AN EMPIRICAL INVESTIGATION OF THE INTERRELATEDNESS OF SELECTED MIDDLE EASTERN COUNTRIES

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ABSTRACT

The Middle East has been a center of attention during the past century. The countries of the Middle East have large reserves of raw materials, especially crude oil. In this article we are going to look at the effects of the Iraq situation on the business cycle of the neighboring countries.

The countries we consider are Iran, Saudi Arabia, Jordan, Syria, and United Arab Emirates. Some of these countries such as Saudi Arabia, Emirates, Syria and Iran are rich in oil resources while others Arab countries like Jordan do not have these natural resources. We will investigate how the Kuwait war in 1992 and the Iraq war in 2003 have affected the economic conditions in these countries, specifically the interrelatedness of their business cycles. The econometric methods of cointegration and common feature testing will be utilized.

INTRODUCTION

The importance of the Middle East has grown substantially over the past fifty years. At the same time, stability in this region has been tenuous at best. The economic condition of the region is as complicated as the cultural and religious environment. Unfolding events over the past fifteen years have brought increased tension and surprising cooperation in the region. Events such as the war between Iran and Iraq in the 1980s and the Iraqi invasion of Kuwait with 100,000 troops in 1990 ultimately led to the first Gulf War. Also, the second Gulf War and ongoing occupation of Iraq by United States has brought change and uncertainty to the region. At the same time there has been surprising cooperation in the region. For example Israel and Turkey have formed a free trade zone.

This article examines the common business cycles between several key counties in the Middle East. The countries include Saudi Arabia, Jordan, Syria, Iran, and the United Arab Emirate. Most of the countries in the region are rich in natural resources mainly crude oil and they rely on the export of crude oil to keep their economies running since the

industrial sector is not well developed. Agriculture although present is a very hard sector to develop due to the extreme climate.

This study examines some oil exporting counties and also some countries like Jordan that enjoy far less abundant resources. Although most borders in the region are closed there are some open borders to create some trade free zones but still they are not open for the outside world. An unfortunate omission due to data limitations is Iraq. Before turning to the empirical evidence regarding the interrelatedness of these countries' economies, we briefly introduce each country.

Jordan is a poor Arab country lacking in oil reserves. Jordan's economy depends on the trade with the Persian Gulf countries. In 1994, Jordan signed a trade agreement with Israel and established the Qualifying Industrial Zone (QIZ). The product manufactured by this industrial park (QIZ) can be exported to the USA duty free provided a 35 percent portion of the product comes from the QIZ, Israel, and/or the West Bank/Gaza. King Abdullah was crowned in 1999 and undertook some economic reforms. These included privatization, attracting foreign investment and debt restructuring.

Jordan's real GDP increased by 3.2 percent in the last quarter of 2003 due to an increase in exports, mainly to the USA. Jordan had a surplus of 11.1 percent of GDP in its balance of payments and the Jordanian Dinar is pegged to the U.S. dollar. Jordan's main exports are phosphates, fertilizers, potash, agriculture products and textiles. Jordan also has a trade agreement with the USA that took effect after 2001.

Saudi Arabia is an oil rich country having around 25 percent of the proved world reserves. Saudi Arabia is the biggest oil exporter in the world. Oil is the main export and accounts for about 75% of budget revenue, 40 percent of GDP and 90 percent of the export earnings. Any fluctuation in oil prices affects its GDP. For example, in 2003 GDP increased due to high oil prices, so fluctuation in oil prices is considered the biggest factor for the economy.

The debt of the country is 100 percent of GDP so the government says that they cannot afford to diversify due to lack of funds. The government encourages foreign investment especially joint ventures with Saudi nationals. A joint venture with Saudi national with at least a 25 % of ownership is eligible for an interest free loan from governmental credit institutions and the corporate taxes are imposed only on foreign investments or foreign portion of the joint venture. The Saudi riyal is pegged against the dollar at the rate of 3.75 riyals per dollar. Saudi Arabia has a surplus in its balance of payments since 1967. The unemployment rate is 15 percent.

Iran is a central based country where most of the major corporations are owned by the government. The Islamic revolution in 1979 had a great affect on the policy making in Iran. Parliament and the Council of Guardians are not in favor of trade liberalization. Like its neighbors Iran is also rich in oil resources. Iran holds 10 percent of the proved oil reserve of the world. Crude oil and oil products are a big part of its exports. Iran is also developing its agriculture sector, which now accounts for 20 percent of its GDP. The service sector stands for 45 percent of its GDP, which makes it the biggest sector in the economy but this

sector faces obstacles such as currency exchange restrictions, time-consuming official procedures and uncertain political situation.

Iran's GDP growth rate was 5.9 percent in 2003 due to high oil prices. The unemployment rate is at 17.8 percent in 2003 as compared to 16.2 in 2002. Iran is not a member of the WTO. It would have to undergo a big transformation in its economic system to qualify for the membership.

The United Arab Emirates (UAE) also has big gas and oil reserves like the other neighboring countries having 10 percent of the world's oil reserves and a fifth of the natural gas reserves. The UAE is more diversified than the other Middle East countries. The country has invested in agriculture, industry and trade. In 2003 the non-oil part of production accounted for 33.3 percent of GDP and more than 30 percent of exports. Most of the development in the UAE happened in the last 30 to 35 years as the per capita income rises from nearly nothing to 27,000 US dollars during this period. The GDP growth was 7 percent in 2003 while in 2002 it was just 1.9 percent due to change in oil prices. The balance of payment surplus was 12.1 billion or around 15.1 percent of GDP. One of the major contributors to this surplus is the trade sector, trade free zone.

As far as the business sector is concerned foreign ownership is very restricted. Even in the limited liability companies, foreigners cannot have more than 49 percent of the ownership stake while in the case of partnerships owners have to be local. The UAE Dirham has been pegged to US Dollar and the rate is 3.67 Dirham per US Dollar. The country has followed this policy since 1980.

Syria, like some of its neighbors, has a centrally planned economy. It has abundant oil resources oil resources accounting for 55 to 60 percent of Syria's exports and about one-third of its GDP. Syria has about 800 potential oil sources and 60 percent of them are still unexplored. To date, foreign investors have not shown much interest in Syria. The other important sector in Syria's economy is the service industry providing employment to 45 percent of the labor force and contributes 50 percent to GDP. The agricultural sector still is developing.

Syria's debt equals 100 percent of GDP, which has led to the World Bank classifying it as a lower income and severely indebted country. The debt increased due to heavy military spending and expansion of the public sector. Syria has engaged in efforts to promote free trade. For example, in 2001 it signed a trade free agreement with Iraq that resulted in 1 billion dollars worth of trade between the two countries. Due to this trade agreement, Syria acquired 100,000 barrels of Iraqi oils on favorable terms.

Kuwait is not in the empirical portion of the current study but offers an interesting example of a Middle East economy. It is the most open economy in the Middle East with legislation to allow foreigners to have 100 percent ownership in a company, in certain sectors, having been passed and waiting to be implemented. The government holds most of the interest in the oil and gas industry and after the crashes of 1979 and 1982 the government also has most of the interest in private companies. In August 1990 Iraq invaded Kuwait devastating Kuwait's economy. The government then started to divest itself of the private

companies. The country is still trying to recover from the effect of the invasion with the GDP growth rate being negative in 2001 (-1.10) and 2002 (-0.90).

The Kuwaiti Dinar is determined daily against a basket of currencies but the rate closely follows the US dollar. The Dinar is freely convertible. Foreign investors are not allowed to invest in the petroleum sector. There is no tax on corporations in Kuwait except for foreign firms or the foreign ownership portion of a company. Local firms listed on the stock exchange pay a 2.5 percent tax to the Kuwait Foundation for the Advancement of Sciences. Shuwaikh port was declared a Kuwait free trade zone in 1999. Foreign firms established in this area do not face restrictions like corporate taxes etc.

As far as the stock markets are concerned Saudi Arabia has the biggest while Kuwait has the second largest stock market in Middle East. Additionally, the Dolphin project was approved in 2001. This is a 10 billion US Dollars project to connect the UAE, Kuwait, Oman and eventually Pakistan through pipeline for the exportation and importation of gas.

We can see that oil is a common source of revenue in the Middle East but it is not the only source. The world tends to see the region as a wealthy oil-producing region. The truth however may be far different from perception. Understanding the economic environment of this region is an increasing priority. The prominence of the Middle East has increased over the past fifty years and will continue to be a major influence on world events for the foreseeable future. This study attempts to examine the linkages between these economies and thus have a better understanding of the economic stability of the region.

DATA AND METHODOLOGY

The data is annual GDP data for Jordan, Iran, Saudi Arabia, United Arab Emirates(UAE), and Syria. The source of the data was Global Insight. These countries were chosen primarily by data availability. Data on the Middle Eastern countries was found to be limited. The time span of data available varied for of these countries. Specifically, the time periods for the data for each of the countries were as follows: Jordan (1985-2002), Iran (1966-2002), Saudi Arabia (1968-2003), United Arab Emirates (1972-1998), and Syria (1989-2000).

The existence of a long term relationship among output data will be tested using Johansen (1988) and Johansen and Juselius (1990) methodology for cointegration. The existence of a cointegrating relation would imply a common business cycle since series that are cointegrated can be expressed with a causal ordering in at least one direction. The bivariate pairings that do not demonstrate a cointegrating relation will be subjected to a more stringent test for comovement called common serial correlation feature tests developed by Engle and Kozicki (1993). The finding of a common serial correlation between variables implies at least one way causality and therefore implies the existence of a common business cycle.

The use of cointegration tests is relatively common in the literature and the reader is referred to Johansen (1988) and Johansen and Juselius (1990) for a complete discussion.

Common feature testing is relatively new to the literature and a brief elaboration on the methodology follows.

Cointegration tests investigate long-term relationships by analyzing forms of comovement of variables that are nonstationary. In order to investigate the forms of comovement that are stationary, common features can be analyzed. Common feature testing is performed among stationary variables. Many macroeconomic variables in their levels are nonstationary and are stationary in their first differences (Nelson and Plossner, 1982). Therefore, it is necessary to perform common feature tests on the first differences. Although stationarity tests are performed in the paper, assume stationarity in first differences of the variables we are considering for methodology exposition purposes. The first differences of the logs of the gross domestic product (GDP) variables of the two countries will share a common feature if a common business cycle exists between the two countries. The common feature for which we test is serial correlation. The finding of a common serial correlation feature between two output variables implies at least one-way causality. Therefore, common serial correlation features are interpretted as common business cycles. The finding of such a common feature will indicate persistence and comovement in the system. Common serial correlation will be tested by using the test statistic developed by Engle and Kozicki (1993).

The model for a common feature test between the output level of one country ($y_{1,t}$) and the output level of a second country ($y_{2,t}$) where the common feature is generated by a vector of variable w_t is given by

$$y_{1,t} = c_t\beta_1 + w_t\,\gamma_1 + \varepsilon_{1,t}$$

$$y_{2,t} = c_t\beta_2 + w_t\,\gamma_2 + \varepsilon_{2,t}$$

In this model, c_t is a constant term and w_t is a serial correlation feature that may be common to both series. The error terms are serially uncorrelated. The linear combination, $y_{1,t} - \delta\, y_{2,t}$, can be written in the following way:

$$y_{1,t} - \delta y_{2,t} = c_t\,(\beta_1 - \delta\beta_2) + w_t(\gamma_1 - \delta\gamma_2) + \varepsilon_t$$

If there exists a parameter, δ, such that $\gamma_1 - \delta\,\gamma_2 = 0$, then w_t is not a component of the linear combination. In this case, w_t is called a common feature. If w_t is a serial correlation common feature, then the linear combination $y_{1,t} - \delta\, y_{2,t}$ will be serially uncorrelated.

The steps involved in the bivariate common serial correlation test are summarized below. First, test for a bivariate common serial correlation feature test for the existence of the serial correlation feature in the individual series. Second, determine among the pairs identified as having the serial correlation feature as to which of these pairs is the feature due to a common component. That is, estimate the following equation for the pairs identified individually as having the feature:

$$y_{1,t} = c_i\beta_{LIML} + y_{2,t}\,\delta_{LIML} + \xi_{LIML}$$

Estimate this equation using the LIML approach where the instrument list is an intercept and the lags of $y_{1,t}$ and $y_{2,t}$. By using the LIML approach the parameter estimate is insensitive to normalization. Then estimate a regression of the residuals from (3) on the lags of $y_{1,t}$ and $y_{2,t}$ given by the following:

$$\xi_{LIML} = c_i\beta_{OLS} + y_{1,t-1}\gamma_{1,OLS} + y_{2,t-1}\gamma_{2,OLS} + \varepsilon_{t,OLS}$$

The value of the $T*R^2$ from this model is the relevant test statistic, with a chi-squared distribution, of the common feature test as proposed by Engle and Kozicki (1993). Refer to Engle and Kozicki (1993, p.371-372) for details of the test statistic. The null hypothesis of this test statistic is that the linear combination of the variables does not have the feature, that is, the feature is common for the two variables in question. The alternative hypothesis is that the linear combination of the variables does have the feature and therefore the feature is not common between the two variables. Recall if the feature is common, this implies at least one-way causality and therefore a common business cycle.

EMPIRICAL RESULTS

Prior to cointegration and common feature testing, the order of integration needs to be ascertained. The order of integration of the individual time series is determined using the augmented Dickey-Fuller test (Fuller, 1976; Dickey and Fuller, 1981) and a Phillips-Perron test (Phillips, 1987; Perron, 1988; Phillips and Perron, 1988). The unit root tests are provided in Table 1. In all cases, the output variables are found to be nonstationary in levels and stationary in first-differences.

Table 1: Unit Root Tests

	Dickey Fuller		Phillips-Perron	
	Level	1st Difference	Level	1st Difference
Jordan	-.078	-12.56	-0.88	-10.88
Iran	-0.40	-27.43	-.50	-23.60
Saudi Arabia	-0.98	-34.36	-.80	-32.60
United Arab Emirates	-2.24	-9.12	-2.08	-7.60
Syria	-0.67	-17.32	-0.54	-12.45

Note: The critical value at the 90% statistical significance level is 3.43.

To investigate the comovement among the nonstationary variables in their levels the cointegration test is applied on a pairwise basis. The lag lengths to be used in the bivariate cointegration models were determined by the Akaike criteria. The null hypothesis for the maximum eigenvalue statistic is that there are r cointegrating vectors and the alternative hypothesis is that there are r+1 cointegration vectors. The null hypothesis for the trace statistic is that there are r or fewer cointegrationg vectors and the alternative hypothesis is that there are at least r+1 cointegrationg vectors. The results of these bivariate cointegration tests are reported in Table 2.

Table 2: Cointegration Tests

	Trace Statistic		Maximum Eigenvalue		
Country Pairings	r=0	r=1	r=0	r=1	# of vectors
Jordan and Iran	14.30	1.02	13.28	1.02	1
Jordan and Saudi	10.82	0.24	10.58	1.02	0
Jordan and UAE	4.21	0.01	4.21	0.01	0
Jordan and Syria	7.13	0.67	6.46	0.67	0
Iran and Saudi	8.38	0.30	8.09	0.30	0
Iran and UAE	8.94	0.40	8.54	0.40	0
Iran and Syria	15.92	0.03	12.89	0.03	1
Saudi and UAE	15.36	5.04	10.32	5.04	0
Saudi and Syria	7.79	1.02	6.77	1.02	0
UAE and Syria	17.73	2.42	15.31	2.42	1
Critical Values--90%	13.33	2.69	12.07	2.69	

The cointegration tests reveal that only three of the possible ten country pairings exhibit a cointegrating vector that can be interpreted as a common business cycle. The pairings that rejected the null hypothesis of no cointegrating vector were the following pairings: Jordan and Iran; Iran and Syria; and United Arab Emirates and Syria.

The other seven country pairings (Jordan and Saudi; Jordan and United Arab Emirates; Jordan and Syria; Iran and Saudi; Iran and United Arab Emirates; Saudi and United Arab Emirates; and Saudi and Syria) are subjected to the common serial correlation test as outlined in the methodology section of this paper. In the first step of the common serial correlation test, the individual countries in the bivariate country pairings are tested for the feature (in this case common serial correlation). None of the seven pairings exhibited serial

correlation in both of the data series for the countries investigated. Therefore, the common serial correlation test could not be further investigated.

CONCLUSION

This paper examined the common business cycles between several countries in the Middle East for which data were available. The region is always portrayed as a common area with common economies and common problems. The truth however is very different from perceptions. In fact, the region is as economically diverse as other parts of the world. Not all countries enjoy the luxuries of large oil reserves. Also, countries struggle from their economies being dependent on one major resource. The only countries that exhibited common business cycles are Jordan and Iran; Iran and Syria; and United Arab Emirates and Syria. This is an interesting result because these are the countries that are not dependent on oil as their main or only source of revenue. Of the pairing Iran has the largest oil reserves but has chosen to diversify their economy. It is an even more interesting result that oil production did not tie together economic business cycles between Saudi Arabia and Iran or the UAE. In conclusion, the Middle East is a complicated region with an increasing prominence on the world stage. Understanding the economic forces of this region is an increasingly important and interesting topic. Areas for further research would be to obtain a larger data set and more fully explore the common business cycles of the region.

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