9-1-2009

Bilateral Trade Flows of The Gulf Cooperation Council Countries: A New Approach To Gravity Model

Aysu Insel
Marmara University

Mahmut Tekce
Marmara University

BILATERAL TRADE FLOWS OF THE GULF COOPERATION COUNCIL COUNTRIES: A NEW APPROACH TO GRAVITY MODEL

Aysu İnsel[*] and Mahmut Tekçe[**]

January 2009

Abstract

The Gulf Cooperation Council (GCC), formed by Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and United Arab Emirates, has contained one of the fastest growing economies in the world since 2000, following a series of economic reforms in the late 1990s enhancing the role of the private sector, encouraging FDI, and laying the ground for competitive integration in the globalization process. The GCC not only controls more than 40 percent of the world's oil wealth, but also emerges as a global hub of finance and heavy manufacturing industries. The GCC is pursuing a highly open trade policy regime both among the member countries and with the rest of the world. Regarding the recent developments towards more integrated economies of the Gulf region, this study analyzes the trade performances of the GCC both among its member countries and with the rest of the world by employing a gravity model in the context of the single country approach in order to estimate the impacts of observable and unobservable variables on the bilateral trade flows for the 1997-2006 and 2001-2006 periods.

In this paper, the research question is whether the trade flows of each GCC countries between their partners have changed over time and/or they have developed new relations in two sample periods. Thus single country panel specifications have been performed in a static income effects model in order to make a decision between the FEM and the REM models, and hence to obtain individual country effects. Then, static and dynamic (ARDL) fixed effects gravity models have been estimated in order to exploit the short run and the long run trade behaviours of the GCC countries using the Least Squares for the static income effects model, and the Least Squares, Generalised Method of Moments and Two Stage Weighted Least Squares for the simultaneous gravity models under the assumption of the presence of cross section heteroskedasticity and the robust standard errors. It has been found that the time invariant variables have different signs and sizes contrasting to what have been discussed in the gravity model literature. The distance variable is positive and significant for Kuwait and Saudi Arabia over the two sample periods, but negative for Oman through 1997 and 2006. The EU15 dummy variable has a significant and negative effect on trade on Bahrain, Oman, Qatar for both sample periods, whereas it has a positive and significant effect on trade in Saudi Arabia for two periods and in Kuwait between 2001 and 2006. These results can be accounted for the characteristics of the main commodities traded and also the geographical situation of the GCC countries. GCC is surrounded by either relatively low-income countries or countries that have oil reserves and do not import oil or gas from the GCC countries. The GCC countries mainly exports commodities to relatively wealthy countries where the distance and the transportation costs do not really matter. On the import side, the GCC imports high-tech commodities which are not produced in neighbouring countries.

JEL Classification: F10, F13, F15, C13, C23

Keywords: Gulf Cooperation Council Countries, Trade Flows, Gravity model, Static and Dynamic Panels, ARDL models.

[*] Prof. Dr., Marmara University, Department of Economics , Goztepe Campus, Kadikoy 34722, Istanbul, Turkey. E-mail: ainsel@marmara.edu.tr Phone: +90 216 3368487 Fax:+90 216 3464356

[**] Dr., Marmara University, Department of Economics, Goztepe Campus, Kadikoy 34722, Istanbul, Turkey. E-mail: mtekce@marmara.edu.tr Phone: +90 216 3368487 Fax:+90 216 3464356

The first version of this paper was presented at the 29th Annual Meetings of the Middle East Economic Association (MEEA) in conjunction with the Allied Social Science Associations (ASSA) Annual Meeting of the American Economic Association, 2 January 2009, San Francisco, CA, USA.

I. Introduction

At a time of the turmoil in global economies, the key suppliers of the world's oil and gas, the Gulf Cooperation Council (GCC) has attracted increasing attention due to its accumulation of wealth, and the vast size of its sovereign wealth funds (SWFs).

Gulf Cooperation Council was formed in 1981 with an agreement signed between the six states of the Gulf (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and United Arab Emirates) in order to strengthen their economic, social and political ties by harmonizing regulations in various fields such as economy, finance, trade, customs and tourism, fostering scientific and technical cooperation, and encouraging cooperation of their private sectors. The ultimate aim of the GCC has been the formation of a monetary and economic union. Towards this aim, in December 2000, the Supreme Council of the GCC mandated the monetary authorities of the member states to draw up a plan to establish a single currency. In 2003, the Customs Union between the GCC stated has been formally implemented and also the GCC members agreed to peg their currencies to the US dollar and to maintain the parity until the establishment of the monetary union in 2010.

However, despite the formation of the GCC Customs Union and the expectations on rising intra-GCC trade, trade among the GCC economies is still limited at around 6 percent of total trade. In this respect, this paper aims to analyze the trade patterns of the GCC countries by using a gravity model for the period 1997-2006.

In this paper, the research question is whether the trade flows of each GCC countries between their partners have changed over time and/or they have developed new relations in two sample periods. Thus single country panel specifications have been performed in a static income effects model in order to make a decision between the FEM and the REM models, and hence to obtain individual country effects. Then, static and dynamic (ARDL) fixed effects gravity models have been estimated in order to exploit the short run and the long run trade behaviours of the GCC countries using the Least Squares for the static income effects model, and the Least Squares, Generalised Method of Moments and Two Stage Weighted Least Squares for the simultaneous gravity models under the

assumption of the presence of cross section heteroskedasticity and the robust standard errors.

It has been found that the time invariant variables have different signs and sizes contrasting to what have been discussed in the gravity model literature. The distance variable is positive and significant for Kuwait and Saudi Arabia over the two sample periods, but negative for Oman through 1997 and 2006. The EU15 dummy variable has a significant and negative effect on trade on Bahrain, Oman, Qatar for both sample periods, whereas it has a positive and significant effect on trade in Saudi Arabia for two periods and in Kuwait between 2001 and 2006. These results can be accounted for the characteristics of the main commodities traded and also the geographical situation of the GCC countries. GCC is surrounded by either relatively low-income countries or countries that have oil reserves and do not import oil or gas from the GCC countries. The GCC countries mainly exports commodities to relatively wealthy countries where the distance and the transportation costs do not really matter. On the import side, the GCC imports high-tech commodities which are not produced in neighbouring countries.

The following section includes an economic outlook of the GCC countries; section III discusses the trade pattern of the GCC countries. In section IV a brief survey on gravity models and in section V methodology and models are presented. Section VI summarizes the estimation results, and the final section draws conclusions.

II. Economic Outlook of GCC Countries

GCC is formed of six members and the economies of these states significantly differ from each other. Saudi Arabia is the largest economy in terms of its GDP and population, but GDP per capita is the highest in Qatar and the UAE, and the lowest in Saudi Arabia and Oman. The total GDP of the six member states was USD 332 billion in 2001, where it exceeded USD 790 billion in 2007 (IMF, 2007). Throughout 2001 and 2006, the GDP per capita for the GCC countries, as a whole, increased by 30 percent, with Bahrain and Qatar experiencing the strongest increases at 42 and 37 percent respectively.

Source: www.dfat.au/eau

Despite significant differences in size, there is an important common feature of the GCC economies; their fiscal and export revenues highly depend on hydrocarbons (oil and natural gas), and their macroeconomic performance is highly correlated to the fluctuations in global oil prices. In 2006, the GCC region accounted for more than one fifth of world oil production. Moreover, GCC owns about 40 percent of world oil reserves and about 23 percent of world natural gas reserves (BP, 2007). Rising oil prices since the late 1990s led to a strong real GDP growth in GCC economies; from 2003 to 2008, real GDP increased by 6.8 percent per annum on average (Sturm et al., 2008). However, although GDP growth stemming from non-oil sources has been significant in the recent years, the recent falling trend in the oil prices is projected to influence the growth of the GCC states in a negative way. The GCC countries are aware of the risks of this high dependency on hydrocarbons and aim to diversify their economies, where a significant expectation from the formation of the GCC was to diversify production and trade with the help of a common trading area. Bahrain and the UAE have significantly advanced in the process of economic diversification; both countries have become important financial centres of the region and also started to earn remarkable revenues from tourism. On the other hand, Qatar and Kuwait are still highly dependent on oil and gas revenues (Sturm et al., 2008).

Until the recent economic crisis, the future of the GCC economies had quite bright projections; in 2007 the crude oil prices was expected to exceed the levels of USD 100 per barrel. However, due to the economic recession oil prices fell sharply to levels below USD 50, which is even lower than 2005 prices. This situation poses a risk on fiscal and export revenues of the GCC countries which could delay the structural reforms in the region, especially for the economically less diversified countries.

III. Trade Patterns of the GCC

The role of the GCC in global and regional trade is expanding significantly. The international economic outreach of the GCC is considerably wider than that of most other Middle Eastern countries. The main export good of the GCC is oil, where it constituted about 83 percent of the member states' total exports over the period 2003-2007 (IMF, 2007). In addition, the GCC emerges as a global hub of finance and heavy manufacturing industries, where the trade of the GCC in goods other than hydrocarbons rose sharply after 2003.

From 2003 to 2007, GCC countries' share in world trade rose from 1.9 percent to 2.7 percent (IMF, 2007). Total exports in goods were USD 86 billion in 1990, reached USD 110 billion at the end of the 1990s, and grew to USD 422 billion in 2006. Imports, on the other hand, were USD 48 billion in 1990, reached USD 82 billion at the end of the 1990s and USD 238 billion in 2006. A bulk percentage of the GCC countries' total exports was oil and natural gas over the period 2003-2007, where on the imports side, GCC countries mainly imported machinery and mechanical appliances, vehicles and parts as well as electrical machinery and equipment, (Australian Department of Foreign Affairs and Trade, 2005).

Studying the GCC countries' global trade patterns, Asia is the predominant destination for GCC countries' exports in goods, while the EU accounts for nearly one-third of GCC imports. In 2006, nearly 60 percent of the GCC economies' exports were destined to Asia, where one third of the GCC exports went to Japan and Korea, while the EU and the US accounted for only a small part, 10 and 9 percent respectively. On the imports side, the EU provided more than 31 percent of the GCC imports, which makes it the GCC's biggest trading partner. Asian countries, on the other hand, accounted for only one-third of GCC countries' imports. Intra-GCC trade is still limited, but is expected to expand with further progress in diversifying GCC countries' economies and regional integration.

Another important characteristic of the GCC is that the bloc gives great importance to trade liberalization both among the member states and with the rest of the world. For a deep regional economic integration, the GCC has been following a plan with three phases; the first phase includes the establishment of a customs union, which has started in 2003, the second phase includes the establishment of a common market, which has been launched on 1 January 2007, and the third phase is to launch a single common currency by 2010. By following these three phases, the GCC countries aim at establishing an EU-style economic bloc. Currently, although the customs union has been implemented and trade barriers among the member countries has been mostly removed, the trade between GCC member states represents only around 10 percent of overall foreign trade, where it is often stated that this rate should be around 25 percent. GCC is also dealing with Free Trade Agreements (FTAs) at various levels with several countries. FTAs have been concluded with EFTA and Singapore in early 2008, and the negotiations are ongoing

with several countries including the EU, Turkey, Australia, South Korea, India, China, New Zealand and Japan.

IV. A Brief Survey on Gravity Model Literature

Numerous panel data gravity models have been used in the literature to facilitate potential international trade flows between countries. This analysis of the bilateral trade flows of the GCC both among the member states and with other selected countries, mainly follow the lines of Harris and Matyas (1998), Egger (2000), Egger and Pfaffermayr (2002), Bun and Klaassen (2002), Zarzoso and Lehman (2003), Benedictis and Vicarelli (2004), Ramos and Zarzoso (2005), Antonucchi and Manzocchi (2006), and Boughanmi (2008).

Harris and Matyas (1998) examined gravity models of exports flows with fixed effect model (FEM) and random effect model (REM) specifications using static and dynamic approaches. They applied OLS, LS, and GIVE methods to estimate gravity models for 12 countries from APEC trading block over the period 1982 to 1994 with annual data. They suggested that proper model specification is crucial. Egger (2000) proposed that whether the REM or the FEM is econometrically more appropriate representation of available data strongly depends on the correlations of individual effects with the right hand side economic variables. A zero correlation supports REM specification. Egger and Pfaffermayr (2002) assumed a dynamic data generating process for errors and use autoregressive distributed lag model (ARDL(1,1)). They estimated the short run and long run effects and found that in panel models with a short time period, reasonable estimates can be produced as long as the estimate on the lagged dependent variable is low. Bun and Klaassen (2003) emphasized the importance of dynamics in panel gravity models of trade flows and used ARDL(1,1) dynamic panel structure to describe short run dynamics including time specific constants and treating country effects as fixed. They indicated that the LSDV estimates give better results than the GMM estimates. Zarzoso and Lehman (2003) estimated a gravity model on the trade potentials between Mercosur and the EU, where they found that FEM is superior REM in explaining bilateral trade flows as they included more variables than the standard gravity model. Benedictis and Vicarelli (2004) underlined that robustness of a common panel functional form depends upon the choice of static or dynamic specification. They used generalised method of

moments (GMM) to estimate export flows. Ramos and Zarzoso (2005) argued that there appear some differences between rich and poor countries in gravity models and they showed that trade flows are more sensitive to geographical and cultural variables for developing countries than for developed countries. Antonucchi and Manzocchi (2006) estimated a dynamic panel fixed effect gravity model using GMM. They followed a two-step procedure; first they estimated a standard FEM regression and then a cross section regression with country specific individual effects as a function of time-invariant variables (i.e. distance and dummies). Boughanmi (2008) is the particular paper on the trade potential of GCC countries with a panel fixed effect gravity model. The paper aimed to investigate the import flows of the GCC countries with 69 partners over the period 1990 and 2004, and found that the income variables and the dummy variable for the GCC countries are positive and significant supporting a high volume of intra-trade, but, the EU and the US dummies are negative and significant, which indicates a low level of integration.

V. Methodology and the Model

This paper analyzes the trade patterns of the GCC countries and attempts to explore the bilateral trade flows of each GCC country with 51 developed and developing countries for two different periods; from 1997 to 2006 and from 2001 to 2006. For the analysis, annual trade data from 1997 to 2006 are drawn from COMTRADE database for 100 countries, however, 48 of them are excluded considering availability and/or reliability. The income data is drawn from IMF International Finance Statistics (IFS).

In this paper, panel specifications have been performed in a static income effects model in order to make a decision between the FEM and the REM models, and hence to obtain individual country effects. Then, static and dynamic 'fixed effects' gravity models have been estimated in order to exploit the short run and the long run trade behaviours of the GCC countries.

Panel structures include total 52 cross section countries in a context of a large geographical coverage in which the economic and political structures and the levels of economic development are different.

Static income effects models have been estimated in equation 1.

$$\mathbf{LTRADE\_GCC_{it}=\beta_0+\beta_1 LPCAPINC\_GCC_{it}+\beta_2 LPCAPINC\_PARTN_{jt}+u_t} \quad \mathbf{(1)}$$

where in GCC_i, i represents member states, Bahrain (BAHR), Kuwait (KUW), Oman (OMA), Qatar (QAT), Saudi Arabia (SAU), and United Arab Emirates (UAE). TRADE represents the real trade flows between GCC_i and its partner, PCAPINC is the per capita real GDP. The PARTN represents partner countries. Trade and per capita income variables are constant in the US dollar. L shows the natural logarithms, j represents the partner country, and β_0, β_1 and β_2 are the parameters of the models.

Gravity models have been used in order to model bilateral trade flows among GCC countries and their trading partners in the context of the **'single country approach'**. It is known that the possibility of heterogeneity across countries must be captured by the specified model considering the per capita real income and time invariant variables. Static and dynamic gravity models have been estimated in a simultaneous equation framework, since the invariant variables cause singularity in the single equation specification.

The gravity models are;

(i) Static model

$$\mathbf{LTRADE\_GCC_{it}=\theta_0\,(COUNTRY\ EFFECT)_i+\theta_1 LPCAPINC\_GCC_{it}+\theta_2 LPCAPINC\_PARTN_{jt}+u_t}$$
$$\mathbf{COUNTRY\ EFFECT_i=\theta_3+\theta_4 LDISTANCE_i+\theta_5 EU15DUM_i+\theta_6 GCCDUM+\varepsilon_t} \quad \mathbf{(2)}$$

(ii) Dynamic model

$$\mathbf{LTRADE\_GCC_{it}=\gamma_0\,(COUNTRY\ EFFECT)+\gamma_1 LPCAPINC\_GCC_{it}+\gamma_2 LPCAPINC\_PARTN_t}$$
$$\mathbf{+\gamma_3 LPCAPINC\_GCC_{it-1}+\gamma_4 LPCAPINC\_PARTN_{t-1}+\gamma_5 LTRADE\_GCC_{it-1}+u_t}$$
$$\mathbf{COUNTRY\ EFFECT_i=\gamma_6+\alpha_7 LDISTANCE_i+\gamma_8\,EU15DUM_i+\gamma_9 GCCDUM_i+\omega_t} \quad \mathbf{(3)}$$

where LDISTANCE is the natural log of distance measured in kilometres between capital cities. EU15DUM is a dummy variable and takes the value of 1 if j is a member of European Union, and otherwise 0. GCCDUM is a dummy variable and takes the value of 1 if i is a GCC country, otherwise 0. θ_0, θ_1, θ_2, θ_3, θ_4, θ_5 and θ_6 are the parameters of panel static gravity model, while γ_0, γ_1, γ_2, γ_3, γ_4, γ_5, γ_6, γ_7, γ_8 and γ_9 are the parameters of panel dynamic gravity model.

The methods of panel estimations are: (i) Least Squares (LS) for the static income effects model, and (ii) Least squares (LS), Generalised Method of Moments (GMM) and Two Stage Weighted Least Squares (TSWLS) for the static and dynamic gravity models since all models are estimated under the assumption of the presence of cross section heteroskedasticity and the robust standard errors[1].

In this empirical research, the following steps are used for the periods 1997-2006 and 2001-2006:

1. Individual variable panel unit root tests are applied in order to distinguish stationary and nonstationary series (Table 1).
2. Static income effect models (Equation 1) are estimated in the forms of both fixed effects model (FEM) and random effects model (REM) in order to control observed and unobserved characteristics of individual country effects (Tables 2-7). In other terms, both the FEM and REM are estimated in order to account for existence of fixed parameters or random effects.
3. Correlation coefficients between (i) the local country income and the FEM residuals, (ii) the partner country income and the FEM residuals, (iii) the local country income and the individual country effects, (iv) the partner country income and the individual country effects, (v) the country effects and the FEM residuals are calculated in order to control country heterogeneity and to choose an appropriate model (Table.8).
4. Panel unit root tests are used for the residual obtained from the static FEM (equation.1) and the static gravity model (equation.2) in order to ensure the stability of the models, (Table.9).
5. Constant term (β_0) is replaced by the individual country effects variable[2] and it is assumed to capture the unobservable and immeasurable characteristics that differentiate within individual countries. That is, the intercept is allowed to vary from one country to another as a function of the specific time invariant variables (LDISTANCE, EU15DUM and GCCDUM), but the slope coefficients are assumed to be constant within country and time dimension. Thus the bilateral trade flows

[1] Except for the random effect models, all models are estimated by keeping the cross section weights and white cross sections for coefficient standard errors. In other terms, the LS specifications are used under the assumption of the presence of cross section heteroskedasticity and serial correlation.
[2] Individual country effect is the cross section term obtained from the FEM (Eq.1), and assumed to be constant over time and it is specific to the individual country over the two different estimation periods.

and the individual country effects have been estimated simultaneously under the structure of static gravity model assuming that θ_0**=1,** (Equation 2), (Tables 10-16).

6. Dynamic gravity model (Equation 3) structure including current and first lagged values of economic variables and the individual country effects variable could encompass the trade and income dynamics as well as the time invariant effects (LDISTANCE, EU15DUM and GCCDUM), (Tables 17-22). Hence, it is expected that equation 1 and 2 exploit the static and dynamic effects as well as individual differences over time and remove the omitted variable bias.

Panel unit root tests with individual fixed effects and both individual fixed effects and trend effects have been carried out for each variable. The Levin, Lin and Chu (LLC) t test has been performed assuming that under the null hypothesis, the persistence parameters are common across cross sections (i.e. each series in the panel contains a unit root) against all individual series in the panel are stationary. Alternatively, Im, Peseran and Shin W test (IMS) has been used allowing for a heterogeneous coefficient on the AR(1) term and assuming that under the null hypothesis each series contains a unit root against at least one of the individual series is stationary.

In time series econometrics, it is known that most of the macroeconomic variables, such as GDP, trade, etc., include a secular component and a cyclical component. The secular component moves slowly and smoothly relative to the cyclical component, secular component needs to be modelled by a deterministic trend. In contrast, cyclical fluctuations are assumed to disperse over time, any long run or permanent movement is attributed to the secular component. In panel models, similar to the time series modelling, important criteria for an adequate econometric modelling are the time series properties of the data, including the non-stationary and stationary components. The panel unit root tests check the possibility of individual fixed and trend effects on each variable before gathering them in an econometric regression analysis. However, as suggested by Hylleberg and Mizon (1989), the linear combination of the variables will be stationary if the conditional distribution of the underlying regression model is stationary. Therefore, it is not necessary for all the variables in a regression model to be stationary. If a variable contains a trend effect as well as a fixed effect, it also contains a stationary

component with finite mean and covariance. In general, the choice of functional form is very important to ensure the correct data generating process. Therefore, an autoregressive distributed lagged model (with a deterministic trend where necessary) would be appropriate for gravity models, assuming that the economic variables are generated by an ARDL(p, q) process, where p and q are the lag lengths of the dependent and independent variables respectively. Inclusion of lagged values of dependent and independent variables helps estimating dynamic relationship and obtaining consistent and asymptotically efficient estimators. The cost of including lagged variables in the estimation process is the loss of degrees of freedom and the degree of multi-collinearity. It is usually suggested that the lag structure of a model depend upon the time units of data. Since the model is specified by using annual data, one year lag is included for each variable.

In this paper, an appropriate type of panel analysis has been chosen in the view of fixed effects (FEM) and random effects (REM) models. Equation 1 has been estimated over the periods 1997-2006 and 2001-2006 in order to examine the bilateral trade flows during 12 years and 6 years period. It is assumed that the composite error (u_t) includes both individual country effects (unobserved heterogeneity) which vary across countries and idiosyncratic errors (regular error) which vary over time and could affect dependent variable. When time period (T) is small but cross sections (N) are large, an efficient use of available data and an appropriate model selection depend upon estimation method. Thus the fixed and random effects have been attained by feasible LS[3] for FEM and LS for REM in order to obtain consistent and asymptotically efficient estimators. It is expected that the estimates of the common slope coefficients do not vary across countries if the model is correctly specified. Identification of whether individual country effects are fixed or random has been accomplished by: (i) the redundant fixed effect **F** test; (ii) the random effect Hausman χ^2 test; (iii) the correlation analysis. It is expected that FEM would be supported by the test results and the correlation analysis since the main interest is to view individual specific country performances.

Panel residual unit root tests facilitate to distinguish a well specified model from a misspecified model. The error term on an econometric model is a generated process

[3] LS weights are the cross section weights and coefficient covariance method is the white cross section standard errors.

and it represents all the excluded effects in the specified equation. It varies with the structure of the model and the estimation method. Thus the stationarity of the error term ensures that the linear combination of the variables is stationary. In other terms, an empirical model does not deviate systematically from its theoretical determinants.

VI. Results

In this paper the research question is whether the trade flows of each GCC countries between their partners have changed over time and/or they have developed new relations in two sample periods. The single country approach and the verification of a suitable model structure have been performed for this intention. The model structures are the static/dynamic panel gravity models and the estimation methods are the least squares (LS) and the generalised method of moments (GMM). Primary concern in this paper is to find a suitable econometric model for a given time dimension and series, so that model selection depends mainly on the properties of the time series given the number of observations, and the research question.

The results of the variable panel unit root tests with fixed effects sustain the persistency on the common and individual cases for the period 1997-2006, but for some of them during the 2001-2006 period. However, the LLC test with individual fixed and trend effects favour individual variable stationarity, which contrasts with the IPS test results. Thus there is a transitory effect on each country data rather than a deterministic one.

Throughout the estimation processes, in the static gravity models (Equation 2) first lagged values of dependent and explanatory variables, with a constant term, country effect, distance and dummy variables, and trend (where necessary) have been used as the instruments for the GMM and TSWLS specifications. However, in the dynamic gravity models, the first lagged has been replaced by the second lagged of dependent variable and all other instruments have been kept same as in the static model.

The FEM and REM static income effect models for each country have been estimated through 1997-2006 and 2001-2006 periods and individual country effects are

obtained separately for each period. Estimated coefficients and test results are given from Table 2 to Table 7, the correlation coefficients are shown in Table 8, and finally the residual panel unit root tests are reported in Table 9. The results can be summarized as follows:

- The fixed effect - F test and the random effect –Hausman χ^2 test results support the FEM for Bahrain, Oman, and Qatar, whereas there are contradictory test results for Kuwait, Saudi Arabia, and the United Arab Emirates.
- If there is a heterogeneity bias, then the LS estimators are inconsistent. In other terms, the LS estimators are consistent if the composite error term (u_t) in Equation.1 is uncorrelated with the explanatory variable ($LPCAPINC\_PARTN_{jt}$). In Table 8, the second column shows that the correlation coefficients are low and close to zero. These results also prove the exogeneity of income variables.
- If there is a correlation between the explanatory variable ($LPCAPINC\_PARTN_{jt}$) and the country effect (CEF_j), then the FEM is the appropriate model. In Table 8, fourth column is the evidence for the FEM apart from the cases of Kuwait and Saudi Arabia. The correlation coefficients for Bahrain, Oman, Qatar and also the United Arab Emirates support the FEM.
- If the country effect is random and is absorbed into the error term, then the idiosyncratic (regular) error is correlated with the country effect. In Table 8, fifth column shows that all the correlation coefficients are zero and favours the FEM for all countries.
- Panel unit root tests for the FEM residual reject the unit root hypothesis at 5% significance level and hence encourage maintaining the FEM specifications.
- The FEM and the REM estimates and the country effects obtained from both models are similar mainly for Kuwait, Saudi Arabia, the UAE and the others, except for Qatar.

As a result of above discussion, the FEM has been chosen as the appropriate model in this single country trade analysis. Static FEM models include an intercept term, and the real per capita income of local (GCC) country and its partners. Income variables describe not only the income effects on trade, but also the size of the economies.

The results obtained from the static income effects models are as follows:

- Contemporaneous income effects on trade are positive and significant for all GCC countries.
- The local country income coefficient is above 1 for Kuwait, Qatar and Saudi Arabia, implying a higher increase in income than trade. For the other countries, the value is less than but still close to 1.
- The partner country income coefficient is around 1 and higher than the local income estimates for Bahrain and Oman, implying that a change in the partner country income highly affects the level of trade. However, the partner country income effect on trade in Kuwait, Saudi Arabia and the UAE are low, which implies that the trade of these countries is less prone to the fluctuations in the trade partners' incomes.
- There is not an important difference in the fit of models for the 1997-2006 and 2001-2006 periods.
- The local income coefficients are higher during the 2001-2006 period for Bahrain, Kuwait, Qatar, and the UAE, whereas the partner country income effects decrease in these countries, except for the UAE.

In the static gravity models the estimated coefficient on the country effect is 1 for all the GCC countries and the income estimates are highly significant and around 1, similar to the static FEM models. Additionally, the inclusions of invariant variables into the models have improved the estimation results in terms of reported statistics. However, trade is a dynamic process and the trade dynamics are expected to assure the time series properties in the specified models, the dynamic models (equation.3) have been used to give a feed back for the validity of long run estimates (in equation 2) as well as the income effects on trade.

The results of the dynamic gravity model estimation are:

- The coefficient on the lagged trade variable is less than 1, which implies that there is a low level of persistence and hence stable dynamic relationships for all countries. In other words, cyclical fluctuations disperse rather quickly. In addition, this result retains the static model specifications.
- There are some differences in the magnitudes and signs of coefficients across the three methods and over the two periods. These could be originated from

inconsistency and/or small sample bias. Accordingly, selection of the appropriate estimation method has been performed through the –stable- long run coefficients calculated from the dynamic gravity models.

- The estimated long run income coefficients (Table.23) calculated from the dynamic gravity models for the local country, $(\gamma_1+\gamma_3)/(1-\gamma_5)$, and the partner country, $(\gamma_2+\gamma_4)/(1-\gamma_5)$, confirm that the LS, GMM, and TSWLS estimates are similar for Bahrain, Kuwait and Qatar during the two sample periods. However, the GMM -partner income- estimates for Oman and Saudi Arabia are much smaller than the LS estimates, whereas the LS -local income- estimate is higher in the UAE.
- The calculated values of the local country income effect on trade ($\gamma_3+\gamma_1\gamma_5$) and the partner country income effect on trade ($\gamma_4+\gamma_2\gamma_5$) validate that the LS estimates are superior to other estimates for all countries except for the UAE[4], (Table.23).
- Both incomes affect trade rather fast during the period 1997-2001 in Bahrain and Kuwait (but not in 2001-2006), and in Oman during the 2001-2006 period (but not in 1997-2006), whereas in Qatar, Saudi Arabia and the UAE both host and partner country incomes affect trade in both periods examined.

Eventually, this paper favours the LS method for estimations and further evaluations, keeping the stable long run coefficients from the dynamic models.

Explanation of the time invariant variables in the estimated gravity models are:

- The time invariant variables have different signs and sizes contrasting to what have been discussed in the gravity model literature.
- The distance variable is positive and significant for Kuwait and Saudi Arabia over the two sample periods, but negative for Oman through 1997 and 2006. The magnitudes of the estimates are equivalent.
- The EU15 dummy variable has a significant and negative effect on trade on Bahrain, Oman, Qatar for both sample periods, whereas it has a positive and significant effect on trade in Saudi Arabia for two periods and in Kuwait between 2001 and 2006.

[4] TSWLS gives beter result for UAE.

- The estimate of the GCC dummy is positive and significant in Kuwait and Saudi Arabia for the two sample periods and for Bahrain between 2001 and 2006. However, it appears with a negative significant effect in Oman over the 1997-2006 years.

In addition to the econometric results, it is crucial to discuss economic meaning of these results. This paper attains the following economic results:

- The local per capita real income coefficient is between 1 and 2 only for Kuwait, Saudi Arabia and UAE confirming that these countries are richer than the other GCC countries and trade more than the others.
- The positive effect of distance variable cannot be interpreted in terms of costs, but this may possibly a result of strong bilateral economic activities and the type of traded goods, mainly oil.
- The effects of EU and GCC dummies can be interpreted in the view of the country effects, obtained from the FEM, (ranking table (Table.24) and figures (Figures 1-6)).
- Negative and significant EU15 dummy for Bahrain, Oman and Qatar reveals that there is not a strong effect of economic integration on trade. The negative significant effect of EU dummy can be accounted in terms of first ten trading partners. It can be seen that there is not any EU country partner in the ranking table. The insignificant EU dummy for the other GCC countries is the evidence for a loose trade tight between these countries.
- Positive significant effects of GCC dummy prove positive effect of economic integration. Both EU15 and GCC dummies have positive significant effects on trade in Kuwait and Saudi Arabia.
- Country rankings for Kuwait and Saudi Arabia support the positive effects of EU dummy on trade in these countries. Saudi Arabia has five (Germany, France, Italy, Netherlands, and the UK) and Kuwait has three (Germany, Netherlands, the UK) trading partners out of 10.
- Positive and high country effect values could indicate that GCC country exports more than imports to these countries, but negative and high effect values reveal a higher level of imports than exports to the GCC countries from partner countries.

VII. Conclusion

This study has analyzed the bilateral trade patterns of the GCC countries both among member states and with other selected countries, and tried to answer the research question whether the trade flows of each GCC countries between their partners have changed over time and/or they have developed new relations in two sample periods. For the empirical analysis, a gravity model has been employed in order to model bilateral trade flows among the GCC countries and their trading partners in the context of the single country approach. Primary concern in this study has been to find a suitable econometric model for a given time dimension and series, so that model selection depends mainly on the properties of the time series given the number of observations, and the research question. After an investigation of static and dynamic panel gravity models and different estimation methods, the fixed effect model (FEM) has been chosen as the appropriate model in this single country trade analysis and the results of the LS method for estimations has been used to comment on the bilateral trade patterns of the GCC countries.

One interesting conclusion is that, in the countries those are among the top ten world oil exporters, Saudi Arabia, Kuwait and the UAE, the coefficient of the per capita income of the trade partner is quite low, which implies that the commodities these countries export have a rather inelastic demand and not very prone to the income fluctuations in the importing country.

Another striking finding has been seen regarding the distance variable. Contrary to the common trend of trade, where distance has a negative relationship with trade, the coefficient of the distance variable has generally been positive, which implies that as the trade partner is farther; the GCC countries tend to trade more with them. This is again due to the characteristics of the main commodities of trade and also the geographical situation of the GCC countries. The GCC is surrounded by either relatively low-income countries or countries that have oil reserves and do not import oil or gas from the GCC countries. The GCC countries mainly exports commodities to relatively wealthy countries like Japan, South Korea, and the US, where the distance and the transportation costs do not really matter. On the import side, the GCC imports high-tech commodities like machinery and mechanical appliances, vehicles, electrical machinery and equipment, which are not produced in neighbouring

countries, but imported from the developed countries, such as the US, Japan, EU, S. Korea, as well as from the developing countries, namely China, India, Thailand.

Consequently, the answer to the research question is that the composition of trade flows for each GCC countries between their partners have changed over time and they have developed new economic relations after 2001.

References

Antonucchi, D., Manzocchi, S., 2006, "Does Turkey Have A Special Trade Relation with The EU? A Gravity Model Approach", Economic Systems 30, 157-169.

Benedictis, L. D., Vicarelli, C., 2004, "Trade Potentials In Gravity Panel Data Models", University of Macerata, Italy.

Boughanmi, H., 2008, "The trade Potential of the Arab Gulf Cooperation Countries (GCC): A Gravity Model Approach", Journal of Economic Integration, 23(1), 42-56.

Bun, M.J.G., Klaassen, F.J.G.M., 2002, "The Importance of Dynamics in Panel Gravity Models of Trade", University of Amsterdam, Netherlands.

Egger, P., 2000, "A Note on the Proper Econometric Specification of the Gravity Equation", Economic Letters, 66, 25-31.

Egger, P., PfaffermayrM., 2002, "Long Run and Short Run Effects in Static Panel Models", University of Innsbruck, Austria.

Harris, M.N., Matyas, L., 1998,"The Econometrics of Gravity Models", Melbourne Institute Working Paper, 5/98, Australia.

Hylleberg, S. and Mizon, E. G., 1989, "Cointegration and Error Correction Mechanism", The Economic Journal, Vol.99, pp.113-125.

Ramos, L.M., Zarzoso, I. M., 2005, "Does Heterogeneity matter in the Context of the Gravity Model?", Economic Bulletin, vol.6, 10, 1-7.

Sturm, M., J. Strasky, P. Adolf and D. Peschel, 2008, "The Gulf Cooperation Council countries: Economic Structures, Recent Developments and Role in the Global Economy", European Central Bank Occasional Paper Series, No. 92, Frankfurt.

Zarzoso, I M. and Lehman, F. N., 2003, "Augmented Gravity Model: An Empirical Application to Mercosur-European Union Trade Flows", Journal of Applied Economics, vol.6, no.2, 291-316.

Australian Department of Foreign Affairs and Trade, 2005, "More than oil: Economic developments in Bahrain, Kuwait, Oman, Qatar and the UAE", Canberra BP (2007).

Statistical Review of World Energy, London IMF, 2007, Regional Economic Outlook, Middle East and Central Asia, Washington, D.C.

APPENDIX

Table.1: Variables Panel Unit Root Tests									
Exogenous variable:		individual fixed effects				individual fixed & trend effects			
Country		1997-2006		2001-2006		1997-2006		2001-2006	
	Test Statistic	LLC	IPS	LLC	IPS	LLC	IPS	LLC	IPS
Bahrain	LTRADE	U	U	U	U	☺	U	☺	U
	$LPCAPINCOME_{BAHR}$	U	U	U	U	U	U	☺	U
	$LPCAPINCOME_{PARTN}$	U	U	☺	U	☺	U	☺	☺
Kuwait	LTRADE	U	U	☺	U	☺	U	☺	U
	$LPCAPINCOME_{BAHR}$	U	U	U	U	☺	☺	☺	☺
	$LPCAPINCOME_{PARTN}$	U	U	☺	U	☺	U	☺	☺
Oman	LTRADE	U	U	☺	U	☺	U	☺	U
	$LPCAPINCOME_{KUW}$	U	U	U	U	☺	U	☺	U
	$LPCAPINCOME_{PARTN}$	U	U	☺	U	☺	U	☺	☺
Qatar	LTRADE	U	U	U	U	☺	U	☺	U
	$LPCAPINCOME_{OMA}$	U	U	U	U	☺	☺	☺	U
	$LPCAPINCOME_{PARTN}$	U	U	☺	U	☺	U	☺	U
Saudi Arabia	LTRADE	U	U	☺	U	☺	U	☺	U
	$LPCAPINCOME_{SAU}$	U	U	U	U	☺	U	☺	U
	$LPCAPINCOME_{PARTN}$	U	U	☺	U	U	U	☺	☺
UAE	LTRADE	U	U	U	U	☺	U	☺	U
	$LPCAPINCOME_{UAE}$	U	U	U	U	☺	U	U	U
	$LPCAPINCOME_{PARTN}$	U	U	☺	U	☺	U	☺	☺

Levin, Lin & Chu t test (LLC): H_0: Common unit root, Im, Pesaran & Shin W-stat (IPS): H_0: Individual unit root. ☺: no unit root, U: unit root

Table.2: Static Income Effect Model _BAHREYN

$$LTRADE\_GCC_{it}=\beta_0+\beta_1 LPCAPINC\_GCC_{it}+\beta_2 LPCAPINC\_PARTN_{jt}+u_t$$

Dependent variable: LTRADE_**BAHR**$_t$ Coef.		Panel FEM LS 1997-2006	Panel FEM LS 2001-2006	Panel REM LS 1997-2006
Intercept	β_0	1.6159 (0.021)	1.9670 (0.000)	0.0449 (0.970)
LPCAPINC_**BAHR**$_t$	β_1	0.7938 (0.000)	1.0209 (0.000)	1.1120 (0.000)
LPCAPINC_PARTN$_t$	β_2	0.9218 (0.000)	0.6476 (0.000)	0.7624 (0.000)
Adjusted R^2		0.955	0.971	0.293
RSS		120.773	51.282	141.409
SER		0.509	0.446	0.523
Fixed effect - F test		194.58 (0.00)	194.29 (0.00)	-
Random effect –H χ^2 test		-	-	14.414 (0.001)
No of observations		**520**	**312**	**520**

Table.3: Static Income Effect Model _KUWAIT

$$LTRADE\_GCC_{it}=\beta_0+\beta_1 LPCAPINC\_GCC_{it}+\beta_2 LPCAPINC\_PARTN_{jt}+u_t$$

Dependent variable: LTRADE_ **KUW** $_t$ Coef.		Panel FEM LS 1997-2006	Panel FEM LS 2001-2006	Panel REM LS 1997-2006
Intercept	β_0	4.0507 (0.000)	5.5494 (0.000)	3.0449 (0.006)
LPCAPINC_ **KUW** $_t$	β_1	1.1753 (0.000)	1.2010 (0.000)	1.3202 (0.000)
LPCAPINC_P**ART**$_t$	β_2	0.3202 (0.000)	0.1339 (0.331)	0.2623 (0.036)
Adjusted R^2		0.987	0.987	0.283
RSS		136.10	64.89	152.937
SER		0.542	0.502	0.545
Fixed effect - F test		569.74 (0.00)	390.83 (0.00)	-
Random effect –H χ^2 test		-	-	0.0594 (0.971)
No of observations		**520**	**312**	**517**

Table.4: Static Income Effect Model _OMAN

$$LTRADE\_GCC_{it}=\beta_0+\beta_1 LPCAPINC\_GCC_{it}+\beta_2 LPCAPINC\_PARTN_{jt}+u_t$$

Dependent variable: LTRADE_**OMA**$_t$ Coef.		Panel FEM LS 1997-2006	Panel FEM LS 2001-2006	Panel REM LS 1997-2006
Intercept	β_0	*0.8303 (0.478)*	4.2118 (0.000)	-0.9225 (0.529)
LPCAPINC_**OMA**$_t$	β_1	0.8796 (0.000)	0.7750 (0.000)	1.1506 (0.000)
LPCAPINC_PARTN$_t$	β_2	0.9598 (0.000)	0.7026 (0.000)	0.8807 (0.000)
Adjusted R^2		0.979	0.987	0.241
RSS		186.618	80.488	214.357
SER		0.633	0.558	0.644
Fixed effect - F test		459.23 (0.00)	461.96 (0.00)	-
Random effect –H χ^2 test		-	-	6.9934(0.030)
No of observations		**520**	**312**	**520**

Probability values are given in parentheses and compared with the 5% significance level.
Bold italic numbers are insignificant.

Table.5: Static Income Effect Model _QATAR

$LTRADE\_GCC_{it}=\beta_0+\beta_1 LPCAPINC\_GCC_{it}+\beta_2 LPCAPINC\_PARTN_{jt}+u_t$

Dependent variable: $LTRADE\_QAT_t$ Coef.		Panel FEM LS 1997-2006	Panel FEM LS 2001-2006	Panel REM LS 1997-2006
Intercept	β_0	-9.8651 (0.000)	-11.1517 (0.00)	-10.6264 (0.000)
$LPCAPINC\_QAT_t$	β_1	1.5418 (0.000)	1.7238 (0.000)	1.7324 (0.000)
$LPCAPINC\_PARTN_t$	β_2	1.2849 (0.000)	1.2227 (0.000)	1.1496 (0.000)
Adjusted R^2		0.9689	0.991	0.469
RSS		181.11	63.919	214.297
SER		0.628	0.498	0.648
Fixed effect - F test		247.27 (0.00)	402.96 (0.00)	-
Random effect –H χ^2 test		-	-	21.537 (0.000)
No of observations		**512**	**311**	**513**

Table.6: Static Income Effect Model_SAUDI ARABIA

$LTRADE\_GCC_{it}=\beta_0+\beta_1 LPCAPINC\_GCC_{it}+\beta_2 LPCAPINC\_PARTN_{jt}+u_t$

Dependent variable: $LTRADE\_SAU_t$ Coef.		Panel FEM LS 1997-2006	Panel FEM LS 2001-2006	Panel REM LS 1997-2006
Intercept	β_0	5.2530 (0.000)	8.3517 (0.000)	5.1522 (0.001)
$LPCAPINC\_SAU_t$	β_1	1.4063 (0.000)	1.2041 (0.000)	1.4118 (0.000)
$LPCAPINC\_PARTN_t$	β_2	0.2240 (0.000)	0.0639 (0.016)	0.2193 (0.000)
Adjusted R^2		0.989	0.993	0.432
RSS		57.649	23.324	64.401
SER		0.353	0.301	0.354
Fixed effect - F test		-	-	-
Random effect –H χ^2 test		705.65 (0.00)	794.805(0.00)	0.258 (0.968)
No of observations		**517**	**312**	**517**

Table.7: Static Income Effect Model _UNITED ARAB EMIRATES

$LTRADE\_GCC_{it}=\beta_0+\beta_1 LPCAPINC\_GCC_{it}+\beta_2 LPCAPINC\_PARTN_{jt}+u_t$

Dependent variable: $LTRADE\_UAE_t$ Coef.		Panel FEM LS 1997-2006	Panel FEM LS 2001-2006	Panel REM LS 1997-2006
Intercept	β_0	7.8706 (0.000)	5.2439 (0.000)	8.5787 (0.000)
$LPCAPINC\_UAE_t$	β_1	0.8728 (0.000)	1.0735 (0.000)	0.7932 (0.000)
$LPCAPINC\_PARTN_t$	β_2	0.3175 (0.000)	0.4192 (0.000)	0.3272 (0.000)
Adjusted R^2		0.984	0.991	0.616
RSS		53.351	22.872	59.372
SER		0.342	0.295	0.341
Fixed effect - F test		569.37 (0.00)	567.84 (0.00)	-
Random effect –H χ^2 test		-	-	1.992 (0.574)
No of observations		**516**	**312**	**516**

Probability values are given in parentheses and compared with the 5% significance level.
Bold italic numbers are insignificant.

Table.8: Correlation Coefficients						
Country	**I**	**II**	**III**	**IV**	**V**	**∑ country effect**
Bahrain						
1997-2006	0.0815	0.0149	0.000	-0.4655	0.000	0.000
2001-2006	0.0272	0.0056	0.000	-0.3192	0.000	0.000
Kuwait						
1997-2006	0.0511	0.0027	0.0016	**-0.0386**	0.000	**0.152**
2001-2006	0.0165	-0.0071	0.0000	**0.0703**	0.000	0.000
Oman						
1997-2006	0.0697	0.0126	0.0000	-0.3183	0.000	0.000
2001-2006	0.0433	0.0097	0.0000	-0.2035	0.000	0.000
Qatar						
1997-2006	0.0547	0.0161	0.0081	-0.5026	0.000	**-0.894**
2001-2006	0.0370	0.0078	-0.0017	-0.5114	0.000	**-0.167**
Saudi Arabia						
1997-2006	0.0392	0.0047	0.0002	**-0.0417**	0.000	**0.075**
2001-2006	0.0716	0.0081	0.0000	**0.0103**	0.000	0.000
UAE						
1997-2006	-0.0022	0.0032	0.0004	-0.1307	0.000	**0.137**
2001-2006	0.0135	0.0047	0.0000	-0.2262	0.000	0.000

I: Corr(local country income, FEM_static residual); II: Corr(target country income, FEM_static residual); III: Corr(local country income, country effect); IV: Corr(target country income, country effect); V: Corr(country effect, FEM_static residual). Sum of country effect (obtained from static FEM) is expected to be zero. This is not valid for KUW, QAT and SAU for the whole period, but sum of country effect (obtained from REM) is zero.

Table.9: Residual Panel Unit Root Tests					
Exogenous variable		**individual effects**			
Country		**1997-2006**		**2001-2006**	
	Test Statistic	**LLC**	**IPS**	**LLC**	**IPS**
Bahrain	Static-FEM	☺	☺	☺	☺
	Static_SYSTEM	☺	☺	☺	☺
Kuwait	Static-FEM	☺	☺	☺	☺
	Static_SYSTEM	☺	☺	☺	☺
Oman	Static-FEM	☺	☺	☺	☺
	Static_SYSTEM	☺	☺	☺	☺
Qatar	Static-FEM	☺	☺	☺	☺
	Static_SYSTEM	☺	U	☺	☺
Saudi Arabia	Static-FEM	☺	☺	☺	☺
	Static_SYSTEM	☺	U	☺	☺
UAE	Static-FEM	☺	U	☺	U
	Static_SYSTEM	☺	☺	☺	☺

LLC: H_0: Common unit root, IPS: H_0: Individual unit root. ☺: no unit root, U: unit root

Table.10: Static Gravity Model_ BAHRAIN

$$LTRADE\_GCC_{it} = \theta_0 (COUNTRY\ EFFECT)_i + \theta_1 LPCAPINC\_GCC_{it} + \theta_2 LPCAPINC\_PARTN_{jt} + u_t$$
$$COUNTRY\ EFFECT_i = \theta_3 + \theta_4 LDISTANCE_i + \theta_5 EU15DUM_i + \theta_6 GCCDUM + \varepsilon_t$$

Dependent variable: LTRADE_BAHR$_t$	**Coeff.**	**1997-2006**			**2001-2006**		
		LS	**GMM**	**TSWLS**	**LS**	**GMM**	**TSWLS**
COUNTRY EFFECT	θ_0	**1.0011 (0.000)**	1.0161 (0.000)	1.0000 (0.000)	**1.0003 (0.000)**	0.9997 (0.000)	0.9996 (0.000)
LPCAPINC_BAHR$_t$	θ_1	**0.9621 (0.000)**	0.9526 (0.000)	0.9651 (0.000)	**1.2260 (0.000)**	1.2313 (0.000)	1.2285 (0.000)
LPCAPINC_PARTN$_t$	θ_2	**0.9250 (0.000)**	0.9345 (0.000)	0.9218 (0.000)	**0.6488 (0.000)**	0.6432 (0.000)	0.6461 (0.000)
Dependent variable: COUNTRY EFFECT							
Intercept	θ_3	*1.9558 (0.396)*	*-2.0509 (0.411)*	*1.9558 (0.395)*	*-1.0425 (0.701)*	*-4.7924 (0.107)*	**-1.0425 (0.699)**
LDISTANCE	θ_4	*-0.1144 (0.443)*	*0.1449 (0.362)*	*-0.1143 (0.441)*	*0.0689 (0.694)*	*0.3151 (0.098)*	**0.0689 (0.692)**
EU15DUM	θ_5	**-0.9781 (0.000)**	-0.9642 (0.000)	-0.9781 (0.000)	**-0.4879 (0.023)**	-0.5387 (0.003)	-0.4879 (0.023)
GCCDUM	θ_6	*0.4535 (0.336)*	*0.9963 (0.037)*	*0.4534 (0.334)*	**1.3229 (0.017)**	1.7587 (0.002)	1.3229 (0.017)
Adjusted R^2		0.924	0.924	0.924	0.942	0.942	0.942
SER		0.491	0.492	0.491	0.409	0.410	0.410
RSS		124.825	125.154	124.832	51.811	51.827	51.814
Adjusted R^2		0.067	0.067	0.073	0.068	0.061	0.068
RSS		1668.638	1679.25	1668.64	825.392	832.01	825.39
No of observations		**520**	**520**	**520**	**312**	**312**	**312**

Probability values are given in parentheses and compared with the 5% significance level. Bold italic numbers are insignificant.

Table.11: Static Gravity Model _ KUWAIT

$$LTRADE\_GCC_{it} = \theta_0 (COUNTRY\ EFFECT)_i + \theta_1 LPCAPINC\_GCC_{it} + \theta_2 LPCAPINC\_PARTN_{jt} + u_t$$

$$COUNTRY\ EFFECT_i = \theta_3 + \theta_4 LDISTANCE_i + \theta_5 EU15DUM_i + \theta_6 GCCDUM + \varepsilon_t$$

Dependent variable: LTRADE_ **KUW** $_t$	**Coeff.**	**1997-2006**			**2001-2006**		
		LS	**GMM**	**TSWLS**	**LS**	**GMM**	**TSWLS**
COUNTRY EFFECT	θ_0	**1.0000 (0.000)**	1.0000 (0.000)	0.9998 (0.000)	**0.9999 (0.000)**	1.0055 (0.000)	1.0002 (0.000)
LPCAPINC_ **KUW** $_t$	θ_1	**1.5887 (0.000)**	1.5967 (0.000)	1.5968 (0.000)	**1.7645 (0.000)**	1.7683 (0.000)	1.7675 (0.000)
LPCAPINC_PARTN$_t$	θ_2	**0.3233 (0.000)**	0.3151 (0.000)	0.3147 (0.000)	**0.1343 (0.000)**	0.1310 (0.000)	0.1311 (0.000)
Dependent variable: COUNTRY EFFECT							
Intercept	θ_3	**-6.6688 (0.002)**	-7.4472 (0.000)	-6.6924 (0.002)	**-8.3078 (0.002)**	-7.6904 (0.004)	-8.3079 (0.002)
LDISTANCE	θ_4	**0.4290 (0.002)**	0.4493 (0.002)	0.4302 (0.002)	**0.5307 (0.002)**	0.4618 (0.008)	0.5307 (0.002)
EU15DUM	θ_5	*0.2010 (0.269)*	0.5671 (0.000)	*0.2056 (0.259)*	**0.4506 (0.046)**	0.7796 (0.000)	0.4506 (0.044)
GCCDUM	θ_6	**1.1203 (0.004)**	1.5785 (0.000)	*1.1272 (0.004)*	**1.3843 (0.004)**	1.7102 (0.000)	1.3843 (0.004)
Adjusted R^2		0.927	0.927	0.927	0.930	0.930	0.930
SER		0.523	0.524	0.525	0.487	0.487	0.487
RSS		140.852	140.894	140.894	73.284	73.334	73.290
Adjusted R^2		0.020	0.022	0.019	0.038	0.004	0.038
RSS		1640.76	1710.89	1640.20	904.436	945.017	904.436
No of observations		**520**	**515**	**515**	**312**	**312**	**312**

Probability values are given in parentheses and compared with the 5% significance level. Bold italic numbers are insignificant.

Table.13: Static Gravity Model_OMAN

$$LTRADE\_GCC_{it} = \theta_0 (COUNTRY\ EFFECT)_i + \theta_1 LPCAPINC\_GCC_{it} + \theta_2 LPCAPINC\_PARTN_{jt} + u_t$$

$$COUNTRY\ EFFECT_i = \theta_3 + \theta_4 LDISTANCE_i + \theta_5 EU15DUM_i + \theta_6 GCCDUM + \varepsilon_t$$

Dependent variable: LTRADE_OMA$_t$	**Coeff.**	**1997-2006**			**2001-2006**		
		LS	**GMM**	**TSWLS**	**LS**	**GMM**	**TSWLS**
							1.0001 (0.000)
COUNTRY EFFECT	θ_0	**1.0004 (0.000)**	0.9983 (0.000)	1.0000 (0.000)	**1.0004 (0.000)**	1.0002 (0.000)	
LPCAPINC_ **OMA$_t$**	θ_1	**0.9687 (0.000)**	0.9911 (0.000)	0.9713 (0.000)	**1.2302 (0.000)**	1.2212 (0.000)	1.2275 (0.000)
LPCAPINC_PARTN$_t$	θ_2	**0.9620 (0.000)**	0.9411 (0.000)	0.9596 (0.000)	**0.7056 (0.000)**	0.7141 (0.000)	0.7083 (0.000)
Dependent variable: COUNTRY EFFECT							
Intercept	θ_3	**7.4741 (0.015)**	*4.3557 (0.127)*	7.4417 (0.016)	*2.9708 (0.428)*	*0.1563 (0.964)*	**2.9708 (0.425)**
LDISTANCE	θ_4	**-0.4673 (0.018)**	*-0.3019 (0.095)*	-0.4653 (0.019)	*-0.1843 (0.445)*	*-0.0460 0.833)*	**-0.1843 (0.442)**
EU15DUM	θ_5	**-0.9781 (0.000)**	-0.4099 (0.000)	-1.0030 (0.000)	**-0.6566 (0.011)**	*0.0501 (0.803)*	-0.6567 (0.011)
GCCDUM	θ_6	**-1.0039 (0.000)**	*0.3179 (0.477)*	*-0.3986 (0.415)*	*0.3212 (0.591)*	1.0483 (0.050)	*0.3212 (0.589)*
Adjusted R^2		0.925	0.925	0.925	0.940	0.940	0.939
SER		0.609	0.611	0.610	0.521	0.521	0.521
RSS		191.957	192.404	191.933	83.721	83.771	83.725
Adjusted R^2		0.055	0.012	0.078	0.028	0.034	0.038
RSS		2258.528	2361.619	1668.64	1206.775	1297.760	1206.775
No of observations		**520**	**519**	**519**	**312**	**312**	**312**

Probability values are given in parentheses and compared with the 5% significance level. Bold italic numbers are insignificant.

Table.14: Static Gravity Model_QATAR

$$LTRADE\_GCC_{it} = \theta_0\,(COUNTRY\ EFFECT)_i + \theta_1 LPCAPINC\_GCC_{it} + \theta_2 LPCAPINC\_PARTN_{jt} + u_t$$

$$COUNTRY\ EFFECT_i = \theta_3 + \theta_4 LDISTANCE_i + \theta_5 EU15DUM_i + \theta_6 GCCDUM + \varepsilon_t$$

Dependent variable: $LTRADE\_QAT_t$	**Coeff.**	**1997-2006**			**2001-2006**		
		LS	**GMM**	**TSWLS**	**LS**	**GMM**	**TSWLS**
COUNTRY EFFECT	θ_0	**0.9948 (0.000)**	0.9777 (0.000)	0.9969 (0.000)	**0.9993 (0.000)**	0.9799 (0.000)	0.9988 (0.000)
$LPCAPINC\_QAT_t$	θ_1	**0.5947 (0.000)**	0.6246 (0.000)	0.5902 (0.000)	**0.6549 (0.000)**	0.6714 (0.000)	0.6553 (0.000)
$LPCAPINC\_PARTN_t$	θ_2	**1.2696 (0.000)**	1.2371 (0.000)	1.2744 (0.000)	**1.2209 (0.000)**	1.2024 (0.000)	1.2207 (0.000)
Dependent variable: COUNTRY EFFECT							
Intercept	θ_3	*2.9541 (0.318)*	*4.1388 (0.143)*	*4.7753 (0.111)*	*1.9063 (0.608)*	*-1.6209 (0.654)*	**1.9413 (0.599)**
LDISTANCE	θ_4	*-0.1678 (0.379)*	*-0.2487 (0.165)*	*-0.2818 (0.145)*	*-0.0995 (0.679)*	*0.1103 (0.631)*	**-0.1013 (0.671)**
EU15DUM	θ_5	**-1.5034 (0.000)**	-1.4999 (0.000)	-1.5734 (0.000)	**-1.4336 (0.000)**	-1.2295 (0.000)	-1.4408 (0.000)
GCCDUM	θ_6	*-0.1783 (0.768)*	*-0.9963 (0.037)*	*-0.5664 (0.354)*	*-0.1161 (0.879)*	*0.6363 (0.370)*	*-0.1278 (0.866)*
Adjusted R^2		0.912	0.912	0.912	0.942	0.942	0.942
SER		0.666	0.670	0.668	0.511	0.511	0.509
RSS		226.206	226.386	225.150	80.165	80.040	79.656
Adjusted R^2		0.079	0.084	0.086	0.071	0.058	0.072
RSS		2612.776	2539.42	2533.69		1500.224	1479.388
No of observations		**520**	**511**	**511**	**312**	**311**	**311**

Probability values are given in parentheses and compared with the 5% significance level. Bold italic numbers are insignificant.

Table.15: Static Gravity Model_SAUDI ARABIA

$$LTRADE\_GCC_{it} = \theta_0 (COUNTRY\ EFFECT)_i + \theta_1 LPCAPINC\_GCC_{it} + \theta_2 LPCAPINC\_PARTN_{jt} + u_t$$

$$COUNTRY\ EFFECT_i = \theta_3 + \theta_4 LDISTANCE_i + \theta_5 EU15DUM_i + \theta_6 GCCDUM + \varepsilon_t$$

Dependent variable: LTRADE_SAU$_t$	Coeff.	1997-2006 LS	1997-2006 GMM	1997-2006 TSWLS	2001-2006 LS	2001-2006 GMM	2001-2006 TSWLS
COUNTRY EFFECT	θ_0	**1.0000 (0.000)**	0.9999 (0.000)	1.0000 (0.000)	**0.9999 (0.000)**	0.9976 (0.000)	1.0000 (0.000)
LPCAPINC_SAU$_t$	θ_1	**2.0128 (0.000)**	2.0178 (0.000)	2.0159 (0.000)	**2.1165 (0.000)**	2.1173 (0.000)	2.1176 (0.000)
LPCAPINC_PARTN$_t$	θ_2	**0.2135 (0.000)**	0.2092 (0.000)	0.2104 (0.000)	**0.1187 (0.000)**	0.1116 (0.000)	0.1107 (0.000)
Dependent variable: COUNTRY EFFECT							
Intercept	θ_3	**-9.3996 (0.000)**	-4.4838 (0.041)	-9.5557 (0.000)	**-10.2096 (0.000)**	*-4.3313 (0.125)*	-10.0425 (0.000)
LDISTANCE	θ_4	**0.6012 (0.000)**	0.2884 (0.042)	0.6111 (0.000)	**0.6505 (0.000)**	*0.2782 (0.129)*	0.6505 (0.000)
EU15DUM	θ_5	**0.4630 (0.003)**	0.3647 (0.007)	0.4680 (0.003)	**0.5986 (0.003)**	0.4736 (0.005)	0.5986 (0.003)
GCCDUM	θ_6	**1.3431 (0.000)**	*0.5849 (0.077)*	1.3438 (0.000)	**1.5708 (0.000)**	*0.6706 (0.113)*	1.5708 (0.000)
Adjusted R^2		0.956	0.957	0.957	0.969	0.969	0.969
SER		0.342	0.343	0.343	0.286	0.286	0.286
RSS		60.221	59.858	59.828	25.229	25.245	25.230
Adjusted R^2		0.047	0.034	0.048	0.058	0.038	0.059
RSS		1183.843	1198.160	1180.864	705.406	720.755	705.407
No of observations		**520**	**516**	**516**	**312**	**312**	**312**

Probability values are given in parentheses and compared with the 5% significance level. Bold italic numbers are insignificant.

Table.16: Static Gravity Model_UNITED ARAB EMIRATES

$$LTRADE\_GCC_{it} = \theta_0\,(COUNTRY\ EFFECT)_i + \theta_1 LPCAPINC\_GCC_{it} + \theta_2 LPCAPINC\_PARTN_{jt} + u_t$$
$$COUNTRY\ EFFECT_i = \theta_3 + \theta_4 LDISTANCE_i + \theta_5 EU15DUM_i + \theta_6 GCCDUM + \varepsilon_t$$

Dependent variable: $LTRADE\_UAE_t$	Coeff.	1997-2006 LS	1997-2006 GMM	1997-2006 TSWLS	2001-2006 LS	2001-2006 GMM	2001-2006 TSWLS
COUNTRY EFFECT	θ_0	**1.0005 (0.000)**	0.9963 (0.000)	1.0000 (0.000)	**1.0000 (0.000)**	0.9983 (0.000)	1.0003 (0.000)
$LPCAPINC\_UAE_t$	θ_1	**1.7183 (0.000)**	1.7263 (0.000)	1.7208 (0.000)	**1.6401 (0.000)**	1.6407 (0.000)	1.6397 (0.000)
$LPCAPINC\_PARTN_t$	θ_2	**0.3184 (0.000)**	0.3111 (0.000)	0.3158 (0.000)	**0.4202 (0.000)**	0.4202 (0.000)	0.4206 (0.000)
Dependent variable: COUNTRY EFFECT							
Intercept	θ_3	*1.0887 (0.613)*	*-1.7714 (0.419)*	*1.3033 (0.547)*	*2.9959 (0.287)*	*-1.0061 (0.729)*	**2.9959 (0.284)**
LDISTANCE	θ_4	*-0.0697 (0.616)*	*0.0997 (0.479)*	*-0.0834 (0.551)*	*-0.1885 (0.298)*	*0.0535 (0.773)*	**-0.1885 (0.295)**
EU15DUM	θ_5	*-0.2307 (0.133)*	*0.0339 (0.812)*	*-0.2339 (0.128)*	**-0.4369 (0.029)**	*-0.1200 (0.519)*	-0.4369 (0.028)
GCCDUM	θ_6	*0.4028 (0.313)*	1.0398 (0.005)	*0.3898 (0.336)*	*-0.0358 (0.945)*	*0.7345 (0.142)*	*0.0358 (0.945)*
Adjusted R^2		0.950	0.949	0.950	0.971	0.971	0.971
SER		0.365	0.366	0.366	0.271	0.271	0.271
RSS		68.349	68.271	68.128	22.744	22.758	22.744
Adjusted R^2		0.013	0.004	0.013	0.018	0.047	0.018
RSS		1189.622	1209.15	1186.88	725.271	742.172	725.271
No of observations		**520**	**515**	515	**312**	**312**	**312**

Probability values are given in parentheses and compared with the 5% significance level. Bold italic numbers are insignificant.

Table.17: Dynamic Gravity Model_BAHRAIN

$$LTRADE\_GCC_{it} = \gamma_0\ (COUNTRY\ EFFECT) + \gamma_1 LPCAPINC\_GCC_{it} + \gamma_2 LPCAPINC\_PARTN_t + \gamma_3 LPCAPINC\_GCC_{it-1} + \gamma_4 LPCAPINC\_PARTN_{t-1} + \gamma_5 LTRADE\_GCC_{it-1} + u_t$$

$$COUNTRY\ EFFECT_i = \gamma_6 + \alpha_7 LDISTANCE_i + \gamma_8\ EU15DUM_i + \gamma_9 GCCDUM_i + \omega_t$$

Dependent variable: $LTRADE\_BAHR_t$	**Coeff.**	**1997-2006**			**2001-2006**		
		LS	**GMM**	**TSWLS**	**LS**	**GMM**	**TSWLS**
COUNTRY EFFECT	γ_0	0.6818 (0.000)	0.5392 (0.024)	0.4100 (0.004)	0.8095 (0.000)	0.8506 (0.001)	0.8025 (0.000)
$LPCAPINC\_BAHR_t$	γ_1	*0.5298 (0.684)*	*0.4790 (0.736)*	*0.8004 (0.577)*	*0.3998 (0.285)*	*0.5409 (0.383)*	1.1491 (0.056)
$LPCAPINC\_PARTN_t$	γ_2	1.2230 (0.000)	*1.1298 (0.381)*	*1.3048 (0.335)*	1.0149 (0.000)	*0.7158 (0.654)*	*0.7242 (0.677)*
$LPCAPINC\_BAHR_{t-1}$	γ_3	*0.1332 (0.649)*	*0.0466 (0.974)*	*-0.3972 (0.783)*	*0.5957 (0.119)*	*0.5129 (0.465)*	*-0.1595 (0.814)*
$LPCAPINC\_PARTN_{t-1}$	γ_4	-0.5961 (0.001)	*-0.6381 (0.620)*	*-0.9296 (0.483)*	*-0.4907 (0.033)*	*-0.1667 (0.919)*	*-0.2054 (0.910)*
$LTRADE\_BAHR_{t-1}$	γ_5	0.3178 (0.000)	0.4626 (0.046)	0.5884 (0.000)	0.1916 (0.000)	*0.1474 (0.581)*	*0.1954 (0.395)*
Dependent variable: COUNTRY EFFECT							
Intercept	γ_6	*1.9558 (0.396)*	**-1.0792 (0.669)**	*1.9558 (0.395)*	*-1.0425 (0.701)*	*-4.7552 (0.113)*	*-1.0425 (0.699)*
LDISTANCE	γ_7	*-0.1144 (0.443)*	**0.0844 (0.599)**	*-0.1143 (0.441)*	*0.0689 (0.694)*	*0.3127 (0.103)*	*0.0689 (0.692)*
EU15DUM	γ_8	-0.9781 (0.000)	-1.0681 (0.000)	-0.9781 (0.000)	-0.4879 (0.023)	-0.5867 (0.002)	-0.4879 (0.023)
GCCDUM	γ_9	*0.4535 (0.336)*	*0.7420 (0.128)*	*0.4534 (0.334)*	1.3229 (0.017)	1.6575 (0.005)	1.3229 (0.017)
Adjusted R^2		0.932	0.930	0.926	0.945	0.944	0.944
SER		0.512	0.539	0.568	0.465	0.468	0.467
RSS		111.297	113.915	121.131	48.766	49.142	49.455
Adjusted R^2		0.078	0.072	0.078	0.068	0.059	0.068
RSS		1668.638	1679.25	1668.64	825.392	833.41	825.39
No of observations			**520**			**312**	

Probability values are given in parentheses and compared with the 5% significance level. Bold italic numbers are insignificant.

Table.18: Dynamic Gravity Model _ KUWAIT

$$LTRADE\_GCC_{it} = \gamma_0\ (COUNTRY\ EFFECT) + \gamma_1 LPCAPINC\_GCC_{it} + \gamma_2 LPCAPINC\_PARTN_t + \gamma_3 LPCAPINC\_GCC_{it-1} + \gamma_4 LPCAPINC\_PARTN_{t-1} + \gamma_5 LTRADE\_GCC_{it-1} + u_t$$

$$COUNTRY\ EFFECT_i = \gamma_6 + \alpha_7 LDISTANCE_i + \gamma_8\ EU15DUM_i + \gamma_9 GCCDUM_i + \omega_t$$

Dependent variable: $LTRADE\_KUW_t$	**Coeff.**	**1997-2006**			**2001-2006**		
		LS	**GMM**	**TSWLS**	**LS**	**GMM**	**TSWLS**
COUNTRY EFFECT	γ_0	0.6830 (0.000)	1.3390 (0.001)	1.0944 (0.004)	0.8636 (0.000)	1.0614 (0.013)	1.1871 (0.000)
LPCAPINC_ **KUW**$_t$	γ_1	1.0181 (0.000)	*4.7045 (0.052)*	*3.3923 (0.191)*	0.7254 (0.005)	*-1.1896 (0.155)*	*-0.7498 (0.276)*
$LPCAPINC\_PARTN_t$	γ_2	0.7298 (0.000)	*-0.5582 (0.779)*	*-0.2458(0.912)*	*0.3621 (0.173)*	*-0.5211 (0.851)*	*-0.2881 (0.931)*
LPCAPINC_ **KUW**$_{t-1}$	γ_3	*0.0718 (0.597)*	*-2.5695 (0.172)*	*-1.6435 (0.421)*	0.8107 (0.002)	3.0944 (0.023)	2.8669 (0.003)
$LPCAPINC\_PARTN_{t-1}$	γ_4	-0.5149 (0.007)	*0.9759 (0.612)*	*0.5878 (0.781)*	*-0.2518 (0.344)*	*0.6659 (0.808)*	*0.4516 (0.892)*
LTRADE_ **KUW**$_{t-1}$	γ_5	0.3182 (0.000)	*-0.3406 (0.389)*	*-0.0965 (0.804)*	0.1363 (0.018)	*-0.0648 (0.874)*	*-0.1876 (0.552)*
Dependent variable: COUNTRY EFFECT							
Intercept	γ_6	-6.6688 (0.002)	-6.8893 (0.002)	-6.5910 (0.003)	-8.3079 (0.002)	-7.4835 (0.005)	-8.3156 (0.002)
LDISTANCE	γ_7	0.4290 (0.002)	0.4135 (0.004)	0.4241 (0.003)	0.5307 (0.002)	0.4473 (0.011)	053139 (0.002)
EU15DUM	γ_8	*0.2010 (0.269)*	0.5549 (0.001)	*0.1982 (0.278)*	0.4507 (0.046)	0.7703 (0.000)	0.4504 (0.045)
GCCDUM	γ_9	1.1203 (0.004)	1.4866 (0.000)	1.1087 (0.005)	1.3843 (0.004)	1.6462 (0.000)	1.3850 (0.004)
Adjusted R^2		0.935	0.830	0.892	0.934	0.908	0.912
SER		0.494	0.799	0.639	0.673	0.559	0.545
RSS		124.474	323.005	206.391	68.566	95.513	90.852
Adjusted R^2		0.014	0.002	0.019	0.032	0.008	0.028
RSS		1640.758	1706.71	1636.14	904.436	948.43	904.436
No of observations		**520**	**514**	**514**	**312**	**311**	**311**

Probability values are given in parentheses and compared with the 5% significance level. Bold italic numbers are insignificant.

Table.19: Dynamic Gravity Model _ OMAN

$$LTRADE\_GCC_{it} = \gamma_0\ (COUNTRY\ EFFECT) + \gamma_1 LPCAPINC\_GCC_{it} + \gamma_2 LPCAPINC\_PARTN_t + \gamma_3 LPCAPINC\_GCC_{it-1} + \gamma_4 LPCAPINC\_PARTN_{t-1} + \gamma_5 LTRADE\_GCC_{it-1} + u_t$$

$$COUNTRY\ EFFECT_i = \gamma_6 + \alpha_7 LDISTANCE_i + \gamma_8\ EU15DUM_i + \gamma_9 GCCDUM_i + \omega_t$$

Dependent variable: $LTRADE\_OMA_t$	**Coeff.**	**1997-2006**			**2001-2006**		
		LS	**GMM**	**TSWLS**	**LS**	**GMM**	**TSWLS**
COUNTRY EFFECT	γ_0	0.4491 (0.000)	0.4614 (0.000)	0.5373 (0.000)	0.5939 (0.000)	0.6071 (0.006)	0.6743 (0.000)
$LPCAPINC\_OMA_t$	γ_1	*0.1502 (0.514)*	*-0.6552 (0.528)*	*-0.9089 (0.457)*	*0.4841 (0.155)*	*0.1719 (0.662)*	*0.4893 (0.223)*
$LPCAPINC\_PARTN_t$	γ_2	0.7595 (0.000)	*1.3330 (0.112)*	*2.7961 (0.064)*	*0.2012 (0.414)*	*-0.1869 (0.775)*	*0.1811 (0.769)*
$LPCAPINC\_OMA_{t-1}$	γ_3	*0.3234 (0.162)*	*1.1247 (0.283)*	*1.4398 (0.245)*	*0.2787 (0.416)*	*0.6150 (0.102)*	*0.3687 (0.368)*
$LPCAPINC\_PARTN_{t-1}$	γ_4	*-0.3359 (0.074)*	*-1.6836 (0.190)*	*-2.2819 (0.119)*	*0.2195 (0.372)*	*0.6204 (0.296)*	*0.2964 (0.623)*
$LTRADE\_OMA_{t-1}$	γ_5	0.5394 (0.000)	0.5346 (0.000)	0.4633 (0.000)	0.3941 (0.000)	*0.3772 (0.076)*	0.3155 (0.001)
Dependent variable: COUNTRY EFFECT							
Intercept	γ_6	7.4741 (0.015)	*3.5044 (0.221) -*	7.5268 (0.014)	*2.9708 (0.428)*	*-0.2118 (0.951)*	*-1.0425 (0.699)*
LDISTANCE	γ_7	-0.4673 (0.018)	*0.2474 (0.172)*	-0.4705 (0.017)	*-0.1843 (0.445)*	*-0.0205 (0.926)*	*0.0689 (0.692)*
EU15DUM	γ_8	-1.0039 (0.000)	-0.4172 (0.014)	-1.0085 (0.000)	-0.6566 (0.011)	*0.0345 (0.863)*	-0.4879 (0.023)
GCCDUM	γ_9	*-0.4032 (0.410)*	*0.4189 (0.351)*	*-0.4135 (0.398)*	*0.3212 (0.591)*	1.0608 (0.048)	1.3229 (0.017)
	Adjusted R^2	0.947	0.941	0.936	0.952	0.951	0.951
	SER	0.512	0.539	0.568	0.465	0.468	0.467
	RSS	134.306	148.358	164.673	66.105	67.099	66.762
	Adjusted R^2	0.055	0.010	0.056	0.028	0.029	0.028
	RSS	2258.528	2364.747	2255.508	1206.775	1291.218	1206.775
	No of observations	**520**	**518**	**518**	**312**	**312**	**312**

Probability values are given in parentheses and compared with the 5% significance level. Bold italic numbers are insignificant.

Table.20: Dynamic Gravity Model _QATAR

$$LTRADE\_GCC_{it} = \gamma_0\ (COUNTRY\ EFFECT) + \gamma_1 LPCAPINC\_GCC_{it} + \gamma_2 LPCAPINC\_PARTN_t + \gamma_3 LPCAPINC\_GCC_{it-1} + \gamma_4 LPCAPINC\_PARTN_{t-1} + \gamma_5 LTRADE\_GCC_{it-1} + u_t$$

$$COUNTRY\ EFFECT_i = \gamma_6 + \alpha_7 LDISTANCE_i + \gamma_8\ EU15DUM_i + \gamma_9 GCCDUM_i + \omega_t$$

Dependent variable: $LTRADE\_QAT_t$	**Coeff.**	**1997-2006**			**2001-2006**		
		LS	**GMM**	**TSWLS**	**LS**	**GMM**	**TSWLS**
COUNTRY EFFECT	γ_0	0.4976 (0.000)	0.6517 (0.000)	0.7315 (0.000)	0.7015 (0.000)	0.9134 (0.000)	1.0044 (0.000)
$LPCAPINC\_QAT_t$	γ_1	0.4958 (0.016)	-1.1716 (0.021)	-1.7857 (0.001)	2.5659 (0.000)	4.0563 (0.001)	5.0511 (0.001)
$LPCAPINC\_PARTN_t$	γ_2	1.6101 (0.000)	4.7629 (0.000)	6.2623 (0.000)	0.6422 (0.012)	*-1.0550 (0.289)*	*-1.6967 (0.170)*
$LPCAPINC\_QAT_{t-1}$	γ_3	*-0.1935 (0.353)*	1.5381 (0.003)	2.1413 (0.000)	-2.1022 (0.000)	-3.4495 (0.001)	-4.3640 (0.001)
$LPCAPINC\_PARTN_{t-1}$	γ_4	-0.9844 (0.000)	-3.9339 (0.000)	-5.3101 (0.000)	*0.2174 (0.411)*	*2.1795 (0.067)*	2.9203 (0.038)
$LTRADE\_QAT_{t-1}$	γ_5	0.5046 (0.000)	0.3665 (0.002)	0.3093 (0.005)	0.2899 (0.000)	*0.0693 (0.794)*	*-0.0303 (0.882)*
Dependent variable: COUNTRY EFFECT							
Intercept	γ_6	*2.9541 (0.318)*	*5.0123 (0.073)*	*5.4603 (0.068)*	*1.9063 (0.608)*	*0.4433 (0.902)*	*2.6776 (0.470)*
LDISTANCE	γ_7	*-0.1678 (0.379)*	*-0.3067 (0.084)*	*-0.3244 (0.093)*	*-0.0995 (0.609)*	*-0.0231 (0.919)*	*-0.1475 (0.537)*
EU15DUM	γ_8	-1.5035 (0.000)	-1.4998 (0.000)	-1.6048 (0.000)	-1.4336 (0.000)	-1.2279 (0.000)	-1.4674 (0.000)
GCCDUM	γ_9	*-0.1784 (0.768)*	*-0.5498 (0.316)*	*-0.7026 (0.250)*	*-0.1161 (0.879)*	*0.3111 (0.659)*	*-0.2692 (0.722)*
Adjusted R^2		0.938	0.905	0.870	0.955	0.946	0.937
SER		0.556	0.690	0.811	0.450	0.491	0.529
RSS		155.277	235.527	325.004	61.490	72.926	84.391
Adjusted R^2		0.079	0.087	0.091	0.071	0.062	0.074
RSS		2612.776	2511.394	2500.613	1481.295	1483.350	1462.961
No of observations		**520**	**509**	**509**	**312**	**310**	**310**

Probability values are given in parentheses and compared with the 5% significance level. Bold italic numbers are insignificant.

Table.21: Dynamic Gravity Model _SAUDI ARABIA

$$LTRADE\_GCC_{it} = \gamma_0\ (COUNTRY\ EFFECT) + \gamma_1 LPCAPINC\_GCC_{it} + \gamma_2 LPCAPINC\_PARTN_t + \gamma_3 LPCAPINC\_GCC_{it-1} + \gamma_4 LPCAPINC\_PARTN_{t-1} + \gamma_5 LTRADE\_GCC_{it-1} + u_t$$

$$COUNTRY\ EFFECT_i = \gamma_6 + \alpha_7 LDISTANCE_i + \gamma_8\ EU15DUM_i + \gamma_9 GCCDUM_i + \omega_t$$

Dependent variable: $LTRADE\_SAU_t$	**Coeff.**	**1997-2006**			**2001-2006**		
		LS	**GMM**	**TSWLS**	**LS**	**GMM**	**TSWLS**
COUNTRY EFFECT	γ_0	0.6053 (0.000)	*0.2493 (0.234)*	0.3320 (0.038)	0.8480 (0.000)	*0.1173 (0.779)*	*0.4193 (0.202)*
$LPCAPINC\_SAU_t$	γ_1	1.5580 (0.000)	*0.3162 (0.802)*	*0.3264 (0.829)*	1.7290 (0.000)	1.0727 (0.039)	1.0469 (0.044)
$LPCAPINC\_PARTN_t$	γ_2	0.4520 (0.000)	*1.1459 (0.423)*	*1.8212 (0.174)*	0.4626 (0.004)	*1.5178 (0.253)*	*1.8423 (0.192)*
$LPCAPINC\_SAU_{t-1}$	γ_3	-0.3376 (0.055)	*0.1770 (0.887)*	*0.3185 (0.818)*	*0.0610 (0.798)*	*-0.8360 (0.410)*	*-0.1973 (0.797)*
$LPCAPINC\_PARTN_{t-1}$	γ_4	-0.3319 (0.006)	*-1.1064 (0.437)*	*-1.7580 (0.189)*	-0.3725 (0.018)	*-1.5232 (0.244)*	*-1.8068 (0.193)*
$LTRADE\_SAU_{t-1}$	γ_5	0.3986 (0.000)	0.7632 (0.000)	0.6835 (0.000)	0.1563 (0.003)	0.8948 (0.032)	*0.6007 (0.065)*
Dependent variable: COUNTRY EFFECT							
Intercept	γ_6	-9.3996 (0.000)	-4.4838 (0.041)	*-9.5063 (0.395)*	-10.2096 (0.000)	*-4.8805 (0.087)*	-10.0425 (0.000)
LDISTANCE	γ_7	0.6012 (0.000)	0.2689 (0.058)	0.6081 (0.000)	0.6505 (0.000)	*0.3112 (0.092)*	0.6505 (0.000)
EU15DUM	γ_8	0.4630 (0.003)	0.3411 (0.011)	0.4641 (0.003)	0.5986 (0.003)	0.4994 (0.003)	0.5986 (0.003)
GCCDUM	γ_9	1.3431 (0.000)	*0.5166 (0.119)*	1.3342 (0.002)	1.5708 (0.001)	*0.7447 (0.081)*	1.5708 (0.001)
Adjusted R^2		0.964	0.954	0.951	0.970	0.944	0.954
SER		0.313	0.352	0.367	0.280	0.384	0.348
RSS		49.827	62.219	67.636	23.985	45.103	37.078
Adjusted R^2		0.047	0.032	0.047	0.059	0.043	0.059
RSS		1183.843	1198.997	1179.631	705.406	717.032	705.406
No of observations		**520**	**515**	**515**	**312**	**312**	**312**

Probability values are given in parentheses and compared with the 5% significance level. Bold italic numbers are insignificant.

Table.22: Dynamic Gravity Model_UNITED ARAB EMIRATES

$$LTRADE\_GCC_{it} = \gamma_0\ (COUNTRY\ EFFECT) + \gamma_1 LPCAPINC\_GCC_{it} + \gamma_2 LPCAPINC\_PARTN_t + \gamma_3 LPCAPINC\_GCC_{it-1} + \gamma_4 LPCAPINC\_PARTN_{t-1} + \gamma_5 LTRADE\_GCC_{it-1} + u_t$$

$$COUNTRY\ EFFECT_i = \gamma_6 + \alpha_7 LDISTANCE_i + \gamma_8\ EU15DUM_i + \gamma_9 GCCDUM_i + \omega_t$$

Dependent variable: $LTRADE\_UAE_t$	**Coeff.**	**1997-2006**			**2001-2006**		
		LS	**GMM**	**TSWLS**	**LS**	**GMM**	**TSWLS**
COUNTRY EFFECT	γ_0	0.4257 (0.000)	0.5948 (0.000)	0.5268 (0.000)	0.6972 (0.000)	0.6521 (0.003)	0.7531 (0.000)
$LPCAPINC\_UAE_t$	γ_1	1.0949 (0.000)	*1.1866 (0.143)*	*0.7835 (0.323)*	1.3760 (0.000)	*0.6939 (0.453)*	*1.3434 (0.139)*
$LPCAPINC\_PARTN_t$	γ_2	0.4283 (0.000)	*1.6716 (0.061)*	2.0697 (0.026)	*0.2348 (0.107)*	*0.7462 (0.539)*	*0.9151 (0.437)*
$LPCAPINC\_UAE_{t-1}$	γ_3	0.3511 (0.007)	*-0.1700 (0.818)*	*0.1106 (0.883)*	*-0.2261 (0.166)*	*0.3773 (0.572)*	*-0.1169 (0.860)*
$LPCAPINC\_PARTN_{t-1}$	γ_4	-0.2989 (0.008)	*-1.4852 (0.092)*	-1.9015 (0.040)	*0.0569 (0.699)*	*-0.4704 (0.686)*	*-0.5978 (0.599)*
$LTRADE\_UAE_{t-1}$	γ_5	0.5738 (0.000)	0.4100 (0.002)	0.4797 (0.000)	0.3022 (0.000)	*0.3489 (0.110)*	*0.2508 (0.192)*
Dependent variable: COUNTRY EFFECT							
Intercept	γ_6	*1.8878 (0.613)*	*-2.1051 (0.341)*	*1.3073 (0.547)*	*2.9959 (0.287)*	*-0.9915 (0.734)*	*2.9959 (0.283)*
LDISTANCE	γ_7	*-0.0696 (0.616)*	*0.1178 (0.406)*	*-0.0836 (0.550)*	*-0.1885 (0.298)*	*0.0515 (0.783)*	*-0.1885 (0.295)*
EU15DUM	γ_8	*-0.2307 (0.134)*	*0.0984 (0.493)*	*-0.2341 (0.128)*	-0.4369 (0.029)	*-0.1054 (0.571)*	-0.4369 (0.028)
GCCDUM	γ_9	*0.4028 (0.313)*	1.1075 (0.003)	*0.3890 (0.338)*	*-0.0358 (0.945)*	*0.7499 (0.135)*	*-0.0358 (0.945)*
Adjusted R^2		0.968	0.960	0.955	0.975	0.973	0.972
SER		0.292	0.331	0.348	0.253	0.261	0.263
RSS		43.184	54.785	60.651	19.513	20.777	21.233
Adjusted R^2		0.014	0.0713	0.014	0.018	0.006	0.018
RSS		1189.622	1219.311	1186.874	725.270	743.71	725.271
No of observations		**520**	**514**	**514**	**312**	**312**	**312**

Probability values are given in parentheses and compared with the 5% significance level. Bold italic numbers are insignificant.

Table.23: Long run coefficients and income effects on trade					
		$(\gamma_1+\gamma_3)/(1-\gamma_5)$	$(\gamma_2+\gamma_4)/(1-\gamma_5)$	$\gamma_3+\gamma_1\gamma_5$	$\gamma_4+\gamma_2\gamma_5$
BAHRAIN					
1997-2006	LS	0.9719	0.9189	0.3016	-0.2074
	GMM	0.9780	0.9150	0.2682	-0.1155
	TSWLS	0.9796	0.9116	0.0738	-0.1619
2001-2006	LS	1.2314	0.6484	0.6723	-0.2962
	GMM	1.2360	0.6440	0.5926	-0.0612
	TSWLS	1.2299	0.6448	0.0650	-0.0639
KUWAIT					
1997-2006	LS	1.5986	0.3152	0.3958	-0.2827
	GMM	1.5926	0.3116	-4.1719	1.1660
	TSWLS	1.5949	0.3119	-1.9709	0.6115
2001-2006	LS	1.7785	0.1277	0.9096	-0.2024
	GMM	1.7889	0.1360	3.1715	0.6997
	TSWLS	1.7827	0.1377	3.0076	0.5056
OMAN					
1997-2006	LS	1.0282	0.9197	0.4044	0.0738
	GMM	1.0088	-0.7533	0.7744	-0.9710
	TSWLS	0.9892	0.9581	1.0187	-0.9865
2001-2006	LS	1.2590	0.6943	0.4695	0.2988
	GMM	1.2635	0.6961	0.6798	0.5499
	TSWLS	1.2527	0.6972	0.5229	0.3535
QATAR					
1997-2006	LS	0.6102	1.2630	0.0567	-0.1719
	GMM	0.5785	1.3086	1.1087	-2.1883
	TSWLS	0.5148	1.3786	1.5890	-3.3732
2001-2006	LS	0.6530	1.2105	-1.3583	0.4036
	GMM	0.6520	1.2082	-3.1684	2.1064
	TSWLS	0.6669	1.1876	-4.5170	2.9717
SAUDI ARABIA					
1997-2006	LS	2.0293	0.1997	0.2834	-0.1517
	GMM	2.0828	0.1668	0.4183	-0.2318
	TSWLS	2.0376	0.1997	0.5416	-0.5132
2001-2006	LS	2.1216	0.1068	0.3312	-0.3002
	GMM	2.2500	-0.0513	0.1239	-0.1651
	TSWLS	2.1277	0.0889	0.4316	-0.7001
UNITED ARAB EMIRATES					
1997-2006	LS	3.3928	0.3036	0.9794	-0.0531
	GMM	1.7231	0.3159	0.3165	-0.7998
	TSWLS	1.7184	0.3233	0.4864	-0.9087
2001-2006	LS	1.6479	0.4180	0.1897	0.1279
	GMM	1.6452	0.4236	0.6194	-0.2101
	TSWLS	1.6371	0.4235	0.2200	-0.3683

Table.24: Country Effect Ranking

	1997-2006	2001-2006
Bahrain		
1	India	India
2	Pakistan	**Saudi Arabia**
3	Kenya	Kenya
4	**Saudi Arabia**	Pakistan
5	China	China
6	Indonesia	**UAE**
7	Thai	Thai
8	S. Korea	USA
9	**UAE**	Indonesia
10	USA	Japan

	1997-2006	2001-2006
1	Japan	Japan
2	S. Korea	S. Korea
3	USA	USA
4	Pakistan	Pakistan
5	India	China
6	Indonesia	Indonesia
7	China	Netherlands
8	Netherlands	India
9	UK	UK
10	**Saudi Arabia**	Germany

Kuwait

Oman		
1	China	China
2	Thai	Thai
3	India	India
4	S. Korea	S. Korea
5	Pakistan	Japan
6	**UAE**	**UAE**
7	Japan	Malaysia
8	Malaysia	Pakistan
9	**Saudi Arabia**	**Saudi Arabia**
10	Philippines	USA

Qatar		
1	India	India
2	China	China
3	Pakistan	Pakistan
4	Thai	Thai
5	Philippines	S. Korea
6	S. Korea	Philippines
7	Japan	Japan
8	Indonesia	Indonesia
9	**Saudi Arabia**	**Saudi Arabia**
10	Kenya	Kenya

Saudi Arabia		
1	USA	USA
2	Japan	Japan
3	S. Korea	S. Korea
4	China	China
5	India	Italy
6	France	Germany
7	Italy	France
8	UK	India
9	Germany	Netherlands
10	Pakistan	UK

United Arab Emirates		
1	India	India
2	Japan	China
3	China	Japan
4	S. Korea	Pakistan
5	Pakistan	S. Korea
6	Thai	Thai
7	UK	**Saudi Arabia**
8	USA	USA
9	**Saudi Arabia**	UK
10	**Oman**	Germany

These countries have the highest positive cross section coefficients.

Visual inspection of country effects:

Figure.1: Country Effect_BAHRAIN

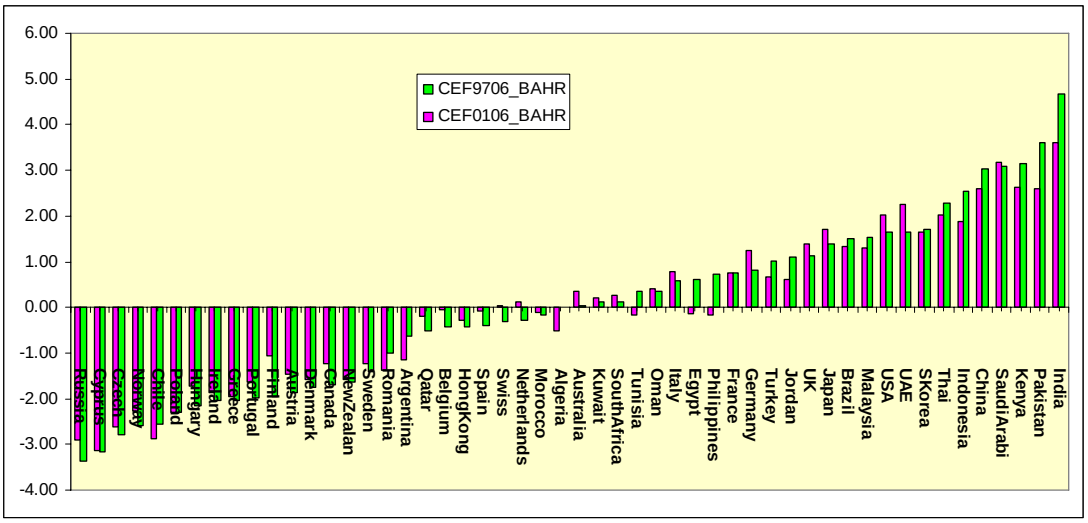

Figure.2: Country Effect_KUWAIT

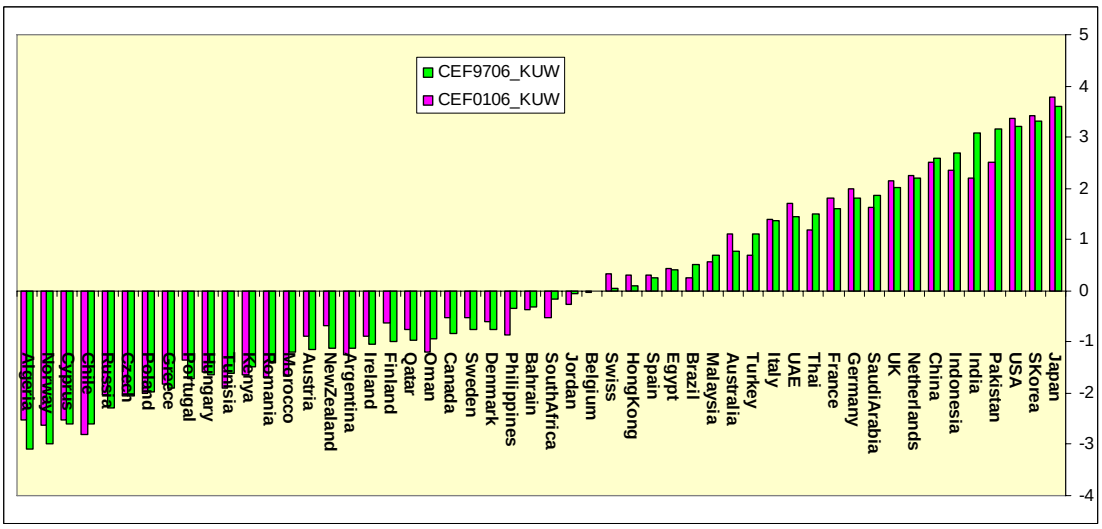

Figure.3: Country Effect_OMAN

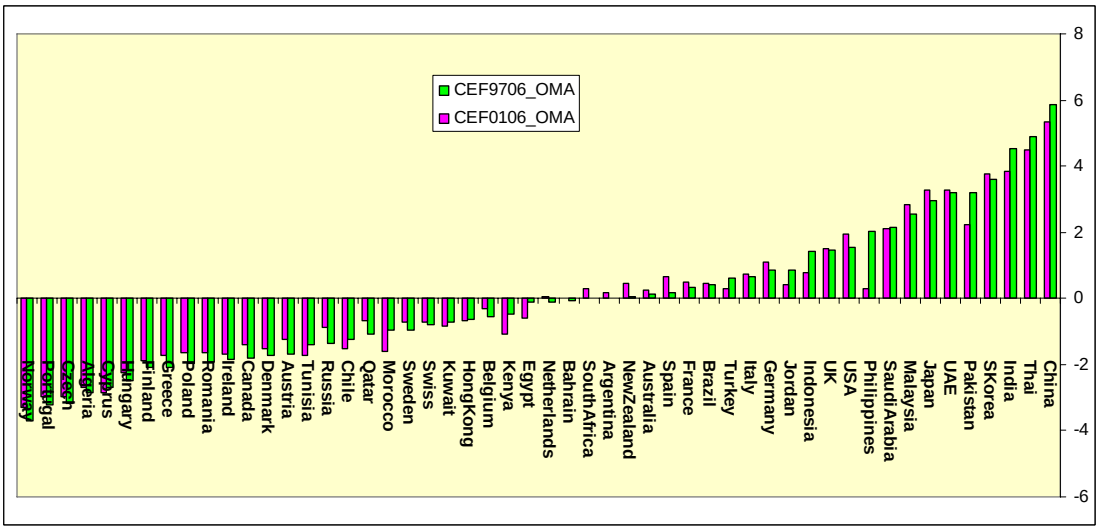

Figure.4: Country Effect_QATAR

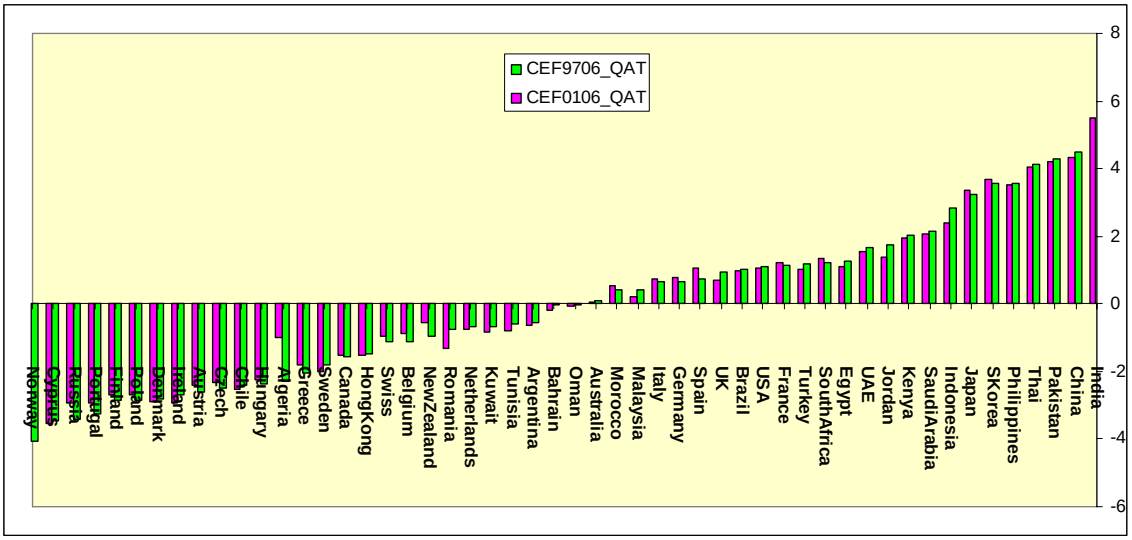

Figure.5: Country Effect_SAUDI ARABIA

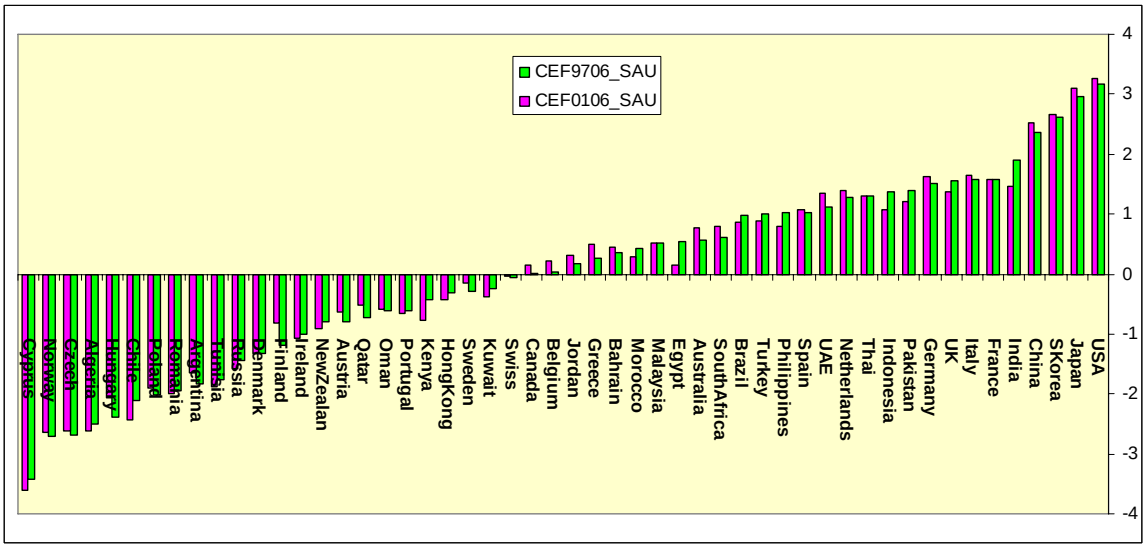

Figure.6: Country Effect_UNITED ARAB EMIRATES