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Sectoral Evaluation for Economic and Financial Development in Dubai and rest of UAE

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Abstract

The paper examines sector specific characteristics to analyse the factors affecting the sustainability of the economies of Dubai and rest of the United Arab Emirates (UAE).

The study applies system design to analyse the research questions. Consequently, Zellner's [seemingly unrelated regressions](#) (SURE) technique is used to examine the relative contribution of sectors to the economies Dubai, as an individual Emirate, and the rest of UAE as a group of Emirates using time series sectoral level data for 2001–2015.

The study shows that there exists positive interdependencies between Dubai and rest of UAE economies. This signifies that the core competencies across various sectors in Dubai and rest of UAE economies need to be promoted further to have overall diversified impact on UAE economy.

The positive sizable impact of the finance sector in Dubai and negative sizable impact in the rest of the UAE provide many opportunities for designing diversification programs for sustained economic development of the entire UAE economy. The small sample size, non-availability of detailed sectoral data in four of the seven emirates constrained the scope of the study for generalization to other economies in the middle east.

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The study findings are very crucial for identifying structural reforms, to strengthen competitiveness and accelerate private sector-led job creation for nationals, potential on further opening up foreign direct investment (FDI), improving selected areas of the business environment, and easing access to finance for start-ups and SMEs in both the economies.

There are very few studies, which have researched the sector specific characteristics to explain the factors affecting the sustainability of the economies of Dubai and the rest of UAE. The study provides insights to the UAE policy makers, for enhancement of policies through development of the key sectors that influence the performance of the two economies. Despite being independent entities though, the seven emirates of the UAE are economically interdependent. Studies on such interactions add unique value to the literature.

Keywords: SURE, GDP, Dubai, UAE, Sectoral Evaluation, Financial development.

1- INTRODUCTION

The declining oil prices have placed gulf cooperation council (GCC) countries in a precarious situation of sustaining their economies. Each of the GCC countries is working to diversify their economies by reducing oil dependence. In their economies, oil contributes about one-third of total GDP and three-fourths of annual government revenues and exports. Together, these countries account for about 45 percent of the world's proven oil reserves and 25 percent of crude oil exports (Saudi Arabia is the largest world oil exporter), and possess at least 17 percent of the proven global natural gas reserves (Qatar has become the fourth-largest exporter of liquefied natural gas) (Callen et al. 2014).

The high-income diversified economic transformation of Dubai¹ in particular and United Arab Emirates (UAE) in general have been significant over the last two decades. Concerted efforts have been made to make these economies less dependent on oil by diversifying to various sectors. In fact, the pace of reduction on oil-dependency has been fastest in UAE as compared to other GCC countries². The diversification of the UAE economy is driven by the rapid expansion of services such as tourism, finance, transport and communication sectors. (IMF 2015). Hussain et al, (2008) report that the macroeconomic performance in ten oil-exporting countries including UAE is closely linked to world oil prices.

Fernandes and Karnik (2009) modelled the oil sector to examine its influence on the UAE economy, notably the government sector. The study concluded that, the UAE is indeed quite dependent on oil sector, despite the attempts to diversify. The study used optimal control technique and concluded that dependence on oil cannot continue indefinitely. This paper extends the work initiated in Fernandes and Karnik (2009) to evaluate the interdependencies among the oil and non-oil sectors and specifically to address the question as to whether the diversification in Dubai economy is sustainable compared to the UAE economy as a whole. Dubai is an interesting case for couple of reasons. Firstly, the emirate heavily relies on non-oil export based international trade. Secondly, the emirate is the relatively small local market size that renders the trade activities vital to the survival and growth of emirate's business plans. The reasons to compare Dubai with the UAE economy is that, the UAE is a federal state of the seven economically interdependent emirates³. Another reason is that, IMF country report (2015) states that the large fiscal and external buffers built in this economy have spill over effects from the lower oil prices, sluggish global growth, and volatility in emerging market economies. Further, the UAE has always taken the lead in the region for being the most diversified economy, with its prudent investment in strategic drivers such as infrastructure, education, innovation, smart city development as detailed in its Vision (2025) document. Thus, the problem of long-term sustainability of economic diversification in Dubai compared to UAE as benchmark is of paramount importance to policy makers to ensure that the vision 2025 for Dubai is achievable. Specifically, this study will examine the following research questions:

1. How are the various sectors interacting in Dubai and the rest of UAE's GDP?

¹ Dubai is one of the seven emirates in UAE. Other emirates are Abu Dhabi, Ajman, Sharjah, Umm-al-Quwain, Ras-EL Khaima, and Fujairah. Figure 3.1 shows the geography of UAE.

² GCC countries – Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and UAE.

³ UAE Federal Government is responsible for foreign affairs, security and defence, nationality and immigration issues, as well as education, public health, currency, postal, telephone and other communication services such as air traffic control, licensing of aircraft, labour relations, financial services (including banking and insurance), delimitation of territorial waters, and extradition of criminals.

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2. Which non-oil economic sectors significantly contribute to the growth of Dubai's economy?
3. Which non-oil economic sectors significantly contribute to the growth of the rest of UAE's economy?

The paper is organized in to five sections. Section 2 provides the macro-economic context of the UAE and Dubai. Section 3 reviews the literature. Section 4 discusses the methodology followed and data used in the study. It addresses sustainability of the two economies by focusing on sectoral interdependencies using system equations. Section 5 discusses the empirical estimates of the model. Section 6 concludes the study with policy implications and limitations.

2- THE MACRO-ECONOMIC CONTEXT OF DUBAI AND UAE

The largest emirate, Abu Dhabi, represents more than half of the UAE's GDP, nearly 40 percent the UAE population, and 90 percent of UAE's oil and natural gas resources. Dubai contributes one-fourth of the nation's aggregate GDP and has been at the front line of developing non-oil activities. Since the 1970s, the other five emirates depend on trade and light manufacturing and on financial backing from the federal government for sustaining their economies (IMF 2015).

Rettab (2016) chronologically explains the economic structure of the UAE and Dubai. In the 1960s and 70s, Dubai was an oil export hub. To facilitate the export, all revenues from oil were utilized to build the requisite infrastructure, namely, the Jebel Ali Port, Dubai International Airport, and Port Rashid, anticipating the long-term sustainability of the non-oil sector in Dubai and the UAE. In the 1980s, the economy was diversified further to become the Trade, Services and Industry hub. In this period, the principal projects were the Dubai Creek, Emirates Airline, Gold and Commodities Exchange, Dubai Dry Docks, and the Jebel Ali Free Zone. In the 1990s, the main projects were the development of the Academic City, Knowledge Village, Road projects and Healthcare City, all of which became the Education, Health, and Communication Hubs. The third Millennium years were all about Tourism and Urbanization. Dubai achieved a major milestone by building the world's tallest building, the Burj-Khalifa, and other tourist attractions like Palm Jumeirah, Burj-al-Arab, Dubai Metro, various shopping malls, and so on. In the 2010s, the government focused on the sustainability of the economy through innovation (Rettab 2016).

Data on passengers and cargo at the Dubai International Airport as of end-April 2015 point to continued expansion of travelers. There has been appreciation of US dollar against UAE Dirhams, and structural measures such as the tightening of industry self-regulation, higher real estate fees, and tighter macro prudential regulation for mortgage lending. House prices in Dubai have declined slightly, reflecting strong supply and slowing demand stemming from lower oil prices. Following Dubai, house price growth has also started to decline in Abu Dhabi. With past increases in rents only feeding gradually into consumer prices, inflation increased to 4.3 percent year-on-year in May 2015, also reflecting upward adjustments of electricity and water tariffs in Abu Dhabi as well as higher costs of education and other services. Contributions to inflation have been negative from clothing and almost nil from food, reflecting the effects of the appreciating U.S. dollar (IMF country report 2015).

Lending to the private sector picked up to 11.5 percent year-on-year in December 2014. Domestic deposit growth between 2013 and early 2014 was strong, boosting liquidity in the banking system, but slowed down towards end-2014 to reach 2.2 percent by April 2015 because of lower government and customer deposit inflows. Even though the capital adequacy ratio has slightly declined, banks remain amply capitalized. Non-performing loans (NPLs) continued to decline from their post-crisis peak. The banking system remains profitable with a return on assets at 1.7 percent due to higher net interest margins, non-interest income, and operational efficiency. The sharp drop in oil

prices last year has triggered a stock market correction and volatility-the stock market declined by 8.8 percent in April 2015 year-on-year (average for Abu Dhabi and Dubai).

The hotel and restaurant sector in Dubai in 2014 witnessed large number of tourists, but the fall in oil prices and the appreciation of the U.S. dollar affected negatively the performance of this market in 2015-17. Vacancy rates remain high in the commercial office market (23 and 25 percent in Dubai and Abu Dhabi, respectively), while new additions to supply this year are expected to put downward pressure on office rents in Dubai.

Figure 2.1. UAE Economic Structure 2015

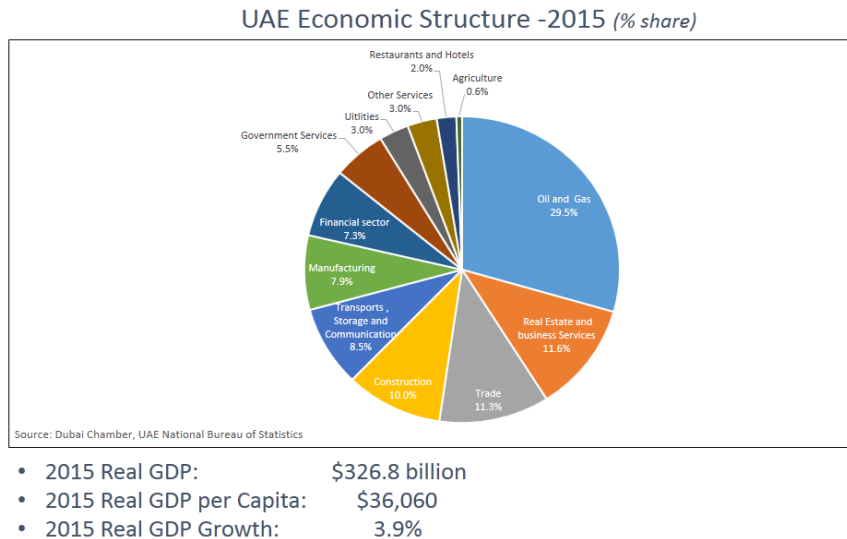


Figure 2.1 shows that the oil and gas sector is the most significant contributor to the UAE economy, contributing 29.5 percent, followed by the real estate sector (11.6 percent), trade (11.3 percent), and construction (10 percent).

Figure 2.2. Dubai Economic Structure 2015

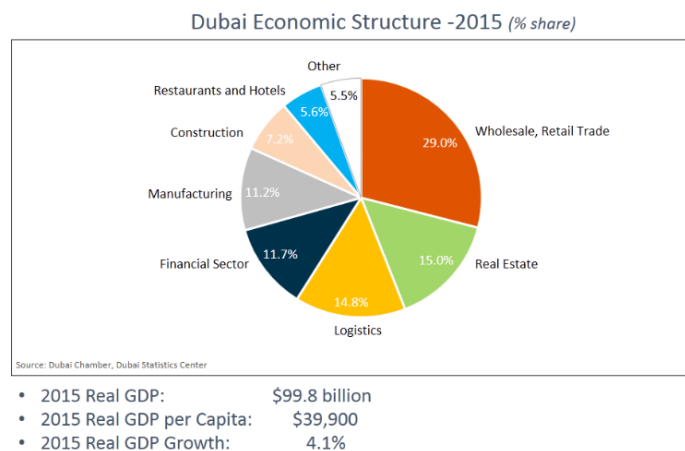


Figure 2.2 shows that, the wholesale and retail trade sector contributes the most, i.e. 29 percent, to the Dubai economy, real estate contributes 15 percent, logistics contributes 14.8 percent, followed by the financial sector at 11.7 percent. Restaurants, government services and other sectors contribute insignificantly to both economies.

Despite the oil sector being predominant in the UAE, its real GDP per capita was at US\$36,060 as compared to the real GDP per capita of Dubai for 2015, which was \$39,900. This shows how Dubai has progressed in diversifying its economy (Rettab, 2016). In summary, the trade, real estate, logistics, financial, manufacturing, and construction sectors have contributed significantly to the Dubai economy. On the other hand, the oil, manufacturing, construction, and financial sectors have contributed less significantly to the economy of the UAE as compared to Dubai.

3. LITERATURE REVIEW AND THEORETICAL FRAMEWORK

3.1. Literature Review

UAE Annual Economic Report (2012) defines inflation in a different way, as the percentage change in the value of the Whole Price Index on a year-on-year basis, which measures the change in the prices of goods and services in a year. Changes in the cost of production and distribution, imbalance between demand and supply of money, or increase on products' taxes can cause inflation in the economy. The value of currency is reduced when an economy experiences inflation and the price level of goods and services rises. Consumers will have trouble in the purchase of basic commodities and will demand for higher incomes, hence, the government strives to keep inflation under control and achieve a limited inflation level, beneficial to the economy as it encourages borrowing and purchases of goods and services.

Ibrahim and Hellyer (2001), in their study on UAE, showed that the combination of massive inward expatriates and increase in the indigenous population contributed to the rapid population growth in recent years. The population at present is growing at a rapid rate attributed to the booming economy and the government support for large families of UAE nationals. Total population of UAE comprises of fifteen to twenty percent citizens and foreign nationals from countries of Jordan, Egypt, Oman, Yemen, India, Afghanistan, Iran, Philippines, Palestine, and Europe form the rest. The UAE population is mostly urban in nature, and projected to grow to 7.9 million by 2020 at an average growth of 2.3 percent from 2010-2020, and with city dwellers to account for 86.7 percent of the nation's population by 2020, Everington (2013). Economic development in the country with positive impact on population growth supports the hypothesis of population growth, induced by economic development and increasing level of economic performance. The cross-country comparison of changes in per capita income and population variables conducted by Simon and Gobin [24] revealed that more people mean better economic performance.

The Harrod-Domar Model of Economic Growth is fundamental for economic growth for any economy including Dubai and the UAE. The model shows that, the economic system is at best balanced on a knife-edge of equilibrium growth even for the long-run growth. (Solow, 1956). As key parameters of labor force rate increase, capital output ratio and savings ratio slightly slip from dead center, the consequence is either prolonged inflation or growing unemployment. The absence of technological change influences natural rate of growth and labor force increase, and warranted rate of growth depends on investment saving habits of households and firms.

Sherif (2013) analyzed the unique unemployment anomaly in UAE and formulated a strategic policy to effectively combat the high rates of unemployment among UAE citizens. The policy is a federal plan of action for human resources development designed to reduce unemployment through stimulation

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of economic growth, increased productivity, educational system reforms, capital accumulation, skills development, and provision of skills consistent with labor market demands. Limitations of the research include the setting of priorities to ensure that implementation of each element of the strategy is cost effective. Findings reveal that complete implementation of the strategy is an effective solution to the unemployment problem in the country. The research offers a long-term practical solution to the problem of unemployment. The economic failure of the Arab region is to reduce unemployment due to the increase of labor force, low labor content of economic growth, inadequate macroeconomic policies, and rigid formal labor markets, registered during the period of 2000s (Bchir and Rajhi, 2012). Sherif's paper proposed short-term reforms to accelerate job creation and allow the government to formulate a development model and initiate long-term reforms which include improvement of labor impacts of macroeconomic policies, implementation of social VAT mechanism, reinforcement of migration policy, and reforms on public employment services.

Bean and Pissarides (1993) studied cross-country bivariate correlation between unemployment and growth depending on economic structures across nations, utilizing a framework that incorporates matching frictions in the labor market and technology. The research presented a two-sector variant of the model showing imperfect competition in the consumption and production of goods. Findings show that expansion in market size for goods production and increased employment can result from a reduction in the propensity to save. Large expansion in employment can produce increased volume of saving if goods production entry costs are sufficiently large.

Simpson (2015) in their study showed that, inflation reflected an increase in the cost of essential goods and services. High rate of inflation lead to decline in the average standard of living, decrease in the purchasing power of consumers, and decrease in the employment rate. However, moderate levels of inflation encouraged both investment due to moderate level of interest rates, and consumer spending. This study concluded that, a nation could plan for inflation and act accordingly. Unexpected high inflation tended to hurt workers, savers, and recipients of fixed incomes but often benefited business organizations through raise of prices without the need to raise wages. Periods of inflation tended to redirect investment from businesses and caused problems in an economy as business organizations preferred less investments for long-term projects and less time in engaging for productive activities. The Phillips curve highlighted the reason why high unemployment is undesirable and full employment is neither practical nor desirable. A variety of factors could alter the curve such as productivity gains; neither zero unemployment nor zero inflation scenario is viable in the long-run. As technology progresses, structural employment becomes a recurrent problem, where workers find their skills no longer matching employers' needs and requires training update with the adoption of new technology.

3.2 Theoretical Framework

Figure 3.1 conceptualises the economic growth as a cycle with complex chain of events, reinforced through a feedback to represent the long-term expansion of the productive potential of a country.

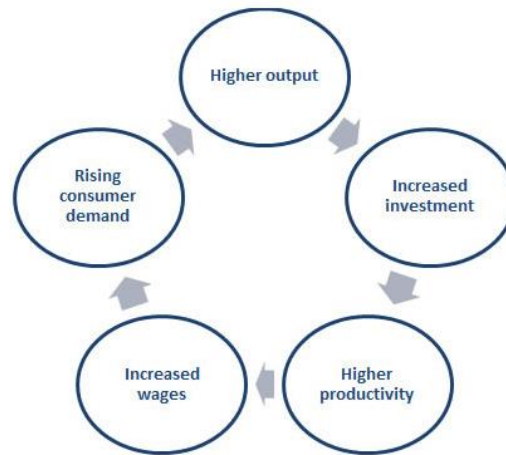


Figure 3.1: Theoretical Framework of the Study “Circle of Economic Growth”, Econs, 2015.

The vicious circle of economic growth emphasizes the key drivers of growth and the factors that determine the long-run increases of a nation’s GDP, which includes higher output, increased investment, higher productivity, increased wages, and rising consumer demand. Each factor varies in importance for a nation at a given point in time. Increased consumer demand will lead to higher output that result in increased investment. The framework presents the advantages of economic growth in terms of higher standards of living, generation of more jobs that facilitates entry into the labor market, and fiscal dividend that will provide the government capability for improvement in public services and budget deficit reduction. The framework focuses on rising consumer demand and output that encourage investment to sustain economic growth through increased long-run aggregate supply. Economic growth is viewed as having positive impact on consumer and business confidence that promote consumer purchases. The cycle is expected to continue in the direction of the momentum until an external factor will intervene.

The framework can be applied to UAE and Dubai economies for sustaining various sectoral development. As discussed in earlier sections, UAE has a commodity-based economy with oil shipments and natural gas contributing to 40 percent of total exports, equivalent to 38 percent of GDP Annual Economic Report (2013). It has one of the world’s highest GDP per capita, providing huge investments in financial, construction, and tourism sectors as a strategy for economic diversification and reduction of dependence on oil revenues. In 2012, drivers of economic growth included tourism, which accounted for 15.5 percent of output growth, manufacturing activities, wholesale and retail trade, and transport and communication sectors. Economic stability was gradually achieved with the process of diversification and the recovery witnessed by the real estate and construction industry. The country is seen to enjoy a strong economy supported by effective economic and investment policies and ideal investment climate creating a strong positive impact on the flow of foreign investments. GDP growth rate in UAE was 4.6 percent in 2014 and averaged 4.82 percent from 2000 to 2016, reaching a high record of 9.80 percent in 2006 and a low record of -5.20 percent in 2009, Trading Economics (2016). Nominal GDP of UAE in 2016 was estimated at US\$ 382 billion compared to US\$ 373 billion in 2012, showing marginal growth between the two periods. The non-oil sectors grew by 3.4 percent

representing 67.3 percent of UAE's GDP. GDP Growth Rate is projected to trend around 4.28 percent in 2020, 4.24 percent in 2030 and 4.24 percent in 2050. UAE managed to overcome the effects of global financial crisis, financial difficulties of European nations, and the rise in unemployment rate, through its balanced economic policies, and effective government leadership. Despite the global economic crisis, UAE economy enjoyed the benefits of economic diversification, increased spending in infrastructure projects, rise in oil prices, and tourism projects. UAE continues to attract more foreign investments through the creation of a favourable investment climate and laws that promote economic climate and business environment.

The driving force for sustained economic performance in the non-oil sector is attributed to immense financial surpluses in infrastructure projects. Stability remains the hallmark of the nation economic activity with a continuing focus on infrastructure projects expenditures. It is expected that stability of the various industries, improvements in the real estate industry, tourism, and rising growth in economic performance will contribute to the nation attractiveness for investments. The generated growth rates of UAE demonstrate the success of the diversification policy on income sources and reduction of oil reliance in the light of global financial crisis. The high level of oil prices in earlier periods boosted government revenues and provided resources for public spending and stimulation of investment.

Fiscal policy is the component by which oil price shocks are transmitted to non-oil economies. The correlation between oil prices and non-oil output has been higher in countries where oil dominates the economy. Tazhibayeva, Husain and Ter-Martirosyan, (2008) study shows that the fiscal policies' effect on oil price shocks enhances the business cycle in oil-exporting countries. Cevik (2014)'s study show that oil price fluctuations tend to influence the share of oil sectors and non-oil sectors in the GDP. Lower oil prices may lead to a higher share of non-hydrocarbon GDP, holding everything else constant.

Fernandes and Karnik (2009) observed that there is a substantial worsening of Gross Fiscal Deficit in UAE due to increases in the deficit every year, because of increase in expenditures and decline in the share of oil sector revenues. The second experiment in their study was with Gross Fiscal Deficit, in which the GDP was restricted to 3 percent of the nominal GDP. It was observed that the current balance showed a surplus yet it decreased by 27 percent due to the restriction of the GDP, requiring the government to pay close attention on its finances. The third experiment was conducted on the oil sector of the UAE in order to examine the after-effects of the decline in the production of crude oil, which adversely affected government finances and the economy. Unfortunately, the impact on the other non-oil sectors was not addressed in the above experiments. Guo and Kliesen (2005) showed that there is positive effect of the increase in oil price for GDPs of oil-exporting countries, and negative effects on GDPs for oil-importing countries.

The education sector is one of the growing sectors contributing to the diversification of the UAE. The education sector drives monetary development by enticing more students to take interest in manufacturing and industrial sectors and take them as career paths. Traditionally these sectors were reserved for expatriates. To thrive in the long-run, industry is making itself more attractive to UAE nationals (Dhaheri, 2016). Structural reforms are pursued to strengthen the competitiveness.

On the fiscal front, while Dubai's government debt sustainability has improved, it could rise rapidly under severe shocks: (i) a sharp decline in GDP growth in 2015 (by $\frac{3}{4}$ of standard deviation from the baseline) and a gradual recovery in 2016–20 would raise the debt-to-GDP ratio by about 6 percentage points in 2020 compared to the baseline; (ii) under a severe global downturn scenario, which assumes a real GDP shock, lower real interest rates, and deterioration in the primary balance in the medium term, Dubai's government debt would increase to about 32 percent of GDP in 2020; (iii) a scenario that combines a global downturn with a real estate shock, under which the government would take over 20 percent of the GREs' total debt in the medium term, would imply a substantial increase in the government debt-to-GDP ratio, to about 54 percent, more than twice as large as under the baseline (IMF Country Report 2015).

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3.3 Operational Hypotheses

A study by Awokuse (2007) indicate that import and export stimulates financial development. Shahbaz, Khan, and Tahir (2013) have shown a positive relationship between exports, imports and economic growth, whereas Uğur (2008) show that imports have a unidirectional relationship between GDP and consumption of import goods. With these mixed results, since Dubai (in particular) and the UAE (in general) are predominantly re-export markets, we hypothesize H1 to get a clearer picture on the re-export sector:

Hypothesis 1: There is positive relationship between re-exports and GDPs in Dubai and other Emirates in the UAE.

Calderón and Liu (2003) observed Granger Causality from financial development to economic growth and vice versa co-exist. Their study showed that financial development leads to economic growth. Hassan and Yu (2007) investigated a positive relationship between financial development and economic growth. The short-term multivariate analysis in their study resulted in mixed results: first, there is a two-way causality between growth and finance for most regions, and, second, in the poorest regions there is a two-way causality. Thus, we hypothesize that:

Hypothesis 2: The relationship between the financial sector and the GDPs of Dubai and other Emirates in the UAE are positive.

Mahonye and Mandishara (2015) show that the mining sector is export-oriented giving different nation's development stimulus. The researchers argue that there is a negative relation between GDP and the mining sector. On the other hand, Shakouri and Yazdi's (2012) study on Iran show that the economic growth of Iran is linked to the export of mineral resources. To attain economic growth, emphasis on exports in the mining sector is necessary. Thus, we hypothesize:

Hypothesis 3: The relationship between the mining sector and GDPs of other Emirates in the UAE and Dubai is positive.

Chui and Chau (2005) state that there is no relationship between real estate and economic growth. The study examines the lead-lag relationship between the variables in Hong Kong. The absence of relationship is because of the critical variety in the project's duration in Hong Kong. On the other hand, Hong (2014) estimates a positive relationship between real estate investment and economic growth through panel analysis of 284 Chinese cities. To clarify the situation in the two economies, we hypothesize that:

Hypothesis 4: The relationship between the GDPs of Dubai and other Emirates in the UAE and real estate sector is positive.

Ajmair (2014) examined the components of manufacturing and industry sector through simple linear regression and concluded that there was positive relationship between manufacturing sector and GDP. We hypothesize that

Hypothesis 5: The relationship between the GDPs of Dubai and other Emirates in the UAE and manufacturing sector is positive

Turin (1969) argued that there is positive relationship between the construction sector and economic growth. Drewer (1997) argued that global construction output has turned out to be progressively concentrated in the developed market economies. Min and Cailou (2007) argued that in the long-run the construction sector positively impacts GDP. In light of these mixed arguments, we hypothesize that:

Hypothesis 6: The relationship between the GDPs of Dubai and other Emirates in the UAE and the construction sector is positive.

Gao, Zhang, Li, Peng, and Hao, (2016) study show a positive relationship between GDP and development in freight transport. Aqeel and Sabihuddin Butt, (2001) study show that energy consumption leads to economic growth as it directly causes employment. A study by Wang (2009) prove the bilateral relationship between transport and economic growth. The result states that proper transportation system can realize economic development. In view of the mixed results, we hypothesize that:

Hypothesis 7: The relationship between the GDPs of Dubai and the other Emirates in the UAE with transport, communication and storage sector is positive.

4. METHODOLOGY

Despite being independent entities though, the seven emirates of the UAE (Abu Dhabi, Dubai, Sharjah, Ajman, Umm Al Quwain, Ras Al Khaima and Fujairah) are economically interdependent. This study, therefore, models these interactions in a system context. Consequently, Zellner's seemingly unrelated regressions (SURE) technique is used to examine the relative contribution of sectors to Dubai, as an individual Emirate, and to the rest of UAE economy. The set of estimable systems of equations are:

$$\left. \begin{aligned} UAE\ GDP\ (GDP_U) &= f[Constant + \sum_i^k \beta_{iu}X_{iu} + \varepsilon_{iu}] \\ Emirate_j\ GDP\ (GDP_j) &= f[Constant + \sum_i^m \beta_{ij}X_{ij} + \varepsilon_{ij}] \end{aligned} \right\} \quad (4.1)$$

where

X_{iu} $i=1, 2, \dots, k$ represents the sectoral attributes to the GDP of the UAE;

X_{ij} $i=1, 2, \dots, n$ represents the sectoral attributes to the GDP of Emirate j ;

β_{iu} and β_{ij} are respective impact coefficients on the respective sectoral attributes to the GDP of the UAE and Emirate j .

Because of the interdependency and spill over effects among the economies of the seven Emirates, the error terms ε_{iu} and ε_{ij} in the above systems of equations (equation 3.1) are not independent. Estimating the parameters β_{iu} and β_{ij} by OLS per equation is consistent, but is inefficient if the disturbances for the different individuals display contemporaneous correlation and the regressor sets differ from individual (equation) to individual (equation). Because of the economic interdependency of the seven emirates of the UAE, the two error terms (ε_{iu} and ε_{ij}) can be contemporaneously correlated, i.e. covariance, $\sigma_{uj} \neq 0$. Moreover, due to Emirate-wise economic diversification and specialization a particular Emirate, the explanatory variables (X_{iu} and X_{ij}) may not be the same for the two system equations. Consequently, unconstrained generalized least squares (GLS) estimator will be used for empirical analysis of this study. GLS estimates obtained through iteration procedures are maximum likelihood estimates.

4.1 The Empirical Model

As shown in figure 4.1, the geographical size of the Emirate of Dubai is the second biggest and yet the highest non-oil GDP contributor to the UAE economy.

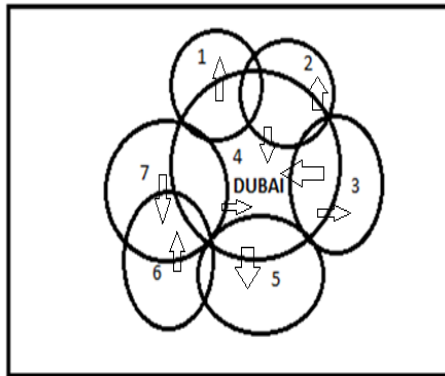


Figure 4.1: Geographical structure of UAE. Figure on the right reflects the possible spill over effect between Dubai and the other six Emirates in UAE

Right panel in figure 4 show the spill over effects from Dubai to other Emirates and from other Emirates to Dubai. There is a free-flow of movement of goods and services, capital and labour among the seven Emirates. These economies are interdependent. For the purpose of this study, we focus on Dubai and the UAE. Data on sector-specific information is not readily available from 2001–2015 for all the Emirates.

Because of the interaction between Dubai and other Emirates in the UAE, we hypothesize that there exists a contemporaneous correlation between the error terms. As the UAE economy is interdependent on Dubai and the Dubai economy is interdependent on the UAE, there is an explicit inter-correlation. In view of these interdependencies, we adopt the framework (system of equations) developed above. Accordingly, the following empirical model is used to explain the relative contributions of the non-oil sectors to the GDP growth of Dubai and the UAE.

$$\left. \begin{aligned} GDP_{UAE \text{ Except } Dxbt} &= f(IMP_{U_t}, EXP_{U_t}, MIN_{U_t}, WRT_{U_t}, CREST_{U_t}, MAN_{U_t}, TSC_{U_t}, FIN_{U_t}) + \epsilon_{U_t} \\ GDP_{Dubai_t} &= f(IMP_{D_t}, EXP_{D_t}, MIN_{D_t}, WRT_{D_t}, CREST_{D_t}, MAN_{D_t}, TSC_{D_t}, FIN_{D_t}) + \epsilon_{D_t} \end{aligned} \right\} \quad (4.2)$$

where subscript U_t denotes all emirates in UAE except Dubai in year t, while subscript D denotes Dubai year t, ϵ_U and ϵ_D are the error terms, and independent variables are as described in table 4.1.

Table 4.1: Description of the Independent variables

IMP	Imports in AED/Millions
EXP	Exports in AED/Millions
REXP	Re-export in AED/Millions
MIN	Mining sector in AED/Millions
WRT	Wholesale and Retail trade sector in AED/Millions
CREST	Construction and Real Estate sector in AED/Millions
MAN	Manufacturing sector in AED/Millions
TSC	Transport, Storage and Communication sector in AED/Millions
FIN	Financial sector in AED/Millions

4.2 Data, Variable Definition and Expected sign on Hypotheses

The time series data for economic sectors of Dubai is obtained from the Statistical Yearbooks published by the Dubai Statistics Center for various years. Sectoral level data for UAE and Dubai is obtained from the UAE Federal Competitiveness and Statistics Authority (FCSA), and these data is used to generate the data for all emirates in UAE except Dubai. Both UAE and Dubai level GDP and sectoral data are collected for the period 2001–2015. The dependent variable used in this study is real gross domestic product (GDP). The definition and expected effect (on real GDP) of the seven independent variables used⁴ are presented in table 4.2.

Table 4.2: Variable description

Variable	Definition	Expected Coefficient Sign
Imports (IMP) Exports (EXP) and Re-export (REXP) sector	Import and export are both functions of international trade whereby goods or services are brought from another country (imports) and goods and services are shipped (exports) to another country. Re-exports involve importing goods and services for export it as value added goods and services	+
Financial (FIN) Sector	The financial sector is a classification of stocks containing firms that give money-related services to business and retail clients; this segment incorporates banks, investment funds, insurance agencies and real estate.	+
Mining (MIN) sector	The mining sector is the act, process or business of extraction of ore or mineral from the ground.	+
Manufacturing (MAN) sector	The manufacturing sector comprises industries engaged in chemical, mechanical, or physical transformation of materials, substances, or components into consumer or industrial goods.	+
Construction and Real Estate (CREST) sector	The construction industry comprises three sectors, namely; infrastructure, building and industrial. Building is further divided into residential and non-residential. Real estate is business relating to land or any immovable property like buildings, fixtures etc.	+
Transport, Storage and Communication (TSC) sector	The branch of manufacture and trade based on freight, transportation, communications, and utilities. Freight and transportation include railroads, trucking, and public transportation, including transit systems, highways, roads, and bridges. Communications include radio and television, but not newspapers and magazines	+

⁴ There are still unobserved sectors and factors that may affect real GDP. However, we have filtered and selected the most suitable independent variables for optimum results.

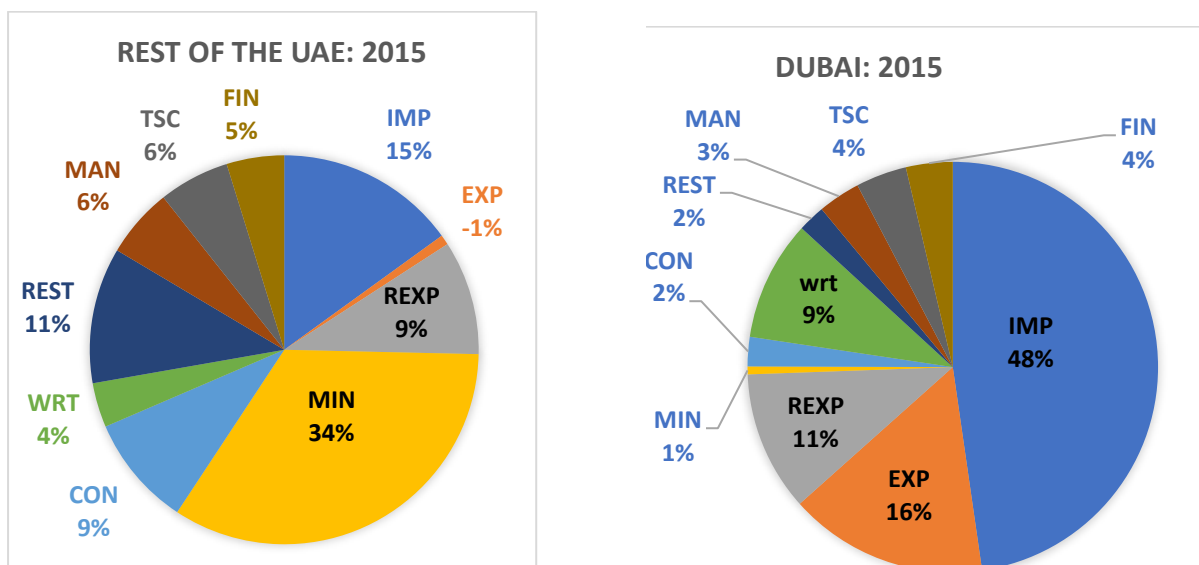
Wholesale and Retail trade	The wholesale and retail trade sector focuses on wholesaling and retailing goods without any transformation. Wholesalers usually are the middlemen and deal from a warehouse, whereas, retailers are the final step in the process of sale of a merchandise	+
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5. DATA ANALYSIS

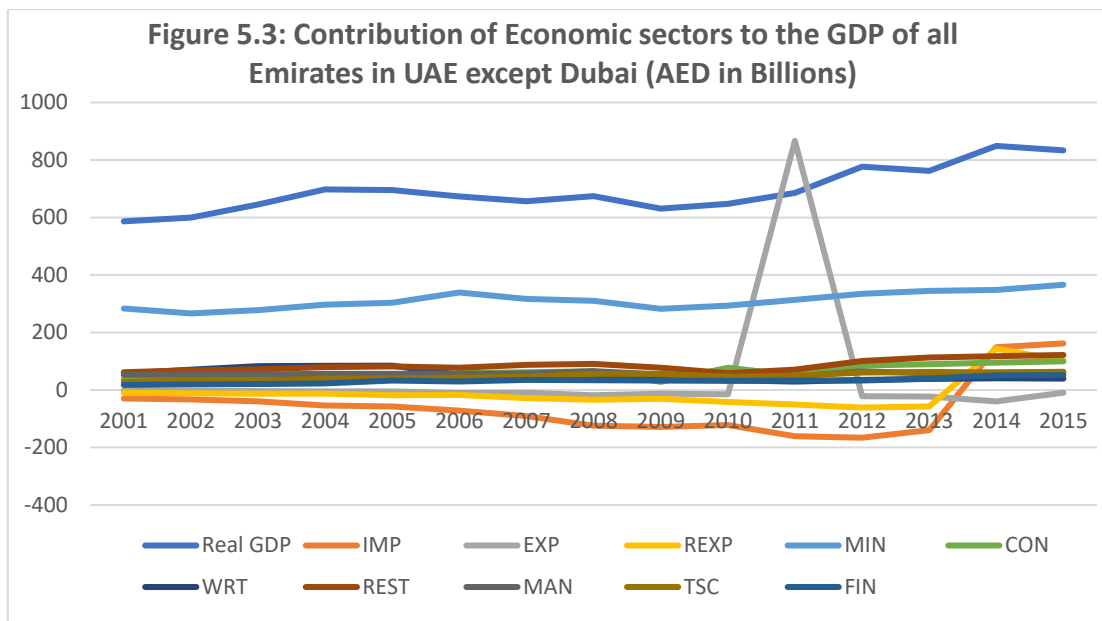
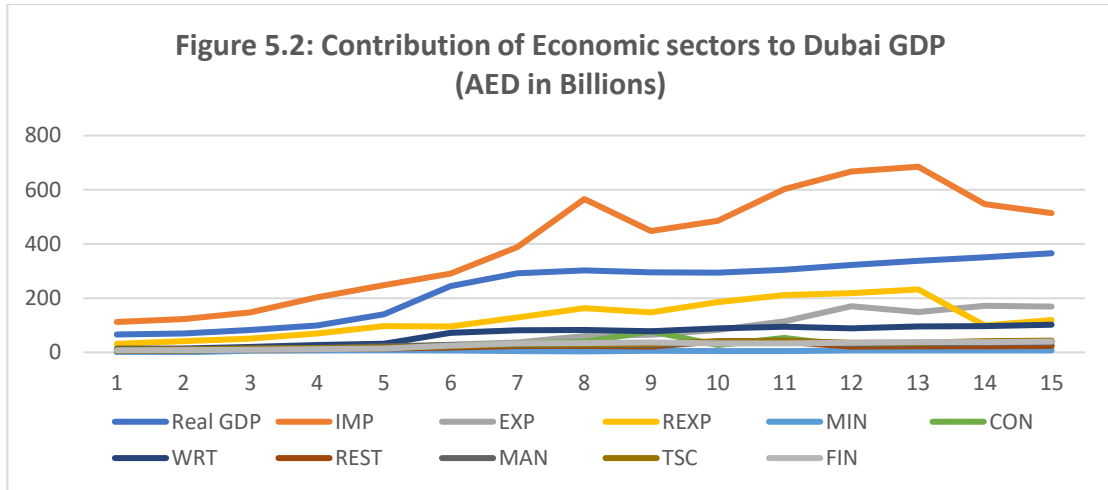
5.1. Summary Statistics

Figure 5.1 presents the sectoral contributors of the GDP of Dubai and the rest of the Emirates. While the major contributors in Dubai include import, export and re-export, the mining sector is a dominant contributor of the GDP of the rest of UAE economies.

Figure 5.1 Sectoral contributors to The GDP of Dubai and rest of UAE



Figures 5.2 and Figure 5.3 show the trend in the sectoral contributors of GDP over the 15 years' study period (Year 1, 2, ..., 15) in Dubai and in all Emirates in UAE except Dubai (AED in Billions). While imports and re-exports are the major contributors of GDP in Dubai economy, mining has been a substantial contributor of the GDP all other Emirates in UAE except Dubai. The fact that Dubai is a re-export market can be justified by the upward trend of re-export until 2013. This trend, however, has shown a decline after 2013 while the trend for the other Emirates has shown an increasing pattern after 2013. In both Dubai and the rest of the Emirates, the wholesale sector has grown on a steady rate over the span of the 15 years. Real Estate sector in both economies have been stagnant with no significant changes over the years. While the financial sector of Dubai has shown a mild progress, the sector in has shown a sudden fluctuation in 2010 to 2012 for the other Emirates. It abruptly increased in 2011 and fall in 2012. In the overall, Dubai's economy has headed to fastest expansion in past seven years as compared to the economy of UAE.

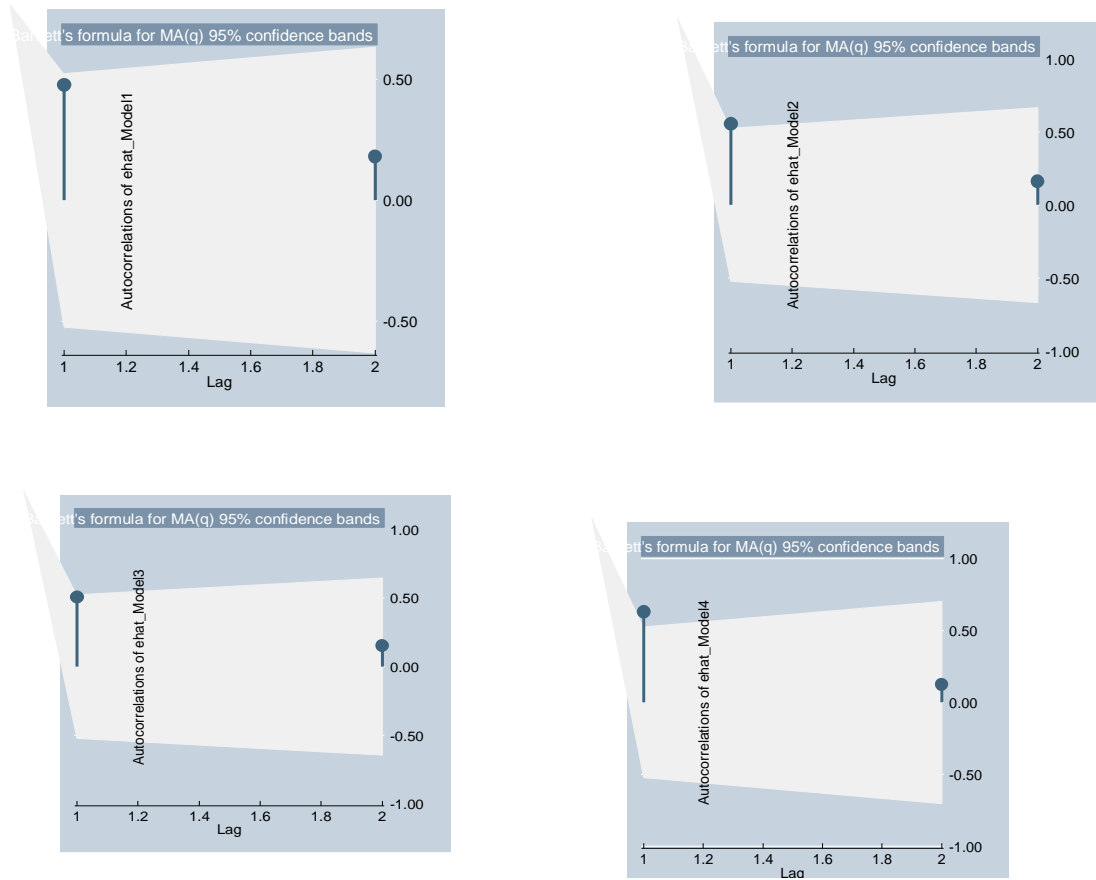


5.2. SUR Estimation

5.2.1 Model Selection

A test for multicollinearity among the independent variables was carried out and variables with variance inflation factor (VIF) > 10 variables were excluded from the empirical analysis. Stationarity of time series was ensured by taking the first difference of the series as indicated in Figure 5.4.

Figure 5.4: Correlogram



Four models were fitted to justify the robustness of the empirical analysis for both Dubai and rest of UAE (without Dubai). Regression estimation results are presented in table

5.1 for rest of UAE (without Dubai) and table 5.2 for Dubai.

For the rest of UAE data (see table 5.1), Model 1 includes the seven independent variables introduced earlier in this paper, and Model 2 includes these variables, except transportation, plus a dummy variable for the year 2008/2009. This dummy variable addresses the financial crisis period of Dubai and the UAE. Model 3 includes an additional variable for net export. This is intended to examine the effect of re-exports, as opposed to net exports. Given the economic structure of Dubai and the rest of UAE, re-exports and net export may measure economic concepts. In model 4, re-export is dropped while net export is maintained.

Table 5.1: Model Results for all emirates in UAE except Dubai

First Difference									
UAE excluding Dubai		Model 1		Model 2		Model 3		Model 4	
Real GDP	Code	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Year Dummy		-	-	-63449*	33092	-	-	-	-
Re-Export	X1	0.712**	.295	0.076	0.226	0.857**	0.305	-	-
Mining	X2	2.058**	.787	0.792	0.662	2.014**	0.799	1.070	0.928
Wholesale	X3	1.806*	1.000	0.263	0.676	1.995*	1.03	0.867	1.200
CREST	X4	0.785	1.635	0.860	1.555	0.939	1.643	2.434	1.995
Manufacturing	X5	-5.195*	2.787	2.530	3.408	-4.792	2.838	-3.073	3.725
Transport	X6	7.846**	3.246	-	-	8.158**	3.193	1.512	3.212
Finance	X7	-6.802*	3.549	3.440	2.843	-7.476*	3.468	0.159	3.462
Net Exports	X10	-	-	-	-	-0.052	0.041	0.009	0.053
Constant		32513.44	217306	116639	197126	2716.72	222839	201155	265876
Diagnostics									
R-squared		0.902		0.904		0.96		0.851	
F-Value		8.68***		8.28***		7.26***		4.90***	
Log Likelihood		-291.67		-293.30		-282.67		-298.6	
AIC		615.35		618.59		601.33		629.21	
ϵ_{12}		0.389		-0.264		.534		0.069	
BP (χ^2)		2.122		0.976		4.047**		0.066	

Table 5.2: Model Results for Dubai

First Difference									
Dubai		Model 1		Model 2		Model 3		Model 4	
Real GDP	Code	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Dummy year		-	-	8849.4	5592.9	-	-	-	-
Re-Export	X1D	-0.037	0.054	-0.011	0.049	-0.019	0.109	-	-
Mining	X2D	0.082	0.936	0.424	0.861	-0.226	1.035	0.053	0.980
Wholesale	X3D	1.259**	0.524	1.203**	0.463	1.148*	0.566	1.225*	0.556
CREST	X4D	-1.734**	0.589	-	0.606	-1.920**	0.652	-1.817**	0.625
Manufacturing	X5D	3.091**	1.416	2.962**	1.160	3.714**	1.573	3.118*	1.602
Transport	X6D	-1.163	0.850	-	-	-1.447	0.928	-0.944	0.916
Finance	X7D	5.572***	1.202	4.773***	0.880	5.915***	1.410	5.517***	1.365
Net Exports	X10D	-	-	-	-	-0.016	0.067	-0.016	0.035
Constant		-3131.18	9615	-6730.37	8949.43	-5273.84	10372	-3770.72	9971
Diagnostics									
R-squared		0.998		0.999		0.998		0.999	
F-Value		581.53***		697.97***		426.41***		575.58***	
Log Likelihood		-291.67		-293.30		-282.67		-298.6	
AIC		615.35		618.59		601.33		629.21	
ϵ_{12}		0.389		-0.264		0.534		0.069	
BP (χ^2)		2.122		0.976		4.047**		0.066	

Index: (*) significant at 10 percent, (**) significant at 5 percent, (***) significant at 1 percent

BP: Breusch-Pagan test of independence of cross equations

The results from these alternative specifications suggests that Model 3 best fits the UAE data used in this study. This is evidenced from the comparison of the diagnostics (see at the bottom of table 5.1), where Model 3 specification generates the lowest Akaike information criterion (AIC), highest R-square, highest Log likelihood and significant Brush Pagan test compared to the alternative specifications. Moreover, Model 3 seems intuitive given that its estimated coefficients are more reasonable in values and signs.

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For Dubai (see table 5.2), a similar analysis suggests that Model 3 best fits the Dubai data, compared to the alternative specifications in table 5.2.

5.2.2 Empirical findings

This section presents the empirical finding from Model 3 (table 5.1) and Model 2 (table 5.2) for rest of UAE and Dubai. As can be seen from the BP (Breusch-Pagan) test for independence of two equations, the contemporaneous correlation across cross equation error terms were not equal to zero. This implies that the two economies (rest of UAE and Dubai) are positively affecting each other. This provides adequate justification for rest of UAE and Dubai economies to derive benefits from diversification of their sectors in which they have core competencies discussed below.

The coefficient of determination for the Model 3 (table 5.1) indicates that the model explains about 96 percent of the variation in rest of UAE GDP. The effect of sectors such as transport, mining, wholesale, and re-exports sectors were positive and significant (in decreasing order of magnitude of SUR coefficients) to the growth of rest of UAE GDP. Since the data are in natural logs and first difference, we can interpret the coefficient values as net impact elasticities of sectors. A one percent increase in the share of transportation sector, increased rest of UAE GDP by 8.158 percent. The impact is highly elastic. The reason could be due to the huge investment expenditure that UAE is investing from its coffers for completing its five-star infrastructure system both at the federal and individual emirate levels over the next several years. The investment projects include all modes of transportation infrastructure, including rail, shipping, and air and include project requirements associated with developments in other sectors. Road and Transport Authority projects alone include the USD 7 billion inter-Emirate Union Rail project, development of the new Port Khalifa, and expansion projects involving the international airport in Abu Dhabi. The results imply that such investments could be continued for positive spill over effect in the long-term in the rest of UAE.

A one percent increase in the share of Mining sector increased the rest of UAE GDP growth by 2.014 percent. Similarly, a one percent increase in wholesale sector increased the rest of UAE GDP growth by 1.995 percent. Similarly, a 1 percent increase in re-export sector showed a 0.857 percent increase in the growth of rest of UAE GDP.

It is interesting to note that finance sector negatively affects rest of UAE GDP growth. The financial crisis period had no impact on UAE GDP.

For Dubai emirate, as expected Model 3 (table 5.2) results were very different from rest of Dubai GDP. Model 3 explains about 99 percent of the variation in the GDP of Dubai. The effect of sectors such as finance, manufacturing, and wholesale sectors were positive and significant (in decreasing order of magnitude of SUR coefficient) to the growth of Dubai GDP. All three sectors were highly elastic. A one percent increase in the share of finance sector increased the GDP growth of Dubai by 5.915 percent. As was detailed in earlier sections, Dubai's competitiveness is in finance sector. The Arab World Competitiveness Report 2007, issued by the World Economic Forum (WEF), ranks the UAE in the top position among Arab countries and in the 29th position among the 40 most advanced economies. It states, "Sound economic management has contributed to stabilizing the macroeconomic environment and strengthening public institutions."

The manufacturing sector in Dubai has taken second spot in the model. A one percent increase in manufacturing sector increased Dubai GDP growth by 3.714 percent. Similarly, a one percent increase in wholesale sector increased Dubai GDP by 1.148 percent while the estimate was less significant at 10 percent.

This was expected since the Department of Economic Development (DED) has identified several major sub-sectors as the main drivers of the manufacturing economy including processed food and beverages, plastics, electrical machinery and equipment, chemicals, minerals, base metals and pearls and precious stones. The high

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degree of concentration in a few key sub-sectors highlights the potential for the growth of, and diversification within, the manufacturing sector. For instance, imports of electrical machinery and equipment along with pearls, precious stones and metals accounted for 70.8 percent of Dubai's manufactured goods imports. Similarly, exports and re-exports are dominated by electrical machinery and equipment along with pearls, precious stones and metals, accounted for 71 percent of Dubai's manufactured exports and re-exports. Despite the overall importance of manufacturing in Dubai's non-oil trade, the surprising degree of concentration of trade activity within a few key sub-sectors highlights the potential for diversification of Dubai's manufacturing trade.

The development of free economic zones has spurred investment in Dubai's manufacturing and wholesale sectors. These include the option of 100 percent foreign ownership of companies based there, exemption from corporate taxes for 50 years, on a renewable basis, and exemption too from personal income tax, import and re-export duties. Firms in the zone can also hire whom they like, as they are not bound by Emiratisation policies, and there are no currency restrictions. The free zone also offers one-stop-shop services for setting up companies, visas and permits. Jebel-ALI free zone (JAFZA) is the flagship free zone operation of Economic Zones World (EZW). JAFZA is currently home to over 7,500 companies with 17 percent of these companies operating in IT and electronics, 15 percent in construction material, 12 percent in chemical and petroleum products, 12 percent in machinery and equipment, 10 percent in food and healthcare, 9 percent in automotive and 5 percent in the logistics sector. JAFZA generated trade worth more than US\$ 90bn in 2014, providing more than 200,000 jobs in Dubai and the UAE. In addition, key to the industrial sector is the Dubai International Airport Free Zone (DAFZA), which contributed US\$ 30bn to Dubai's non-oil foreign trade in 2014. It offers the same incentives package as JAFZA and other zones, while also being located next to Dubai airport, a big logistical advantage for manufacturers there. While certain cargo services have moved to Al Maktoum International Airport at Dubai World Central (DWC), DAFZA is still very much a major hub for airborne imports and exports.

It is surprising to note that construction and real-estate sector in Dubai had a moderately significant negative impact on Dubai GDP. This is plausible, as rental growth declined, capital investments decreased, completion of pending projects resulted in oversupply and decreased demand and appetite for real estate by investors. Further, lenders continued to carefully scrutinize their real estate exposure, particularly for speculative development. Lender also required greater equity contributions (in addition to land) and other forms of security to support higher-risk lending. Mortgage caps were introduced to protect consumers and slow down sales price growth.

6. ANALYSIS and CONCLUSION

6.1 Results Analysis

Stability remains the hallmark of Dubai and rest of UAE economies with a continuing focus on infrastructure projects expenditures as growth in the various industries, improvements in the real estate industry, focus on ICT, tourism, and rising growth in economic performance will allow Dubai and rest of UAE to achieve sustainability in economic performance. Both economies are experiencing growth in economic performance and are expected to maintain stability in the coming years with the governments' efforts to achieve long-term development objectives as outlined in vision 2025 documents. This paper analysed the interrelationships between Dubai and UAE Economies and between various sectors within Dubai and UAE economy.

As seen from table 4.3, there exists positive interdependencies between Dubai and rest of UAE economies. This signifies that the core competencies across various sectors in Dubai and rest of UAE economies need to be promoted further to have overall diversified impact on UAE economy. As discussed in section 3 and 4, Dubai economy is more diversified towards non-oil sectors. Rest of UAE in general and Abu Dhabi emirate in particular is more oil-dependent while efforts are being made to diversify to manufacturing, mining and construction and real estate sectors. Table 6.1 summarizes the extent of validation of hypotheses formulated in section 3.

Table 6.1: Summary of hypotheses from the model results

Variable	Expected Coefficient Sign	Actual coefficient sign and magnitude in rest of UAE (excluding Dubai) economy (from Table 5.1)	Actual coefficient sign and magnitude in Dubai economy (from Table 5.2)
Re-export (REXP) sector	+	+0.857**	-0.019
Mining (MIN) sector	+	+2.014**	-0.226
Wholesale and Retail trade	+	+1.995*	1.148*
Construction and Real Estate (CREST) sector	+	+0.939	-0.192**
Manufacturing (MAN) sector	+	-4.792	+3.714***
Transport, Storage and Communication (TSC) sector	+	+8.158***	-1.447
Financial (FIN) Sector	+	-7.476*	+5.915***

Index: (**) significant at 5 percent, (***) significant at 1 percent;

Grey highlighted cells indicate hypothesis was contradictory to the one formulated in section 3.

- In Dubai, the finance sector is the first major sector and contributed significantly to the economy. This is mainly due to the sustained stimulus given to this sector since 1970s as Dubai is emerging as international financial centre as envisaged in Dubai Vision 2025. The second major significant sector is the manufacturing sector, which contributed significantly to the GDP of Dubai economy. The third sector is wholesale and retail which significantly and positively contributed to the growth of Dubai economy. These three results are plausible due to the sustained efforts in projecting Dubai as the key logistic hub of the middle-east region as envisaged in Dubai Vision 2025. The fourth sector construction and real estate sector unexpectedly had a negative impact on the GDP; one possible reason behind this may be the over-exploitation of the real estate sector in Dubai over the last 1 decade. The real estate sector in Dubai has become saturated and there is overhanging of supply, whereas in other Emirates in UAE it is just catching up. This particular result therefore imply that real estate sector in Dubai needs consolidation without undertaking further investments to ensure long-term sustainability of Dubai GDP.

All other sectors were insignificant implying non-sustainability of these sectors in the long-term. Even though Dubai is considered a re-export market, the impact of re-export sector was negative and insignificant over the study period. One possible reason might be the saturation of the re-export market similar to real estate and construction sectors.

- In the rest of UAE, the transportation sector is making in road as diversification from non-oil sector. This sector in rest of UAE has just picked up pace after taking clue from Dubai and thus had a major impact on the rest of UAE GDP than in Dubai GDP. Whether this sector is sustainable in rest of UAE economy is a question worth review after 5-6 years. The mining sector is the second biggest sector. It influences the rest of UAE GDP significantly and positively. The magnitude of contribution of the mining sector to the GDP is far more intense in rest of UAE than Dubai, which indicates sustainability of mining sector in rest of UAE in the future. The third sector is wholesale and retail sector, which had a positive impact, but in comparison with Dubai, the magnitude was higher and less significant indicating that this may not be sustainable for long-term. This may be due to the reason that rest of UAE has their own regulatory powers for setting up manufacturing units. The government laws, emirates' laws and free zone laws can be complex and confounding. The fourth sector is re-export sector, which positively contributed to the growth of rest of UAE GDP. The Finance sector negatively influenced the rest of UAE GDP although the impact was less significant; implying that financial investments in this sector have not reaped adequate returns since the investments in this sector are in the initial phases and the benefits will start flowing to rest of UAE economy in the long-term.

6.2 Policy Implications

The study conclusions point to prudent management of Governments' investments in both economies towards non-hydrocarbon GDPs. Raising more nonhydrocarbon revenues through new value added tax measures being implemented from 2017-18 could be the starting point for such prudent management of resources.

The positive sizable impact of the finance sector in Dubai and negative sizable impact in the rest of the UAE provide many opportunities for designing diversification programs for sustained economic development of the entire UAE economy.

The proposed structural reforms in the UAE in 2025 Vision document, could aim at further diversifying the economy and accelerating private sector-led job creation for nationals. These could include further opening up foreign direct investment, improving selected areas of business environment, transitioning toward a knowledge-based economy with focus and support to fundamental research, easing access to finance for start-ups and SMEs, and creating the right incentives for innovation, entrepreneurship and job creation.

6.3 Study Limitations

The study has few limitations. First, the sample size of the data was small covering the years 2001–2015 (15 years), which constrained the choice of applying VAR as analytical tool for studying co-integration

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between Dubai and rest of UAE economies. The second limitation was the lack of sectoral data in four emirates in UAE, which could have broadened the scope of the study. To that extent, the model results may not be generalizable to other economies in the Middle-East region.

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