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# The Role of Manufacturing in Promoting Sustainable Economic Growth in the GCC

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## **Abstract**

Over the past decade, manufacturing levels and manufacturing shares of non-oil GDP were growing in the GCC economies. However, this paper shows that the importance of manufacturing or non-oil GDP in general was declining relative to the oil sectors in these countries. This paper also shows that manufacturing is strongly linked to non-oil economic growth in the GCC over the long run, in a way that income and population are both important to stimulate manufacturing in the GCC, especially income. In the short run, manufacturing in the GCC countries has no significant effects on stimulating the growth levels of real non-oil GDP and that government spending might not be effective in terms of deriving the growth of non-oil GDP or stimulating diversification efforts in the GCC countries over the sample period.

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## Introduction

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For a long time, the industrial efforts of the Gulf Cooperation Council (GCC) region have been focusing on manufacturing as a way to diversify the economy away from the dependence on oil revenue. Until now, the impact of these efforts to promote manufacturing to sustain economic development is not fully examined. It is not known if manufacturing is the engine of non-oil economic growth in the GCC countries. Moreover, the success of the efforts to enhance productivity and competitiveness of the manufacturing industry and its ability to create jobs in the market is linked to many important factors, among them is the education system, research in science and technology, and government policies, all of which are advancing very slowly in the GCC countries.

This short paper investigates the role of increased manufacturing share of non-oil GDP in GCC economies in accelerating economic growth that leads into diversification of their economies. The paper is organized as follow: section 2 provides a quick overview of economic growth and manufacturing in the GCC region. Sections 3 and 4 discuss methodology and econometric results, and section 5 concludes.

## Economic Growth and Manufacturing in the GCC

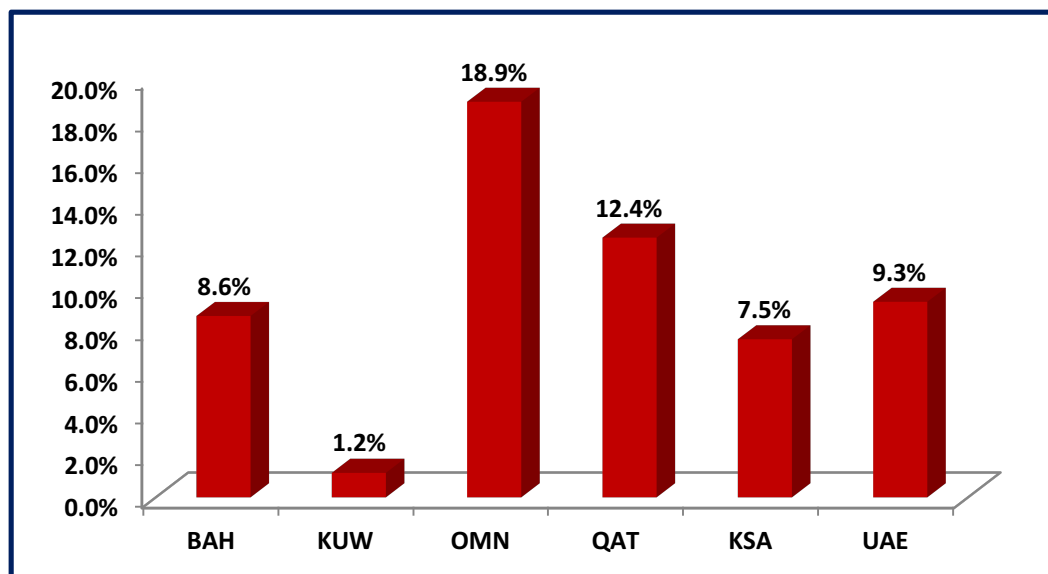
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Economic literature argues that in abundant natural resources countries (especially oil), exports of primary goods have negative effects on economic growth (see Sachs and Warner 1995, Gylfason 2001, Sala-i-Martin and Subramanian 2003, Stijns 2005, and Harb 2009). Many explanations have been offered to explain this negative association. First, the Dutch Disease which refers to the observation that when natural resources are abundant, factors of production are directed from manufacturing to the non-tradable sectors (e.g., services). Second, as the demand for manufacturing goods grows faster than the demand for natural resources, terms of trade favor industrial countries. Therefore, natural resources exporting countries grow slower than other countries. Third, the abundance of natural resources is known to weaken public and private incentives to accumulate human capital, which in effect weakens economic growth. Fourth, natural resources are thought to lead to high economic rents and inefficient distribution of resources that favor less efficient and corrupted use. Finally, the volatility of natural resources prices increases risk and uncertainty which affects economic planning and projects and reduces factor accumulation.

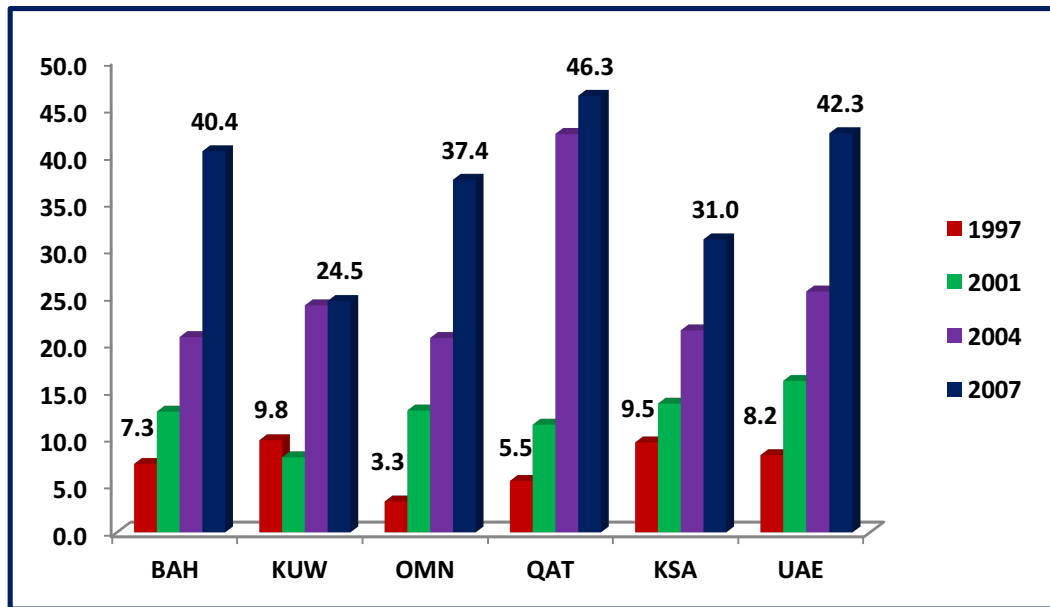
However, we may argue that in the case of the GCC countries, abundance of oil may have played a positive effect on real non-oil economic growth. Dutch Disease is an unlikely event in the GCC countries as they import most of the labor force that is used to build the country and derive economic growth. Moreover, world demand for oil, which has been accelerating for several decades, prevented any expected deterioration of the terms of trade in these countries. The GCC countries, as they enjoy high levels of oil revenues, targeted ambitious development targets. Most importantly, GCC countries have been focusing attention on the diversification of their economies away from large dependence on oil, through larger support to manufacturing and some service industries.

Figure (1) shows the annual real rate of growth in manufacturing in the last decade. Except for Kuwait, which enjoyed a rate of growth around 1%, real manufacturing output was growing annually at very high rates ranged from 7.5% in Saudi Arabia to around 19% in Oman. The overall annual real growth in the GCC region of manufacturing output over these years was around 7.9%, compared to an annual non-oil real GDP growth of around 6.2%. This implies an increase of the share of manufacturing output in the non-oil GDP (see figure 2). The share increased from around (3% to 10%) in 1997 to around (24% to 46%) in 2007.

**Figure (1): Annual real growth rates of manufacturing between 1997 and 2007 in the GCC (%)**



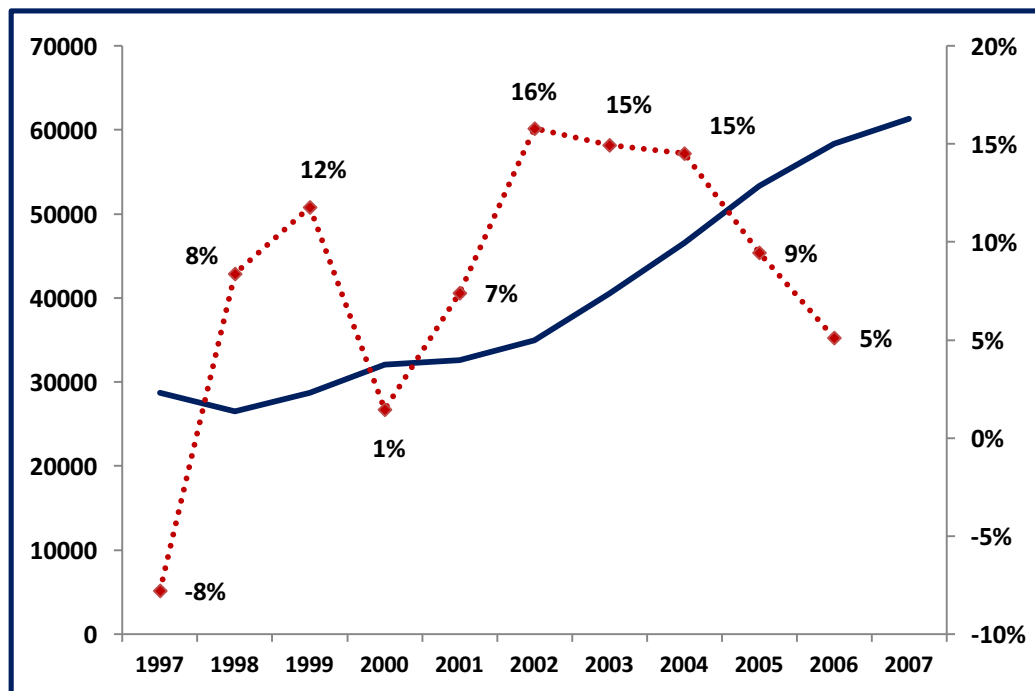
**Figure (2): Manufacturing share in non-oil real GDP in the GCC for selected years (%)**



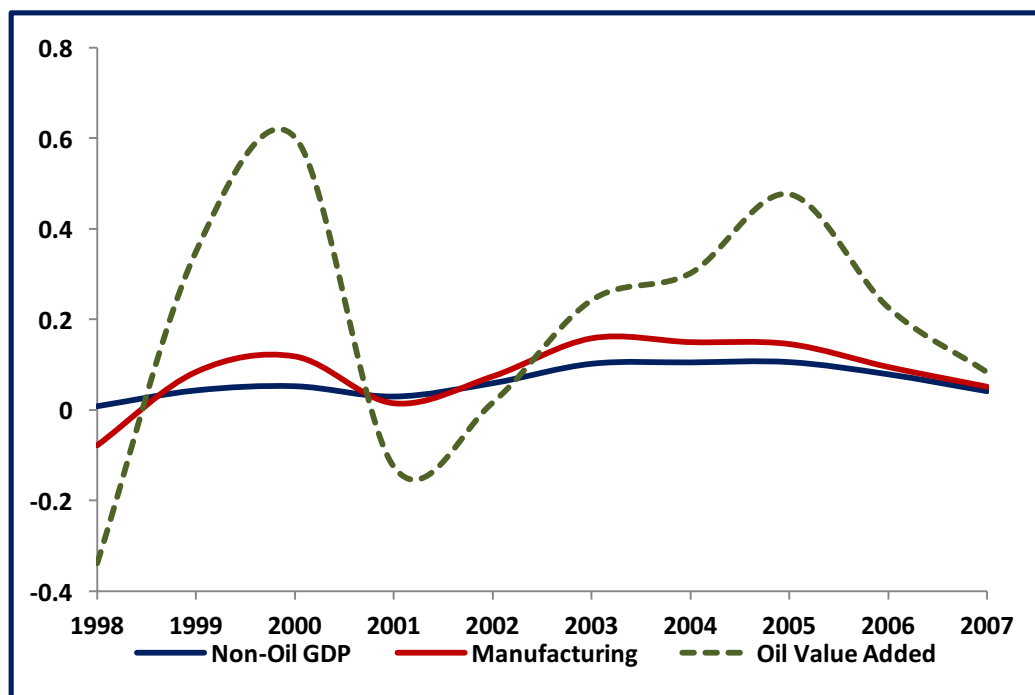
Although manufacturing output was increasing over the years, fluctuations of this growth have to be noted as shown in figure (3). Real manufacturing growth in the GCC region fluctuated from around a low -8% in 1997 to a high growth of 16% in 2001 before declining to around 5% in 2007. Figure (4) shows that these fluctuations in manufacturing and non-oil GDP might be both related to fluctuations in oil output. If this is the case, then the fate of the non-oil growth, including manufacturing growth, is still linked to oil economy and diversification efforts are not yet fully independent from oil in the GCC countries.



**Figure (3): Manufacturing value added and real growth in manufacturing in the GCC (millions of US \$ in 1995 prices and percentages)**

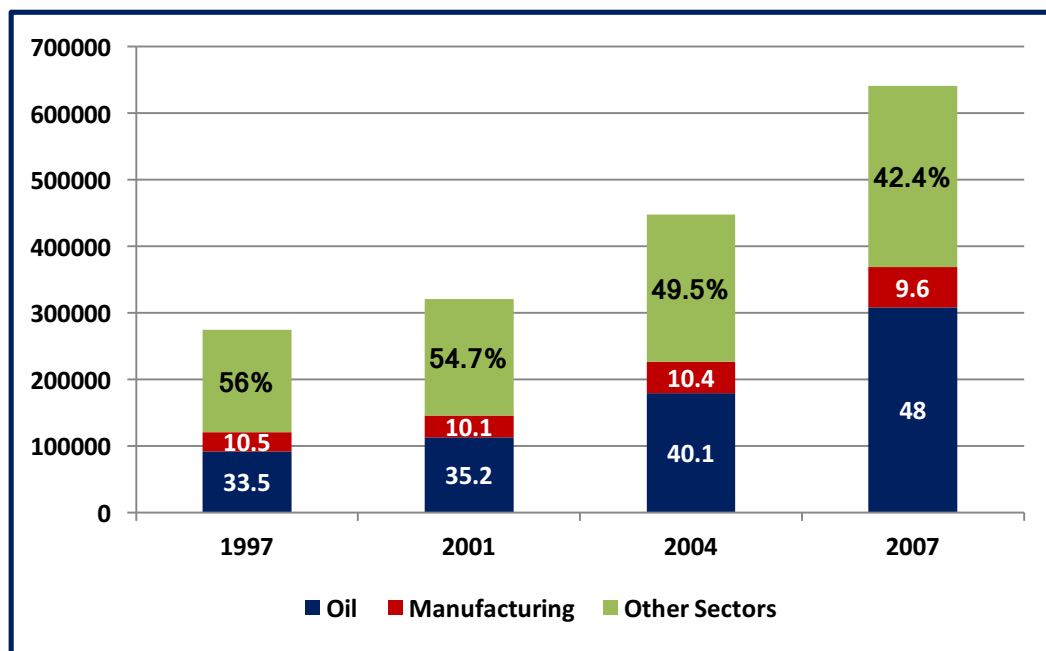


**Figure (4): Real non-oil GDP, manufacturing value added and oil value added growth in the GCC (%)**



Now we know that the share of manufacturing in non-oil GDP was growing and that the value added of manufacturing was growing in the GCC countries. However, if we look at the profile of overall GDP in these countries we observe that over the past ten years the importance of the oil sector was growing relative to shares of manufacturing and all other non-oil components in the GCC region. Oil's share in real GDP was around 33.5% in 1997 and increased to 48% in 2007 (figure 5). Manufacturing share in real overall GDP was almost fixed at around 10% while other non-oil sectors' share fell from around 56% in 1997 to around 42% in 2007.

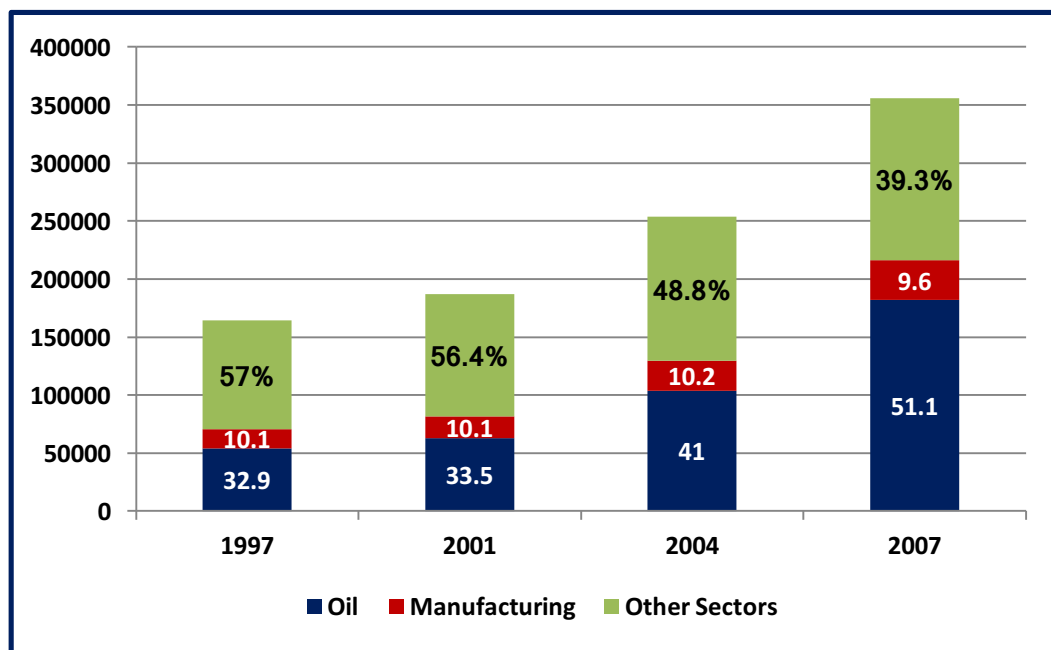
**Figure (5): Real GDP Components in the GCC for Selected Years (1995 prices in US dollars and percentages)**



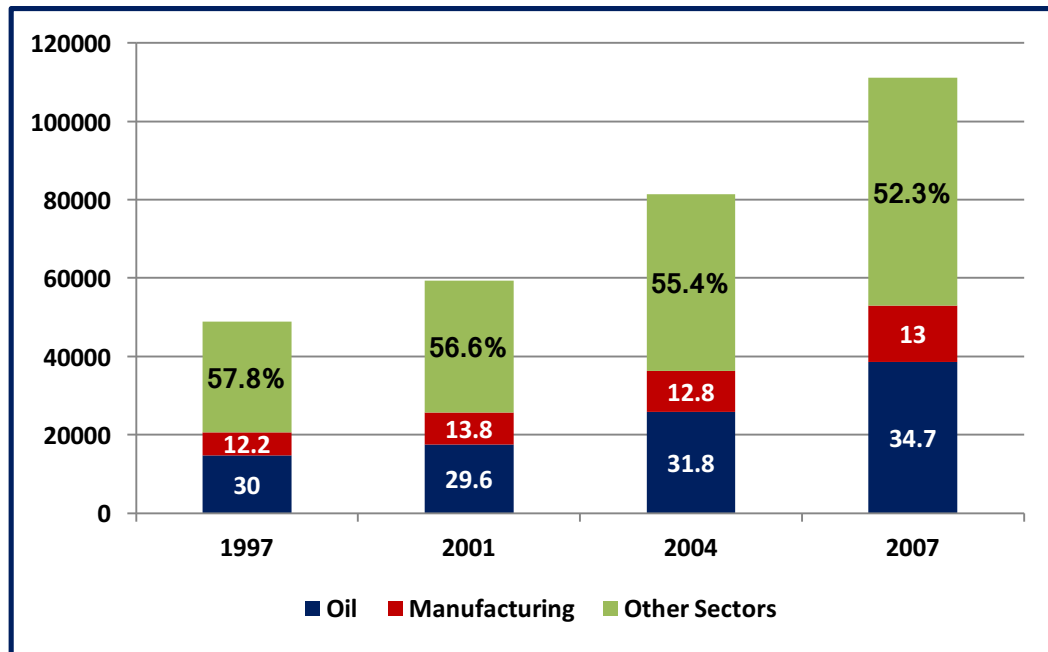
Looking at the largest two GCC economies (figures 6 and 7), we see that the oil's share in the Saudi economy increased from around 33% to more than 51% over the last ten years while the manufacturing share in the overall real GDP was almost stable at around 10%. For the UAE economy the picture is somewhat less severe as the

share of oil in real GDP increased from around 30% to 35% and the share of manufacturing was fluctuating between 12% and 14% out of overall real GDP. \The increasing share of oil of GDP might be related to the increases of oil prices and oil revenues over the period under study, which outweigh diversification efforts in these countries.

**Figure (6): Real GDP Components in Saudi Arabia for Selected Years (1995 prices in US dollars and percentages)**



**Figure (7): Real GDP Components in the UAE for Selected Years (1995 prices in US dollars and percentages)**



## Methodology

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In our analysis we will depend on newly developed panel cointegration techniques to study the role of manufacturing in non-oil economic growth of the GCC countries. These modern panel econometric techniques are very useful to eliminate effects of cross sectional correlations that are observed in data such those that may be observed in the case of some GCC countries.

To characterizing the pattern of manufacturing transformation in the GCC, we use a simple form of the Chenery-Syrquin (1975) equation to relate manufacturing to non-oil real GDP and population:

$$\text{Man}_{it} = \alpha + \beta_1 \ln(\text{GDP}_{it-1}) + \beta_2 \ln(\text{POP}_{it-1}) + \epsilon_{it}$$

Where  $\text{Man}$  is the share of manufacturing in GDP,  $\text{POP}$  is population,  $\epsilon_{it}$  is the error term, and (it) refer to country and time. It is expected that both income and population have positive effect on manufacturing.

To identify the relationship between manufacturing and economic growth, we use an expanded form of Kaldor's first law which states that the growth of GDP is positively related to the growth of manufacturing output, not simply because manufacturing output is part of GDP but in a fundamental causal sense related to the production characteristics of manufacturing activities (Kaldor 1966, 1967).

$$G_{it} = \alpha + \beta_1 \text{MSG}_{it} + \beta_2 \text{LF}_{it} + \beta_3 \text{Inv}_{it} + \beta_4 \text{Exp}_{it} + \beta_5 \text{WG}_t + \epsilon_{it}$$

In this expanded specification, in addition to growth of manufacturing share in GDP (MSG), we include the most important variables that are thought to effect economic growth in the GCC such as the labor force (LF), investment as a share of GDP (Inv), government expenditure as a share of GDP (Exp), and world GDP growth rate (WG)

## Data and Econometric Results:

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All data are from the Arab Monetary Fund's database except for the world real economic growth which is obtained from the World Bank's World Development Indicators. The data span from 1997 to 2007 so that we can include all GCC countries in a balanced panel. We focus our analysis on a period that is not characterized by economic crises or other major structural breaks.

We use Im, Pesaran and Shin (IPS), the Augmented Dickey Fuller (ADF) and the Phillips and Perron (PP) panel unit root tests to check for the non-stationarity in the variables used (see Im, Pesaran and Shin 2003, Maddala and Wu 1999 and Choi 2001). For Cointegration tests, we use Pedroni Residual and Johansen Fisher Panel Cointegration tests (see Pedroni 1999 and 2004 and Maddala and Mu 1999) to avoid problems related to spurious regression when some of the variables in our analysis display unit roots.

Unit root tests (Table 1) indicate that all variables are stationary, i.e., integrated of order zero  $I(0)$  except for real non-oil GDP, manufacturing real value added and population which are integrated of order one:  $I(1)$ . Cointegration tests of manufacturing, real non-oil GDP and population (tables 2 & 3) show that a long run relationship exists among these variables with two Cointegration relations. This implies that in the short run there must exist some causality at least in one direction amongst these variables so that this observed long-run relationship can be established (Granger 1988 and Granger and Weiss 1983). However, the direction of this causal relationship with regards to manufacturing will be determined in the later analysis.

**Table (1): Panel Unit Root Tests Results**

Variable	No. Lags	Statistic - Levels		
		IPS	ADF	PP
Man	1	0.8256*	7.2863*	12.4039*
GDP	1	0.3861*	7.6397*	17.0800*
POP	1	0.6237*	8.5325*	12.0536*
Oil	1	-2.2684	31.9503	43.6178
MSG	1	-2.8776	31.4146	58.8620
LF	3	-1.7576	41.4622	36.2583
INV	1	-2.4327	35.1466	13.7167*
GEXP	1	-1.5142	24.2209	35.1177
WG	0	-2.0735	21.3066	21.1846
MG	1	-3.2889	34.1819	42.9951

(\*\*,\*) indicates failure to reject the null of non-stationarity at the 10% and 5% levels, respectively.

**Table (2): Pedroni Residual Cointegration Tests (Null of No Cointegration)**

Test	Statistic	Test	Statistic
<b>Panel v</b>	0.1558	<b>Group <math>\rho</math></b>	2.4945
<b>Panel <math>\rho</math></b>	0.9634	<b>Group PP</b>	1.3921
<b>Panel PP</b>	0.3639	<b>Group ADF</b>	-1.6630
<b>Panel ADF</b>	-0.4988		

Variables are: manufacturing share of GDP, logs of real non-oil GDP and population

**Table (3): Johansen Fisher Panel Cointegration test**

Hypothesized	Fisher Stat.		Fisher Stat.*	
No. of CE(s)	(from trace test)	Prob.	(from max-eigen test)	Prob.
<b>None</b>	73.68	0.0000	73.68	0.0000
<b>At most 1</b>	53.25	0.0000	51.66	0.0000
<b>At most 2</b>	13.29*	0.1022	13.29	0.1022

Variables are: manufacturing share of GDP, real non-oil GDP and population; test is performed with linear deterministic trend. (\*) denotes rejection of the null of no-cointegration

The panel ordinary least squares and two-stages least squares estimations of the effect of share of manufacturing on real economic growth and population growth (tables 4 and 5) show that income and population are both important to stimulate manufacturing in the GCC. Therefore, any failure in manufacturing or industrialization strategies are due to policies and institutions rather than the availability of income or the population base (see Elhiraika 2008 for similar argument on African countries). The income effect is very large compared to the population effect. This implies that the initial income level has a great impact on the share of manufacturing in real non-oil GDP. Therefore, income is an important stimulator of manufacturing; thus, an important stimulator of diversification efforts in the GCC countries.



**Table (4): Panel Ordinary Least Squares (dependant variable: share of manufacturing in non-oil GDP)**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
<b>G(-1)</b>	174.4832	13.98585	12.47570	0.0000
<b>PG(-1)</b>	0.636070	0.171816	3.702041	0.0005

G is the real non-oil GDP growth and PG is population growth, (-1) denotes first lag. Adjusted R-Squares = 0.11, Log likelihood = -204.01, DW stat = 1.9543

**Table (5): Panel Two-Stages Least Squares (dependant variable: share of manufacturing in non-oil GDP)**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
<b>G(-1)</b>	228.0835	19.20218	11.87800	0.0000
<b>PG(-1)</b>	0.437136	0.212965	2.052618	0.0452

G is the real non-oil GDP growth and PG is population growth, (-1) denotes first lag. Instrument list: Constant, oil GDP, Government expenditure as a share of non-oil GDP, and Labor Force. Adjusted R-Squares = -0.17, DW stat = 2.5

Now we turn to the question of the effect of manufacturing on diversification efforts in the GCC countries in the short run. Tables 6 and 7 show the panel ordinary least squares and two-stages least squares estimation results controlling for other variables that may affect the levels of non-oil GDP. The main result shows that manufacturing efforts in the GCC countries do not significantly stimulate the growth levels of real non-oil GDP. The coefficients on the growth of manufacturing share in real non-oil GDP are negative (opposite expected sign) and highly not significant (effectively, zero). Lack or improper government policies in manufacturing might explain this result. Another explanation might be related to the importance of the share of manufacturing in total exports. Abu-Quarn and Abu-Bader (2004) in their study on

exports and economic growth in MENA countries argue that manufacturing exports lead to growth only when they represent a substantial volume of total exports.

The growth in labor force also has no significant effect on non-oil GDP growth, which is expected since productivity levels of the labor force in the GCC have been deteriorating over the years (See Alawad 2010 for an example in the UAE).

Investment share in non-oil GDP, government expenditure as a share of non-oil GDP and world real rate of GDP growth are all significant determinants of the growth of non-oil GDP in the GCC countries. The effects of investment and world growth rates are positive as expected. Domestic investment plays an important role in the success of diversification efforts and expanding non-oil GDP, and the world economic growth which implies higher demand from GCC trade partners also has an important effect on growth of non-oil GDP in the GCC. However, the negative and significant coefficient of government expenditure refers to the fact that government spending might not be effective in terms of deriving the growth of non-oil GDP or stimulating diversification efforts in the GCC countries over the sample period.

**Table (6): Panel Least Squares (dependant variable: non-oil GDP growth)**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
<b>MSG</b>	-0.000626	0.000445	-1.407425	0.1656
<b>LFG</b>	0.001931	0.004165	0.463627	0.6450
<b>INV</b>	0.003340	0.001751	1.907046	0.0624
<b>GEXP</b>	-0.002536	0.001228	-2.064929	0.0442
<b>WG</b>	0.022665	0.007382	3.070241	0.0035

MSG is the growth of manufacturing share in non-oil GDP, LFG is labor force growth, INV is total investment as a share of non-oil GDP, GEXP is government expenditure as a share of non-oil GDP, and WG is the world GDP growth. Adjusted R-Squares = 0.27, Log likelihood = 75.23, DW stat = 1.5855

**Table (7): Panel Two-Stages Least Squares (dependant variable: non-oil GDP growth)**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MSG	0.000272	0.001218	0.223684	0.8239
LFG	-0.011922	0.011208	-1.063630	0.2927
INV	0.009285	0.004023	2.308289	0.0252
GEXP	-0.006943	0.002816	-2.465331	0.0172
WG	0.026073	0.010595	2.460877	0.0174

MSG is the growth of manufacturing share in non-oil GDP, LFG is labor force growth, INV is total investment as a share of non-oil GDP, GEXP is government expenditure as a share of non-oil GDP, and WG is the world GDP growth. Instruments: Constant, oil GDP, manufacturing value added, population, level of non-oil GDP. Adjusted R-Squares = -0.02, DW stat = 1.60264

## **Concluding Remarks**

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Over the past decade, manufacturing levels and manufacturing shares of non-oil GDP were growing in the GCC economies. However, the importance of manufacturing or non-oil GDP in general was deteriorating relative to the oil sectors in these countries. This paper also shows that manufacturing is strongly linked to GCC non-oil economic growth over the long run (in the way that income and population are both important to stimulate manufacturing in the GCC, especially income). However, results for the short run demonstrate that manufacturing efforts in the GCC countries have no significant effects on stimulating the growth levels of real non-oil GDP and that government spending might not be effective in terms of deriving the growth of non-oil GDP or stimulating diversification efforts in the GCC countries over the sample period.

The failure of manufacturing or industrialization strategies to have a larger impact on non-oil GDP growth and diversification effects might be related to policies and institutions rather than the availability of income. The large influx of labor into these countries did not have the expected effect to help the efforts of diversification of the economies because the growth of foreign labor bypassed the real growth of the non-oil economy in general, thus, implying a deterioration in labor productivity levels.

Therefore, the main conclusion of the paper states that policies and institutions are more important than income and population base in promoting the manufacturing sector and diversifying the economy away from oil. GCC countries must direct their policies in a way to induce a structural transformation in favor of manufacturing and knowledge-based technologies to help accelerate the growth of non-oil GDP. Moreover, the GCC countries may join efforts in launching large and efficient manufacturing projects to limit competition among them which creates difficulties in exporting manufacturing products overseas. Finally, the GCC countries should focus on projects that depend on highly advanced technologies which provide high value added to the economy to increase the competitiveness power of this sector in international markets.

## **References**

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- Abu-Quarn A. and Abu-Bader S. (2004), “The Validity of the ELG Hypothesis in the MENA Region: Cointegration and Error Correction Model Analysis,” *Applied Economic* **36**: 1685-95
- Al Awad M. (2010), “The Cost of Foreign Labor in the UAE,” ISER Working Paper No. 3, July.
- Alhiraika A (2008), “Promoting Manufacturing to Accelerate Economic Growth and Reduce Volatility in Africa,” African Economic Conference: Globalization, Institutions and Economic Development of Africa, Tunis, Tunisia, November.
- Chenery H, and Syrquin M (1975), *Patterns of Development*. Oxford University Press, London.
- Choi I. (2001), “Unit Root Tests for Panel Data,” *Journal of International Money and Finance* **20**: 249–272.
- Granger C. (1988), “Some Recent Developments in the Concept of Causality,” *Journal of Econometrics* **39**: 199-211.
- Granger C. and Weiss A. (1983), “Time Series Analysis of Error-Correcting Models,” in *Studies in Econometrics, Time Series, and Multivariate Statistics*, New York: Academic Press: 255-278.
- Gylfason T. (2001), “Natural Resources, Education and Economic Development,” *European Economic Review* **45**: 847-59.
- Harb N. (2009), “Oil Exports, Non Oil GDP and Investment in the GCC Countries,” *MPRA Paper* No. 15576, June.
- Im K., Pesaran M. and Shin Y. (2003), “Testing for Unit Roots in Heterogeneous Panels,” *Journal of Econometrics* **115**: 53-74.
- Kaldor N. (1966), *Causes of the Slow Rate of Economic Growth of the United Kingdom*, Cambridge University Press, Cambridge, UK.
- Kaldor N. (1967), *Strategic Factors in Economic Development*, New York State School of Industrial and Labor relations, Cornell University, Ithaca, NY, USA.
- Maddala G. and Wu S. (1999). “A Comparative Study of Unit Root Tests with Panel Data and A New Simple Test,” *Oxford Bulletin of Economics and Statistics* **61**: 631–52.

- Metwally M. (1987), "Determinants of the External Surplus of the Member States of the Gulf Co-Operation Council," *Applied Economics* **19**: 305-16.
- Pedroni P. (1999), "Critical Values for Cointegration Tests in Heterogeneous Panels with Multiple Regressors," *Oxford Bulletin of Economics and Statistics* **61**: 653–70.
- Pedroni P. (2004), "Panel Cointegration; Asymptotic and Finite Sample Properties of Pooled Time Series Tests with an Application to the PPP Hypothesis," *Econometric Theory* **20**: 597–625.
- Sala-i-Martin X and Subramanian A.(2003), "Addressing the Natural Resource Curse: an Illustration from Nigeria, NBER Working Papers No. **9804**.
- Sachs J. and Warner A.(1995), "Natural Resource Abundance and Economic Growth," NBER Working Papers No. **5398**.
- Stijns J.(2005), "Natural Resource Abundance and Economic Growth Revisited," *Resources Policy* **30**: 107-30.