDI, Export, Import, Industrial sector, UAE

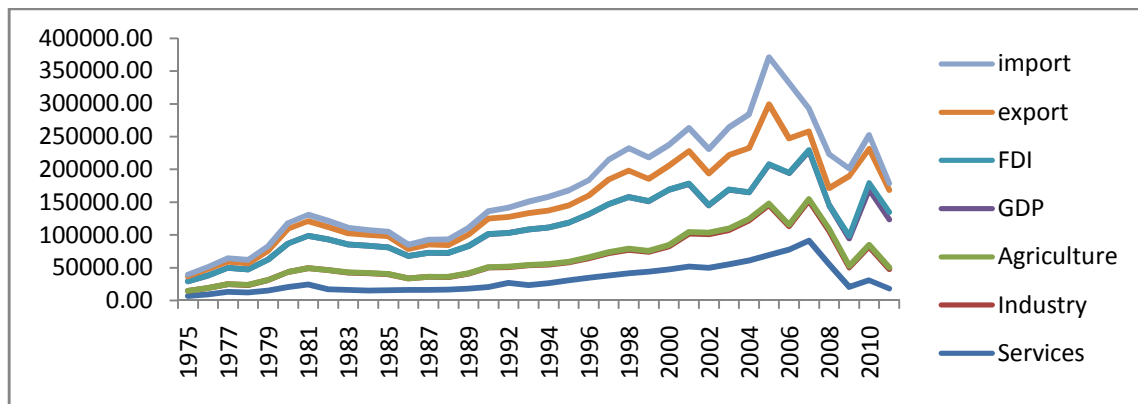
JEL Classification: C13, C22, E13, E22, F14.

1.Introduction:

The UAE's economic policy since 1990s has paid a big concern on redirecting the natural resources to diversify the economy and mitigate the share of oil export to GDP (Fasano and Iqbal 2003; Gelb 2011) in which Dubai, for instance, became a distinct example for building a new economy. This perspective, however, reflects a long-run economic policy which recognizes that crude oil will be depleted in the future. Thus, reinforcement non-oil sectors are highly crucial to achieve a robust economy and reduce the negative influence of sharp fluctuations of global oil prices. Overall, the UAE's economic policy considers that enhancing the inter-sectorial linkage is a key motivation for stimulating level of productivity, and then achieving a high rate of economic growth as a result. Based on this view, this paper addresses the status of the UAE's production sectors; agriculture, services and industry, and GDP, export and FDI. A key challenge facing the UAE's economic policy is to achieve a stable economic growth by means which diversify its economy via enhancing contribution of non-oil sectors (Shihab 2001; Fasano and Iqbal 2003). This policy, however, targets to promote inter-sectorial linkages amongst sectors of the economy.

Theoretically, Solo growth theory considers a technology as an exogenous agent to achieve an economic growth, it explains the long-run growth (Wang 1990). Furthermore, this theory assumed that with the absence of technical progress, the growth will slow down as a result of diminishing returns (Dowling, Valenzuela et al. 2004). In addition, Power-Balance theory, which is a subclass of Solow model postulated that international power balance as an important factor in development, including pattern and terms of trade (Dowling, Valenzuela et al. 2004). Based on that, this study attempts to specify whether or not the UAE economy is subjecting to Solow model. However, and according to the data used in this study we noted that the growth of value added of producing sectors, GDP and FDI almost witnessed parallel volatilities. The durations 1978-1987 and 1988-1999 exhibit, somewhat, a case of diminishing returns, while the period from 2000 through 2011 represents a sharp fluctuations, as shown in the following figure:

Figure 1: The UAE' value added of production sectors, GDP and FDI, 1975-2011 (Million USD)



Source: By the author based on data of IMF. <http://www.imf.org/external/data.htm>

However, the figure above illustrates a case of instability of economic activities, which could be attributed to the changes of market oil prices especially the period spanned through 1975 to 1985 (Gately, Adelman et al. 1986; Zind 1999). Accordingly, we can say that the economic activities are heavily related to changes occur in oil prices and the technical progress has no tangible influence on the UAE economy, where it experiences a low level of technical progress. In other words, the economic policy has paid an attention to exogenous technical progress via import, and FDI inflows which are achieved a remarkable value added compared to services and agricultural sectors. This implies that this economy does not endogenize technical progress as supposed by Romer^(*). However, the contribution of current paper lies particularly in two trends. First, it employs the VECM method which is amenable for long-run analysis via testing seven related equations that will specify the extent of inter-sectorial linkage amongst the variables studied. Second, this paper provides empirical evidence by incorporating the core sectors of the economy. The reason for electing the UAE for our analysis is that it has implemented a variety of programs and policy initiatives since 1990s (Shihab 2001). However, the UAE is considered one of the fastest growing economies in terms of diversification in comparison to the rest of GCC countries. The objective of this paper is to investigate the interrelationships between the variables studied for the UAE economy over the period of 1975 – 2011. The rest of the paper will tackle the related literature in section 2. Section 3 has the empirical strategy including the VECM method. The empirical results and its analysis will be addressed in section 4, and then section 5 is for concluding remarks.

2. Review of Literature:

There many studies which have paid increasing interest to state whether a country's economy grows well with endogenous or exogenous factors. The UAE economy has attracted an attention in this respect due to its dramatic changes as a desired direction for foreign investors and doing business. Accordingly, the literature review of this study will pay more concern on studies related to the UAE economy. (Chaherli and El-Said 2000) reviewed the status of MENA countries' agriculture trade using country specific economy-wide models. This paper quantifies the impact of

^(*)Romer assumes that economic growth is primarily result endogenous and not external forces. Romer, P. M. (1994). "The origins of endogenous growth." *The Journal of Economic Perspectives* 8(1): 3-22.

70 unilateral trade liberalization and suggested domestic policies that would contribute most in
71 expansion of developing country exports. In Malaysia (Gemmell, Lloyd et al. 2000) examined how
72 far agriculture output has been affected by inter-sectorial spillover. The results reveal that
73 expansion of manufacturing output that associated with reduced agriculture output in the short run
74 is associated with agriculture expansion over the long-run. In this context also, (Eswaran and
75 Kotwal 2002) found that a high level of agriculture productivity growth can lead to
76 industrialization, and this progress would enhance level of service sector. Based on that, the
77 presence of a sound agriculture policy is significantly needed for countries which their agriculture
78 sector still contributes modestly. However, an increase in the level of agriculture is affected
79 positively on the economy via reinforcement inter-sectorial linkages with other economic sectors of
80 a country. However, the existence of inter-sectorial linkage is a significant indicator for a stable
81 economic growth (Subramaniam 2010). Furthermore, FDI inflows consider as an important agent in
82 the development process of a country through the transfer of financial resources and technology
83 particularly in sectors that need a high level of capital and technical progress (Chaturvedi 2011). In
84 addition, (Dah and Sulemana 2010) concludes that FDI contributes to the productive capacity of the
85 host country. Moreover, (Gawad and Muramalla 2013) tested the relationship between FDI, oil and
86 gas, and refinery industries production and their export in seventeen countries selected. The study
87 reveals a positive and significant relationship between FDI and export of oil and gas industries in
88 the UAE and China, as well as between FDI and natural gas production. While (Neaime,
89 Marktanner et al. 2009) infers that FDI in the Arab countries has not affected positively on
90 economic growth, and vice versa for Asian countries. In this respect (Hussein 2009) tested to what
91 extent the six members of the GCC countries have recognized the importance of FDI in the process
92 of growth and hence what are the measures adopted aiming at attracting foreign capital. However,
93 the result indicated that there is a weak relationship between FDI and GDP, and this finding
94 supports endogenous growth hypothesis. In other words, this means that GCC countries are not
95 subjected to Solo growth theory, which assumes that the growth could be achieved via exogenous
96 factors. In addition, another study mentioned that the last three decades, 1973-2003, the economic
97 sectors in the UAE experienced a remarkable growth which is significantly was heavily related to
98 global oil prices (Mosesov and Sahawneh 2005). Accordingly, we can say that the impact of
99 investment and trade on other sectors of an economy is not definitely unified in terms of its positive
100 and negative influence. It is, of course, variant due to the nature and size of the economy studied, as
101 well as the contribution of its economic sectors within a certain period. As well as the pattern and
102 policy of trade and investment, for instance, (Hasanat Shah, He et al. 2011) specified that GDP, FDI
103 and domestic investment have a mutual interrelationship. This study, however, revealed a two-way
104 causality runs among the said variables, while unidirectional causality is found from export to FDI.
105 And FDI inflows have an insignificant role in export and import. Furthermore, (Saddam and Kari
106 2012; Saddam and Kari 2012) measured the intensity of intra-regional trade in GCC countries. The
107 study revealed that the intensity index is negative for these economies –except for the UAE and
108 Saudi Arabia in which the size of economy and level of production has a major impact in
109 determining the index adopted. On the contrary, other studies proved that the size of GDP is a
110 significant factor in attracting FDI (Bakir and Alfawwaz 2009; Saddam 2012). This finding is
111 evidently recognized the linkage between FDI and the economy as a key determinant of FDI. In
112 addition (Kadam 2012) concludes that FDI inflows have stimulated the industries in India and
113 China, but the political uncertainty and corruptions put a break on the FDI inflow to India.

Accordingly, the role of state is highly important in attracting FDI. Therefore, the political reformation ought to be an initial platform for evolution an economy. (Elhiraika and Hamed 2002) found that the natural resource abundance in the UAE's is a recipe for growth, as well as, terms of trade shocks have strong positive effects on economic growth in the UAE. This result asserts that a high reliance on crude oil exports has led to more volatility in its trading sector. Hence, the economic growth of this economy is highly linked to shocks occur in global economies as much as its relation to the domestic economy. (Istaitieh, Hugo et al. 2007) indicated that the UAE economy is benefiting from high oil prices, but more significantly from the government's commitments for diversification. In respectof foreign trade impact, (Kota and Sahawneh 2011) found a sharp increase in trade flows in the UAE, which is attributed to the government policies and the infrastructure support extended by the Dubai in particular. In addition, this study also reveals that efficiencies and cost advantages are sufficient adequately to provide sustainable strategic policies given its trading infrastructure facilities rather than looking for short-run benefits. Hence, we can argue that the logistic support is a key matter in stimulating economic activities of sectors of a country, which leads at the end to achieve a remarkable economic growth. In this context, (Echevarria 1997) confirms that the sectorial composition is an important part of the variation in growth rates across countries. Moreover, (Portes and Sassen-Koob 1987) asserts that the industrial structure has been significant of macroeconomic development and economic growth.

Through the above, we can state that an economic policy ought to be consistent with all sectors of a country in terms of redirection the economy's potential , as well as, current producing sectors toward parallel targets that could improve the level of value added and then sustained economic growth. Therefore, the inter-sectorial linkage is definitely a significant agent to figure up to what extent the UAE's economic policy has accomplished its strategic goals.

3. Methodology:

This study uses a Vector Autoregressive (VAR) model via utilizing a complete system of equations, in which the number of equations equal the number of endogenous variables (Greene and Zhang 2003). Accordingly, It comprisesan equal number of observations, where there are (M) equations ($M = 7$) and (T) observations ($T = 238$). However,7 variables will be examined which are; Industry (*ind*), Service (*ser*), Agriculture (*agr*), Foreign direct investment (*FDI*), Export (*exp*), Import (*imp*) and Gross domestic product (*GDP*). The model adopted is based on an initial functional relation which could specify as follows:

$$GDP = f(ind, ser, agr, FDI, exp, im) \quad \dots\dots\dots (1)$$

The variables above are measured in thousand millions USD per annum. However, equation 1 could be shaped in its logarithmic model by the following form:

$$Log (GDP) = a + B1 \log (ind) + B2 \log (ser) + B3 \log (agr) + B4 \log (FDI) + B5 \log (exp) + B6 \log (im) + ui \quad \dots\dots\dots (2)$$

As formerly reported that this study is using a complete system of equations. So, the general VAR model will be formulated as in the following equations:

$$Log (Agr) = a0 + B1 \log (GDP)_{t-i} + B2 \log (ind)_{t-i} + B3 \log (ser)_{t-i} + B4 \log (agr)_{t-i} + B5 \log (FDI)_{t-i} + B6 \log (exp)_{t-i} + B7 \log (im)_{t-i} + u_{1t} \quad \dots\dots\dots (3)$$

$$\begin{aligned} \text{Log}(exp) = & a1 + B8 \log(ind)_{t-i} + B9 \log(GDP)_{t-i} + B10 \log(ser)_{t-i} + B11 \log(agr)_{t-i} + B12 \log \\ & (FDI)_{t-i} + B13 \log(exp)_{t-i} + B14 \log(im)_{t-i} + u_{2t} \end{aligned} \quad \dots\dots\dots(4)$$

$$\begin{aligned} \text{Log}(FDI) = & a2 + B15 \log(ser)_{t-i} + B16 \log(GDP)_{t-i} + B17 \log(ind)_{t-i} + B18 \log(agr)_{t-i} + B19 \log \\ & (FDI)_{t-i} + B20 \log(exp)_{t-i} + B21 \log(im)_{t-i} + u_{3t} \end{aligned} \quad \dots\dots\dots(5)$$

$$\begin{aligned} \text{Log}(GDP) = & a3 + B22 \log(agr)_{t-i} + B23 \log(ser)_{t-i} + B24 \log(GDP)_{t-i} + B25 \log(ind)_{t-i} + B26 \log \\ & (FDI)_{t-i} + B27 \log(exp)_{t-i} + B28 \log(im)_{t-i} + u_{4t} \end{aligned} \quad \dots\dots\dots(6)$$

$$\begin{aligned} \text{Log}(Im) = & a4 + B29 \log(agr)_{t-i} + B30 \log(ser)_{t-i} + B31 \log(GDP)_{t-i} + B32 \log(ind)_{t-i} + B33 \log \\ & (FDI)_{t-i} + B34 \log(exp)_{t-i} + B35 \log(im)_{t-i} + u_{5t} \end{aligned} \quad \dots\dots\dots(7)$$

$$\begin{aligned} \text{Log}(Ind) = & a5 + B36 \log(agr)_{t-i} + B37 \log(ser)_{t-i} + B38 \log(GDP)_{t-i} + B39 \log(ind)_{t-i} + B40 \log \\ & (FDI)_{t-i} + B41 \log(exp)_{t-i} + B42 \log(im)_{t-i} + u_{6t} \end{aligned} \quad \dots\dots\dots(8)$$

$$\begin{aligned} \text{Log}(Ser) = & a6 + B43 \log(agr)_{t-i} + B44 \log(ser)_{t-i} + B45 \log(GDP)_{t-i} + B46 \log(ind)_{t-i} + B47 \log \\ & (FDI)_{t-i} + B48 \log(exp)_{t-i} + B49 \log(im)_{t-i} + u_{7t} \end{aligned} \quad \dots\dots\dots(9)$$

Where; $a0 \dots a6$ are intercepts, $B1 \dots B49$ are coefficients to be estimated, and $u_{1t} \dots u_{7t}$ represent correlated error terms of the model. Also, GDP , ind , ser , agr , FDI , ex , and im have mutually contemporaneous effect on each other in the system. However, the unit root test is employed to check the stationarity of the data adopted, as shown in table 1 below:

Table 1: Group Unit root test for the VAR model.

Group unit root test: Summary				
Series: AGRI, EX, FDI, GDP, IM, IND, SER				
Sample: 1976 2011				
Exogenous variables: Individual effects				
Automatic selection of maximum lags				
Automatic selection of lags based on SIC: 0 to 4				
Newey-West bandwidth selection using Bartlett kernel				
Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t^*	-2.38508	0.0085	7	235
Null: Unit root (assumes individual unit root process)				
PP - Fisher Chi-square	29.4246	0.0092	7	245

Source: By the author based on Eviews software.

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

As we note in table above, the two statistic tests depict that the probabilities (P-value) are statistically significant at the 1 percent level. Therefore, the null hypotheses are rejected and we accepted the alternative one. Meaning that, there is no unit root, and the data are stationary, which could be used in this model. Accordingly, the results that we will obtain will be statistically valid and economically meaningful for interpreting the output of the model. Furthermore, and in order to select an ideal lag for the model, we have used Eviews software to state the lag length for this

186 study. However, we found that lag one is the optimum option in this respect, as shown in the
187 following table.

188 **Table 2: VAR lag order criteria**

VAR Lag Order Selection Criteria Endogenous variables: AGRI EX FDI GDP IM IND SER Exogenous variables: C Sample: 1976 2011 Included observations: 34						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-89.29232	NA	6.80e-07	5.664254	5.978505	5.771423
1	83.44534	264.1870*	5.00e-10	-1.614432	0.899574*	-0.757084*
2	139.8469	63.03701	4.79e-10*	-2.049816*	2.663944	-0.442289
* 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						

189 Source: By the author based on Eviews software.

190
191 As shown in table 1 above, the three criteria (LR, SC and HQ) stated that lag one is the most
192 suitable lag for the model adopted in this study. While two criteria (FPE and AIC) indicated that lag
193 2 is the ideal lag. Thus, this model will be based on lag 1, due to its selection by the majority of
194 criteria, three criteria relative to two criteria. In addition, and in order to identify whether or not the
195 variables adopted are co-integrated, the Johansen trace test is conducted as shown in table 2. It
196 shows that the variables used in this study are cointegrated, which means that these variables could
197 be drifted together in the long-run.

198 **Table 3: Johansen test for cointegration**

Sample (adjusted): 1979 2011 Included observations: 33 after adjustments Trend assumption: Linear deterministic trend Series: AGRI EX FDI GDP IM IND SER Lags interval (in first differences): 1 to 2				
Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.903038	239.1537	125.6154	0.0000
At most 1 *	0.818245	162.1502	95.75366	0.0000
At most 2 *	0.720478	105.8820	69.81889	0.0000
At most 3 *	0.637407	63.81772	47.85613	0.0008
At most 4 *	0.418658	30.34004	29.79707	0.0433
At most 5	0.279639	12.44030	15.49471	0.1370
At most 6	0.047796	1.616202	3.841466	0.2036
Trace test indicates 5 cointegrating eqn(s) at the 0.05 level				

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.903038	77.00349	46.23142	0.0000
At most 1 *	0.818245	56.26821	40.07757	0.0003
At most 2 *	0.720478	42.06424	33.87687	0.0042
At most 3 *	0.637407	33.47768	27.58434	0.0078
At most 4	0.418658	17.89974	21.13162	0.1336
At most 5	0.279639	10.82410	14.26460	0.1632
At most 6	0.047796	1.616202	3.841466	0.2036

Max-eigenvalue test indicates 4 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

199 Source: By the author based on Eviews software.

200 However, since the data used are cointegrated, and to obtain an accurate econometric result, we can
201 adopt a restricted VAR model, which is usually call Vector Error Correction Model (VECM),
202 accordingly, the former VAR model equations could be reformulated in the following system:

203 $Log(Agr) = a0 + B1 [\delta0 + \theta1 \log(GDP)_{t-1} + \theta2 \log(ind)_{t-1} + \theta3 \log(ser)_{t-1} + \theta4 \log(agr)_{t-1} + \theta$
204 $5 \log(FDI)_{t-1} + \theta6 \log(exp)_{t-1} + \theta7 \log(im)_{t-1}] + B2 \log(GDP)_{t-1} + B3 \log(ind)_{t-1} + B4 \log(ser)_{t-1}$
205 $+ B5 \log(agr)_{t-1} + B6 \log(FDI)_{t-1} + B7 \log(exp)_{t-1} + B8 \log(im)_{t-1} + u_{1t}$

206(10)

207 $Log(Exp) = a1 + B9 [\delta1 + \theta8 \log(GDP)_{t-1} + \theta9 \log(ind)_{t-1} + \theta10 \log(ser)_{t-1} + \theta11 \log(agr)_{t-1} + \theta$
208 $12 \log(FDI)_{t-1} + \theta13 \log(exp)_{t-1} + \theta14 \log(im)_{t-1}] + B10 \log(GDP)_{t-1} + B11 \log(ind)_{t-1} + B12 \log$
209 $(ser)_{t-1} + B13 \log(agr)_{t-1} + B14 \log(FDI)_{t-1} + B15 \log(exp)_{t-1} + B16 \log(im)_{t-1} + u_{2t}$ (11)

210 $Log(FDI) = a2 + B17 [\delta2 + \theta15 \log(GDP)_{t-1} + \theta16 \log(ind)_{t-1} + \theta17 \log(ser)_{t-1} + \theta18 \log(agr)_{t-1}$
211 $+ \theta19 \log(FDI)_{t-1} + \theta20 \log(exp)_{t-1} + \theta21 \log(im)_{t-1}] + B18 \log(GDP)_{t-1} + B19 \log(ind)_{t-1} +$
212 $B20 \log(ser)_{t-1} + B21 \log(agr)_{t-1} + B22 \log(FDI)_{t-1} + B23 \log(exp)_{t-1} + B24 \log(im)_{t-1} +$
213 u_{3t} (12)

214 $Log(GDP) = a3 + B25 [\delta3 + \theta22 \log(GDP)_{t-1} + \theta23 \log(ind)_{t-1} + \theta24 \log(ser)_{t-1} + \theta25 \log(agr)_{t-1}$
215 $+ \theta26 \log(FDI)_{t-1} + \theta27 \log(exp)_{t-1} + \theta28 \log(im)_{t-1}] + B26 \log(GDP)_{t-1} + B27 \log(ind)_{t-1} +$
216 $B28 \log(ser)_{t-1} + B29 \log(agr)_{t-1} + B30 \log(FDI)_{t-1} + B31 \log(exp)_{t-1} + B32 \log(im)_{t-1} +$
217 u_{4t} (13)

218 $Log(Im) = a4 + B33 [\delta4 + \theta29 \log(GDP)_{t-1} + \theta30 \log(ind)_{t-1} + \theta31 \log(ser)_{t-1} + \theta32 \log(agr)_{t-1}$
219 $+ \theta33 \log(FDI)_{t-1} + \theta34 \log(exp)_{t-1} + \theta35 \log(im)_{t-1}] + B34 \log(GDP)_{t-1} + B35 \log(ind)_{t-1} +$
220 $B36 \log(ser)_{t-1} + B37 \log(agr)_{t-1} + B38 \log(FDI)_{t-1} + B39 \log(exp)_{t-1} + B40 \log(im)_{t-1} + u_{5t}$
221(14)

222 $Log(Ind) = a5 + B41 [\delta5 + \theta36 \log(GDP)_{t-1} + \theta37 \log(ind)_{t-1} + \theta38 \log(ser)_{t-1} + \theta39 \log(agr)_{t-1} +$
223 $\theta40 \log(FDI)_{t-1} + \theta41 \log(exp)_{t-1} + \theta42 \log(im)_{t-1}] + B42 \log(GDP)_{t-1} + B43 \log(ind)_{t-1} + B44$
224 $\log(ser)_{t-1} + B45 \log(agr)_{t-1} + B46 \log(FDI)_{t-1} + B47 \log(exp)_{t-1} + B48 \log(im)_{t-1} + u_{6t}$
225(15)

$$\begin{aligned} \log(Ser) = & a_6 + B_{49} [\delta_6 + \theta_{43} \log(GDP)_{t-1} + \theta_{44} \log(ind)_{t-1} + \theta_{45} \log(agr)_{t-1} \\ & + \theta_{46} \log(FDI)_{t-1} + \theta_{47} \log(exp)_{t-1} + \theta_{48} \log(im)_{t-1}] + B_{50} \log(GDP)_{t-1} + B_{51} \log(ind)_{t-1} + B_{52} \\ & \log(ser)_{t-1} + B_{53} \log(agr)_{t-1} + B_{54} \log(FDI)_{t-1} + B_{55} \log(exp)_{t-1} + B_{56} \log(im)_{t-1} + u_{7t} \\ & \dots\dots\dots(16) \end{aligned}$$

Furthermore, the estimation method will utilize the Seemingly Unrelated Regression (SUR) model, which proposed by (Zellner 1963). It assumes that error terms are correlated across the equation estimated. However, the reason of using (SUR) method is to obtain an efficient estimation via merging different equations (Biørn 1981). It is also a flexible analytic strategy because the correlation amongst exogenous variables (Moon and Perron 2005; Beasley 2008). However, as we formerly mentioned, in this study, seven individual relationships are linked together via their disturbances correlated.

237

238 4. Empirical Result and Analysis:

239 Based on the mentioned empirical methodology, the model is regressed via using Eviews software,
240 where we obtained the following results:

241 **Table 4: Regression Result for the VECM of study**

Estimation Method: Seemingly Unrelated Regression				
Sample: 1978 2011				
Included observations: 34				
Total system (balanced) observations 238				
Linear estimation after one-step weighting matrix				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
(Agr. Equation)	-0.113015	0.029519	-3.828573	0.0002(*)
(Agr) _{t-1}	-0.190422	0.166361	-1.144627	0.2539
(Exp) _{t-i}	0.063545	0.040861	1.555141	0.1217
(FDI) _{t-i}	-0.033142	0.010898	-3.041159	0.0027(*)
(GDP) _{t-i}	-0.163459	0.062539	-2.613722	0.0097(*)
(Im) _{t-i}	-0.047527	0.039179	-1.213081	0.2267
(ind) _{t-i}	0.177434	0.058031	3.057559	0.0026(*)
(ser) _{t-i}	0.113197	0.068070	1.662938	0.0981
C	0.113892	0.020061	5.677420	0.0000
(Exp. Equation)	0.158790	0.109120	1.455184	0.1474
(agr) _{t-1}	0.742807	0.614978	1.207859	0.2287
(exp) _{t-1}	0.276207	0.151049	1.828595	0.0692
(FDI) _{t-i}	-0.094659	0.040286	-2.349708	0.0199(**)
(GDP) _{t-i}	-0.379434	0.231184	-1.641266	0.1025
(Im) _{t-1}	0.281793	0.144829	1.945690	0.0533
(ind) _{t-1}	0.170858	0.214521	0.796463	0.4268
(ser) _{t-1}	-0.223488	0.251632	-0.888154	0.3757
C	-0.032046	0.074157	-0.432137	0.6662
(FDI Equation)	0.866551	0.482566	1.795714	0.0743
(agr) _{t-1}	3.422020	2.719643	1.258261	0.2100
(exp) _{t-1}	1.694407	0.667989	2.536578	0.0121(**)
(FDI) _{t-i}	-0.450275	0.178156	-2.527416	0.0124(**)
(GDP) _{t-1}	1.796531	1.022375	1.757214	0.0806
(Im) _{t-1}	1.451935	0.640484	2.266934	0.0246(**)

$(ind)_{t-1}$	-1.162681	0.948685	-1.225571	0.2220
$(ser)_{t-1}$	-2.177318	1.112801	-1.956611	0.0520
C	-0.157139	0.327946	-0.479162	0.6324
(GDP Equation)	-0.266629	0.081413	-3.275008	0.0013(*)
$(agr)_{t-1}$	-1.318214	0.458828	-2.873000	0.0046(*)
$(Exp)_{t-1}$	0.483591	0.112696	4.291111	0.0000(*)
$(FDI)_{t-1}$	-0.069320	0.030057	-2.306314	0.0223(**)
$(GDP)_{t-1}$	-0.389586	0.172484	-2.258680	0.0251(**)
$(Im)_{t-1}$	0.114227	0.108056	1.057111	0.2919
$(ind)_{t-1}$	0.001839	0.160052	0.011487	0.9908
$(ser)_{t-1}$	-0.073036	0.187740	-0.389026	0.6977
C	0.177651	0.055327	3.210900	0.0016
(Im. Equation)	-0.241020	0.116129	-2.075459	0.0394(**)
$(agr)_{t-1}$	-0.764237	0.654477	-1.167706	0.2445
$(exp)_{t-1}$	0.615674	0.160750	3.830000	0.0002(*)
$(FDI)_{t-1}$	-0.072088	0.042873	-1.681435	0.0945
$(GDP)_{t-1}$	-0.482150	0.246033	-1.959699	0.0516
$(Im)_{t-1}$	-0.894752	0.154131	-5.805126	0.0000(*)
$(ind)_{t-1}$	0.513051	0.228299	2.247272	0.0259(**)
$(ser)_{t-1}$	1.127643	0.267794	4.210867	0.0000(*)
C	0.090490	0.078919	1.146607	0.2531
(Ind. Equation)	-0.236183	0.097367	-2.425696	0.0163(*)
$(agr)_{t-1}$	-0.112167	0.548741	-0.204408	0.8383
$(exp)_{t-1}$	0.242175	0.134780	1.796819	0.0741
$(FDI)_{t-1}$	-0.089665	0.035947	-2.494414	0.0135(**)
$(GDP)_{t-1}$	-0.336883	0.206284	-1.633103	0.1042
$(Im)_{t-1}$	-0.492089	0.129230	-3.807850	0.0002(*)
$(Ind)_{t-1}$	-0.227640	0.191416	-1.189243	0.2360
$(ser)_{t-1}$	0.577017	0.224529	2.569897	0.0110(**)
C	0.082084	0.066169	1.240520	0.2164
(Ser. Equation)	-0.295628	0.085605	-3.453401	0.0007(*)
$(agr)_{t-1}$	-1.111134	0.482452	-2.303098	0.0224(**)
$(exp)_{t-1}$	0.480227	0.118498	4.052610	0.0001(*)
$(FDI)_{t-i}$	-0.071780	0.031604	-2.271238	0.0244(**)
$(GDP)_{t-1}$	-0.224012	0.181364	-1.235148	0.2184
$(Imp)_{t-1}$	-0.268980	0.113619	-2.367389	0.0190(*)
$(Ind)_{t-i}$	0.037679	0.168292	0.223891	0.8231
$(Ser)_{t-1}$	0.521255	0.197406	2.640530	0.0090(*)
C	0.123778	0.058176	2.127642	0.0348

Source: By the author based on Eviews software.

(*)(**) statistically significant at the (0.01) and (0.05) levels, respectively.

Besides, R-squared and Durbin- Watson statistic values of the regression above are shown in the following table:

Table5: R-squared and DW values of the model of study

Equation name	R-squared	DW
<i>Agr.</i>	0.50	2.08
<i>Exp.</i>	0.63	1.91
<i>FDI</i>	0.53	2.28
<i>GDP</i>	0.62	2.28
<i>Im.</i>	0.66	1.56
<i>Ind.</i>	0.56	2.08

Ser.	0.61	1.95
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Source: By the author based on Eviews software.

According to the table above, we note that R-squared value ranged between 0.50 and 0.63 in which reflects the strength relation amongst the endogenous and exogenous variables adopted into the system of equations. As well as, DW value depicts the absence of autocorrelation problem. This means the models adopted are statistically valid. Hence, It is economically will be meaningful in analyzing the interrelationship amongst the variables of study.

Agriculture equation in table 4 illustrates that the increase of the aggregate of production sectors, GDP and FDI by one time will reduce level of agriculture sector by 0.11 times. This result, however, reflects that there is no linkage between agriculture sector and other sectors of the UAE economy. It is due to the modest level of this sector which has no link with the economy; this finding could be recognized via monitoring GDP and FDI variables, which have achieved a negative impact on the agriculture sector. However, their rising by one time will influence in decreasing level of agriculture by 0.16 and 0.03 times respectively. Hence, this result can be interpreted due to the high growth of GDP and FDI inflows into the UAE which led to weaken the modest role of the agriculture sector in this country. Moreover, It was noted that the industry sector has had a positive effect, in which its increase by one time will enhance the level of agriculture by 0.11 times.

Export equation reveals that the FDI inflows have led to mitigate the level of exports. This implies, that on the long-run, the UAE has seen a slowdown in the level of export, and the reason for that could be attributed to concentrating of FDI flows in the real estate and construction sectors in comparison to other investment. Accordingly, we can point that the policy of attracting FDI to the UAE economy does not target achieving an improvement in the level of export, as much as, it is for meeting the domestic market needs. However, due to the result obtained, the increase of level of FDI by one time will cause in dropping level of export by 0.09 times.

FDI equation shows that the export of the UAE has a high positive influence on the level of FDI and import, an increase in the level of export by one time will lead to rising their levels by 1.69 and 1.45 times. Meaning that, the foreign trade is an important criteria for attracting FDI, which stimulates foreign investors. We therefore can say that foreign trade sector of the UAE is a vital element which significantly contribute in shifting producing factors and technology on the long-run. In other words, the UAE's foreign trade is crucially led to a reinforcement level of FDI over the period 1978-2011. On the contrary, we note that the lagged FDI has a negative effect on FDI as a dependent variable of the equation system. This means the current FDI is not positively affecting in attracting more FDI. Accordingly, the foreign trade is the major catalyzer for encouraging foreign investors.

Besides, the GDP equation represents that the coefficient of the whole equation has an inverse impact on GDP in the long-run. This result could be explained by the modest role of FDI and production sectors in which have not achieved a developmental impact over the period studied. However, this statement dates back to the negative role of other variables of the study, particularly agriculture sector, in which the increase of its production by one time will lead to decrease level of GDP by 1.31 times. While we note that the rising of level of export by one time will improve level of GDP by 0.48 times. This reflects, however, the significant role of export of the UAE relative to

other variables. In the equation of the import, we see that the variables studied together have a negative impact on the level of import. This clarifies that their aggregate increase by one time will cause in declining level of imports by 0.24 times. However, this finding could be revealed via the role of FDI and aggregate GDP. Their rising by one time have led to reduced level of imports by 0.07 and 0.48 times respectively. In contrast, the industry and services sectors have accomplished a positive interrelationship, in which the growing of the said variables by one time lead to raising import levels by 0.51 times. Hence, this result infers the necessity of the import sector in meeting the industry sector needs. As well as, service sector has an important impact on import sector, meaning that, the industry and service sectors have mutual significance influence on the UAE's economy in the long-run.

Furthermore, the industry equation shows a negative relationship between industry sector and other variables of the study at all. The growing of level of FDI and imports by one time lead to drop level of industry sector by 0.23 times. Whereas service sector has a positive impact, its increase by one time will derive to rising level of industry sector by 0.57 times. Accordingly, it can be seen the FDI inflows have a highly competitive against the industry sector of the UAE. In other hand, the domestic industry sector does not compete FDI inflows. This implies that these flows enjoy in a high level of technology. However, the industry sector in the UAE is a weak competitor to FDI inflows over the period of the study. Thus, the UAE's industrial policies ought to be geared to reinforce level of productivity and technology used in order to compete its counterpart in the long-run.

Finally, service equation illustrates that the whole equation coefficients have a negative effect on the service sector. As well as, FDI, agriculture and import also have inversely influenced on the service sector. While, export and lagged service variable have a positive with the service sector. Meaning that, the service sector is crucially related to export, which is a reflection of a significant positive interrelationship between foreign trade and FDI over the period studies. Hence, we can say that the commercial policies of the UAE have affected in improving level of service sector indirectly via the increase of level of import and export, which is in turn, enhanced level of service sector in the long-run.

5. Concluding Remarks:

This study investigated the interrelationship amongst the economic sectors of the UAE economy. It employed a system of equations. The empirical models reveal that the agriculture sector is still vulnerable and has a negative interrelationship with GDP and FDI. This asserts the failure of agriculture policies over the study period, while the industrial sector has a slight positive impact on the agriculture sector. As well as, the positive linkage between industrial, service sectors and import assured the necessity of the import sector in meeting the industry sector needs, and, of course, this linkage is crucially related to the service sector. Furthermore, FDI inflows have a highly competitive against the industry sector, where it does not able to compete foreign investors. And the service sector is found significantly interrelated with export sector in which the commercial policies have led to increasing exports, and thus enhanced level of services sector consequently.

Besides, FDI inflows have been affected in reducing level of exports, where it does not concentrate in manufacturing sectors, as much as, in real estate and construction sectors. However, the policy of

attracting FDI to the UAE is not targeted to achieve an improvement in sectors which could increase exports significantly. It is focused on meeting the domestic demand. Nonetheless, the export sector has achieved a positive impact in attracting FDI in the long-run. Also, the foreign trade of the UAE is significantly contributing in shifting producing factors and technology in the long-run, but it does not lead to increased levels of export. On the contrary, the export sector has achieved a dynamic developmental influence on the GDP, and vice versa for the other sectors. Finally, the study extrapolates that the UAE's economic policy has concentrated on the policy of reducing imports due to the growing of other sectors have led to reduce the level of imports over the period 1978-2011.

References:

- Bakir, A. and T. Alfawwaz (2009). "Determinants of Foreign Direct Investment in Jordan." *International Management Review* **5**(2): 66-73.
- Beasley, T. M. (2008). "Seemingly unrelated regression (SUR) models as a solution to path analytic models with correlated errors." *Multiple Linear Regression Viewpoints* **34**(1): 1-7.
- Biørn, E. (1981). Estimating seemingly unrelated regression models from incomplete cross-section/time-series data, Statistisk sentralbyrå.
- Chaherli, N. and M. El-Said (2000). Impact of the WTO Agreement on MENA Agriculture, Citeseer.
- Chaturvedi, I. (2011). Role of FDI in Economic Development of India: Sectoral Analysis. *International Conference on Technology and Business Management*.
- Dah, F. K. and M. Sulemana (2010). The contribution of oil to the economic development of Ghana: The role of foreign direct investments (FDI) and government policies, University West.
- Dowling, J. M., M. R. Valenzuela, et al. (2004). *Economic development in Asia*, Thomson Learning Asia.
- Echevarria, C. (1997). "Changes in sectoral composition associated with economic growth." *International Economic Review*: 431-452.
- Elhiraika, A. B. and A. H. Hamed (2002). Explaining growth in an oil-dependent economy: the case of the United Arab Emirates. Workshop on Global Research Project "Explaining Growth", Rio de Janeiro, Brazil.
- Eswaran, M. and A. Kotwal (2002). "The role of the service sector in the process of industrialization." *Journal of Development Economics* **68**(2): 401-420.
- Fasano, U. and Z. Iqbal (2003). GCC countries: from oil dependence to diversification, International Monetary Fund.
- Gately, D., M. Adelman, et al. (1986). "Lessons from the 1986 oil price collapse." *Brookings papers on economic activity* **1986**(2): 237-284.
- Gawad, G. M. A. and V. S. S. R. Muramalla (2013). "Foreign Direct Investment (FDI) and Its Effects On Oil, Gas And Refinery Production and Their Exports: An Applied Study." *Journal of Economics and Sustainable Development* **4**(1): 21-35.
- Gelb, A. (2011). *Economic Diversification in Resource Rich Countries*. Center for Global Development, Washington, DC, [www.imf.org/external/np/seminars. eng/2010/afrfin/pdf/GELB2. pdf](http://www.imf.org/external/np/seminars/eng/2010/afrfin/pdf/GELB2.pdf).

- 381 Gemmell, N., T. Lloyd, et al. (2000). "Agricultural Growth and Inter-Sectoral Linkages in a Developing
382 Economy." *Journal of Agricultural Economics* **51**(3): 353-370.
383
- 384 Greene, W. H. and C. Zhang (2003). *Econometric analysis* (Vol. 5), Prentice hall Upper Saddle River, NJ.
385
- 386 Hasanat Shah, S., B. He, et al. (2011). "The Causality and Economic Impact of FDI inflows from Trade
387 Partners in Pakistan."
388
- 389 Hussein, M. A. (2009). "Impacts of foreign direct investment on economic growth in the Gulf Cooperation
390 Council (GCC) Countries." *International Review of Business Research Papers* **5**(3): 362-376.
391
- 392 Istitieh, A., S. Hugo, et al. (2007). "UAE Macroeconomic Report." *Macroeconomic Report Series*.
393
- 394 Kadam, R. N. (2012). "Attracting Foreign Direct Investment by India: A Today's Great Challenge."
395 *International Journal of Social Science Tomorrow* **1**(4): 1-8.
396
- 397 Kota, S. and N. Sahawneh (2011). "Trends In Commodity Flows In Uae." *Journal of Global Business and*
398 *Economics* **3**(1): 87-100.
399
- 400 Moon, H. R. and B. Perron (2005). "Efficient estimation of the seemingly unrelated regression cointegration
401 model and testing for purchasing power parity." *Econometric Reviews* **23**(4): 293-323.
402
- 403 Mosesov, A. and N. M. F. Sahawneh (2005). "UAE: Financial Development and Economic Growth." *Skyline*
404 *Business Journal* **1**: 1-11.
405
- 406 Neaime, S., M. Marktanner, et al. (2009). *The Role of Foreign Direct Investment for Economic Development*
407 *in the MENA Region*. American University of Beirut, Department of Economics and Institute of Financial
408 Economics, Beirut, Lebanon, prepared for the 29th annual meeting of MEEA, Allied Science Associations,
409 San Francisco, CA, USA.
410
- 411 Portes, A. and S. Sassen-Koob (1987). "Making it underground: Comparative material on the informal sector
412 in western market economies." *American Journal of Sociology*: 30-61.
413
- 414 Romer, P. M. (1994). "The origins of endogenous growth." *The Journal of Economic Perspectives* **8**(1): 3-22.
415
- 416 Saddam, A. and F. Kari (2012). "Analysis of Intensity of Intra-Regional Trade in GCC Countries, 1998-
417 2008." *International Journal of Trade, Economics and Finance* **3**(3): 223-226.
418
- 419 Saddam, A. and F. Kari (2012). "Size of Economy, Cost of Transport and their impact on Trade in GCC
420 countries: Evidence from qualitative and quantitative approaches." *Journal of finance and investment analysis*
421 **1**(3): 137-169.
422
- 423 Saddam, A. and F. Kari. (2012). "Foreign trade, FDI and their impact in growth in GCC countries: Evidence
424 from qualitative and quantitative approaches." *Arab Economic Journal* (59-60): 3-32.
425
- 426 Shihab, M. (2001). "Economic Development in the UAE." *United Arab Emirates: a new perspective*: 249-
427 259.
428
- 429 Subramaniam, V. (2010). "Agricultural Intersectoral Linkages and Their Contribution to Economic
430 Development."
431
- 432 Wang, J.-Y. (1990). "Growth, technology transfer, and the long-run theory of international capital
433 movements." *Journal of international economics* **29**(3): 255-271.
434
- 435 Zellner, A. (1963). "Estimators for seemingly unrelated regression equations: Some exact finite sample
436 results." *Journal of the American Statistical Association* **58**(304): 977-992.

437
438 Zind, R. G. (1999). "Oil price movements and the Arabian Gulf economies:: A sectoral analysis." Resources
439 policy **25**(1): 59-67.