UNIVERSITY OF SOUTHAMPTON

School of Social Sciences

Department of Economics

ESSAYS ON TRADE INTEGRATION AMONG GCC COUNTRIES

by

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ABSTRACT

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This dissertation consists of the three essays; in these three essays I study different areas of trade integration among Gulf Cooperation Council Countries (GCC) by examining the effect of GCC Free Trade Agreement (GCC FTA) on trade among GCC countries during the 1983-2010 period. In the three essays, different variations of the gravity model of international trade are applied to a set of bilateral trade flows among 54 countries representing GCC countries and their major trade partners during the 1978-2010 period.

The first essay is presented in chapter two, where I investigate the effect of GCC FTA on aggregate trade among GCC countries. The findings of chapter two suggest that GCC FTA has resulted in trade creation among GCC countries during the 1983-2010 period.

The second essay is presented in chapter three, where I investigate the effect of GCC FTA on intra-industry trade among GCC countries. Investigating GCC FTA effects for disaggregate trade is important, as the aggregate results may suffer from aggregation bias. Also, it helps identify the sectors that benefit more from GCC FTA which is an important issue for GCC countries that are seeking diversification of their economies. Chapter three results suggest that GCC FTA trade creation was more concentrated in sectors that exhibit lower shares of GCC intra-trade during the 1983-2010 time period.

The third essay is presented in chapter four where I investigate whether GCC FTA trade creation/destruction effect (aggregate and intra-industry trade) among GCC

countries was attributed mainly to new trade relations (extensive margin) or to existing trade relations (intensive margin), and whether GCC FTA led to an increase in new trade relations among GCC countries. Chapter four results suggest that GCC FTA trade creation is attributed mostly to trade along the intensive margin while GCC FTA has a negative effect on trade along the extensive margin for most trade sectors.

Overall, the results of the three essays suggest that trade integration among GCC countries is not very deep. Although GCC FTA is effective at the aggregate level, however GCC FTA failed to promote trade among GCC countries in larger intra-trade industries and failed in creating trade in new products among GCC countries. GCC countries have plans for a unified currency, since a unified currency requires deeper levels of economic integration than those needed for an FTA, the shallow level of trade integration maybe a sign that GCC economies are not yet ready to adopt a unified currency.

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DECLARATION OF AUTHORSHIP

I, Ahmad Shareef Alawadhi

Declare that the thesis entitled

ESSAYS ON TRADE INTEGRATION AMONG GCC COUNTRIES

and the work presented in the thesis are both my own, and have been generated by me as the result of my own original research. I confirm that:

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1 Introduction

In 1981 Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates (UAE) formed the Gulf Cooperation Council (GCC). One of the main goals of this council is to promote economic integration between member states. The first step in the path of economic integration was the signing of the Unified Economic Agreement (UEA) by GCC members in 1981.The UEA was set to coordinate and standardize economic, financial, monetary, commercial, industrial, and customs regulations among the members with the ultimate goal of introducing a unified currency for the GCC countries[1]. The UEA also stated stages in which the economic integration path should follow. In 1983[2] a further step of economic integration was taking by GCC countries when a Free Trade Agreement (FTA) was established, under GCC FTA customs on products of GCC countries were eliminated. The UEA included eight articles that relate to trade exchange between GCC members. The main issues covered in these articles were, 1) the elimination of tariffs on all products of national origins of member states, 2) for a product to qualify as a national product, the value added from the production in a GCC member should be 40% or more and the entity producing the national product should be owned by 51% or more by a GCC national(s), 3) Items in transit among three or more GCC members should be exempted from tariffs and shall be treated as a national product. Recently, the path to a unified currency suffered three major setbacks; first, in 2006 Oman's withdrawal from the currency union; second, in 2009 the UAE announced its withdrawal from the currency union; and third, the currency union was postponed to an unknown date. For a CU to be successful different aspects of economic integration should be achieved among those is trade integration, the main gains of a CU comes are through trade, where member countries benefit from the elimination of transaction fees and exchange rate uncertainty among them.

The economic importance of GCC countries comes from their abundant resources of oil and gas. GCC countries have very large reserves of oil and gas and are major producers of oil and gas. According to OPEC (2011) in 2010, GCC countries accounted for about 34% and 22% of world oil and gas reserves respectively, and accounted for about 22% and 9% of world oil and gas production respectively. The

[1] As stated in articles 8 and 9 of the UEA

[2] According to the concluding statement of the 3rd round of the higher supreme council of GCC countries in November 1982, GCC FTA was approved to start in 1983.

high level of oil production and low density of population (combined 42 million in 2010) have resulted in high GDP and GDP per capita for most of GCC countries. In 2010 GCC combined GDP reached about $ 1.1 trillion, with the largest economy belonging to Saudi Arabia with a GDP reaching about $448 billion, while the smallest economy belonged to Bahrain with a GDP reaching about $23 billion. GCC countries are very similar when it comes to the structure of the economy; the six members are highly dependent on oil/gas as a source of income which in turn reflects high fluctuations in output due to the unstable nature of oil/gas prices. The oil/gas sector has the highest contribution to GDP (as shown in table 1.1) and although there are efforts to diversify the economy, however, in practice these efforts are still modest. Although trade among GCC countries has increased considerably in recent years, still it is limited as it represents only 2.6 percent of GCC trade with the world during the 2003-2007 time period.

This dissertation aims to assess trade integration among GCC members by assessing the impact of the GCC FTA on trade among GCC countries at the aggregate level, disaggregate level and whether GCC FTA effects trade through existing trade relations (intensive margin) or new trade relation (extensive margin). Gains from FTA through the extensive margin channel suggests that GCC FTA have led to an improvement of consumer welfare by providing more products to the consumer and also is important to GCC countries in particular as they seek to diversify their production structure. To answer these three questions, the gravity model of international trade is applied to a set of bilateral trade flows among of 54 countries, representing GCC countries and their major trade partners (including intra-GCC trade) during the 1978-2010 time period.

In chapter two, I examine the effect of GCC FTA on trade among GCC countries at the aggregate level. Different variations of the gravity model are applied to trade among GCC countries and major trade partners during the 1978-2010 time period. The major contribution of chapter two to existing literature on the effect of GCC FTA on aggregate trade among GCC countries is that the model applied is augmented with exporter-time and importer-time fixed effects (as well as country-pair effects) that control for time variation in multilateral resistance and exporter/importer heterogeneity. This issue has been ignored in all previous work that estimated the effect of GCC FTA on aggregate trade. The findings of chapter two suggest that GCC FTA has resulted in trade creation at the aggregate level among GCC countries during the 1983-2010 time period.

In chapter three, I extend the analysis from chapter two to assess the impact of GCC FTA on trade by sector among GCC countries during the 1983-2010 time period at the first digit level of the Standard International Trade Classification Revision1 (SITC Rev.1). There are very few empirical studies that assess the impact of GCC FTA at the disaggregate level, consequently investigating GCC FTA effects for disaggregate trade is important as the aggregate results from chapter two may suffer from aggregation bias as suggested by Anderson and Yotov (2010). Additionally, chapter three results identify the industries/trade sectors that benefited the most from GCC FTA during the 1983-2010 time period, this may serve as a guideline for export-industries policies especially in GCC countries whose trade is concentrated around oil/gas products and are seeking resource diversification. To my knowledge this is the first study that applies a gravity model with time and country pair effects or exporter-time and importer-time fixed effects along with country pair effects to assess the impact of GCC FTA on GCC intra-industry trade. The findings of chapter three suggest that GCC FTA trade creation is more concentrated in sectors that exhibit lower shares of GCC intra-trade during the 1983-2010 period.

In chapter four, I investigate whether GCC FTA trade creation effect (aggregate and intra-industry trade) among GCC countries was attributed mainly to new trade relations (extensive margin) or to existing trade relations (intensive margin). A set of bilateral trade flows representing 54 countries including GCC countries from 1978-2010 data at the fourth digit level of product aggregation of the Standard International Trade Classification Revision1 (SITC Rev.1) system is used to construct the extensive and intensive margins of trade (dependent variables) then the effect of GCC FTA is estimated by applying the gravity model of international trade to these margins. To my knowledge this is the first study that applies a gravity model to assess impact of GCC FTA along the extensive and intensive margins of trade. The two main findings of chapter four are, 1) for aggregate trade and sectoral trade, GCC FTA trade creation is attributed mostly to trade along the intensive margin (existing trade relations), 2) GCC FTA has a negative effect on trade along the extensive margin among GCC countries for most trade sectors.

Chapters two and three provide evidence that trade integration was deepened by GCC FTA coming into force for aggregate trade and some disaggregate sectors of trade. While evidence from chapter four suggests that GCC FTA served as trade barrier (on average) for new trade in most trade sectors. Overall, results of chapters two, three and four suggest that trade integration among GCC countries is not very

deep especially in the later years of GCC FTA implementation, and this should be alarming for GCC countries as they pursue a unified currency. The main gains from a unified currency come through trade among member countries who benefit from the elimination of transaction fees and exchange rate uncertainty. Also, a unified currency requires deeper levels of economic integration than those needed for an FTA to be successful, this shallow level of trade integration among GCC countries maybe a sign that GCC economies are not yet ready to adopt a unified currency.

Several interesting areas of related future research could be generated from this thesis. The findings from chapter four suggest that GCC FTA had a negative effect on the extensive margin of trade, this can be due to non-tariff barriers. To my knowledge there are no studies that explored non-tariff barriers among GCC countries. These effects of non-tariff barriers are important, as with the elimination of tariffs under GCC FTA these are the actual barriers to trade among GCC countries. Also further investigation of the effect of GCC FTA on the most important 2 and 3 digit (maybe even 4 digit) sectors of trade among GCC countries and help eliminate more any aggregation bias that occurs in 1 digit sectors and help identify more specifically industries that can be targeted for diversification policies.

Other interesting areas of further research that has not been addressed in the GCC FTA literature is the different aspects of the effect of GCC FTA on trade in services among GCC countries. Another interesting subject would be studying the effect of GCC custom union on trade among GCC countries, the custom union was announced to start in 2003, yet according to media reports full implementation/agreement of the custom union have not been achieved yet.

Before proceeding to chapter two I provide below a brief background of the gravity model.

The gravity model has been a successful model in empirical research in economics and it extends beyond international trade to areas such as migration, foreign direct investment and many other fields. The gravity model has been used to explain bilateral trade flows between trade partners. The model indicates that trade between two countries is determined by:

- Supply conditions in the exporting country.

- Demand conditions in the importing country.

- Other factors that encourage (country economic size) or discourage (distance) trade.

The gravity equation is usually expressed as following[3]:

$$X_{ij} = \beta_0 Y_i^{\beta 1} Y_j^{\beta 2} D_{ij}^{\beta 3} e^{\beta 4(Z_{ij})} u_{ij}$$

Where,

X_{ij}**:** Value of exports from country *i* to country *j*;

Y_i **:** Country *i* GDP reflecting exporter economic size;

Y_j**:** Country *j* GDP reflecting importer economic size;

D_{ij}**:** Geographic distance (trade barrier/resistance) between the economic centres of the two countries which is a proxy for transportation cost;

Z_{ij}**:** A set of time invariant dummy variables that either aid or resist trade;

u_{ij}**:** A normally distributed error term with mean of zero;

while the betas are coefficients to be estimated.

It is common to express the equation in log-linear form as follows:

$$\ln X_{ij} = \beta_0 + \beta 1 \ln Y_i + \beta 2 \ln Y_j + \beta 3 \ln D_{ij} + \beta 4(Z_{ij}) + u_{ij} \qquad (1.1)$$

Early works on the gravity model were criticized for lacking theoretical foundations. The first notable effort to provide a theoretical foundation for the gravity equation was made by Anderson (1979) who developed a gravity model based on a Cobb-Douglas and Constant Elasticity of Substitution (CES) utility function, with goods differentiated by origin and an elasticity of substitution that is >1. Ten years later Bergstrand (1989) developed a gravity model based on the Dixit-Stiglitz model of monopolistic competition where each firm produces a variety of differentiated goods. later Deardorff (1998) added a new frame work as he developed a gravity model based on the Heckscher-Ohlin model (differences in resource abundance), while Eaton and Kortum (2002) developed a gravity model based on homogeneous goods, iceberg trading costs and Ricardian technology. Perhaps one of the most recent breakthroughs in gravity model estimation is attributed to Anderson and Van Wincoop (2003) (AvW onwards). AvW used the theoretically motivated gravity model developed by Anderson (1979), there contribution came through manipulation of the CES expenditure system to derive a

[3] See (Bergstrand 1985).

simple and easy to estimate gravity model that takes into consideration that the resistance to trade comes from:

i. Bilateral trade barriers between *i* and *j*.

ii. Trade barriers (multilateral-resistance) between *i (j)* and the rest of the world.

AvW assume identical, homothetic preferences; approximated by a CES utility function, in their model consumers of region *j* maximize their utility by consuming goods from country *i* according to the following CES utility function

$$U_{ij} = \left(\sum_i \beta_i^{(1-\sigma)/\sigma} C_{ij}^{(\sigma-1)/\sigma}\right)^{\sigma/(\sigma-1)} \quad (1.2)$$

Subject to budget constraint

$$Y_j = \sum_i p_{ij} C_{ij} \quad (1.3)$$

Where,

U_{ij}: the utility of country *j* consumers arising from consuming country *i* goods;

β_i: a positive distribution parameter of country *i*'s goods;

C_{ij}: consumption of country *j* consumers of goods from country *i;*

σ: elasticity of substitution between products which is > 1;

Y_j: nominal income of country *j;*

p_{ij}: price paid by country *j* consumers for county *i* goods;

AvW assume that trade costs are borne by the exporter and the exporter transfers these costs via the selling price to the importer, so if p_i is the exporter (factory) price and if t_{ij} represent the trade costs for selling country *i*'s goods to country *j*'s consumers (such as distance, language, tariffs…etc.) then $p_{ij} = p_i t_{ij}$ and the nominal value of exports from country *i* to country *j* is

$$X_{ij} = p_{ij} C_{ij} \quad (1.4)$$

Maximizing (1.2) subject to (1.3) gives,

$$C_{ij} = \left(Y_j / p_{ij} t_{ij}\right)\left(\beta_i p_i t_{ij} / P_j\right)^{(1-\sigma)} \quad (1.5)$$

Plugging (1.4) into (1.5) gives

$$X_{ij} = Y_j\left(\beta_i p_i t_{ij} / P_j\right)^{(1-\sigma)} \quad (1.6)$$

Where

$$P_j = \left(\sum_i \left[\beta_i p_{ij} \right]^{1-\sigma} \right)^{1/(1-\sigma)}$$

P_j represent the consumer price index of country *j* or the multilateral resistance of country *j*. The general-equilibrium structure of the model imposes market clearance this implies that total income of country *i* is

$$Y_i = \sum_j X_{ij} \tag{1.7}$$

$$= \sum_j Y_j \left(\frac{\beta_i p_i t_{ij}}{P_j} \right)^{(1-\sigma)} = (\beta_i p_i)^{(1-\sigma)} \sum_j Y_j \left(\frac{t_{ij}}{P_j} \right)^{(1-\sigma)}$$

Then the scaled prices($\beta_i p_i$) are

$$(\beta_i p_i)^{(1-\sigma)} = Y_i / \sum_j Y_j \left(t_{ij} / P_j \right)^{(1-\sigma)} \tag{1.8}$$

Define world income[4] as $Y_w = \sum_j Y_j$, then plug in (1.8) into (1.6)

$$X_{ij} = \left(Y_i Y_j / Y_w \right) \left(t_{ij} / P_j P_i \right)^{(1-\sigma)} \tag{1.9}$$

Where

$$P_i = \left[\sum_j \left(Y_j / Y_w \right) \left(t_{ij} / P_j \right)^{(1-\sigma)} \right]^{1/(1-\sigma)}$$

P_i represent the consumer price index of country *i* or the multilateral resistance of country *i*, and 1.9 represents the theoretical AvW gravity equation.

In chapters 2-4 of this dissertation I apply different variations of the traditional and AvW specifications of the gravity model, in both specifications I augment the gravity model with fixed effects to account for multilateral resistance as suggested by Anderson and Van Wincoop (2003).

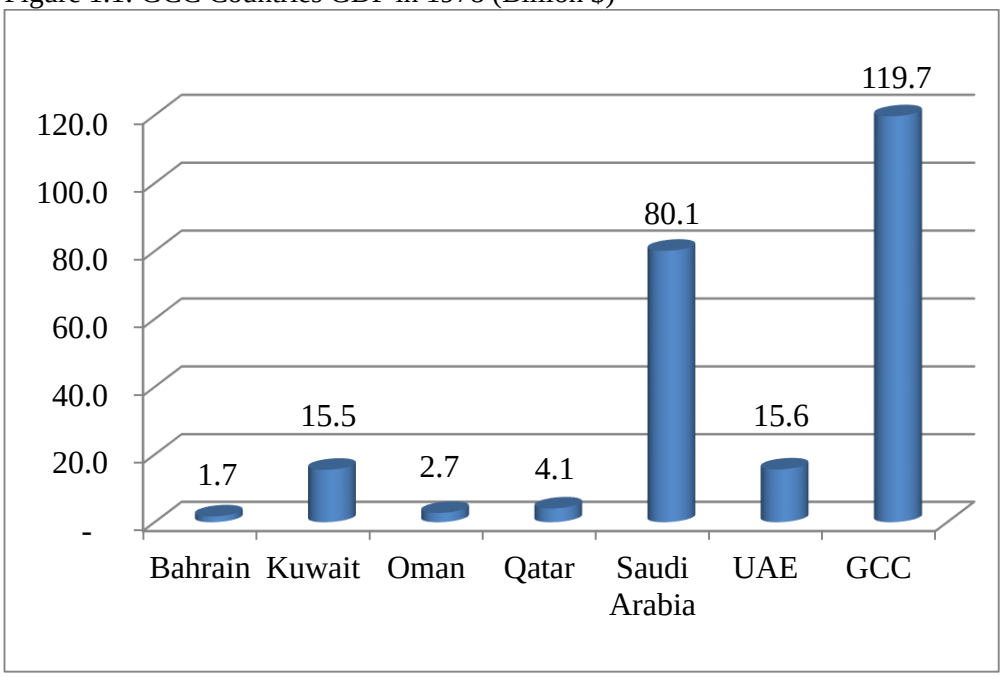
[4]World income Y_w is absorbed in β_0 in empirical estimation.

Table 1.1: GCC Countries GDP (Billion $) and OIL/GAS share of GDP (2008)[5]

Country	GDP	%OIL/GAS
Bahrain	21.9	29.20%
Kuwait	148.16	59.50%
Oman	60.3	50.80%
Qatar	100.41	60.80%
Saudi Arabia	475.05	57.50%
UAE	254.39	37%
GCC	1,060.21	52%

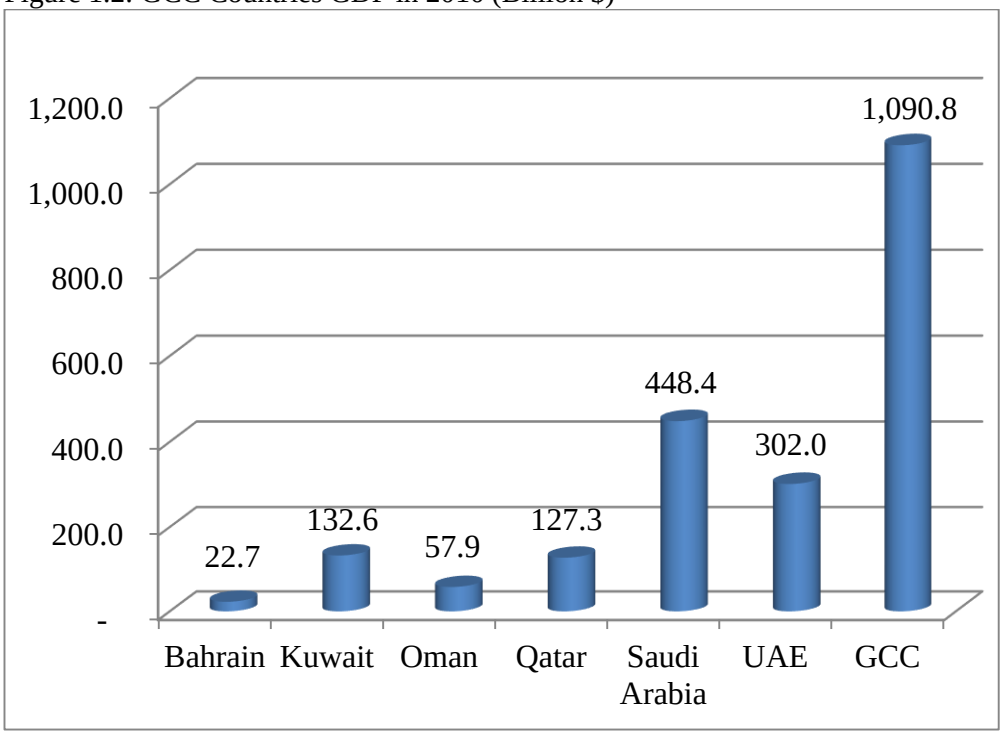
[5] Source: GCC statistical database, GCC statistics : www.sites-gcc-sg.org/statistics/index.php?SID=129

Figure 1.1: GCC Countries GDP in 1978 (Billion $)



Source: constructed by author using IMF World Economic Outlook (WEO) [6]Database Data

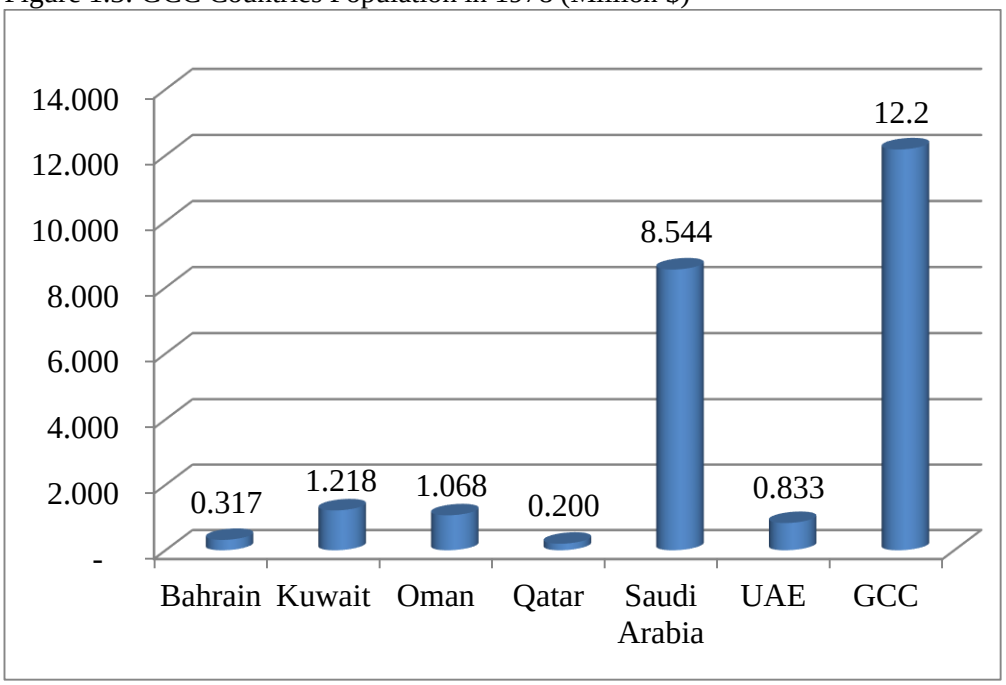
Figure 1.2: GCC Countries GDP in 2010 (Billion $)



Source: constructed by author using IMF World Economic Outlook Database Data

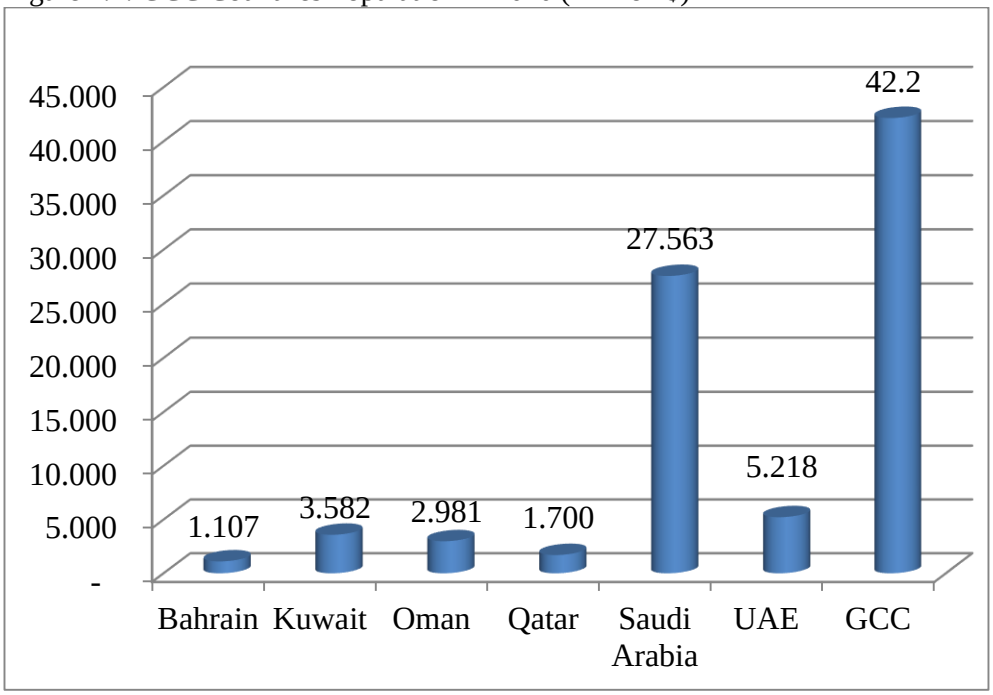
[6] http://www.imf.org/external/data.htm

Figure 1.3: GCC Countries Population in 1978 (Million $)



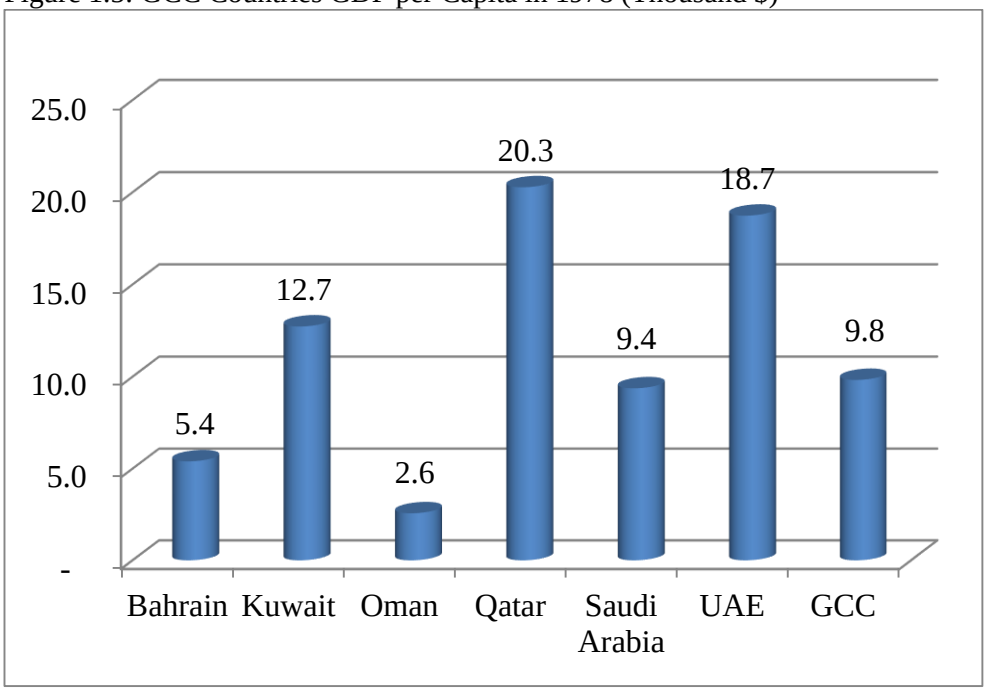
Source: constructed by author using IMF World Economic Outlook Database Data

Figure 1.4: GCC Countries Population in 2010 (Million $)



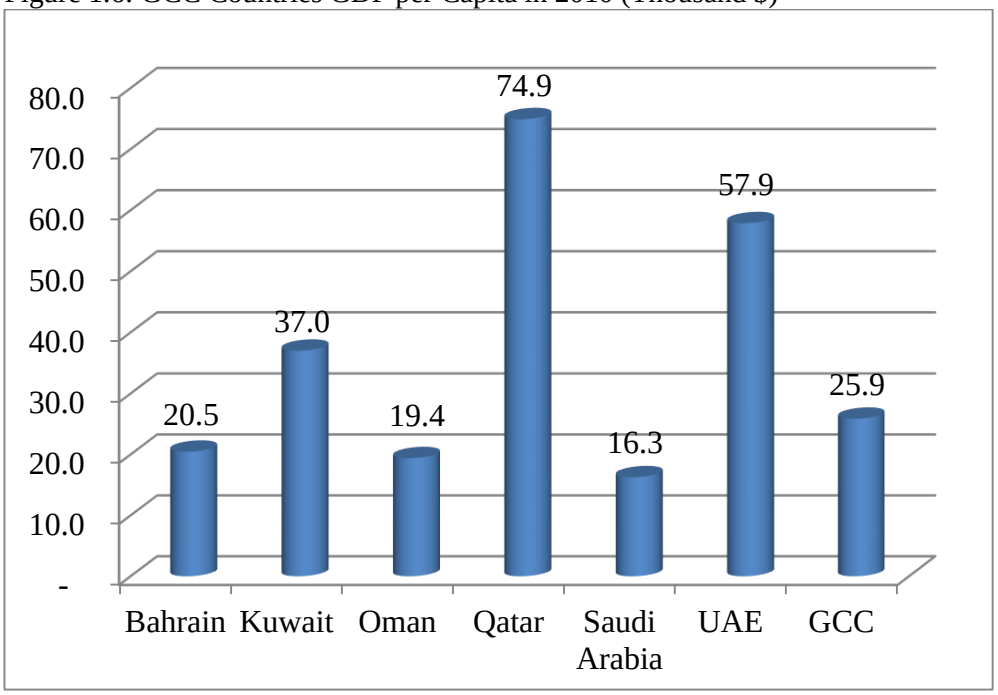
Source: constructed by author using IMF World Economic Outlook Database Data

Figure 1.5: GCC Countries GDP per Capita in 1978 (Thousand $)



Source: constructed by author using IMF World Economic Outlook Database Data

Figure 1.6: GCC Countries GDP per Capita in 2010 (Thousand $)



Source: constructed by author using IMF World Economic Outlook Database Data

2 The Effect of GCC FTA on Aggregate Trade among GCC Countries, What Does Gravity Tell Us?

2.1 Introduction

In 1981 Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates (UAE) formed the Gulf Cooperation Council (GCC). One of the main goals of the GCC is to promote economic integration between member states. In 1981, the first step in the path of economic integration was accomplished when GCC members signed the Unified Economic Agreement (UEA). The UEA was set to coordinate and standardize economic, financial, monetary, commercial, industrial, and customs regulations among the members with the ultimate goal of introducing a unified currency for the GCC countries.[7] The UEA stated stages in which the economic integration path should follow. In 1983 a Free Trade Area FTA was established, where customs on products of member states were eliminated. In 1999, a custom union agreement was announced where a unified 5 percent tariff was set on most of non-GCC imports. In 2001, the members agreed to a modified version of the UEA and called it the New Economic Agreement (NEA) which set goals for further integration in order to achieve full financial, monetary and any other aspects of economic integration in order to introduce a common currency by 2010. In the spirit of the NEA a common market was set to be established in 2008 with the ultimate goal of facilitating the movement of GCC citizens and capital among member states. The path to a unified currency suffered three major setbacks; first, in 2006 Oman's withdrawal from the currency union; second, in 2009 the UAE announced its withdrawal from the currency union; and third, the currency union and the common market were postponed to an unknown date.

For a Currency Union (CU) to be successful different elements of economic integration should be achieved. Probably trade integration appears to be one of the most important elements, as the more trade is integrated among a group of countries, the more advantageous the formation of a CU among them (as members of CU gain from high levels of intra-trade after formation of a CU due to the elimination of exchange rate risk and transaction costs associated with multiple currencies). The goal of this chapter is to assess trade integration among GCC members by assessing the impact of GCC FTA on aggregate trade among GCC countries. In this chapter, I apply different variations of the gravity model of

[7] As stated in article 8 and 9 of the UEA

international trade to a set of bilateral trade flows among 54 countries representing GCC countries and their major trade partners (including intra-GCC trade). To my knowledge this is the first study on GCC trade that accounts for time variations in multilateral resistance and exporter/importer heterogeneity. This is done by augmenting the gravity equation with the interaction of importer/exporter effects and time effects (along with country pair effects) to assess the impact of GCC FTA on trade among GCC countries, more details are provided in the methodology and results sections. The results of this chapter suggest that at the aggregate level of trade GCC FTA has resulted in trade creation among GCC countries during the 1983-2010 time period.

The remainder of this chapter is organized as follows. Section 2.2 presents an overview of trade patterns of GCC countries. Section 2.3 discusses the theoretical background on FTA and FTA effect on trade. Section 2.4 discusses the problems with gravity model estimation, summarizes problems associated with gravity model estimation. Section 2.5 discusses the literature on GCC trade using the gravity model. Section 2.6 presents the methodology. Section 2.7 presents data descriptions and results. Section 2.8 presents sensitivity analysis of the results. Finally, the last section provides an overall conclusion and summary of this chapter.

2.2 Overview of GCC International Trade

2.2.1 Total Trade

GCC total for the 1978-1982 and the 2003-2007 time periods are presented in tables 2.1 and 2.2 while GCC countries shares of total GCC trade are presented in table 2.3, looking at these tables one can see that GCC countries are very open to trade. In the 1978-1982 time period, total trade reached $785 billion, this figure increased to $2.09 trillion in the 2003-2007 time period[8]. The structure of GCC trade has changed over time; in the1978-1982 period Saudi Arabia had the largest share (65 percent) of total GCC trade, while Bahrain had the lowest share (2 percent). In the 2003-2007 time period, Saudi Arabia had the largest share (48 percent) of total GCC trade and Bahrain had the lowest share (2 percent). One can see that although Saudi Arabia remained the largest contributor to GCC trade with world, yet its share has declined significantly between the two periods.

Looking at trade partners of GCC region, in the 1978-1982 time period, Japan and the United States were the largest trade partners of the GCC with shares of 24.4

[8] Although the study covers data up to 2010, for trade comparisons I stop at 2007 because there are data missing for some GCC countries for the years 2008- 2010.

percent and 13.8 percent respectively, while in the 2003-2007 time period, Japan was the largest trading partner with 18.4 percent of total GCC trade and South Korea became the second largest trade partner with 10.8 percent of total GCC trade. The increasing shares of trade with the rest of the world (from 61.8 percent during the 1978-1982 time period to 68.2 percent during the 2003-2007 time period) indicate more diversity of GCC trade partners in more recent years.

2.2.2 GCC Intra-Trade

GCC intra-trade is presented in tables 2.4 and 2.5 for the 1978-1982 and the 2003-2007 periods, looking at these tables, on can see that GCC intra-trade share of total GCC trade increased from 1 percent during the 1978-1982 time period to 2.6 percent during the 2003-2007 time period. GCC intra- trade increased from $7.85 billion during the 1978-1982 time period to $55.1 billion during the 2003-2007 time period, an increase of about 600 percent between the two periods. This increase is more than three times larger than the increase in total GCC trade between the 1978-1982 and 2003-2007 time periods (about 170 percent between the 1978-1982 and 2003-2007 time periods). However the share of intra-trade to total trade remains very small, especially when considering many trade enhancing attributes that GCC countries share among themselves, such as sharing a common language, sharing borders and having an FTA in force since 1983. This is mainly attributed to the similarity in production structure which is mainly dominated by oil/gas production.

In the 1978-1982 time period, the UAE was the biggest contributor to GCC intra-trade, exporting 26.3 percent of GCC exports to other members and importing 31 percent of GCC imports from other members. While the smallest contributor to GCC trade during the 1978-1982 time period was Qatar, exporting 3.6 percent of GCC exports to other members and importing 6.7 percent of GCC imports from other members. In the 2003-2007 time period, the UAE was the biggest contributor to GCC intra-trade, exporting 53.3 percent of GCC exports to other members and importing 12.8 percent of GCC imports from other members. While the smallest contributor to GCC trade in the 2003-2007 time period was Kuwait, exporting 4.5 percent of GCC exports to other members and importing 8.4 percent of GCC imports from other members.

2.2.3 Exports and Imports

Exports are very important for GCC countries, since most of these countries are high oil/gas producers with small domestic markets, this means that the majority of the oil/gas products are exported to other regions. Oil and gas exports dominate the structure of GCC exports, yet in recent years the dependence on oil/gas exports has declined for GCC countries. The destination of GCC countries exports are summarized n tables 2.6 and 2.7, in the 1978-1982 time period GCC exports at the aggregate level reached $556 billion, and this figure increased to $1.27 trillion in the 2003-2007 time period, an increase of about 129 percent between the two periods. The largest contributor to GCC exports was Saudi Arabia which accounted for 67.1 percent and 48.7 percent of total GCC exports for the 1978-1982 and 2003-2007 time periods respectively, while Bahrain had the lowest share of GCC exports with 1.6 and 1.5 percent for the 1978-1982 and 2003-2007 time periods respectively.

In the 1978-1982 period the largest export partners of GCC countries were Japan and the United States with shares of 26.3 percent and 11.8 percent respectively, while in the 2003-2007 period Japan was the largest export partner with a share of 21.7 percent, and South Korea became the second largest export partner with a share of 13.3 percent of total GCC exports.

GCC countries are highly dependent on imports to satisfy local consumption, due to limited natural resources and a common production structure that relies heavily on oil/gas production. GCC countries values of imports have grown significantly in the last three decades as indicated by the figures in tables 2.20 and 2.21. In the 1978-1982 time period, GCC imports at the aggregate level reached $229.5 billion this figure increased to $609 billion during the 2003-2007 time period. The largest contributor to GCC imports from the world was Saudi Arabia, which accounted for 61 percent of total GCC imports during the 1978-1982 time period and 45 percent of total GCC imports during the 2003-2007 time period, while Bahrain had the lowest share of GCC total imports at 3.2 percent during the 1978-1982 time period and 3.6 percent during the 2003-2007 time period. During the 1978-1982 time period, Japan and the United States were the largest import partners of the GCC with shares of 19.4 percent and 18.7 percent respectively, while during the 2003-2007 time period the United States was the largest import partner with a share of 12.1 percent followed by Japan with a share of 10.1 percent of total GCC exports.

Moving to trade of each GCC member. Tables 2.8 and 2.9 present Bahrain's exports destinations for the 1978-1982 and 2003-2007 time periods and tables 2.22 and 2.23 presents Bahrain's imports. The largest share of Bahrain's exports is directed to GCC markets; while a large share of Bahrain's imports comes from GCC countries (14 percent in the 1978-1982 period and 17 percent in the 2003-2007 period).

Tables 2.10 and 2.11 presents Kuwait's exports destinations for the 1978-1982 and 2003-2007 time periods and tables 2.24 and 2.25 presents Kuwait's imports destinations. The largest share of Kuwait's exports are directed to Japan (about 26% in the 1978-1982 period and 22% in the 2003-2007 period), unlike Bahrain Kuwait has low share of exports to GCC markets, yet the share has increased from 1.4% in the 1978-1982 time period to 3.6% in the 2003-2007 time period. Looking at imports of Kuwait, one can see that there was very little imports from GCC in the 1978-1982, yet this has totally changed as GCC imports contributed the largest share of Kuwait's imports in the 2003-2007 time period (about 13%).

Tables 2.12 and 2.13 presents Oman's exports destinations for the 1978-1982 and 2003-2007 time periods and tables 2.26 and 2.27 presents Oman's imports destinations. The largest share of Oman's exports in the 1978-1982 period were directed to Japan (about 57%) while in 2003-2007 period the largest share was directed to China (about 33%). Oman's exports to GCC have seen a very large increase in value, yet the share of exports to GCC is still very low (about 4% in 2003-2007 period). Looking at Oman's imports, one can see that there is an increasing dependence on GCC imports, in the 1978-1982 GCC imports share was 22 %, this increased to 32% in the 2003-2007 period. It is worth to mention that the majority of these imports come from the UAE (see tables 2.4 and 2.5).

Tables 2.14 and 2.15 presents Qatar's exports destinations for the 1978-1982 and 2003-2007 time periods and tables 2.28 and 2.29 presents Qatar's imports destinations. The largest share of Qatar's exports were directed to Japan (about 33% in the 1978-1982 period and 37% in the 2003-2007 period). Qatar's share of exports to GCC have been very low for the 1978-1982 and 2003-2007 periods (2.4% and 0.8% respectively). Looking at Qatar's imports, one can see that there is an increasing dependence on GCC imports, in the 1978-1982 GCC imports share was 3.9 %, this increased to 13.7% in the 2003-2007 period.

Tables 2.16 and 2.17 presents Saudi Arabia's exports destinations for the 1978-1982 and 2003-2007 time periods and tables 2.30 and 2.31 presents Saudi Arabia's

imports destinations. The largest share of Saudi Arabia's exports were directed to Japan (about 22% in the 1978-1982 period and 17% in the 2003-2007 period). Saudi Arabia's share of exports to GCC have been very low for the 1978-1982 and 2003-2007 periods (0.3% and 1.7% respectively). Looking at Saudi Arabia's imports, the largest import partner was the US (about 22% in 1978-1982 and about 16% in 2003-2007), with regard to GCC imports one can see that although the share of imports has increased it is still low reaching 4.9% in the 2003-2007 period.

Tables 2.18 and 2.19 presents UAE's exports destinations for the 1978-1982 and 2003-2007 time periods and tables 2.32 and 2.33 presents UAE's imports destinations. The largest share of UAE's exports were directed to Japan (about 39% in the 1978-1982 period and 27% in the 2003-2007 period). UAE's share of exports to GCC have increased from 2.6% in the 1978-1982 to 8.1% in the 2003-2007 period. Looking at UAE's imports, the largest import partner was the Japan in the 1978-1982 period (about 19%) and India in the 2003-2007 period (about 11.5%); with regard to GCC imports one can see that GCC imports share have dropped from 6.9% in 1978-1982 to 4.8% in 2003-2007, which makes UAE the only GCC country that experienced a reduction in the share of imports from the GCC.

Overall, it seems that GCC countries trade with each other is more on the imports side rather than exports, this might be due to the dominance of oil/gas exports for most GCC countries.

2.3 FTA and FTA effect on Trade

Economic integration between a set of countries usually takes place in stages, with the first stage being smaller in terms of lowering trade barriers and foregoing control on domestic economy. According to Appleyard et al. (2005) these stages are:

a) *Free Trade Area or Agreement (FTA)*: The first stage of integration where all members of the FTA agree to remove tariffs on each other's commodities, while trading policies with non-members are set by each individual member (no common policies). Usually there are rules of origin that define what type of goods qualify for non-tariff access, and this is to prevent non-member goods from benefiting from the differences in tariffs inside the FTA by shipping goods to a low tariff member and then transporting them to a higher tariff member tax free, which would result in a loss for the higher tariff member.

b) *Custom Union*: This is the second stage of integration, in addition to the FTA rules, a common external tariff and trade policies are applied to all non-member trade. Rules of origin do not apply in Custom Union because tariffs are the same for all members.

c) *Common Market*: this is the third stage in integration, in addition to all the features of FTA and Custom Union; all the barriers on the movement of factors of production (capital and labour) are removed.

d) *Economic Union*: the last stage of integration, in addition to all the features of stages one, two and three; unification of economic institutions and coordination of economic policy across members. Some forms stop at a Monetary or Currency Union (CU), where all members adopt a common currency and monetary policy is set by supra-national central bank which implements monetary policy that is binding for all members.

FTA has been at the interest of a large number of research papers in the field of international economics. According to WTO (2011) in the early 1990's the number of FTAs was around 70 by 2010 this figure increased to over 300. One of the earliest studies on FTA effect on trade among member countries was conducted by Viner (1950) who indicated that an FTA can result in trade creation and/or trade diversion. Trade creation occurs when there is an increase in trade among members due to a shift in product origin from a domestic producer whose resource costs are higher, to a member producer whose resource costs are lower; this represents a shift towards free trade which is assumed to be welfare enhancing. On the other hand trade diversion occurs when there is an increase in trade among members due to a shift in product origin from a non-member with low resource cost to a member with higher resource costs, this represents a shift away from free trade and it is assumed to be welfare reducing. Since an FTA can be trade creating or diverting at the same time, the net outcome determines the benefit of the FTA, which implies that this is an empirical matter.

FTAs imply static and dynamic effects. The main static effects are attributed to increased trade due to trade creation among members versus trade diversion from non-members to members of the FTA. Other static effects may include higher bargaining power in trade negotiations and having access to a bigger market for each member's goods. Dynamic effects may include economies of scale, increased competition with member products may lead to higher production efficiency and specialization, and according to Appleyard et al. (2005), if further integration is

pursued it may be possible that integration may stimulate greater investment by member and non-member forces, thus inducing demand and growth.

Many researchers have used the gravity model to estimate the empirical effect of Preferential Trade Agreements (PTA) on trade including the effect of FTA on trade[9]. The majority of studies find PTAs to be trade creating, Frankel et al. (1995) and Frankel (1997) state that PTAs between countries that already trade intensely and share certain geographical and cultural features (like sharing borders and language, which tend to reduce transaction costs) are more likely to benefit from a PTA because they are considered to be natural trading partners. Yet this is not always the case. According to Schiff and Winters (2003), PTA between small developing countries will most likely lead to trade diversion due to the similarity of the export structure of these countries this limits the level of trade creation that would happen and since small developing countries have small domestic markets and a small production, then the majority of imports will come from outside the FTA .

The use of the gravity model to estimate the effects of FTA and RTA dates back to Tinbergen (1962), who included a dummy variable to account for the fact that two countries belong to the same FTA, Tinbergen (1962) found that membership in FTA increased trade by 5 percent. Many researchers followed in his footsteps and came up with similar results (such as Aitken (1973) and Bergstrand (1985)). A series of papers such as Rose (2000), Rose and Van Wincoop (2001) and Glick and Rose (2002) found (depending on the technique) that a CU increases trade by 200-300 percent; Hassan (2001) finds a negative effect of FTA on trade, while Ghosh and Yamarik (2004) have documented the fragility of these results by applying extreme bound analysis; finally Baier and Bergstrand (2009b) apply non-parametric estimates by implementing matching econometrics; they find similar results to the results of gravity models of panel data and parametric techniques which indicate FTA has a positive effect on trade among member countries. They also indicate that traditional gravity models can still provide a baseline to assess FTAs or PTAs.

2.4 Problems with Estimating the Gravity Equation

The standard gravity equation (log of gravity) is usually estimated with applying OLS to a cross-section of data. According to Baier and Bergstrand (2007) the main

[9] For example: (Tinbergen, 1962), (Frankel et al., 1995), (Frankel 1997) and (Baier and Bergstrand 2007).

problems of estimating a standard gravity equation using OLS (also apply when using panel data) are:

a) Endogeneity Bias:

Endogeneity occurs when one or more of the independent variables are correlated with the error term, leading to bias and inconsistent OLS results. Endogeneity comes from:

i. Omitted Variable (OV) Bias

This happens when an important determinant of trade does not appear on the right hand side of the equation and this variable is correlated with other independent variables, especially the independent variable(s) of interest (for this study the FTA dummy). There are three ways to correct for OV, first is to include the OV, second is to include fixed effects; the third is to use Instrumental Variable(s) (IV). Including omitted variables is not always possible, some variables are hard to measure, identify (e.g. country specific characteristics) or sometimes there is not enough data available for this variable. Using fixed effects will account for most time invariant omitted variables, yet interacting fixed effects with time effects will account for most time variant omitted variables. If there is an omitted variable that is correlated with one or more independent variables then the independent variable(s) are correlated with the error term. In this case, an IV is used to eliminate this correlation, where the IV is a determinant of at least one independent variable and an omitted variable, this helps eliminate the correlation between independent variable(s) and the error term, the major challenge is to find an appropriate IV. In the case of FTAs, Baier and Bergstrand (2007) state that the instruments should be correlated with FTA but not with the other factors causing trade between countries which is very hard to find, Baier and Bergstrand (2007) suggest that the use of fixed effects eliminates most of the OV bias and it is the best practical solution for OV problem.

ii. Reverse Causality (RC) Bias

In the context of applying the gravity equation to measure effects of an FTA, causality stems from the fact that the level of trade between countries may cause them to form/join an FTA, and then the impact of an FTA on trade may not be independent of trade levels between FTA members. So the larger trade between

countries the more inclined they are to form/join an FTA. Possible solution to RC is to use IV[10].

b) Sample Selection Bias

In the context of the gravity equation sample selection occurs when some countries do not trade at all, hence there are zero trade flows in the data. Since the model is usually estimated in a log-linear form the presence of zeros creates an estimation problem since the log of zero is undefined. The standard practice to deal with zeros was to drop the observations with zero value; dropping zeros entails losing information that may tell us something on trade flow. Also dropping zeros means that data is *selected* with regards to the value of the dependent variable, hence the sample is selected from the population and is not random, and this will bias the OLS estimates. The most common solutions to this problem in the gravity literature to address sample selection include: adding a positive constant to each data entry, using Non Linear Squares (NLS) to estimate the gravity equation as in Anderson and Van Wincoop (2001), using Poisson Pseudo Maximum Likelihood (PPML) as in Silva and Tenreyro (2006), a Two-Stage Heckman Selection (TSHS) model as suggested by Helpman et al. (2008) and Zero Inflated Negative Poisson (ZINP) as suggested by Burger et al. (2009). Adding a positive constant has no theoretical justification and there is no consensus on what is considered to be a small constant (results vary depending on the value of the constant). NLS as suggested by Anderson and Van Wincoop (2001) is a good solution for including zero trade, however it presents another problem where NLS requires assumptions on price elasticities for exporter and importer countries to estimate the MR terms. Anderson and Van Wincoop (2003) recommend using fixed effects for empirical estimation as a more practical way. PPML allows including zero trade flows; however as suggested by Burger et al. (2009), PPML is not appropriate for over dispersed data (when the variance is larger than the mean, which is the case with trade data). Also in many cases PPML estimates do not converge when using a large number of exporter-time and importer-time fixed effects. TSHS accounts for the omission of zero trade flows in two stages, where in the first stage a probit equation is used to predict the probability of trade between country pairs, then the estimates of the probit are used to construct a variable that adjust for sample selection and this variable enters as an additional regressor in the second stage gravity equation to

[10] Another RC problem is the causality between GDP and trade, one possible solution is to estimate an AvW version of the gravity equation where trade is scaled by GDP and thus GDP is on the left hand side not the right hand side.

adjust for sample selection, Silva and Tenreyro (2009) suggest that the assumptions needed for a robust estimation of the TSHS model for trade flows are too strong to make it practical, the main assumption of HMR depends on homoscedasticity of the error terms, Silva and Tenreyro (2009) results show that, all estimators based on the HMR model are misspecified[11]. Finally ZINP allows for estimation of a sample containing zero trade flows and also adjusts for the shortcomings of PPML, yet to my knowledge ZINP is only available for panel data with fixed effects via LIMDEP software which is unfortunately unable to handle models that contain more than 900[12] variables. Over all the decision on how to account for sample selection bias is dependent on the type of gravity model a researcher is estimating, data availability and the number of fixed effects used in the model.

2.5 GCC Trade and the Gravity Model

Studies applying the gravity model to analyse GCC trade are scarce[13]. One of the pioneering studies on GCC trade was Al-Atrash and Yousef (2000) which used the gravity model to measure the expected level of trade between Arab countries including GCC (GCC FTA dummy) using average trade cross sectional bilateral trade from 1995-97. They found that GCC FTA was not associated with higher trade. Mehanna (2002) used a cross sectional average of trade data during the 1996-99 time period covering 13 middle east countries (including GCC countries) he found that GCC countries were more integrated than other middle east countries, yet the results for GCC FTA were not significant. Bolbol et al. (2005) used a gravity model with fixed-year effects on panel data during the 1997-2003 time period to analyse the determinants of intra Arab exports under the influence of PTAs, and found a positive effect of GCC FTA on trade among GCC countries. Al-Shammari (2007) used a gravity model with exporter, importer and time effects on a panel of bilateral exports for a large sample of countries (including GCC countries) from 1990-2005, the model included a dummy to account for the announcement of GCC currency union in the year 2000, his main finding for the aggregate model that the effect of GCC currency union announcement in 2000 is negative. Al Said (2007) used gravity model with fixed effects on a pooled cross section of bilateral trade from 1995-2006 to measure the effect of GCC FTA on trade, he found that GCC FTA had no substantial effect on trade. Elsewhere, Insel

[11] I have applied the TSHS model to the sample in this chapter, there were some practical issues when applying TSHS to the data of this dissertation, these issues are presented in the appendix of chapter 4 along with the results of the second stage of the selection model.
[12] In the model with interaction effects the interactions are 3564 interactions (54x33x2).
[13] Here I am talking about aggregate trade, disaggregate trade is discussed in the chapter 3.

and Tekçe (2009) used a dynamic gravity model with random effects and static gravity models augmented with fixed effects on a panel of bilateral trade flows from 1997-2006 for 65 countries (including GCC countries) to analyse GCC trade patterns among members and the rest of the world. They found that GCC membership had different effects on each GCC country (some positive some negative and some insignificant positive/negative). Alsadoun (2009) used different variations of the gravity model augmented with exporter, importer, country pair and time fixed effects on panel of one way export (two way for GCC intra-trade) flows representing 39 countries (including GCC countries) during the 1980-2004 time period to assess the effect of GCC FTA on trade among GCC countries, he found that GCC FTA was associated with a negative effect on non-oil trade among GCC countries. Aljarrah (2010) used different variations of the gravity model with fixed effects and random effects to assess the determinants of trade for GCC countries using total exports of 18 countries (including GCC countries) which represent the major importers of GCC exports for the 1980-2004 time period. He found no evidence that GCC FTA increased trade among members post 1983. Finally, Abdmoulah (2011) used a gravity model with a zero inflated negative binomial specification on aggregate and disaggregate one way exports and one way imports (both exports and imports are two way for GCC intra-trade) of 65 countries (including GCC countries) over the 2000-2007 time period to assess the effect of GCC FTA on exports and imports among GCC countries. His main finding for aggregate trade was that GCC FTA had no effect on total exports and non-oil exports among GCC countries, while he found a positive and significant effect of GCC FTA on imports among GCC countries. All of the previously mentioned studies assessing GCC FTA effect on trade among GCC countries had at least one of the following shortcomings:

i. Some studies (Al-Atrash and Yousef, 2000), (Mehanna, 2002) and (Al Said, 2007) suffer from OV bias, where they fail to account for multilateral trade resistance as suggested by Anderson and Van Wincoop (2003). While Bolbol et al. (2005) used fixed year effects they did not control for importer and exporter fixed effects as recommended by Mátyás (1997) and Egger and Pfaffermayr (2003).

ii. Most of the studies using panel data used data post 1983, this limits the choice of fixed effects to exporter, importer and time effects, however country pair effects offers advantages over importer/exporter effects as it accounts for the appropriate measure of distance between countries and also includes any other

shared characteristics between trade partners (such as similarities in legal systems) that are time invariant.

iii. All of the studies did not include interactions of time and importer/exporter effects to account for the fact that multilateral resistance may change over time as suggested by Baier and Bergstrand (2007).

2.6 Methodology[14]

In section 2.4 the main problems with estimating the gravity model were presented, those being OV(s) bias, RC bias and selection bias. First, with regards to OV Baier and Bergstrand (2007) suggest that the use of fixed effects is the best practical solution for OV problem, all different variations of the gravity model throughout chapters 2-4 include fixed effects to control for OVs. Second, with regards to RC between FTA and trade this does not present a problem for GCC countries because the level of trade among GCC countries before (and even after) GCC FTA was enforced was low, RC between trade and FTA is a problem when a high level of trade between any group of countries is tempting to form a trade agreement which is not the case with GCC countries. In this chapter, I estimate different variations of two versions of the gravity model, the traditional gravity and the AvW gravity equation, both versions are estimated via OLS. There are advantages in using the AvW model; first, it eliminates any reverse causality that may be present in the regression between GDP and trade; one shortcoming is that the model does not incorporate the inclusion of GDP per capita, for this reason I will not augment different versions of the gravity equation with GDP per capita. Fortunately, the use of exporter-time and importer-time effects eliminates the need to include GDP or GDP per capita (the results for GCC FTA is exactly the same whether including GDP and GDP per capita, including one of them or omitting both). In equation (1.1), Z_{ij} would contain in it the GCC FTA dummy while it is contained in t_{ij} for equation (1.9). Also, I add time dummies for each year, these dummies control for variables such as globalization or shocks that effect the world economy. According to Wooldridge (2001),"with large N and small T it is a good idea to allow for separate intercepts for each time period. Doing so allows for aggregate time effects that have the same influence on Y_{it} for all i." another reason for adding the time

[14] I ignore RC bias because GCC has low level of intra-trade before and after FTA and GCC which may indicate that GCC RTAs and the ultimate goal of a Currency Union is an issue of politics rather than trade, I will also ignore the problem of sample selection due to the small percentage of observations dropped (about 8% of all possible observations are either zero or missing).

effect is that when time is added nominal and real models (deflated GDP and exports) will return almost identical estimates[15]. The use of fixed effects helps to adjust for OVs, especially multilateral resistance as indicated by Anderson and Van Wincoop (2003). With fixed effects estimation, I use both the traditional and the AvW gravity models, where instead of solving internally for multilateral resistance I use exporter and importer fixed effects to account for it. The use of fixed effects vs. random effects is more common in the case of RTAs as suggested by Egger (2000), Rose (2005), Baier and Bergstrand (2007) and Shepherd (2008). According to Egger (2000) the use of fixed effects is more appropriate when trade flows are estimated for a set of countries that are chosen, while random effects is more appropriate if the countries are chosen randomly[16]. Equations 2.1-2.5 illustrate different types of fixed effects that will be applied to the data. Shepherd (2008) states that fixed effects are consistent regardless of whether the true model is fixed effects or random effects while the opposite is not true, in addition fixed effects imposes less restrictive assumptions when compared to random effects (random distribution of mean and variance).

Exporter and importer effects control for unobservable time invariant country effects, the time effects control for unobservable effects that are time variant that effect all exporters and importers, the country pair effects control for possible unobservable interaction effects between exporter and importer, and finally the interaction between importer effects and time effects, and exporter effects and time effects control for possible interactions between country specific effects and time effects (such as time variation in multilateral resistance terms).

For the importer/exporter effects and time effects model, the following equation will be applied:

$$\ln X_{ijt} = \beta_0 + \beta_1 \ln GDP_{it} + \beta_2 \ln GDP_{jt} + \beta_3 \ln D_{ij} + \beta_4 GCCFTA_{ijt}$$
$$+ \beta_5 PTA_{ijt} + \beta_6 Border_{ij} + \beta_7 Lang_{ij} + \beta_8 PCol_{ij} + \beta_9 CCol_{ij}$$
$$+ \beta_{10} Island_{ij} + \beta_{11} Locked_{ij} + \theta_t + \gamma_j + \sigma_i + u_{ijt} \quad (2.1)$$

In AvW gravity equation form:

[15] The results presented in this paper are for nominal trade data; real results are almost identical and are not presented here for brevity.

[16] Haussman test for several variations of fixed and random effects gravity model confirms at 1% significance that fixed effects model is a more appropriate model.

$$\ln\left(\frac{X_{ijt}}{GDP_{it} * GDP_{jt}}\right) = \beta_0 + \beta_1 \ln D_{ij} + \beta_2 GCCFTA_{ijt} + \beta_3 PTA_{ijt}$$

$$+ \beta_4 Border_{ij} + \beta_5 Lang_{ij} + \beta_6 PCol_{ij} + \beta_7 CCol_{ij} + \beta_8 Island_{ij}$$

$$+ \beta_9 Locked_{ij} + \theta_t + \gamma_j + \sigma_i + u_{ijt} \quad (2.2)$$

For the country pair effects and time effects model, the following equation will be applied:

$$\ln X_{ijt} = \beta_0 + \beta_1 \ln GDP_{it} + \beta_2 \ln GDP_{jt} + \beta_3 GCCFTA_{ijt} + \beta_4 PTA_{ijt}$$

$$+ \theta_t + \sigma_i \gamma_j + u_{ijt} \quad (2.3)$$

In AvW gravity equation form:

$$\ln\left(X_{ijt}/GDP_{it} * GDP_{jt}\right) = \beta_0 + \beta_1 GCCFTA_{ijt} + \beta_2 PTA_{ijt}$$

$$+ \theta_t + \sigma_i \gamma_j + u_{ijt} \quad (2.4)$$

Finally for the last model the following equation will be applied:

$$\ln X_{ijt} = \beta_0 + \beta_1 GCCFTA_{ijt} + \beta_2 PTA_{ijt} + \sigma_i \gamma_j + \theta_t \gamma_j + \theta_t \sigma_i + u_{ijt} \quad (2.5)$$

Where:

X_{ijt}: Exports from country *i* to country *j* at time *t*;

GDP_{it} : GDP of country *i* at time *t*;

GDP_{jt} : GDP of country *j* at time *t*;

D_{ij} : Distance between country *i* and country *j*;

$GCCFTA_{ijt}$: A dummy that takes value of one if both countries are GCC members[17] at time *t*, and zero otherwise;

PTA_{ijt} : A dummy that takes value of one if both countries are members of a preferential trade agreement at time *t*, and zero otherwise;

$Border_{ij}$: A dummy that takes a value of one if country *i* and country *j* share a border and zero otherwise;

$Lang_{ij}$: A dummy that takes a value of one if country *i* and country *j* share the same official language and zero otherwise;

[17] The effect of the GCC dummy starts at 1983.

$PCol_{ij}$: A dummy that takes a value of one if country *j* was a previous colonizer of country *i*, and zero otherwise;

$CCol_{ij}$: A dummy that takes a value of one if both countries *i* and *j* have been previously colonized by the same colonizer, and zero otherwise;

$Island_{ij}$: A dummy that takes value of one if either country *i* or *j* is an island, and zero otherwise;

$Locked_{ij}$: A dummy that takes a value of one if either country is land locked and zero otherwise;

θ_t: Time effects;

γ_j: Importer fixed effects;

σ_i: Exporter fixed effect;

$\sigma_i\gamma_j$: Country pair fixed effects;

$\theta_t\gamma_j$: Time variant importer effects;

$\theta_t\sigma_i$: Time variant exporter effects.

In equations 2.3-2.5, all the time invariant variables are replaced by the interaction between importer effects γ and exporter effects σ that results in country pair effects $\sigma\gamma$. For country pair effects, I apply a two way model that assumes that $\sigma\gamma \neq \gamma\sigma$, where according to Egger and Pfaffermayr (2003) this is identical to a triple way model (including σ, γ and $\sigma\gamma$). The difference between a two way model and a one way model is that a two way model assumes that costs or barriers to exports from country *i* to country *j* can be different from costs or barriers to exports from *i* to *j*. For example, consider distance between two trading partners, shipping routes from point A to point B can be longer (more expensive) or shorter (less expensive) than routes from point B to point A due to logistics, economies of scale or other reasons.

In equation 2.5 GDP, is accounted for in the exporter-time $\theta_t\sigma_i$ and importer-time $\theta_t\gamma_j$ effects and does not show up in the regression equation. Since the results of equation 2.5 and its alternative AvW specification are identical I only use specification of equation 2.5.

In chapters 2, 3 and 4, the GCC FTA dummy takes the value of one from 1983 onwards if both the exporter and the importer are GCC countries, trade data used in this dissertation cover the period 1978-2010 it is not possible to include additional

years because the data for UAE starts at 1978. How many years to include before the FTA is an empirical matter. In the data sample used in this dissertation there are 5 years before GCC FTA, this may bias the result, especially if there is a large number of zeros/missing observations in the sample, unfortunately 1978 is the earliest date available.

Other possible ways to account for multilateral resistance includes estimating (1.1) and (1.9) with Non Linear Square (NLS) and Taylor Series Approximation (TSA) to capture MR terms as suggested by Baier and Bergstrand (2009a). Using NLS is complicated and cumbersome, and requires assumptions on price elasticities for exporter and importer countries to estimate the MR terms. Anderson and Van Wincoop (2003) recommend using fixed effects for empirical estimation as a more practical way. TSA is used to estimate the MR terms (internally) from a gravity model such as the one in Anderson and Van Wincoop (2003) and then use OLS to estimate the gravity equation. This method is fairly new and has not been used extensively, also it may not adjust for any other possibly missing omitted variables (such as internal distance for large area countries), and so I prefer to use the fixed effects approach.

2.7 Data Description and Results

2.7.1 Data Description

The data used in this chapter are:

Exports: Annual data from 1978-2010 representing the values of exports between 54 countries (including GCC countries). These countries were chosen because they are the major trade partner with GCC countries[18]and represent about 85-90 percent of GCC trade and about 80% of world trade. The values are measured in current US dollars and were obtained from UN Comtrade database. Time and country dummies account for inflation, so as indicated by Baldwin and Taglioni (2006) there is no need to deflate exports. Since the equation is estimated in logs I drop the zero values (about 8 percent of a complete sample); mirror exports (imports of the importing countries from exporting countries) are used rather than exports as they provide more observations for GCC countries.

GDP: annual data from 1978-2010 for 54 countries including GCC countries, the data were obtained from IMF World Economic Outlook (WEO) database[19].

[18] See appendix for country list.
[19] http://www.imf.org/external/data.htm

Population: Annual data from 1978-2010 for 54 countries including GCC countries, the data were obtained from IMF WEO database and will be used along with GDP data to calculate GDP per Capita which will be used in the sensitivity analysis section.

Distance: obtained from CEPII distance database[20]. According to CEPII distance is: "distances are calculated following the great circle formula, which uses latitudes and longitudes of the most important cities/agglomerations (in terms of population) for the dist variable …… incorporate internal distances based on areas"

Data on dummy variables were obtained from the CEPII geographic database except for the PTA variable that was obtained from the Database on Economic Integration Agreements constructed by Scott Baier and Jeffrey Bergstrand[21].

2.7.2 Results[22]

Three fixed effects specifications were applied; the first includes importer, exporter and time effects, the second includes country pair and time effects, and the third includes the previous two effects along with the interaction of time and importer effects and the interaction of time and exporter effects.

The 5 models presented in table (2.34) predict that GCC FTA had a positive effect on trade among GCC countries during the 1983-2010 time period, yet this positive effect is insignificant in models 1 and 2 which include exporter, importer and time effects. Since models 3, 4 and 5 control for more variables by including a more comprehensive set of fixed effects their findings are more reliable. The difference in the GCC FTA coefficient between the models with country pair and time effects (models 3 and 4) and the GCC FTA coefficient of model 5 that include country pair and exporter/importer-time effects is not a big difference, and this suggests that for aggregate trade the most important fixed effects that should be included in the gravity equation is country pair effects. Models 3-5 predict that GCC FTA increased trade among GCC countries during 1983-2010 time period by 108-146 percent depending on the model used. Detailed results for each fixed effects specification are presented in sections 2.7.2.1 and 2.7.2.3.

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[20] http://www.cepii.fr/anglaisgraph/bdd/distances.htm

[21] http://www.nd.edu/~jbergstr/DataEIA2009/EIA_Data_June30_2009.zip

[22] The original intention of this chapter was to investigate the effect of GCC FTA on aggregate non-oil trade among GCC countries, yet the results of this classification of trade among GCC countries was counter intuitive, were the gravity estimates of the effect of GCC FTA on aggregate non-oil trade among GCC countries turned out to be negative, which contradicts the findings in chapter three were most of the effect of GCC FTA on sectoral trade is positive and significant.

2.7.2.1 Time, Exporter and Importer Fixed Effects

Results are summarized in columns (1) and (2) of table 2.34, where the first column presents the results for the traditional gravity equation and the second contains the results for the AvW gravity equation. All coefficients have the expected signs (positive except for distance, island and land locked), except for the Border coefficient which turned out to be negative (insignificant). Models (1) and (2) are almost identical except for a small difference in the GCC FTA coefficient.

Exporter GDP coefficient value is 0.65 for model (1); this suggests that a 1 percent increase in exporter GDP was associated with 0.65 increase in exports from country *i* to country *j* during the 1978-2010 time period. Importer GDP coefficient value is 0.77 for model (1); this suggests that a 1 percent increase in importer GDP was associated with 0.77 percent increase in exports from country *i* to country *j* during the 1978-2010 time period. Distance impact does not change with specifications; it is -1.09 for both models, which means that on average an exporter exported 109 percent less to an importer that has twice the distance of another importer during the 1978-2010 time period.

The border dummy coefficients for models 1 and 2 are insignificant with a value of -0.18 and -0.17 respectively. The results suggest that on average for any two countries, sharing a border had no impact on trade between these two countries during the 1978-2010 time period; while sharing a common language between any two countries increased exports from country *i* to country *j* on average by 36 percent ($e^{0.31}$-1) according to models 1 and 2 during the 1978-2010 time period. Colonial linkages between the exporter and the importer countries tend to increase exports from country *i* to country *j* in models 1 and 2 (both models have identical coefficients). The first colonial linkages variable is the previous colonizer variable, its coefficient suggests that during the 1978-2010 time period, exports from country *i* to country *j* increased on average by 105 percent if one of either of the two countries was a colony of the other. While the other colonial linkages variable is the common colonizer variable, where its coefficient suggests that during the 1978-2010 time period, exports from country *i* to country *j* increased on average by 68 percent if both countries were colonized in the past by the same colonizer. The results of models 1 and 2 show that when one or both countries that trade together have limited access to direct transportation routes (sea and air for islands and air for land locked countries) then trade between these two countries will be less when compared with other countries that have full access to all transportation methods. The negative impact is higher for countries who only have access to direct air

transportation (land locked) which confirms that trade between countries (especially if they do not share a border) is usually via sea routes ; the island dummy variable coefficients suggest that during the 1978-2010 time period, exports from country *i* to country *j* decreased on average by 21 percent if one or both of the two countries is an island, while for landlocked countries the coefficient of the landlocked dummy s that during the 1978-2010 time period, exports from country *i* to country *j* decreased on average by 46 percent if one or both of the two countries is land locked.

The variable of interest GCC FTA had an insignificant coefficient with values of 0.08 and 0.11 for models (1) and (2) respectively, which suggests that on average, GCC FTA had no impact on trade among GCC countries during the 1983-2010 time period. The PTA dummy is also insignificant and has identical coefficients (-0.02) for models (1) and (2), which suggests that in general for all of the countries in the sample (excluding intra-GCC trade), trade agreements among member countries had no significant impact on trade among members of the same agreement during the 1978-2010 time period.

2.7.2.2 Time and Country Pair Fixed Effects

Results are summarized in columns (3) and (4) of table 2.34. By using country pair effects all time invariant variables are dropped from the regression, where the pair effect replaces them. The advantages of using country pair effects instead of importer/exporter effects is that one does not have to worry about the appropriate measure of distance between countries and the inclusion of any other shared characteristics between trade partners (such as similarities in legal systems) that are time invariant.

Exporter GDP coefficient value is 0.64 for model (3), suggesting that a 1 percent increase in exporter GDP was associated with 0.64 increase in exports from country *i* to country *j* during the 1978-2010 time period. Importer GDP coefficient value is 0.78 for model (3) suggesting that a 1 percent increase in importer GDP was associated with 0.78 percent increase in exports from country *i* to country *j* during the 1978-2010 time period. The variable of interest GCC FTA coefficient values are 0.73 and 0.86 for models (3) and (4) respectively, suggesting that on average GCC FTA increased trade among GCC countries by 108 and 136 percent during the 1983-2010 time period according to models (3) and (4) respectively. The PTA dummy has a low negative and significant impact; PTA coefficient values are -0.11 and -0.13 for models (3) and (4) respectively; this implies that

during the 1978-2010 time period in general for all of the countries in the sample (excluding GCC intra-trade) trade agreements among member countries decreased trade by 10 and 12 during the 1978-2010 time period percent according to models (3) and (4) respectively.

Replacing importer and exporter effects by country pair effects hardly changes the impact of exporter and importer GDP on trade between countries. The picture is quite different for GCC FTA and PTA, where these variables change from being insignificant to significant and increase significantly in absolute terms especially for the GCC FTA dummy. This might suggest that when using importer and exporter fixed effects instead of country pair effects, one might omit variables that affect the impact of trade agreements on trade (for example similarities in legal/economic regulations), then omission of these effects might lead to rendering the GCC FTA (or PTA) effect on trade among members to be insignificant.

2.7.2.3 Exporter-Time, Importer-Time and Country Pair Fixed Effects

The last model is presented in column (5) of table 2.34. This model incorporates all of the previous fixed effect models and adds to them interactions between importer and time effects and exporter and time effects. All the papers on GCC FTA and GCC bilateral trade have ignored these interaction effects, if these effects are significant, ignoring these interactions may lead to biased estimations of the regression coefficients.

The use of exporter-time and importer time effects eliminates the need for accounting for GDP in the gravity equation, and thus results do not include GDP exporter or GDP importer. In addition, country pair effects are used in this model which means that all time invariant variables are dropped from the regression, where the pair effect replaces them.

The variable of interest GCC FTA has a coefficient of 0.9, which suggests that on average, GCC FTA increased trade among GCC members from 1983-2010 by 146 percent (compared to average trade with non GCC countries). The PTA dummy has coefficients of -0.22 in model (5) which suggests that in general for all of the countries in the sample (excluding intra-GCC trade) trade agreements among member countries decreased trade members intra-trade by 20 percent during the 1978-2010 time period.

The interaction effects model differs from all other models in the since that adding GDP has no effect on the GCC FTA or the PTA coefficients. Also, in line with the models (3) and (4) in table 2.34 the interaction effects model predicts that GCC

FTA had a positive effect on trade among GCC countries during the period 1983-2010. The results from the interaction effects model makes the impact of GCC FTA and PTA higher on trade among members, suggesting that omitting the interaction between fixed effects and time effects may result in a biased estimation of the effect of GCC FTA (or PTA) on trade and in this particular case the omission may cause a downward bias of the GCC FTA dummy variable coefficient. Yet the difference in GCC FTA coefficient is not very big between model 5 and models 3 and 4, which might suggest that multilateral resistance and heterogeneity among GCC countries did not change significantly during 1978-2010 for the aggregate level of trade.

2.8 Sensitivity Analysis[23]

This section aims to test the sensitivity of section 2.7 results. I will limit the discussion to the country pair model and the interaction effects model, to see if altering these models would significantly change the GCC FTA coefficient results.

The first step of the sensitivity analysis is to "break up" the PTA dummy into several trade agreements. According to Baldwin (2006), a lump sum PTA variable does not control properly for other nations (non-GCC members in this study) trade arrangements, and this may have an effect on the GCC FTA coefficient. The PTA variable is broken up into nine PTA dummies: ASEAN, COMESA, ECO, EU, EURO, GAFTA, NAFTA, UMA[24] and the PTA dummy becomes PTA2 which accounts for any other trade agreements that are still present after removing eight TAs.

In the second step, I check the sensitivity of the two models to varying the GCC FTA start date and breaking up the PTA dummy. This is done to account for the possibility that GCC FTA had actually been announced/implemented around 1983, the years 1982, 1984 and 1985 were chosen as alternative start dates.

In the third step of the sensitivity analysis, I run a model that includes three alternative measures of economic size, the first is the sum of importer and exporter GDPs as a measure of both countries overall economic size; the second is a similarity index between the exporter and importer countries in GDPs which

[23] Sensitivity was done also by including a variable that accounts for changes in oil prices/production and variable to account for the Iraqi invasion of Kuwait (dummy variable) the results showed very small differences in GCC FTA coefficient for the country pair and time effects specification and no changes for the exporter-time and importer-time specification, these results are not included and are available upon request.

[24] See appendix for details and a list of countries for each TA

accounts for relative country size; and the third is an absolute difference in relative factor endowments between the exporter and the importer. The first two independent variables would account for the possibility that trade between countries is determined by product differentiation and economies of scales as suggested by NTT models such as the ones in Krugman (1980) and Helpman and Krugman (1985). While the last variable accounts for the possibility that trade between countries is determined by the difference in factor endowments between countries as suggested by the HO models or by the LH as in Helpman (1987), Bergstrand (1990) and Ghosh and Yamarik (2004), a positive and significant coefficient in the first two variables will give evidence in favour of NTT, a negative and significant coefficient for the third variable will give evidence for LH and a positive and significant coefficient gives evidence for HO model[25] . If after including these variables the GCC FTA varies significantly, then the models in the results section may be misspecified.

Finally, I add three lags/phases of implementation to account for the possibility that GCC FTA was implemented after the announcement or had several stages of removing trade restriction among GCC countries. The years chosen are 1988, 1993, 1998; according to Baier and Bergstrand (2007) almost all FTAs have phases of implementation, typically over 10 years. The models with lags/phases are estimated using the same variables and specifications from previous steps (except for varying start date).

Overall, most of the sensitivity results confirm the findings of section 2.7 that GCC FTA had resulted in trade creation among GCC countries during the period 1983-2010 at the aggregate level of trade although sensitivity results are lower than the main results (GCC FTA effect for the model with exporter/importer-time and country pair effects in section 2.7 was 146 percent while for sensitivity results with GCC FTA effect ranged between 62 and 114 percent). Also in the sensitivity results the difference of GCC FTA coefficient between models with country pair and time and models with exporter-time, importer-time and country pair effects becomes bigger which emphasises the importance of including exporter-time and

[25] The use of the difference in GDP per capita is consistent with Linder hypothesis which predicts that countries with close income levels (low difference) tend to trade more in general with each other, while it also can be used to test the Heckscher-Ohlin theory which indicates that a high difference in factor endowments between any two countries would produce more trade between them.

importer-time effects in the gravity model when using data that spans for a long period of time. More details are provided in sections 2.8.1-2.8.4.

2.8.1 FTA Effect, Accounting for Major Trading Agreements among GCC Trade Partners

The PTA variable is broken up to nine dummy variables which represent the most important trading agreements in the data among non-GCC countries. This specification is applied to two models; the first containing time and country pair fixed effects, and the second exporter-time, importer-time and country pair fixed effects. The results suggests that accounting for major trading agreements in the data among non- GCC countries separately lowers the effect of GCC FTA on aggregate trade among GCC countries, yet GCC FTA still increased aggregate trade among GCC countries between 1983 and 2010 even after accounting for major trade agreements among non-GCC countries.

Results of the gravity models with country pair and time effects are summarized in columns 1 and 2 of table 2.35 for the traditional gravity model and the AvW gravity model respectively. Looking at the traditional model (column 1), one can see that GDP coefficients do not exhibit a lot of change compared to GDP coefficients in table 2.34. The GCC FTA coefficient drops from 0.73 to 0.49 and is significant at the 10 percent level, this result implies that GCC FTA increased aggregate trade among GCC countries by 63 percent during the 1983-2010 time period (2.3 percent a year). After accounting for major trading agreements among non-GCC countries using the AvW version of the gravity model the effect of GCC FTA is lower than its equivalent in the results section, as GCC FTA coefficient drops from 0.86 to 0.64, and this result suggests that GCC FTA increased aggregate trade among GCC countries by 90 percent during the 1983-2010 time period (3.2 percent a year).

Results for the gravity model with exporter/importer-time and country pair effects are summarized in column 3 of table 2.35, the GCC FTA coefficient to drops from 0.9 to 0.76. This implies that after accounting for change in heterogeneity and multilateral resistance across time, shared characteristics between trade partners and accounting for major trading agreements among GCC trade partners, GCC FTA increased trade among GCC countries by 114 percent during the 1983-2010 time period (4.1 percent a year).

2.8.2 GCC FTA Effect, Varying GCC FTA Start GCC

The aim of this section is to account for the possibility that GCC FTA was announced in 1983 yet the implementation either lagged or some steps were done prior to the announcement. The alternative dates are 1982, 1984 and 1985. Comparing the results of this section with the results of section 2.7, one can see that changing the start date of GCC FTA had no significant impact on the effect of GCC FTA on aggregate trade among GCC countries during the 1983-2010 time period.

Results of the gravity models with country pair and time effects are summarized in columns 1-6 of table 2.36 for the traditional gravity model and the AvW gravity model respectively. Looking at the traditional model (columns 1, 3 and 5), the GCC FTA coefficients values for 1982, 1984 and 1985 are 0.46, 0.55 and 0.56 respectively, which suggests that GCC FTA increased aggregate trade among GCC countries by 58 -75 percent during the 1983-2010 time period (2.1 to 2.7 percent a year). Moving to the AvW model (columns 2, 4 and 6), the GCC FTA coefficients values for 1982, 1984 and 1985 are 0.58, 0.71 and 0.73 respectively, which suggests that GCC FTA increased aggregate trade among GCC countries by 79-108 percent during the 1983-2010 time period (2.8 to 3.8 percent a year).

Adding interaction effects to country pair effects increases the effect of GCC FTA on GCC intra-trade (the results are summarized in columns 1-3 of table 2.37). The GCC FTA coefficients values for 1982, 1984 and 1985 are 0.73, 0.77 and 0.73 respectively, which suggests that GCC FTA increased aggregate trade among GCC countries by 108-116 percent during the 1983-2010 time period (3.8 to 4.1 percent a year).

2.8.3 GCC FTA Effect, Accounting for Different Trade Theories

The goal of this section is to see if applying different structures of trade would significantly change the effect of GCC FTA on trade among GCC countries. Following Baltagi et al. (2003), the gravity equation becomes:

$$\ln X_{ijt} = \beta_0 + \beta_1 \ln GDPSUM_{ijt} + \beta_2 \ln \mathrm{SIM}_{\mathrm{ijt}} + \beta_3 \ln DCAP_{ijt}$$

$$+ \beta_4 GCCFTA_{ijt} + \beta_5 PTA_{ijt} + \theta_t + \sigma_i\gamma_j + u_{ijt} \qquad (2.6)$$

$$\ln X_{ijt} = \beta_0 + \beta_1 \ln GDPSUM_{ijt} + \beta_2 \ln SIM_{ijt} + \beta_3 \ln DCAP_{ijt}$$

$$+ \beta_4 GCCFTA_{ijt} + \beta_5 PTA_{ijt} + \theta_t + \sigma_i\gamma_j + \theta_t\gamma_j + \theta_t\sigma_i + u_{ijt} \qquad (2.7)$$

Where,

$$\ln GDPSUM_{ijt} = \ln(GDP_{it} + GDP_{jt})$$

$$\ln SIM_{ijt} = \ln\left[1 - \left(\frac{GDP_{it}}{GDP_{it} + GDP_{jt}}\right)^2 - \left(\frac{GDP_{jt}}{GDP_{it} + GDP_{jt}}\right)^2\right]$$

$$\ln DCAP_{ijt} = \left|\ln\left(\frac{GDP_{it}}{POPULATION_{it}}\right) - \ln\left(\frac{GDP_{jt}}{POPULATION_{jt}}\right)\right|$$

Since the AvW model contains GDP on the left hand side, I only test the theories using the traditional gravity model. The results show that accounting for other structures of trade does not really change the effect of GCC FTA on GCC intra-trade during the 1983-2010 time period, where GCC FTA continues to have a positive effect on trade among GCC countries during the 1983-2010 even after applying equations 2.6 and 2.7. The results of equation 2.6 and 2.7 favour NTT structure for trade, and the results suggest that the absolute difference in relative factor endowments (DCAP) has a negative coefficient which supports the LH, yet the effect on trade is very low.

Results of the gravity model with country pair and time effects are summarized in column 1 of table 2.38. The results suggest that even after accounting for NTT, HO and LH structures of trade, GCC FTA coefficient value is 0.5 which suggest that GCC FTA increased trade among GCC countries at the aggregate level by 65 percent during the 1983-2010 time period (2.3 percent a year). The results for trade structure variables support NTT with weak impact for LH.

Results for the gravity model with exporter-time, importer-time and country pair effects are summarized in column 2 of table 2.38. The GCC FTA coefficient value is 0.72, which suggests that GCC FTA increased GCC intra-trade at the aggregate level by 105 percent during the 1983-2010 time period (3.8 percent a year). Finally, when including the gravity equation with interaction effects and country effects the model supports the NTT structure with weak impact for LH.

2.8.4 GCC FTA Effect, Accounting for Possible FTA Phases

Three additional GCC dummies are added to the gravity model. The dummies are GCC 88, GCC 93 and GCC 98, with each dummy representing a five year implementation phase and they account for any possible implementation phases of GCC FTA. The Net GCC variable in table 2.39 represents the sum of the GCC FTA dummies coefficients (sum of only significant coefficients) and represents the net effect of GCC FTA on trade after accounting for 3 possible implementation phases. This specification will be applied to different variations of the gravity

model. The results of this section suggest that the omission of interaction effects tends to lower the effect of GCC FTA on GCC intra-trade at the aggregate level. Nevertheless GCC FTA still have resulted in trade creation among GCC countries even after accounting for implementation phases (in the gravity model with exporter-time, importer-time and country pair effects only), however the impact is much lower than the one suggested by the results section.

Results for different variations of a gravity model with country pair and time effects are summarized in columns 1-3 of table 2.39.The results suggest that after accounting for NTT, HO and LH structures of trade, major trade agreements among non-GCC countries and three possible phases of implementation of GCC FTA, GCC FTA had a small but significant negative effect on GCC intra-trade. The Net GCC variable has values of - 0.1, -0.11 and -0.1 for the three different specifications in columns 1-3, which implies that GCC FTA has decreased aggregate trade among GCC countries by about 10 percent for specifications 1, 2 and 3 during the 1983-2010 time period (0.4 percent a year).

Results for different variations of a gravity model with exporter-time importer-time and country pair effects are summarized in columns 4 and 5 of table 2.39. The results suggest that after accounting for NTT, HO and LH structures of trade, major trade agreements among non-GCC countries and three possible phases of implementation of GCC FTA, GCC FTA resulted in trade creation. Net GCC has a value of 0.48 and 0.49 for models 4 and 5 respectively, which suggests that GCC FTA increased GCC intra-trade by about 62 percent during the 1983-2010 time period (1.2 percent a year). The differing results between models 1-3 and models 4-5 is due to the inclusion of exporter-time importer-time to the gravity model, which accounts for heterogeneity and multilateral resistance to change over time and thus makes the net of GCC FTA dummies coefficients becomes positive.

2.9 Conclusion

The process of economic integration among GCC countries dates back to 1981 when the UEA was signed and reconfirmed in 2001 with signing of the NEA. The first step towards economic integration was the implementation of GCC FTA in 1983, with several steps to follow to reach the ultimate goal of a unified currency. The other steps of integration are recent which makes them hard to measure (2008 for the custom union full implementation and the common market is still under review), while the FTA has an adequate time frame to assess. Due to the nature of exports being dominated by oil production and imports being dominated by non-oil

commodities, it is not surprising that GCC intra-trade is very low at the aggregate level.

In this chapter, different specifications and variations of the gravity model of international trade were applied to a set of bilateral exports between GCC countries and 54 trade partners (including GCC countries) for the period 1978-2010. A dummy variable was included in all models to assess the impact of GCC FTA on GCC intra-trade at the aggregate level during the 1983-2010 time period. The gravity model augmented with exporter, importer and time effects suggested that GCC FTA had no impact on GCC intra-trade at the aggregate level during the 1983-2010 time period, while the results of the gravity model augmented with country pair and time effects and the gravity model augmented with exporter-time, importer-time and country pair effects suggested that on average GCC FTA resulted in trade creation among GCC members at the aggregate level during the 1983-2010 time period. To my knowledge this chapter is the first study that adds exporter-time and importer-time effects to the gravity model to assess the impact of GCC FTA on GCC intra-trade at the aggregate level. The gravity model augmented with exporter-time, importer-time and country pair effects predicts that for the period 1983-2010, GCC FTA had a positive effect on GCC intra-trade at the aggregate level of about 146 percent, which means that the GCC members tend to trade 146 percent more among themselves compared to trade with non GCC trade partners (the results of the gravity model augmented with country pair and time effects are very close). The results in this chapter confirms the findings of Baier and Bergstrand (2007) that it is important to account for time changes in heterogeneity and multilateral resistance when assessing the effect of trade agreements. To test the sensitivity of the results a number of variations to the gravity model were applied. The results of the sensitivity analysis confirmed that even after accounting for major trading agreements among GCC trade partners, different start dates of GCC FTA, different trade theories and possible implementation phases of GCC FTA, GCC FTA still had a positive effect on aggregate trade among GCC countries during the 1983-2010 time period.

Two main findings from the sensitivity analysis section are worth mentioning; the first is that summing up trade agreements among GCC trade partners in a single dummy variable (non GCC countries) tends to overestimate the impact of GCC FTA on trade among GCC countries; the second finding is that accounting for implementation phases of GCC FTA tends to lower the impact of GCC FTA significantly.

The results of this chapter may be a result of using aggregate data, according to Anderson and Yotov (2010), aggregation of trade data can bias gravity results, in the following chapter, I use sectoral data, this would remove some of the aggregation effects and help to identify the specific trade sectors that benefited from GCC FTA during the 1983-2010 time period.

Table 2.1: GCC Total Trade 1978-1982 (Billion $)[26]

Country	Trade	% Total Trade
Japan	191.5	24.4%
United States	108.3	13.8%
GCC	7.85	1%
Rest of world	485.1	61.8%
Total	785	100.0%

Table 2.2: GCC Total Trade 2003-2007 (Billion $)

Country	Trade	% Total Trade
Japan	390	18.4%
South Korea	229	10.8%
GCC	55.1	2.6%
Rest of world	1445.9	68.2%
Total	2,120	100.0%

[26] All Trade data in tables and figures are from United Nations Statistics (UNCOMTRADE)

Table 2.3: GCC Countries % Shares of GCC Total Trade

Country/Year	78-82	83-87	88-92	93-97	98-02	03-07
Bahrain	2%	3%	3%	3%	2%	2%
Kuwait	11%	13%	9%	13%	12%	11%
Oman	3%	6%	7%	7%	7%	6%
Qatar	4%	4%	4%	4%	7%	9%
Saudi Arabia	65%	59%	61%	52%	47%	48%
UAE	15%	15%	16%	20%	25%	25%

Table 2.4: GCC Intra-Trade by Country 1978-1982 (%)[27]

Exp/Imp	Bahrain	Kuwait	Oman	Qatar	Saudi Arabia	UAE	GCC Imports
Bahrain	-	0.5%	6.1%	0.3%	6.7%	21.0%	34.6%
Kuwait	0.3%	-	0.7%	0.7%	8.5%	5.8%	16.1%
Oman	0.1%	0.2%	-	0.0%	0.3%	0.0%	0.5%
Qatar	0.1%	0.8%	0.0%	-	3.8%	1.9%	6.7%
Saudi Arabia	11.6%	1.4%	0.2%	0.4%	-	2.2%	15.8%
UAE	1.3%	1.1%	17.5%	2.1%	4.3%	-	26.3%
GCC Exports	13.4%	4.0%	24.5%	3.6%	23.5%	31.0%	100.0%

Table 2.5: GCC Intra-Trade by Country 2003-2007 (%)

Exp/Imp	Bahrain	Kuwait	Oman	Qatar	Saudi Arabia	UAE	GCC Imports
Bahrain	-	0.4%	0.9%	1.4%	5.5%	1.2%	9.4%
Kuwait	0.6%	-	0.8%	0.6%	1.7%	1.0%	4.5%
Oman	0.2%	0.3%	-	1.0%	2.1%	1.2%	4.9%
Qatar	0.3%	0.1%	0.3%	-	1.2%	0.9%	2.9%
Saudi Arabia	3.4%	4.7%	3.0%	5.3%	-	8.5%	25.0%
UAE	2.1%	2.9%	26.6%	7.0%	14.8%	-	53.3%
GCC Exports	6.6%	8.4%	31.6%	15.3%	25.3%	12.8%	100.0%

[27] Note that this is a two way table, so for example Bahrain exports to Kuwait = Kuwait imports from Bahrain so the share of total trade of Bahrain of GCC trade = (%exports+%imports) and because of the two way nature of the table the sum of shares for all GCC trade for all countries would equal 200%.

Table 2.6: GCC Total Exports1978-1982 (Billion $)

Country	Exports	% Total Exports
Japan	146.2	26.3%
United States	65.6	11.8%
GCC	7.85	1.4%
Rest of world	336.35	60.5%
Total	556	100.0%

Table 2.7: GCC Total Exports 2003-2007 (Billion $)

Country	Exports	% Total Exports
Japan	327.8	21.7%
South Korea	200.93	13.3%
GCC	54.4	3.6%
Rest of world	927.67	61.4%
Total	1510.8	100.0%

Table 2.8: Bahrain Total Exports 1978-1982 (Billion $)

Country	Exports	% Total Exports
GCC	2.85	32%
Japan	1.87	21%
Singapore	1.34	15%
Rest of world	2.84	32%
Total	8.9	100.0%

Table 2.9: Bahrain Total Exports 2003-2007 (Billion $)

Country	Exports	% Total Exports
GCC	5.8	25.6%
India	3.07	13.5%
United States	1.64	7.2%
Rest of world	12.26	53.7%
Total	22.77	100.0%

Table 2.10: Kuwait Total Exports 1978-1982 (Billion $)

Country	Exports	% Total Exports
Japan	15.49	26.7%
South Korea	6.03	10.4%
GCC	1.22	2.1%
Rest of world	35.26	60.8%
Total	58	100.0%

Table 2.11: Kuwait Total Exports 2003-2007 (Billion $)

Country	Exports	% Total Exports
Japan	32.87	19.1%
South Korea	29.43	17.1%
GCC	2.58	1.5%
Rest of world	107.23	62.3%
Total	172.11	100.0%

Table 2.12: Oman Total Exports 1978-1982 (Billion $)

Country	Exports	% Total Exports
Japan	8	57.5%
United States	1.8	13%
GCC	0.04	0.3%
Rest of world	4.06	29.2%
Total	13.9	100.0%

Table 2.13: Oman Total Exports 2003-2007 (Billion $)

Country	Exports	% Total Exports
China	25.87	32.7%
South Korea	13.45	17%
GCC	2.93	3.7%
Rest of world	36.87	46.6%
Total	79.12	100.0%

Table 2.14: Qatar Total Exports 1978-1982 (Billion $)

Country	Exports	% Total Exports
Japan	7.35	33.1%
France	3.11	14%
GCC	0.53	2.4%
Rest of world	11.21	50.5%
Total	22.2	100.0%

Table 2.15: Qatar Total Exports 2003-2007 (Billion $)

Country	Exports	% Total Exports
Japan	47.14	36.8%
South Korea	25.5	19.9%
GCC	1.03	0.8%
Rest of world	54.43	42.5%
Total	128.1	100.0%

Table 2.16: Saudi Arabia Total Exports 1978-1982 (Billion $)

Country	Exports	% Total Exports
Japan	82.2	22%
United States	50.8	13.6%
GCC	1.12	0.3%
Rest of world	11.21	64.1%
Total	239.48	100.0%

Table 2.17: Saudi Arabia Total Exports 2003-2007 (Billion $)

Country	Exports	% Total Exports
Japan	125	17%
United States	121.3	16.5%
GCC	12.5	1.7%
Rest of world	476.4	64.8%
Total	735.2	100.0%

Table 2.18: United Arab Emirates Total Exports 1978-1982 (Billion $)

Country	Exports	% Total Exports
Japan	31.28	39.2%
United States	10.53	13.2%
GCC	2.07	2.6%
Rest of world	35.92	45%
Total	79.8	100.0%

Table 2.19: United Arab Emirates Total Exports 2003-2007 (Billion $)

Country	Exports	% Total Exports
Japan	100.1	26.8%
India	54.9	14.7%
GCC	30.25	8.1%
Rest of world	188.25	50.4%
Total	373.5	100.0%

Table 2.20: GCC Total Imports 1978-1982 (Billion $)

Country	Imports	% Total Imports
Japan	44.5	19.4%
United States	42.9	18.7%
GCC	7.85	3.4%
Rest of world	134.25	58.5%
Total	229.5	100.0%

Table 2.21: GCC Total Imports 2003-2007 (Billion $)

Country	Imports	% Total Imports
United States	73.68	12.1%
Japan	61.5	10.1%
GCC	55.41	9.1%
Rest of world	418.31	68.7%
Total	608.9	100.0%

Table 2.22: Bahrain Total Imports 1978-1982 (Billion $)

Country	Imports	% Total Imports
United States	1.24	16.7%
United Kingdom	1.16	15.6%
GCC	1.05	14.2%
Rest of world	3.96	53.5%
Total	7.41	100.0%

Table 2.23: Bahrain Total Imports 2003-2007 (Billion $)

Country	Imports	% Total Imports
GCC	3.71	17.1%
Japan	2.5	11.5%
Australia	1.95	9%
Rest of world	13.56	62.4%
Total	21.72	100.0%

Table 2.24: Kuwait Total Imports 1978-1982 (Billion $)

Country	Imports	% Total Imports
Japan	6.82	23%
United States	4.33	14.6%
GCC	0.33	1.1%
Rest of world	18.19	61.3%
Total	29.67	100.0%

Table 2.25: Kuwait Total Imports 2003-2007 (Billion $)

Country	Imports	% Total Imports
GCC	7.54	12.8%
United States	7	11.9%
China	5.54	9.4%
Rest of world	38.85	65.9%
Total	58.93	100.0%

Table 2.26: Oman Total Imports 1978-1982 (Billion $)

Country	Imports	% Total Imports
GCC	1.93	22.1%
Japan	1.75	20.1%
United Kingdom	1.4	16%
Rest of world	3.64	41.8%
Total	8.72	100.0%

Table 2.27: Oman Total Imports 2003-2007 (Billion $)

Country	Imports	% Total Imports
GCC	14.96	31.9%
Japan	7.6	16.2%
United States	2.49	5.3%
Rest of world	21.86	46.6%
Total	46.91	100.0%

Table 2.28: Qatar Total Imports 1978-1982 (Billion $)

Country	Imports	% Total Imports
Japan	1.49	20.7%
United Kingdom	1.21	16.7%
GCC	0.28	3.9%
Rest of world	4.24	58.7%
Total	7.22	100.0%

Table 2.29: Qatar Total Imports 2003-2007 (Billion $)

Country	Imports	% Total Imports
GCC	8.68	14.7%
United States	6.61	11.2%
Japan	6.32	10.7%
Rest of world	37.45	63.4%
Total	59.06	100.0%

Table 2.30: Saudi Arabia Total Imports 1978-1982 (Billion $)

Country	Imports	% Total Imports
United States	31.28	22.2%
Japan	26.63	18.9%
GCC	1.83	1.3%
Rest of world	81.15	57.6%
Total	140.9	100.0%

Table 2.31: Saudi Arabia Total Imports 2003-2007 (Billion $)

Country	Imports	% Total Imports
United States	43.5	15.8%
Japan	26.98	9.8%
GCC	13.49	4.9%
Rest of world	191.33	69.5%
Total	275.3	100.0%

Table 2.32: United Arab Emirates Total Imports 1978-1982 (Billion $)

Country	Imports	% Total Imports
Japan	6.85	19.3%
United Kingdom	5.57	15.7%
GCC	2.45	6.9%
Rest of world	20.63	58.1%
Total	35.5	100.0%

Table 2.33: United Arab Emirates Total Imports 2003-2007 (Billion $)

Country	Imports	% Total Imports
India	16.9	11.5%
United States	12.8	8.7%
GCC	7.05	4.8%
Rest of world	110.25	75%
Total	147	100.0%

Table 2.34: Regression Results

Variable/Model	1	2	3	4	5
GDP Exporter	0.65***	-	0.64***	-	-
GDP Importer	0.77***	-	0.78***	-	-
Distance	-1.09***	-1.09***	-	-	-
Border	-0.18	-0.17	-	-	-
Language	0.31***	0.31***	-	-	-
Pre-Colonizer	0.72***	0.72***	-	-	-
Co-Colonizer	0.52***	0.52***	-	-	-
Island	-0.24**	-0.24**	-	-	-
Landlocked	-0.62**	-0.62**	-	-	-
GCC FTA	0.08	0.11	0.73***	0.86***	0.9***
PTA	-0.02	-0.02	-0.11**	-0.13***	-0.22***
R-Square	0.775	0.476	0.888	0.737	0.905
Observations	87266	87266	87266	87266	87266
Time Effects	Yes	Yes	Yes	Yes	No
Exporter and Importer Effects	Yes	Yes	No	No	No
Country Pair Effects	No	No	Yes	Yes	Yes
Exporter-Time & Importer-Time Effects	No	No	No	No	Yes

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

Columns 2 and 4 represent the AvW gravity specification of the dependent variable: $\ln\left(X_{ijt}/GDP_{it} * GDP_{jt}\right)$

Table 2.35: Sensitivity Results, Accounting for Major Trading Agreements among GCC Trade Partners

Variable/Model	1	2	3
GDP Exporter	0.63***	-	-
GDP Importer	0.78***	-	-
GCC FTA	0.49*	0.64**	0.76**
PTA2	-0.12**	-0.13***	-0.19***
ASEAN	0.42**	0.29	-0.29
COMESA	0.42	0.62	0.8**
ECO	0.48	0.62	-0.61
EU	-0.21***	-0.22***	0.19**
EURO	-0.11***	-0.08**	0.33***
GAFTA	0.53***	0.48***	0.32**
NAFTA	0.42**	0.44**	-0.16
UMA	0.95*	1.1**	0.32
R-Square	0.888	0.738	0.906
Observations	87266	87266	87266
Time Effects	Yes	Yes	No
Country Pair Effects	Yes	Yes	Yes
Exporter-Time & Importer-Time Effects	No	No	Yes

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

Column 2 represents the AvW gravity specification of the dependent variable: $\ln\left(X_{ijt}/GDP_{it} * GDP_{jt}\right)$

Table 2.36: Sensitivity Results, Varying GCC FTA Start Date (Time and Country Pair Effects)

Variable	1	2	3	4	5	6
GDP Exporter	0.63***	-	0.63***	-	0.63***	-
GDP Importer	0.78***	-	0.78***	-	0.78***	-
GCC 82	0.46*	0.58**	-	-	-	-
GCC 84	-	-	0.55**	0.71***	-	-
GCC 85	-	-	-	-	0.56**	0.73***
PTA2	-0.12**	-0.13***	-0.12**	-0.13***	-0.12**	-0.13***
ASEAN	0.42**	0.29	0.42**	0.29	0.42**	0.29
COMESA	0.42	0.62	0.42	0.62	0.42	0.62
ECO	0.48	0.62	0.48	0.62	0.48	0.62
EU	-0.21***	-0.22***	-0.21***	-0.22***	-0.21***	-0.22***
EURO	-0.11***	-0.09**	-0.11***	-0.09**	-0.11***	-0.09**
GAFTA	0.53***	0.5***	0.51***	0.47***	0.51***	0.46***
NAFTA	0.42**	0.44**	0.42**	0.44**	0.42**	0.44**
UMA	0.95*	1.1**	0.96*	1.1**	0.96*	1.11**
R-Square	0.888	0.738	0.888	0.738	0.888	0.738
Observations	87266	87266	87266	87266	87266	87266

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

Columns 2, 4 and 6 represent the AvW gravity specification of the dependent variable: $\ln\left(X_{ijt}/GDP_{it} * GDP_{jt}\right)$

Table 2.37: Sensitivity Results, Varying GCC FTA Start Date (Exporter-Time, Importer-Time and Country Pair Effects)

Variable/Model	1	2	3
GCC 82	0.73**	-	-
GCC 84	-	0.77**	-
GCC 85	-	-	0.73***
PTA2	-0.19***	-0.19***	-0.19***
ASEAN	-0.29	-0.29	-0.29
COMESA	0.8**	0.8**	0.8**
ECO	-0.61	-0.61	-0.61
EU	0.19**	0.19**	0.19**
EURO	0.33***	0.33***	0.33***
GAFTA	0.32**	0.31**	0.31**
NAFTA	-0.16	-0.16	-0.16
UMA	0.32	0.32	0.32
R-Square	0.906	0.906	0.906
Observations	87266	87266	87266

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

Table 2.38: Sensitivity Results, Accounting for Different Trade Theories

Variable/Model	1	2
Sum of GDPs	1.44***	1.95***
Similarity Index	0.63***	1.13
Differences in Endowments	-0.03*	-0.03**
GCC FTA	0.5*	0.72**
PTA2	-0.12**	-0.18***
ASEAN	0.43**	-0.26
COMESA	0.42	0.74*
ECO	0.52	-0.62
EU	-0.21***	0.18**
EURO	-0.1***	0.33***
GAFTA	0.51***	0.33**
NAFTA	0.42**	-0.14
UMA	0.95*	0.22
R-Square	0.888	0.929
Observations	87266	87266
Time Effects	Yes	No
Country Pair Effects	Yes	Yes
Exporter-Time & Importer-Time Effects	No	Yes

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

Table 2.39: Sensitivity Results, Accounting for Different Trade Theories and Possible FTA Phases

Variable/Model	1	2	3
GDP Exporter	0.64***	-	-
GDP Importer	0.78***	-	-
Sum of GDPs	-	-	1.46***
Similarity Index	-	-	0.63***
Differences in Endowments	-	-	-0.03*
GCC FTA	0.26	0.31	0.26
GCC 88	0.52***	0.71***	0.52***
GCC 93	0.26***	0.25*	0.26*
GCC 98	-0.88***	-1.07***	-0.88***
Net GCC	-0.1	-0.11	-0.1
PTA2	-0.12**	-0.13**	-0.12**
ASEAN	0.43**	0.32*	0.43**
COMESA	0.42	0.62	0.43
ECO	0.52	0.61	0.53
EU	-0.2***	-0.22***	-0.21***
EURO	-0.11***	-0.12***	-0.11***
GAFTA	0.64***	0.63***	0.63***
NAFTA	0.42**	0.42**	0.43**
UMA	0.93*	1.07*	0.93*
R-Square	0.888	0.738	0.888
Observations	87266	87266	87266
Time Effects	Yes	Yes	Yes
Country Pair Effects	Yes	Yes	Yes
Exporter-Time & Importer-Time Effects	No	No	No

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

Table 2.39 (Continued): Sensitivity Results, Accounting for Different Trade Theories and Possible FTA Phases

Variable/Model	4	5
GDP Exporter	-	-
GDP Importer	-	-
Sum of GDPs	-	0.92***
Similarity Index	-	0.6***
Differences in Endowments	-	-0.03**
GCC FTA	0.42*	0.41*
GCC 88	0.53**	0.48*
GCC 93	0.45***	0.45***
GCC 98	-0.91***	-0.86***
Net GCC	0.49	0.48
PTA2	-0.19***	-0.18***
ASEAN	-0.29	-0.27
COMESA	0.8**	0.75*
ECO	-0.67	-0.63
EU	0.19**	0.18**
EURO	0.33***	0.33***
GAFTA	0.42**	0.42**
NAFTA	-0.16	-0.14
UMA	0.31	0.22
R-Square	0.929	0.906
Observations	87266	87266
Time Effects	No	No
Country Pair Effects	Yes	Yes
Exporter-Time & Importer-Time Effects	Yes	Yes

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

Appendix 2.A

Table 2.A.1: GCC Countries and Major Trading Partners

Algeria	Iran	Qatar
Australia	Ireland	Romania
Austria	Italy	Saudi Arabia
Bahrain	Japan	Singapore
Brazil	Jordan	South Korea
Canada	Kenya	Spain
China	Kuwait	Sudan
Cyprus	Lebanon	Sweden
Denmark	Libya	Switzerland
Egypt	Malaysia	Syria
Finland	Mauritania	Tanzania
France	Mauritius	Thailand
Germany	Morocco	Tunisia
Greece	Netherlands	Turkey
Hong Kong	Oman	United Arab Emirates
Hungary	Pakistan	United Kingdom
India	Philippines	United States
Indonesia	Portugal	

Table 2.A.2: Trade Agreements

Agreement	Members (included in the paper only)
ASEAN	Indonesia, Malaysia, Philippines, Singapore, Thailand
COMESA	Egypt, Kenya, Sudan, Tanzania
ECO	Iran, Pakistan, Turkey
EU	Austria, Belgium, Cyprus, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, Spain, Sweden, UK
EURO	Austria, Belgium, Cyprus, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, Spain
GAFTA	Bahrain, Egypt, Jordan, Kuwait, Lebanon, Morocco, Oman, Qatar, Saudi Arabia, Syria, UAE, Tunisia
NAFTA	Canada, Mexico, USA
UMA	Algeria, Morocco, Tunisia

3 The Effect of GCC FTA on Intra-Industry Trade among GCC Countries, What Does Gravity Tell Us?

3.1 Introduction

Free Trade Agreements (FTAs) are usually assessed at the aggregate level, where models aggregate all products of a country as a single homogenous good. There is less attention in the literature to the impact of FTAs and Regional Trade Agreements (RTA) on trade by sector, and this might be due to the fact that such estimation is less straight forward and bares more complications than an estimation of aggregate trade.

In 1983, the Gulf Cooperation Council (GCC) countries, Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates (UAE) established GCC FTA which eliminated tariffs on all intra-GCC imports. There are very few empirical studies that assess the impact of GCC FTA on the disaggregate level of trade. Most studies on GCC FTA or GCC trade apply the gravity model to aggregate trade. However, the impact of an FTA on trade sectors can be important, as it may serve as a guideline for export-industries policies, especially in GCC countries whose trade are concentrated around oil/gas products. GCC countries are seeking resource diversification so an assessment of how GCC FTA affects sectoral trade can serve as a guideline on which industries have more potential for GCC Intra-trade. Also, with the ultimate goal of Monetary Union (MU), it is important to know how a simpler version of economic/trade integration have changed intra-industry trade among GCC countries and which sectors might be more sensitive to changes in trade policy.

In this chapter, I investigate the effect of GCC FTA on intra-industry trade among GCC countries at the first digit level of the Standard International Trade Classification Revision1 (SITC Rev.1) system. I apply different variations of a sectoral gravity model of international trade to a set of bilateral trade flows representing 54 countries (including GCC countries), which represent GCC countries major trade partners by trade sector during the 1978-2010 time period. To my knowledge this is the first study that applies a sectoral gravity model augmented with country pair and time effects or a sectoral gravity model augmented with exporter-time, importer-time and country pair effects to assess the impact of GCC FTA on GCC intra- industry trade. The results of the previous chapter suggests that omitting exporter-time, importer-time and country pair effects results in a bias estimation of the effect of GCC FTA on aggregate trade among GCC countries, the results of this chapter suggest that the omission of these effects

(especially exporter-time and importer-time) can result in a bias estimation of the effect of GCC FTA on trade by sector among GCC countries.

The rest of this chapter is organized as follows. Section 3.2 provides an overview of GCC countries trade patterns by sector. Section 3.3 provides a summary of the literature on the impact of FTA on sectoral trade. Section 3.4 discusses the theoretical background of the gravity model and problems with gravity estimation at the disaggregate level. Section 3.5 presents the methodology used to estimate the gravity model. Section 3.6 presents data descriptions and results. Section 3.7 presents sensitivity analysis of the results, and the last section provides an overall conclusion and summary of chapter three.

3.2 GCC Disaggregate Trade Patterns

This chapter analyses trade by sectors (0-9) according to the SITC Rev. 1 classification system. A list of these ten sectors is provided in the appendix. This section will give an overview for each sector (the sector number is between parentheses) by total trade (imports + exports), GCC intra-trade, imports and exports. GCC trade experienced high growth during the 1978-2010 time period, with some sectors growing more than others. Trade is mainly dominated by sector 3 which is concentrated in exports, while trade in other sectors is concentrated in imports. Although GCC countries have an overall trade surplus, for non-oil sectors, GCC countries have a trade deficit (with the exception of sector 2 post 2003 and sector 5 post 1993). One thing to notice is that aggregate imports growth is very close to aggregate exports growth, so if the patterns of exports and imports remain the same it is possible that imports might surpass exports and the trade balance will become negative especially if there is a substantial drop in oil prices.

Trade among GCC countries has grown over the last three decades. Unlike total trade, GCC intra-trade is not dominated by the oil sector (about 8.7 percent between 1978 and 2007); on the contrary after GCC FTA came into force trade in sector 3 commodities dropped significantly in terms of value and relative share of GCC intra-trade. On average during the period 1978-2010, the largest sector was sector 6 and the smallest was sector 4, yet sector 4 experienced the largest intra-trade growth compared with the other sectors. Sections 3.2.1-3.2.3 give a more detailed view of GCC trade patterns, additional details are presented in tables (3.1-

3.29)[28] which summarize total trade, intra- trade, exports and imports of GCC countries.

3.2.1 Trade by Sector

Trade by sector for GCC countries is presented in tables 3.1 and 3.2. Sector 3 (Mineral fuels, Lubricants and Related Materials) is the largest and most important trade sector for GCC countries, it is highly concentrated in exports rather than imports, yet it is not very big when it comes to GCC intra-trade. During the 1978-1982 time period, trade in sector 3 commodities reached $550.9 billion, this figure increased to $1,277 billion (1.277 trillion) during the 2003-2007 time period. Moving to share in GCC total trade, during the1978-1982 time period, the share of sector 3 was 70.1 percent, while it decreased to 60.3 percent during the 2003-2007 time period. Overall sector 3 has grown by 123 percent between the two periods and its share of GCC trade relative to other sectors has decreased.

During the 1978-1982 time period, the largest trade sectors were sector 3 (Mineral fuels, Lubricants and Related Materials), which accounted for about 70 percent of total trade followed by sector 7 (Machinery and Transport Equipment), which accounted for 12.7 percent of GCC total trade, while the smallest sectors in terms of their shares of GCC total trade were sectors 4 (Animal and Vegetable Oils and Fats), which accounted for 0.1 percent of GCC total trade and sector 1 (Beverages and Tobacco), which accounted for 0.4 percent of GCC total trade. During the 2003-2007 time period, the largest trade sectors were sector 3 (Mineral fuels, Lubricants and Related Materials), which accounted for about 60 percent of GCC total trade followed by sector 6 (Manufactured Goods), which accounted for 14.6 percent of GCC total trade, while the smallest sectors in terms of their shares of GCC total trade were sectors 4 (Animal and Vegetable Oils and Fats), which accounted for 0.2 percent of GCC total trade, and sector 1 (Beverages and Tobacco), which accounted for 0.3 percent of GCC total trade.

In terms of growth in value, the largest growth was attributed to sector 9 commodities (Other Goods and Transactions), which increased from $1.5 billion during the 1978-1982 time period to $22.1 billion during the 2003-2007 time period (about 1373 per cent), while the least growing sector was sector 1(Beverages and Tobacco), which increased from $3.2 billion during the 1978-1982 time period to $7 billion during the 2003-2007 time period.

[28] Although the study covers data up to 2010, for trade comparisons I stop at 2007, because there are data missing for some GCC countries for the years 2008-2010.

3.2.2 GCC Intra-Trade by Sector

Trade among GCC countries has grown over the last three decades. Trade has grown from $7.84 billion during the 1978-1982 time period to $55.25 billion during the 2003-2007 time period, and the share of trade among GCC countries as a percentage of GCC total trade have grown from 1.0 percent to 2.8 percent between the 1978-1982 and 2003-2007 time periods. This growth in value and share raises the question of whether this increase or a part of it could be attributed to GCC FTA coming into force in 1983, yet this increase in intra-trade is still modest due to the dominance of oil exports as the main contributor to GCC total trade. Unlike exports with the world, intra-GCC trade are not dominated by the oil sector (about 8.7 percent between 1978 and 2007), but rather after GCC FTA came into force, trade in sector 3 commodities dropped significantly in terms of value and relative share of GCC intra-trade. On average between 1978 and 2007 the sector that had the largest share of GCC intra-trade was sector 6 (Manufactured Goods) and the sector with the smallest share was smallest was sector 4 (Animal and Vegetable Oils and Fats), yet sector 4 experienced the largest intra-trade growth compared with the other sectors.

Trade by sector among GCC countries is presented in tables 3.3-3.25. Sectors 0, 2 ,4, 5, 6 ,7 and 9 shares of total GCC intra-trade have increased considerably perhaps on the expense of trade in sector 3 commodities among GCC countries that dropped significantly from 48.9 percent during 1978-1982 period to 5.2 percent in the 2003-2007 period.

In terms of growth in the share or value of sectors, the largest growth was attributed to sector 4 commodities (Animal and Vegetable Oils and Fats) which increased from $6 million during the 1978-1982 time period to $1.16 billion during the 2003-2007 time period (about 19233 percent). The least growing (negative growth) sector was sector 3 (Mineral fuels, Lubricants and Related Materials) where trade decreased from $3.84 billion during the 1978-1982 time period to $2.85 billion in the 2003-2007 time period (about 26 percent).

Looking at the contribution of individual GCC countries to GCC intra-trade by sector (tables 3.6-3.25) for the 1978-1982 and 2003-2007 periods, one can see that in the 1978-1982 period in most sectors UAE was the largest exporter, exporting over 50% of GCC exports to other GCC countries in most sectors; while the largest shares of imports in most sectors were attributed to Oman and to a lesser extent Saudi Arabia, where either of them have accounted for more than 50% of intra-

GCC imports in most sectors. The picture is somewhat different in the 2003-2007 period. Although the UAE is still the largest exporter in almost all sectors, its share of exports has fell considerably in a number of sectors; while on the import side the concentration of imports fell greatly, Oman and Saudi Arabia are still the largest importers of GCC products in most sectors, yet in most sectors the share of the largest importer has fell by a large amount. These changes in exports and imports shares of trade among GCC countries between the two periods indicate that in most sectors trade has become more distributed among GCC countries rather than being dominated by a single country pair (for example in 1978-1982, 61% of GCC intra-trade in sector 0 was attributed to exports from UAE to Oman, this share fell to about 24% from UAE to Saudi Arabia in the 2003-2007 time period).

3.2.3 Exports and Imports by Sector

Exports of GCC countries have more than doubled between 1978 and 2007, despite having the largest share of GCC total exports sector 3 (Mineral fuels, Lubricants and Related Materials) was the lowest growing export sector between 1978 and 2007. On the other hand sector 4 (Animal and Vegetable Oils and Fats) had the largest growth in terms of value of all trade sectors, although non-oil exports have out preformed oil exports they still contribute very little to overall GCC exports (about 16 percent during the 2003-2007 time period compared to 2 percent during the 1978-1982 time period). Oil exports have grown from $ 544.9 billion during the 1978-1982 time period to $1.27 trillion during the 2003-2007 time period (about 131 percent), while non-oil exports increased from $11 billion during the 1978-1982 time period to $241 trillion during the 2003-2007 time period (more than 2000 percent). This difference in the growth of oil versus non-oil exports shows a success of GCC countries efforts to diversify their export and production structure.

Exports by sector for GCC countries are presented in tables 3.26 and 3.27. Sector 3 (Mineral fuels, Lubricants and Related Materials) is the most important sector for GCC countries exports and is highly concentrated in exports with non-GCC countries. During the 1978-1982 time period, the share of sector 3 of total GCC exports was about 98 percent, and this share decreased to 84.1 percent of total GCC exports during the 2003-2007 time period. Overall, sector 3 exports have grown by 131 percent between the two periods and its share of total GCC exports relative to other sectors have decreased.

During the 1978-1982 time period, the largest GCC non-oil export sectors were sector 6 (Manufactured goods) and sector 7 (Machinery and Transport Equipment) each accounted for 0.6 percent of GCC total exports, while the smallest sectors in terms of their shares of total exports were sectors 4 (Animal and Vegetable Oils and Fats) which accounted for 0.002 percent of GCC total exports and sector 1 (Beverages and Tobacco) which accounted for 0.0.014 percent of GCC total exports. During the 2003-2007 time period the largest GCC non-oil export sectors were sector 5 (Chemicals) which accounted for about 6 percent of GCC total exports followed by sector 6 (Manufactured goods) which accounted for 4 percent of GCC total exports, while the smallest sectors in terms of their shares of GCC total exports were sector 1 (Beverages and Tobacco) which accounted for 0.1 percent of GCC total exports and sector 4 (Animal and Vegetable Oils and Fats) which accounted for 0.11 percent of GCC total exports.

Imports of GCC countries have more than doubled between 1978 and 2007. GCC countries imports are dominated by non-oil commodities and the growth of imports by sector is more stable and gradual for most sectors when compared to exports. Also imports concentration across sectors has dropped, reflecting more diversity in demand for commodities by GCC consumers.

Imports by sector for GCC countries are presented in tables 3.28 and 3.29. Between 1978 and 2007 the largest growing sector was sector 9 (Other Goods and Transactions), which increased from $24.26 billion during the 1978-1982 time period to $56.56 billion during the 2003-2007 time period (about 1740 percent increase), while the lowest growing sector was sector 3 (Mineral fuels, Lubricants and Related Materials) which increased from $6 billion during the 1978-1982 time period to 7.32 during the 2003-2007 time period (a modest increase of about 22 percent).

During the 1978-1982 time period the largest GCC import sectors were sector 7 (Machinery and Transport Equipment) and sector 6 (Manufactured goods) accounting for 42.1 percent and 24.8 percent respectively of total GCC imports, while the smallest sectors in terms of their shares of total GCC imports were sectors 9 (Other Goods and Transactions) and 4 (Animal and Vegetable Oils and Fats) both accounting for 0.4 percent of GCC total imports. During the 2003-2007 time period the largest GCC import sectors were sector 7 (Machinery and Transport Equipment) and sector 6 (Manufactured goods) accounting for 44.1 percent and 20.4 percent respectively of total GCC imports, while the smallest

sectors in terms of their shares of total GCC imports were sector 4 (Animal and Vegetable Oils and Fats) an sector 1 (Beverages and tobacco) accounting for 0.5 percent and 0.9 percent respectively of GCC total imports.

3.3 FTA and Intra-Industry Trade

Among the notable efforts to estimate the impact of RTA on sectoral trade are the papers by Flam and Nordström (2006) and Baldwin et al. (2005) both papers estimate the effect of the introduction of the Euro on sectoral trade among European countries. Flam and Nordström (2006) investigated the effect of the Euro on aggregate trade and disaggregate trade (1-digit disaggregation) using a gravity model augmented with exporter and importer fixed effects, they also augmented their gravity model with three dummies, EU11 dummy which equals one if both countries are Euro countries, EU12 dummy which equals one when the exporter is an Euro country and EU21 dummy which equals one when the importer is A Euro country. The purpose of their study was to estimate trade creation/diversion effects of the Euro on trade with Euro and non-Euro partners; they found that the trade creation effects of the Euro were concentrated in four sectors, beverages and tobacco (SITC 1), chemicals (SITC5), manufactured goods (SITC6) and machinery and transport equipment (SITC7), which can be characterized as highly differentiated goods. Baldwin et al. (2005) used the gravity model to estimate the effect of the Euro on OECD ISIC Rev.3 manufacturing sectors (2-digit and 3-digit sectors), they augmented their gravity model with exporter and importer fixed effects, time effects and three dummies EMU2 (both countries adopt Euro) EMU1 (importer or exporter only adopt Euro) and EU (if both countries are European Union countries). They found that the Euro had varying effects across sectors (intra-Euro and non- Euro trade), with strong positive effects for sectors characterized with increasing returns to scale such as Energy and Car manufacturing sectors. Other examples of the effect of TA's on trade include, Kandogan (2005), Jayasinghe and Sarker (2008) and Lambert and McKoy (2009).

To the best of my knowledge Abdmoulah (2011) is the only paper that analysed the impact of GCC FTA on sectoral trade among GCC countries. While Al-Shammari (2007) and Boughanmi et al. (2010) offer some insight. Al-Shammari (2007) studied the impact of the announcement of GCC proposed CU on disaggregate trade among GCC countries, while Boughanmi et al. (2010) studied the impact of GCC FTA on total agri-food sector and disaggregate agri-food sectors among GCC countries. Al-Shammari (2007) used a gravity model augmented with exporter, importer and time effects to a set of bilateral trade flows among 169 countries

(including GCC countries) during the 1990-2005 time period to estimate the effect of GCC CU announcement in 2000 on disaggregate trade (1-digit level) among GCC countries, Al-Shammari (2007) found that the GCC CU announcement in the year 2000 had a positive effect on intra-trade for sectors classified as low processing industries which include: sector(0) food and live animals, sector (1) beverages and tobacco, and sector (9) "crude materials commodities and transactions not classified elsewhere". Boughanmi et al. (2010) applied a differenced gravity model with importer and exporter fixed effects for total agri-food sector and a pooled OLS to 2-digit agri-food sectors covering the period 1990-2004; they found that GCC FTA had a positive and significant effect on trade among GCC countries in the overall agri-food sector, and a positive and significant effect on trade among GCC countries in several 2-digit sectors like dairy and meat preparation. Abdmoulah (2011) used a gravity model augmented with exporter and importer effects to investigate the effect of GCC FTA on sectoral trade among GCC countries during the 2000-2007 time period, Abdmoulah (2011) used a zero inflated negative binomial gravity model to account for the presence of zero trade in the data, his gravity model was augmented with various variables to account for heterogeneity across trade partners. Finally Abdmoulah (2011) found that for most sectors GCC FTA had no significant effect on trade among GCC countries during the 2000-2007 time period.

In this chapter I improve on the previous GCC studies by the following; first I use data that covers a longer time period starting from 1978-2010, and second I use different variations of the gravity model augmented with country pair and exporter-time, importer-time to estimate the effect of GCC FTA on GCC intra- industry trade during the 1983-2010 time period. The results of chapter two suggest that omitting exporter-time, importer-time and country pair effects results in a bias estimation of the effect of GCC FTA on aggregate trade among GCC countries. The results of this chapter suggest that the omission of these effects (especially exporter-time and importer-time) can result in a bias estimation of the effect of GCC FTA on trade by sector among GCC countries, none of the papers assessing GCC intra-industry trade have accounted for these effects.

3.4 The Gravity Model and Intra-Industry Trade

In the international trade literature it is more common to investigate the effect of Trade Agreements (TAs) on aggregate trade, while investigating the effect TAs on intra-industry trade seems to be less frequent, this might be due to difficulties regarding the application of the gravity model to disaggregate trade. Early works on the gravity model were criticized for the lack of theoretical foundations one of the most notable breakthroughs in theoretical modelling of the gravity mode was by Anderson and Van Wincoop (2003) AvW form here after, Anderson and van Wincoop (2004) show that the AvW gravity model[29] can be applied to disaggregate trade their final model is,

$$X_{ij}^{k} = \left(Y_i^k Y_j^k \Big/ Y_w^k\right)\left(\left[T_{ij}^k \Big/ P_i^k P_j^k\right]^{1-\sigma^k}\right)$$

Dividing by $Y_i^k Y_j^k$ and taking logs,

$$\ln\left(\frac{X_{ij}^k}{Y_i^k Y_j^k}\right) = -\ln Y_w^k + \left(1-\sigma^k\right)\ln T_{ij}^k - \left(1-\sigma^k\right)\ln P_i^k - \left(1-\sigma^k\right)\ln P_j^k \quad (3.1)$$

Where,

X_{ijt}^k: Value of sector *k* (*k* = 0, 1, 2, .., n) exports from country *i* to country *j* at time *t*;

Y_i^k : Country *i* value added of sector *k* reflecting economic size of sector *k* in the exporting country;

Y_j^k : Country *j* expenditure on sector *k* commodities reflecting economic size of sector *k* in the importing country

Y_w^k : Total world output of sector *k* commodities; this is constant for all countries and is represented in empirical estimation by the constant term β_0.

T_{ij}^k: Trade costs between country *i* and country *j* for sector *k* commodities, such as tariffs, transportation costs and other costs due to differences in language, laws and other attributes of country *i* and country *j*. Trade costs can be written as,

$$T_{ij}^k = D_{ij} t_{ij}^k e^{Lang} e^{Border}$$

Where D_{ij} represents distance between *i* and *j* as a proxy of transportation cost, t_{ij}^k is tariffs and non-tariff barriers for exports from *i* to *j* in sector *k* commodities. In

[29] See chapter one for a derivation of the AvW gravity model.

the absence of tariff data, tariffs can be replaced by a FTA dummy that represents the absence or presence of tariffs between two countries another option is the use of trade barriers indices such as the trade complementary index[30]; finally e is a set of dummy variables that represent the presence or absence of trade enhancing/reducing variables between *i* and *j* such as sharing a common language or borders.

π_i^k: multilateral resistance of country *i* commodities from sector *k*, which is computed internally from the model as follows,

$$P_i^k = \sum_j \left(\left[T_{ij}^k / P_j^k \right]^{1-\sigma^k} \right) \left(Y_j^k / Y_w^k \right)$$

alternatively P_i^k can be replaced by exporter fixed effects. Multilateral resistance refers to the fact that exports from *i* to *j* is depends on trade costs between the two countries effecting sector *k* products and the overall average import costs of country *j* of sector *k* products from the world.

P_j^k: is multilateral resistance of country *j* which is computed internally from the model as follows,

$$P_j^k = \sum_i \left(\left[T_{ij}^k / \pi_i^k \right]^{1-\sigma^k} \right) \left(Y_i^k / Y_w^k \right)$$

alternatively P_j^k can be replaced by importer fixed effects.

$(1 - \sigma^k)$: the elasticity of substitution between all commodities of sector *k*.

There are some problems that arise when estimating the gravity model at a sectoral level, as noted in the equation each variable has a *k* superscript, this is to indicate that the variables are sector specific, so GDP of country *i* in a sectoral environment is equivalent to the actual output or value added of sector *k* in country *i*, while for country *j* the appropriate measure of size would be expenditure on sector *k* commodities, this presents an estimation problem because output and expenditure by sector are hard to collect for a large sample of countries and/or time. In addition, some of the trade barriers may cause a problem, for instance tariffs are usually unavailable for a large sample of countries across a long period of time. Another example is that the choice of distance measure is more problematic with sectoral

[30] http://www.heritage.org/index, the index starts form 1995 onwards.

data, for example for a large country like the USA some sectors (especially smaller sectors) maybe concentrated in areas that are far away from the economic centre (New York) and might be exported from ports very far from New York, this suggest that distance should be measured from the economic centre (or shipping port) of country *i* for sector *k* to destination in country *j*. Fortunately for distance the use of country pair fixed effects eliminates the need to include distance all together.

3.5 Methodology

In this chapter, using OLS, I apply different variations of the traditional gravity model and the AvW gravity model to investigate the effect of GCC FTA on trade among GCC countries during the 1978-2010 time period. There are advantages in using the AvW model, as it eliminates any reverse causality that may be present in the regression between GDP and trade, one shortcoming is that the model does not incorporate the inclusion of per capita GDP, for this reason I will not augment models with per capita GDP. Three models are applied for sectors 0-9 for a total of 10 sectors, and all models are estimated using OLS. The first model is a panel data model with exporter, importer and time effects for each year. According to Wooldridge (2001) "with large N and small T it is a good idea to allow for separate intercepts for each time period. Doing so allows for aggregate time effects that have the same influence on for all i." thus time effects control for unobservable effects that are time variant (effecting all countries), including factors such as globalization and global business cycle effects; another reason for adding the time effect is that when time is added nominal and real models (deflated GDP and exports) will return almost identical estimates. The exporter and importer effects control for all unobservable time invariant country effects which control for factors such as a country's business cycle or effect of its political and legal system along with multilateral trade resistance for exporter (outward) and importer (inward). The use of fixed effects helps to adjust for omitted variables, especially multilateral resistance as indicated by Anderson and Van Wincoop (2003). The use of fixed effects vs. random effects is more common in the case for estimating the effects of TAs on trade as suggested by Egger (2000), Rose (2005) and Baier and Bergstrand (2007). According to (Egger, 2000) the use of fixed effects is more appropriate when trade flows are estimated for a set of countries that are chosen, while random effects are more appropriate if the countries are chosen randomly.

Equation (3.2) illustrates the first model in traditional gravity form,

$$\ln X_{ijt}^{k} = \beta_0^k + \beta_1^k \ln GDP_{it} + \beta_2^k \ln GDP_{jt} + \beta_3^k \ln D_{ij} + \beta_4^k GCCFTA_{ijt}$$

$$+ \beta_5^k PTA_{ijt} + \beta_6^k Border_{ij} + \beta_7^k Lang_{ij} + \beta_8^k Locked_{ij} + \beta_9^k PCol_{ij}$$

$$+ \beta_{10}^k CCol_{ij} + \beta_{11}^k Island_{ij} + \theta_t + \gamma_j + \sigma_i + u_{ijt}^k \quad (3.2)$$

In the AvW gravity model form,

$$\ln\left(\frac{X_{ijt}^{k}}{GDP_{it} * GDP_{jt}}\right) = \beta_0^k + \beta_1^k \ln D_{ij} + \beta_2^k GCCFTA_{ijt} + \beta_3^k PTA_{ijt}$$

$$+ \beta_4^k Border_{ij} + \beta_5^k Lang_{ij} + \beta_6^k Locked_{ij} + \beta_7^k PCol_{ij} + \beta_8^k CCol_{ij}$$

$$+ \beta_9^k Island_{ij} + \theta_t + \gamma_j + \sigma_i + u_{ijt}^k \quad (3.3)$$

Where:

X_{ijt}^{k}: Value of sector *k* (*k* = 0, 1, 2,…,9) exports from country *i* to country *j* at time *t*;

GDP_{it} : Real GDP of country *i* at time *t*;

GDP_{jt} : Real GDP of country *j* at time *t*;

D_{ij} : Distance between country *i* and country *j*;

$GCCFTA_{ijt}$: A dummy that takes value of one if both countries are GCC members[31] at time *t*, and zero otherwise;

PTA_{ijt} : A dummy that takes value of one if both countries are members of a preferential trade agreement at time *t*, and zero otherwise;

$Border_{ij}$ *:* A dummy that takes a value of one if country *i* and country *j* share a border and zero otherwise;

$Lang_{ij}$: A dummy that takes a value of one if country *i* and country *j* share the same official language and zero otherwise;

$Locked_{ij}$: A dummy that takes a value of one if either country is land locked and zero otherwise;

$PCol_{ij}$: A dummy that takes a value of one if country *j* was a previous colonizer of country *i*, and zero otherwise;

$CCol_{ij}$: A dummy that takes a value of one if both countries *i* and *j* have been previously colonized by the same colonizer, and zero otherwise;

[31] The effect of the GCC dummy starts at 1983.

Island_{ij} : A dummy that takes value of one if either country *i* or *j* is an island, and zero otherwise;

θ_t: Time effect;

γ_j: Importer fixed effect;

σ_i: Exporter fixed effect;

In the second model exporter effects, importer effects and time invariant variables such as distance and language are replaced by country pair effects. Country pair effects control for possible unobservable interaction effects between exporter and importer as well as heterogeneity that is time invariant between the importer and the exporter. The inclusion of country pair effects eliminates the need to include individual country importer or exporter effect and at the same time accounts for time invariant multilateral resistance.

Equation (3.1) illustrates the second model in traditional form,

$$\ln X_{ijt}^k = \beta_0^k + \beta_1^k \ln GDP_{it} + \beta_2^k \ln GDP_{jt} + \beta_3^k GCCFTA_{ijt} + \beta_4^k PTA_{ijt}$$

$$+ \theta_t + \sigma_i \gamma_j + u_{ijt}^k \qquad (3.4)$$

In AvW model form,

$$\ln \left(\frac{X_{ijt}^k}{GDP_{it} * GDP_{jt}} \right) = \beta_0^k + \beta_1^k \ln D_{ij} + \beta_2^k GCCFTA_{ijt} + \beta_3^k PTA_{ijt}$$

$$+ \theta_t + \sigma_i \gamma_j + u_{ijt}^k \qquad (3.5)$$

Where $\sigma_i \gamma_j$ represents bilateral country pair fixed effects.

For country pair effects I apply a two way model that assumes that $\sigma\gamma \neq \gamma\sigma$. According to Egger and Pfaffermayr (2003) this is identical to a triple way model (including σ, γ and $\sigma\gamma$), and the difference between a two way model and a one way model is that a two way model assumes that costs or barriers to exports from country *i* to country *j* can be different from costs or barriers to exports from *i* to *j*. For example consider distance between two trading partners, shipping routes from point A to point B can be longer (more expensive) or shorter (less expensive) than routes from point B to point A due to logistics, economies of scale or other reasons.

The third model adds to the second model the interaction effects between time and exporter effects and time and importer effects, time effects are a subset of exporter and time and importer and time effects and do not appear independently in the

equation. The interaction between importer effects and time effects, and exporter effects and time effects control for the possibility that multilateral resistance and country specific heterogeneity may evolve over time, this a reasonable assumption when using a panel that covers a long period of time.

Ideally when estimating a sectoral gravity model one should include value added by sector for the exporting country and expenditure by sector for the importing country as measures of size of the sector in both countries, unfortunately these data are hard to gather for datasets with large number of countries or long time periods or both, using exporter-time and importer-time effects has the advantage of eliminating the need to include value added or expenditure by sector; according to Baier and Bergstrand (2007) exporter-time and importer-time effect account for variation in GDPs(value added and expenditure in a sectoral setting) over time, thus removing their effect on the FTA variable, the results of this paper confirms their findings for intra-industry trade.

Equation (3.6) illustrates the third model,

$$\ln X_{ijt}^{k} = \beta_0^k + \beta_1^k GCCFTA_{ijt} + \beta_2^k PTA_{ijt} + \sigma_i\gamma_j + \theta_t\gamma_j + \theta_t\sigma_i + u_{ijt}^{k} \qquad (3.6)$$

Where,

$\theta_t\gamma_j$: Time variant importer effects;

$\theta_t\sigma_i$: Time variant exporter effects.

In equation 3.6 GDP is included in the exporter-time $\theta_t\sigma_i$ and importer-time $\theta_t\gamma_j$ effects and does not show up in the regression equation, since the results of equation 3.6 and its alternative AvW specification are identical I only use 3.6 specification.

Presence of zero/missing trade flows[32] becomes more frequent with disaggregation level, for most sectors the number of zero flows is not large, yet for some sectors there a large number of zeros (30-40%). The omission of zero trade may lead to sample selection bias and alter the results; in recent years this issue have caught attention, authors have suggested solutions to the zero trade flows problem, some of the most notable approaches include estimating the gravity equation in its multiplicative form using Poisson Pseudo Maximum Likelihood (PPML) as suggested by Silva and Tenreyro (2006) or Zero Inflated Negative Poisson (ZINP)

[32] More details regarding zero trade flows are presented in tables 3.A.2-45 in the appendix of chapter 3.

as suggested Burger et al. (2009), alternatively Two Stage Heckman Selection (TSHS) model as suggested by Helpman et al. (2008) can be used, where in the first stage of the regression, a probit estimator is used to predict the probability of trade between country pairs then the probit estimates are used to construct variables to correct for sample selection and selection into exporting by producers in the exporting country, these correction term enter the gravity equation (second stage of estimation) in its log form as additional regressors. PPML is not appropriate for over dispersed data (when the variance is larger than the mean, which is the case with trade data), and suffers from convergence problems when a large set of exporter-time and importer-time effects are included in the regression, ZINP is only available for panel data with fixed effects via LIMDEP software which is unfortunately unable to handle models that contain more than 900[33] variables, also both Poisson estimators do not correct for producers decision to export or not export in the exporting country, finally according to Silva and Tenreyro (2009) assumptions needed for the estimation of the TSHS model for trade flows are too strong to make it practical, Silva and Tenreyro (2009) results show that, all estimators based on the Helpman et al. (2008) model are misspecified[34], the results should be considered with these limitations in mind.

3.6 Data Description and Results

3.6.1 Data Description

The data used in this paper are:

Exports per Sector: Annual data from 1978-2010 representing the values of exports between 54 countries (including GCC countries) for ten trade sectors at the 1-digit aggregation level of the Standard International Trade Classification (SITC), the sectors are: sector 0 “Food and live animals”, sector 1 “Beverages and tobacco”, sector 2 “Crude materials, inedible, except fuels”, sector 3 “Mineral fuels, lubricants and related materials”, sector 4 “Animal and vegetable oils and fats”, sector 5 “Chemicals”, sector 6 “Manufactured goods classified chiefly by material”, sector 7 “Machinery and transport equipment”, sector 8 “Miscellaneous manufactured articles” and sector 9 “Commodities & transactions not classified according to kind”; these countries represent major trade partners of GCC countries,

[33] In the model with interaction effects the interactions are 3564 interactions (54x33x2).
[34] I have applied the TSHS model to the sample in this chapter, there is some practical issues to applying TSHS to the data of this dissertation, these issues are presented in the appendix along with the results of the second stage of the selection model, and overall the results do not change for most trade sectors after applying TSHS.

they account for 75-90 percent of GCC countries trade for each sector, also these trade flows represent at least 70 percent of world trade in each sector. I use mirror exports (imports of the importing countries from exporting countries) rather than exports because mirror exports provide more observations for GCC intra-trade. Export values are measured in current US dollars and were obtained from UN Comtrade database[35], the inclusion of time effects and country / pair fixed effects in the gravity equation adjusts for inflation over time and as indicated by Baldwin (2006) eliminates the need for using a price deflator to deflate trade flows.

GDP: annual data from 1978-2010 for 54 countries including GCC countries, the data were obtained from IMF World Economic Outlook (WEO) database[36].

Distance: obtained from CEPII distance database[37]. According to CEPII distance is: "distances are calculated following the great circle formula, which uses latitudes and longitudes of the most important cities/agglomerations (in terms of population) for the dist variable …… incorporate internal distances based on areas"

Data on dummy variables were obtained from the CEPII geographic database except for data on the PTA dummy variable which was obtained from the Database on Economic Integration Agreements[38] constructed by Scott Baier and Jeffrey Bergstrand.

3.6.2 Results

Three fixed effects specifications were applied for each sector; the first includes importer, exporter and time effects, the second includes country pair and time effects, and the third includes the previous two effects along with the interaction of time and exporter effects and the interaction of time and importer effects.

The results of the gravity model augmented with exporter, importer and time effects suggest that GCC FTA resulted in trade creation among GCC countries during the 1983-2010 time period in sectors 0, 1, 2, 4, 6, 7 and 8 with the highest trade increase attributed to sector 6 (405 percent in the AvW specification). The results of the gravity model augmented with country pair and time effects suggest that GCC FTA resulted in trade creation among GCC countries during the 1983-2010 time period in sectors 0, 1, 2, 4, 5, 6 and 9 for the traditional gravity model and sectors 0, 2, 4, 5, 6, 7, 8 and 9 for the AvW gravity model with the highest

[35] http://www.comtrade.un.org
[36] http://www.imf.org/external/pubs/ft/weo/2012/02/weodata/index.aspx
[37] http://www.cepii.fr/CEPII/en/welcome.asp
[38] http://www.nd.edu/~jbergstr/DataEIA2009/EIA_Data_June30_2009.zip

trade increase in sector 4 (2142 percent in the AvW specification). Finally, the results of the gravity model augmented with exporter-time, importer-time and country pair effects suggest that GCC FTA resulted in trade creation among GCC countries during the 1983-2010 time period in sectors 0, 2, 3, 4, 7 and 9 with the highest trade increase in sector 4 (2584 percent).

Comparing the results from tables 3.32 and 3.33 which include country pair effects and time effects with the results of table 3.34 that use country pair effects and exporter/importer-time effects one can see that difference in the coefficient of GCC FTA for aggregate trade is small (goes from 0.73 to 0.9) while the effect of GCC FTA changes significantly in sectors 0, 2, 3, 5, 6 and 9 with most significant changes in sectors 3, 5 and 6, the main reason behind this is that the appropriate measure of economic size for the exporting and importing countries at the aggregate level is GDP of the exporting and importing countries, while at the disaggregate level is value added of the economic sector in the exporting country and expenditure per sector in the importing country. For the models in tables 3.32 and 3.33 these data on value added and expenditure are not available and GDP is used as an alternative. While the model from table 3.34 for exporter-time and importer-time effects account for the effects of value added and expenditure at the disaggregate level of trade, this makes the model in table 3.34 the most comprehensive specification makes its results the most reliable. Detailed results for each fixed effects specification are presented in sections 3.6.2.1-3.6.2.3.

3.6.2.1 Time, Exporter and Importer Fixed Effects

Results are summarized in table 3.30 for the traditional gravity model and 3.31 for the AvW gravity model. Looking at table 3.30 results, the exporter GDP coefficients have a positive sign across all sectors except for sector 0 (negative and significant) and sectors 1 and 2 (insignificant). Exporter GDP coefficient for the significant sectors ranges between -0.1 and 0.77, suggesting that a 1 percent increase in exporter GDP lead to a 0.1 decrease in in the value of exports of sector 0 (food and live animals) commodities from country *i* to country *j* during the 1978-2010 time period, while it suggests that a 1 percent increase in exporter GDP leads to a 0.77 increase in the value of exports of sector 7 (machinery and transport equipment) commodities from country *i* to country *j* during the 1978-2010 time period. all Importer GDP coefficients are positive and significant they range between 0.42 and 1.02, suggesting that a 1 percent increase in exporter GDP lead to a 0.42 increase in the value of exports of sector 4 (animal and vegetable oils and fats) commodities from country *i* to country *j* during the 1978-2010 time period,

while it suggests that 1 percent increase in exporter GDP lead to a 1.07 increase in the value of exports of sector 8 (miscellaneous manufactured articles) commodities from country *i* to country *j* during the 1978-2010 time period. The distance coefficient range between -1 and -2.11, suggesting that if the distance between country *i* and country *j* is greater than the distance between country *i* and any other country by 1 percent the value of exports from *i* to *j* falls by 1 percent for sector 8 (miscellaneous manufactured articles) commodities and falls by -2.11 percent for sector 3 (Mineral fuels, lubricants and related materials) commodities.

Moving to dummy variables, the coefficients on the border dummy are surprisingly insignificant (yet consistent with the coefficient of the border dummy for the aggregate model) for seven of the ten sectors. The border dummy coefficient is significant and negative for sectors 2 (crude materials, inedible, except fuels) and 5 (chemicals). While it is significant and positive for sector 4 commodities (animal and vegetable oils and fats). This may indicate that overall for countries in the sample sharing a border has no impact on most sectoral trade. Language coefficients are all positive and significant (except for sector 3, which is negative and significant) suggesting that sharing a common language increases intra-industry trade. The language coefficient ranges between -0.61 and 1, suggesting that trade decreased (on average between any two countries who share a common language in the sample) in sector 3 (Mineral fuels, lubricants and related materials) commodities by 46 percent ($e^{-0.61}$-1) during the 1978-2010 time period (about 1.4 percent a year). It also suggests that sharing a common language increased trade in sector 8 (miscellaneous manufactured articles) commodities by 172 percent during the 1978-2010 period (about 5.2 percent a year). The negative impact of language on sector 3 commodities can be due to the fact that GCC countries have a large percentage of exports in this sector, yet they do not trade much in petroleum and refined petroleum products among each other. Also, due to the low industrialization of Arab countries there is not much trade with other Arab countries for these products; hence the majority of sector 3 exports go to countries in Europe and East Asia. Colonial linkages have a positive and significant impact on sectoral trade between countries; the previous colonizer coefficient ranges between 0.51 and 0.98, suggesting that trade increased by 67 percent (on average between previous colonizers and their previous colonies) for sector 4 (animal and vegetable oils and fats) commodities during the 1978-2010 time period, while it suggests that trade increased by 166 percent for sector 3 (mineral fuels, lubricants and related materials) commodities during the 1978-2010 time period. The

coefficient of common colonizer ranges between 0.18 and 0.54, suggesting that trade increased by 20 percent (on average between any two countries that share the same previous colonizer) for sector 9 (Miscellaneous manufactured articles) commodities during the 1978-2010 time period, while it suggests that trade increased by 72 percent for sector 1 (Beverages and tobacco) and sector 4 (animal and vegetable oils and fats) commodities during the 1978-2010 time period. The island dummy coefficients are negative and significant for 7 sectors, while it is insignificant for sector 0 (food and live animals), sector 1 (beverages and tobacco) and sector 4 (animal and vegetable oils and fats). These results suggest that for most intra-industry trade not having access to land transportation reduces trade between any two countries when one or both of them is an island, yet for some sectors this does not matter. This can be explained as some commodities are usually transported via air or sea or the cost of transporting them is not affected significantly by the method of transportation. The significant Island coefficient ranges between -0.27 and -0.46, suggesting that trade decreased by 21 percent (on average between any two countries in the sample when one or both is an island) for sector 5 (chemicals) commodities during the 1978-2010 time period, while it suggests that trade decreased by 37 percent for sector 3 (Mineral fuels, lubricants and related materials) commodities during the 1978-2010 time period. The landlocked dummy coefficients are negative and significant for 6 sectors, while it is insignificant for sector 1 (Beverages and tobacco), sector 7 (machinery and transport equipment), sector 8 (miscellaneous manufactured articles) and sector 9 (commodities and transactions not classified according to kind). These results suggest that for most intra-industry trade not having access to direct land (unless the goods originate from a bordering country) or sea transportation reduces trade between any two countries when one or both of them is land locked. Yet for some sectors it does not matter, this can be explained as some commodities are mostly transported via air or the cost of transporting them is not affected significantly by the method of transportation, or that landlocked countries trade more with bordering countries (in comparison to non-bordering countries) in these sectors. The significant landlocked coefficient ranges between -0.41 and -3.87, suggesting that trade decreased by 34 percent (on average between any two countries when one or both are land locked) for sector 0 (food and live animals) commodities during the 1978-2010 period, while it suggests that trade decreased by 98 percent for sector 3 (mineral fuels, lubricants and related materials) commodities during the 1978-2010 period.

Turning to the variable of interest, the GCC FTA dummy, the GCC FTA coefficients are positive and significant for 7 sectors, negative and significant for sector 3 (mineral fuels, lubricants and related materials) and insignificant for sector 5 (chemicals) and sector 9 (commodities and transactions not classified according to kind). These results suggest that GCC FTA have resulted in trade creation in most intra-industry trade sectors among GCC countries during the 1983-2010 time period. The coefficient of the GCC FTA dummy for the significant sectors ranges between -4.97 and 1.56 suggesting that trade decreased by 99 percent (on average between any two GCC countries) for sector 3 (mineral fuels, lubricants and related materials) commodities during the 1983-2010 time period (about 3.5 percent a year), it also suggests that trade increased by 376 percent for sector 6 (manufactured goods classified chiefly by material) commodities during the 1983-2010 time period (about 13.4 percent a year). The last dummy variable is PTA. The coefficients of PTA are low in impact (positive or negative) on sectoral trade. The PTA coefficients are negative and significant for 6 sectors, positive and significant for sector 0 (food and live animals) and sector 8 (miscellaneous manufactured articles), and insignificant for sector 3 (mineral fuels, lubricants and related materials) and sector 4 (Animal and vegetable oils and fats). The PTA coefficient ranges between -0.52 and 0.11, suggesting that trade decreased by 40 percent (on average between any two countries that are members of the same trade agreement) for sector 5 (chemicals) commodities during the 1978-2010 time period, while it suggests that trade increased by 12 percent for sector 0 (food and live animals) commodities during the 1978-2010 period.

The results for the AvW version of the model is almost identical for most of the variables, except for the GCC FTA dummy which is a bit higher for most sector using the AvW specification.

Comparing the sectoral results of this specification with results of aggregate trade, the GCC FTA coefficient for aggregate trade is insignificant while it is positive and significant with large values for most trade sectors. For example the two sectors that have the largest share of intra-industry trade among GCC countries are sector 6 (manufactured goods classified chiefly by material) and sector 7 (machinery and transport equipment) have coefficients of 1.56 and 1.28 (both significant) respectively. This big difference suggests that the model is missing variable(s) that affects the impact of GCC FTA either on the sectoral or aggregate level.

3.6.2.2 Time and Country Pair Fixed Effects

Results are summarized in table 3.32 for the traditional gravity model and 3.33 for the AvW gravity model. Time invariant variables (distance, border, language, previous colonizer, common colonizer, island and landlocked) are absorbed in the country pair fixed effects and do not appear in these regressions. Looking at table 3.32 results, exporter GDP coefficient values are very close to those of table 3.30 except for sector 4 (increases from 0.17 to 0.27), likewise, importer GDP coefficient values are very close to those of table 3.30 except for sector 1 (increases from 0.78 to 0.93) and sector 3 (increases from 0.65 to 0.78) and sector 9 (increases from 0.61 to 0.83)

The GCC FTA dummy variable coefficients are positive and significant for 7 sectors and insignificant for sector 3 (mineral fuels, lubricants and related materials), sector 7 (machinery and transport equipment) and sector 8 (miscellaneous manufactured articles). These results suggest that GCC FTA have resulted in trade creation in most intra-industry trade sectors among GCC countries during the 1983-2010 time period. The coefficient of GCC FTA dummy for the significant sectors ranges between 0.65 and 2.79 suggesting that trade among GCC countries increased by 92 percent for sector 1 (beverages and tobacco) commodities during the 1983-2010 time period (about 3.3 percent a year), while trade among GCC countries increased by 1528 percent for sector 4 (animal and vegetable oils and fats) commodities during the 1983-2010 period (about 54.6 percent a year). The coefficients of PTA dummy are low in impact on sectoral trade, and they are positive and significant for 5 sectors and insignificant for sector 1 (beverages and tobacco), sector 2 (crude materials, inedible, except fuels), sector 3 (mineral fuels, lubricants and related materials), sector 5 (chemicals) and sector 7 (machinery and transport equipment). For the significant sectors the PTA coefficient ranges between 0.13 and 0.4 suggesting that trade increased by 14 percent for sector 0 (food and live animals) commodities during the 1978-2010 time period, while trade increased by 49 percent for sector 9 (commodities and transactions not classified according to kind) commodities during the 1978-2010 time period.

The results for the AvW version of the model are higher for GCC FTA variable for most of the trade sectors, also sectors 7 (Machinery and transport equipment) and 8 (miscellaneous manufactured articles) become positive and significant. Thus, if the AvW specification is the right form of the gravity model then using the traditional model might underestimate the impact of GCC FTA on trade among GCC

countries. Also, if reverse causality between trade and GDP exists then it might alter the impact of GCC FTA on trade. The PTA variable coefficients do not exhibit a lot of changes.

Comparing the country pair effects model with importer and exporter fixed effects model one can notice that the country pair effects model is superior to the importer and exporter effects model when it comes to the effect of GCC FTA on trade. Results of the country pair effects model for aggregate and disaggregate trade are consistent, the model predicts that GCC FTA effect on aggregate trade is positive and significant, and similarly for most of the disaggregate sectors the effect is positive and significant. The size of the effect of GCC FTA on disaggregate trade is close to the effect on aggregate trade taking into consideration aggregation bias and the relative size of each disaggregate sector. Thus, it seems that the country pair effects account for variables that the importer and exporter effects does not account for whether one is looking at aggregate or disaggregate trade. One example of an omitted variable that country pair effects accounts for compared to exporter and importer effects is internal distance. The distance variable used in the models of tables 3.30 and 3.31 measures distance from the economic centre of the exporting country to the economic centre of the importing country, and this measure can be inaccurate when one or both countries are very large and it might be more aggravated at the disaggregate level if trade is centred in an area of the country that is far from its economic centre.

Replacing exporter and importer effects by country pair effects has different impacts on the effect of GCC FTA on trade among GCC countries for different sectors. The most notable changes are in sectors 3, 4, 5 and 7. For sector 3 (mineral fuels, lubricants and related materials) the GCC FTA coefficient goes from negative to insignificant, while for sector 4 (animal and vegetable oils and fats) GCC FTA effect on GCC intra-trade increased from 344 percent to 2142 percent, a very large increase yet it can be justified when one considers that intra-trade in this sector has increased tremendously by about 19000 percent between 1978 and 2007. In the case of sector 5 (chemicals) GCC FTA effect on GCC intra-trade changes from insignificant to positive and significant. Finally for sector 7 (machinery and transport equipment) GCC FTA effect on GCC intra-trade changes from increasing trade by 267 percent to insignificant (significant at 10 percent (55.3 percent) level in the AvW specification).

3.6.2.3 Exporter-Time, Importer-Time and Country Pair Fixed Effects

Results are summarized in table 3.34. The GCC FTA dummy variable coefficients are positive and significant for 6 sectors, and insignificant for sector 1(Beverages and tobacco), sector 5 (chemicals) and sector 6 (manufactured goods classified chiefly by material) and sector 8 (Miscellaneous manufactured articles). These results suggest that GCC FTA have resulted in trade creation in most intra-industry trade sectors among GCC countries during the 1983-2010 time period. The coefficient of GCC FTA dummy for the significant sectors ranges between 0.5 and 3.29, suggesting that trade among GCC countries increased by 65 percent for sector 7 (machinery and transport equipment) commodities during the 1983-2010 time period (about 2.3 percent a year), while trade among GCC countries increased by 2584 percent for sector 4 (animal and vegetable oils and fats) commodities during the 1983-2010 time period (about 92 percent a year). The coefficients of the PTA dummy are insignificant for 8 sectors, while sector 7 (machinery and transport equipment) commodities had a low negative effect and sector 8 (miscellaneous manufactured articles) commodities had a low positive impact. These results for the PTA dummy suggest that PTA membership had either no effect or a weak effect on intra-industry trade among the countries in the sample during the 1978-2010 time period.

Comparing the exporter-time, importer-time and country effects model with the importer and exporter fixed effects model; one can notice that the first model is superior to the importer and exporter effects model when it comes to estimating the effect of GCC FTA on trade, exporter-time, importer-time and country effects model results for aggregate and disaggregate trade are consistent. The model predicts that GCC FTA effect on aggregate trade is positive and significant, the same can be said for most of the disaggregate sectors. The size of the effect of GCC FTA on disaggregate trade is close to the effects on aggregate trade taking into consideration aggregation bias and the relative size of each disaggregate sector.

Introducing exporter-time, importer-time to the country pair and time effects model has significant changes on the effect of GCC FTA on trade among GCC countries during the 1983-2010 time period for most trade sectors. The most notable changes are in sectors 2, 3, 5, and 6. The effect of GCC FTA on GCC intra-trade in sector 2 (Crude materials, inedible, except fuels) drops from 475 percent to 92 percent during the 1983-2010 time period. For sector 3 (mineral fuels, lubricants and related materials) the GCC FTA effect on trade among GCC countries goes from insignificant to significant with a large positive sign, for sector 5 (chemicals) GCC

FTA coefficient goes from a significant and large positive coefficient to negative and insignificant, and finally for sector 6 (manufactured goods classified chiefly by material) GCC FTA coefficient changes from a significantly large positive coefficient to insignificant. Comparing the results of tables 3.32 and 3.33 which use country pair effects and time effects with the results of table 3.34 that use country pair effects and exporter/importer-time effects one can see that the difference in the coefficient of GCC FTA for aggregate trade is small (goes from 0.73 to 0.9) while for most trade sectors the differences are very high. The main reason behind this is that the appropriate measure of economic size for the exporting and importing countries at the aggregate level is GDP of the exporting and importing countries, while at the disaggregate level it is the value added of the economic sector in the exporting country and the expenditure per sector in the importing country, for the models in tables 3.32 and 3.33 these data on value added and expenditure are not available and GDP is used as an alternative which means that these models suffer from omitted variable bias if the correlation between GDP and value added/expenditure is not high, while the model from table 3.34 does not suffer from this bias because exporter-time and importer-time effects account for the effects of value added and expenditure at the disaggregate level.

3.7 Sensitivity Analysis[39]

This section aims to test the sensitivity of the results in the previous section. I will limit the analysis to the country pair and time effects model, and the exporter-time, importer-time and country pair effects model, to see if applying changes to the GCC FTA and PTA dummies or adding new variables to the models would significantly change the GCC FTA effects on intra-industry trade among GCC countries.

The first step in the sensitivity analysis is to "break up" the PTA dummy into several trade agreements. According to Baldwin (2006) lump sum PTA variable does not control properly for other nations (non-GCC members in this study) trade arrangements. This may have an effect on GCC FTA coefficients across sectors. The PTA variable is broken up into nine PTA dummies: ASEAN, COMESA, ECO,

[39] Sensitivity was done also by including a variable that accounts for changes in oil prices/production and variable to account for the Iraqi invasion of Kuwait (dummy variable) the results showed very small differences in GCC FTA coefficient for the country pair and time effects specification and no changes for the exporter-time and importer-time specification, these results are not included and are available upon request.

EU, EURO, GAFTA, NAFTA, UMA[40] and the PTA dummy becomes PTA2 which accounts for any other trade agreements that are still present after removing eight PTAs. The second part of the sensitivity analysis involves adding three dummies, GCC 88, GCC 93 and GCC 98. These dummies will account for any possible implementation phases of GCC FTA or allowing the effect of GCC FTA on the terms of trade to come in phases. Although the GCC FTA declaration agreement did not specify any phases and there is no information to my knowledge on such phases, according to Baier and Bergstrand (2007) almost every FTA has "phase-in" periods that follows the announcement date. Phases can be set prior to the announcement, yet this is not possible for GCC trade since the dataset begins in 1978 and GCC FTA was announced in 1983.

Overall sensitivity results confirm the results of section 3.6.2 that GCC FTA have resulted in trade creation in most trade sectors among GCC countries during the 1983-2010 time period, yet in some sectors GCC FTA had a negative effect on GCC intra-trade, also for sensitivity results suggest that trade creation effects of GCC FTA is lower than those suggested in section 3.6.2. More details are provided in sections 3.7.1-3.7.2

3.7.1 GCC FTA Effect, Accounting for Major Trade Agreements among non-GCC Countries[41]

The PTA variable is broken up to 9 variables. These 9 dummies represent the most important trade agreements among non-GCC countries. This specification will be applied to two models, the first containing time and country pair fixed effects, and the second exporter-time, importer-time and country pair fixed effects. The results of section 3.7.1 suggest that for the country pair and time effects specification, GCC FTA resulted in trade creation among GCC countries for most trade sectors during the 1983-2010 time period, while for the exporter-time, importer-time and country pair effects specification, GCC FTA resulted in trade creation among GCC countries in sectors 2, 3, 4 and 9. Overall, in all specifications accounting for major trading agreements among non-GCC countries lowers the trade creation effects of GCC FTA on trade by sector among GCC countries.

Results for the specifications including country pair and time effects are summarized in tables 3.35 and 3.36 for the traditional gravity model and the AvW gravity model respectively, for the traditional model the GCC FTA coefficient is

[40] See appendix for details and a list of countries for each TA
[41] GAFTA includes GCC countries.

positive and significant for 6 sectors, while it is insignificant for sector 3 (mineral fuels, lubricants and related materials), sector 7 (machinery and transport equipment) and sector 8 (miscellaneous manufactured articles) and sector 9 (Commodities & transactions not classified according to kind). The coefficient of GCC FTA dummy for the significant sectors ranges between 0.73 and 2.52, suggesting that trade among GCC countries increased by 108 percent for sector 1 (Beverages and tobacco) commodities during the 1983-2010 time period (about 3.8 percent a year), while trade among GCC countries increased by 1243 percent for sector 4 (animal and vegetable oils and fats) commodities during the 1983-2010 time period (about 44.4 percent a year). The results for the AvW version of the model are higher for GCC FTA variable for most sectors, sector 1 becomes insignificant and sectors 7, 8 and 9 become significant and positive. Thus if the AvW specification is the right form of the gravity model then using the traditional model might underestimate the impact of GCC FTA when using country pair fixed effects, and if reverse causality between trade and GDP exists then it might reduce the impact of GCC FTA on trade.

Results for the specification including exporter-time, importer-time and country pair effects are summarized in table 3.37, the GCC FTA coefficient is positive and significant for 4 sectors, while it is insignificant for sector 0 (food and live animals), sector 1 (Beverages and tobacco), sector 5 (chemicals), sector 6 (manufactured goods classified chiefly by material) sector 7 (machinery and transport equipment) and sector 8 (miscellaneous manufactured articles). The coefficient of GCC FTA dummy for the significant sectors ranges between 0.58 and 3.01, suggesting that trade among GCC countries increased by 79 percent for sector 2 (Crude materials, inedible, except fuels) commodities during the 1983-2010 time period (about 2.8 percent a year), while trade among GCC countries increased by 1929 percent for sector 4 (animal and vegetable oils and fats) commodities during the 1983-2010 time period (about 69 percent a year).

3.7.2 GCC FTA Effect, Accounting for Major Trade Agreements among non-GCC Countries and Possible GCC FTA Phases

In this section, the PTA variable is broken up to 9 variables and in addition three dummies GCC 88, GCC 93 and GCC 98 are added to all specifications. These dummies will account for any possible implementation phases of GCC FTA. The Net GCC column in tables 3.38-3.40 represents the sum of the significant GCC FTA dummies coefficients and represents the net effect of GCC FTA on trade after accounting for 3 possible implementation phases. This specification will be applied

to two models; the first model includes time and country pair fixed effects and the second model includes exporter-time, importer-time and country pair fixed effects. Introducing phases or dividing the impact of GCC FTA on sub time periods reveals an interesting result; in most sectors (depending on model specification) GCC FTA effect turns negative from 1998 onwards. This might suggest that GCC FTA did not provide an advantage for GCC commodities after 1998, yet even after introducing phases GCC FTA still led to trade creation among GCC countries in most trade sectors in all models.

Results for the specification that includes time and country pair effects are summarized in tables 3.38 and 3.39 for the traditional gravity model and the AvW gravity model respectively. For the traditional gravity model, Net GCC is positive and significant for 6 sectors, while it is insignificant for sector 1 (Beverages and tobacco) and sector 9 (commodities and transactions not classified according to kind), and negative for sector 3 (mineral fuels, lubricants and related materials) and sector 8 (miscellaneous manufactured articles). The Net GCC (significant) coefficient ranges between -0.96 and 2.47, suggesting that trade among GCC countries decreased by 62 percent for sector 3 (mineral fuels, lubricants and related materials) commodities during the 1983-2010 time period (about 2.2 percent a year), while trade among GCC countries increased by 1082 percent for sector 4 (animal and vegetable oils and fats) commodities during the 1983-2010 time period (about 38.7 percent a year).

The results for the AvW version of the model are higher for Net GCC for most sectors, while sector 9 (commodities and transactions not classified according to kind) becomes significant. Using the traditional model might underestimate the impact of GCC FTA when using country pair fixed effects and time effects, and if reverse causality between trade and GDP exists then it might reduce the impact of GCC FTA on trade.

The results of the models from tables 3.38 and 3.39 for Net GCC variable suggest that accounting for TAs among GCC trade partners independently and accounting for possible implementation phases reduces the effect of GCC FTA when compared to summing all TAs in one variable (PTA) and not accounting for FTA phases. Also, sensitivity results suggest that from 1998 onwards, for most sectors GCC FTA effect is negative; overall for most sectors GCC FTA created intra-industry trade among GCC countries during the period 1983-2010.

Results for the specification with exporter-time, importer-time and country pair effects are summarized in table 3.40. Net GCC is positive and significant for 6 sectors, while it is negative and significant for sector 5 (chemicals) and sector 6 (manufactured goods classified chiefly by material), and insignificant for sector 1 (Beverages and tobacco) and sector 8 (miscellaneous manufactured articles). Net GCC ranges between - 0.73 and 2.96, suggesting that trade among GCC countries decreased by 52 percent for sector 5 (Chemicals) commodities during the 1983-2010 time period (about 1.9 percent a year), while trade among GCC countries increased by 1830 percent for sector 3 (mineral fuels, lubricants and related materials) commodities during the 1983-2010 time period (about 65 percent a year). Results of table 3.40 for Net GCC suggests that accounting for TAs among GCC trade partners independently and accounting for possible implementation phases reduces the effect of GCC FTA, and GCC FTA trade creation is more concentrated in smaller (in size of trade among GCC countries) sectors, while for the sectors with larger shares like sector 5 and sector 6, GCC FTA has a negative effect on intra-GCC trade.

3.8 Conclusion

In this chapter, different specifications and variations of the gravity model of international trade were applied to assess the impact of GCC FTA on intra-industry trade among GCC countries at the first digit level of the SITC Revision 1 classification system. The models were applied to a set of bilateral exports representing trade between 54 countries that are the major trade partners of GCC countries (including GCC countries) for the period 1978-2010. Studies on the effect of GCC FTA on members intra-trade are limited in number and in the case of sectoral trade the studies are even less. All the previous studies analysing the effect of GCC FTA on trade among GCC countries do so using samples that start post 1983 after the GCC FTA came into effect, which limits the specification of the gravity model used in these studies to include only exporter, importer and time effects. To my knowledge the essay presented in this chapter is the first study that applies a gravity model with time and country pair effects to disaggregate sectors or a gravity model with exporter/importer-time effects and country pair effects to assess the impact of GCC FTA on intra-GCC sectoral trade. Therefore, the main contribution of this chapter to existing literature on the effect of GCC FTA on sectoral trade among GCC countries is the use of these effects and thus reducing the omitted variable bias that existed in all of the previous studies. Country pair effects control for exporter and importer shared characteristics while exporter-time

and importer–time effects accounts for the possibility that exporter/importer heterogeneity and/or multilateral resistance might change over time. Also, when assessing trade at sectoral level the use of exporter-time and importer-time effects accounts for value added per sector and expenditure per sector that are more precise measures of the economic size of a trade sector in the exporting and importing countries.

This analysis is not free of shortcomings, as the results may be affected by the fact that there is only 5 years of data before GCC FTA. Unfortunately there is no trade data for UAE prior to that date. Another problem is that the presence of zero/missing trade flows becomes more frequent with disaggregation level. For most sectors the number of zero flows is not large, yet for some sectors there is a large number of zeros (30-40%). The omission of zero trade may lead to sample selection and bias the results. In recent years this issue has caught attention in the gravity literature, studies have suggested solutions to the zero trade flows problem. Some of the most notable approaches in the literature suggest estimating the gravity equation in its multiplicative form using PPML as suggested by Silva and Tenreyro (2006) or ZINP as suggested Burger et al. (2009). Alternatively, the gravity equation can be estimated in its log form using TSHS as suggested by Helpman et al. (2008). Yet all of these approaches have their limitations that were discussed in section 3.5.[42].

In all of the different variations of the gravity model in this chapter, a dummy variable was included to assess the impact of GCC FTA on intra-industry trade among GCC countries. Three main specifications were applied; a model with exporter, importer and time effects, a model with country pair and time fixed effects, and finally a model with exporter-time, importer-time and country pair fixed effects. The results suggest that the third model with the full set of fixed effects is more suitable to predict the effect of GCC FTA on GCC intra-industry trade, as the first model does not account for a comprehensive set of shared characteristics among trade partners and time changes in country heterogeneity while the second model fails to account for time changes in country heterogeneity[43].

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[42] I have applied the TSHS model to the sample in this chapter; there were some practical issues to applying TSHS to the data of this dissertation. These issues are presented in the appendix of chapter four along with the results of the second stage of the selection model. Overall, the results do not change for most trade sectors after applying TSHS.

[43] Time changes in heterogeneity or multilateral resistance does not affect aggregate trade and some trade sectors substantially, yet for some sectors the difference in GCC FTA effect on trade changes significantly when these time changes are accounted for.

The results suggest that trade creation is more concentrated in sectors that exhibit lower shares of GCC intra-trade. These results are more or less confirmed when applying different robustness checks in section 3.7. The main and sensitivity results suggest that GCC FTA increased GCC intra-trade in sector 7 "Machinery and Transport Equipment" commodities. Since GCC countries are not known to be manufacturers of such goods in the global markets, it is worth the effort to take a deeper look at trade among GCC countries in sector 7 commodities. Table 3.41 presents the major commodity groups under sector 7 (according to SITC 4th level of aggregation) that are traded among GCC countries for the years 1983, 1989, 1999 and 2007. A high share of GCC intra-trade in insulated wire and cable commodities is plausible, as these commodities do not require high level of manufacturing, on the contrary the other three major commodity groups require high level of manufacturing and it is surprising that GCC intra-trade is high in these commodities, especially construction and mining machinery commodities that has the largest share of GCC intra-trade in sector 7 commodities. These high shares of high level manufactured products might lead one to suspect that there might be some re-direction of imports in these commodities groups from outside the GCC from one GCC member to another to take an advantage of lower tariffs in the first point of entry into the GCC. Tables 3.42-3.45 presents the major share of trade direction among GCC countries, it can be noticed that for construction and mining machinery commodities and to a lesser extent bodies and parts of motor vehicles the majority of GCC intra-trade is exports from UAE to Oman, this might suggest that these products are imported in the UAE and then re-exported to Oman as imports from the UAE. Sensitivity analysis reveals several interesting findings; the first finding is that a more appropriate way to account for trade agreements among non-GCC countries is to account for these agreements explicitly rather than summing them up in one PTA variable, a lump-sum PTA variable leads to an exaggeration of GCC FTA effect on trade. The second interesting finding is that the effect of GCC FTA is lower when allowing for possible implementation phases, and some sectors examine a switch in sign or significance (from significant to insignificant and vice versa). This suggests that when evaluating an impact of PTA that spans over a long period of time, it might be useful to use several PTA dummies across time to capture the evolution of the PTA at different time periods.

Table 3.1: Value of GCC Trade by Sector ($ Billions)

Sector/Year	78-82	83-87	88-92	93-97	98-02	03-07
Food & Live Animals	24.9	24.5	25.7	26.8	44.4	68.5
Beverages & Tobacco	3.2	2.7	3.2	3.7	7.1	7.0
Crude Materials	3.4	4.2	5.9	7.1	9.4	22.5
Mineral Fuels	550.9	293.8	324.1	410.7	506.2	1,277.3
Animal & Vegetable Oils	0.9	0.8	1.0	1.5	2.5	4.7
Chemicals	11.1	16.4	29.5	38.5	61.4	143.2
Manufactured Goods	60.3	46.3	44.7	50.1	75.5	185.2
Machinery & Transport	99.9	76.2	81.1	84.3	134.7	308.5
Misc. Manufactured Goods	29.3	27.3	27.2	30.4	49.0	80.8
Other Commodities	1.5	3.0	3.6	4.5	24.8	22.1

Table 3.2: Sector Shares of GCC Trade (% Total Trade)

Sector/Year	78-82	83-87	88-92	93-97	98-02	03-07
Food & Live Animals	3.2%	5.0%	4.7%	4.1%	4.9%	3.2%
Beverages & Tobacco	0.4%	0.5%	0.6%	0.6%	0.8%	0.3%
Crude Materials	0.4%	0.8%	1.1%	1.1%	1.0%	1.1%
Mineral Fuels	70.1%	59.3%	59.4%	62.5%	55.3%	60.3%
Animal & Vegetable Oils	0.1%	0.2%	0.2%	0.2%	0.3%	0.2%
Chemicals	1.4%	3.3%	5.4%	5.9%	6.7%	6.8%
Manufactured Goods	7.7%	9.4%	8.2%	7.6%	8.2%	8.7%
Machinery & Transport	12.7%	15.4%	14.9%	12.8%	14.7%	14.6%
Misc. Manufactured Goods	3.7%	5.5%	5.0%	4.6%	5.4%	3.8%
Other Commodities	0.2%	0.6%	0.7%	0.7%	2.7%	1.0%

Table 3.3: Value of GCC Intra-Trade ($ Billions)

Sector/Year	78-82	83-87	88-92	93-97	98-02	03-07
Food & Live Animals	0.523	0.910	1.630	2.486	3.906	6.764
Beverages & Tobacco	0.063	0.132	0.406	1.016	2.020	0.716
Crude Materials	0.134	0.141	0.224	0.417	0.786	2.424
Mineral Fuels	3.838	0.753	0.811	3.156	0.941	2.850
Animal & Vegetable Oils	0.006	0.011	0.099	0.286	0.492	1.162
Chemicals	0.230	0.565	1.086	1.798	3.339	8.078
Manufactured Goods	1.624	2.224	3.539	4.999	7.276	17.446
Machinery & Transport	0.505	0.689	1.081	1.850	3.025	10.295
Misc. Manufactured Goods	0.919	1.077	1.272	1.396	2.359	4.390
Other Commodities	0.011	0.054	0.089	0.040	1.843	1.126

Table 3.4: Intra -GCC Trade by Sector as a Percentage of Total GCC Trade by Sector

Sector/Year	78-82	83-87	88-92	93-97	98-02	03-07
Food & Live Animals	2.1%	3.7%	6.3%	9.3%	8.8%	9.9%
Beverages & Tobacco	2.0%	5.0%	12.6%	27.3%	28.4%	10.2%
Crude Materials	3.9%	3.4%	3.8%	5.9%	8.3%	10.8%
Mineral Fuels	0.7%	0.3%	0.3%	0.8%	0.2%	0.2%
Animal & Vegetable Oils	0.6%	1.4%	10.0%	18.8%	19.6%	24.5%
Chemicals	2.1%	3.4%	3.7%	4.7%	5.4%	5.6%
Manufactured Goods	2.7%	4.8%	7.9%	10.0%	9.6%	9.4%
Machinery & Transport	0.5%	0.9%	1.3%	2.2%	2.2%	3.3%
Misc. Manufactured Goods	3.1%	3.9%	4.7%	4.6%	4.8%	5.4%
Other Commodities	0.7%	1.8%	2.5%	0.9%	7.4%	5.1%
Total Trade	1.0%	1.3%	1.9%	2.7%	2.8%	2.6%

Table 3.5: Sector Shares of GCC Intra- Trade (% Total Intra-Trade)

Sector/Year	78-82	83-87	88-92	93-97	98-02	03-07
Food & Live Animals	6.7%	13.9%	15.9%	14.3%	15.0%	12.2%
Beverages & Tobacco	0.8%	2.0%	4.0%	5.8%	7.8%	1.3%
Crude Materials	1.7%	2.2%	2.2%	2.4%	3.0%	4.4%
Mineral Fuels	48.9%	11.5%	7.9%	18.1%	3.6%	5.2%
Animal & Vegetable Oils	0.1%	0.2%	1.0%	1.6%	1.9%	2.1%
Chemicals	2.9%	8.6%	10.6%	10.3%	12.8%	14.6%
Manufactured Goods	20.7%	33.9%	34.6%	28.7%	28.0%	31.6%
Machinery & Transport	6.4%	10.5%	10.6%	10.6%	11.6%	18.6%
Misc. Manufactured Goods	11.7%	16.4%	12.4%	8.0%	9.1%	7.9%
Other Commodities	0.1%	0.8%	0.9%	0.2%	7.1%	2.0%

Table 3.6: Shares of GCC Intra –Trade by Origin and Destination in Food & Live Animals (Sector 0) During 1978-1982

Exp/Imp	Bahrain	Kuwait	Oman	Qatar	Saudi Arabia	UAE	GCC
Bahrain	-	0.1%	0.0%	0.9%	0.4%	0.4%	1.9%
Kuwait	0.7%	-	0.4%	1.5%	5.0%	0.7%	8.3%
Oman	0.3%	1.1%	-	0.2%	2.0%	0.0%	3.6%
Qatar	0.1%	0.0%	0.0%	-	0.1%	0.4%	0.6%
Saudi Arabia	3.5%	8.5%	0.1%	1.3%	-	3.3%	16.7%
UAE	0.7%	0.8%	61.1%	2.4%	4.0%	-	69.0%
GCC	5.2%	10.6%	61.6%	6.3%	11.5%	4.8%	100.0%

Table 3.7: Shares of GCC Intra –Trade by Origin and Destination in Food & Live Animals (Sector 0) During 2003-2007

Exp/Imp	Bahrain	Kuwait	Oman	Qatar	Saudi Arabia	UAE	GCC
Bahrain	-	0.9%	0.1%	0.0%	1.1%	0.1%	2.2%
Kuwait	0.4%	-	0.2%	0.3%	3.1%	0.3%	4.3%
Oman	0.4%	0.5%	-	0.5%	4.2%	0.7%	6.4%
Qatar	0.0%	0.0%	0.1%	-	0.3%	0.0%	0.4%
Saudi Arabia	6.8%	10.4%	2.9%	7.2%	-	8.1%	35.3%
UAE	1.9%	3.0%	17.9%	4.2%	24.4%	-	51.4%
GCC	9.5%	14.8%	21.2%	12.1%	33.2%	9.1%	100%

Table 3.8: Shares of GCC Intra –Trade by Origin and Destination in Beverages & Tobacco (Sector 1) During 1978-1982

Exp/Imp	Bahrain	Kuwait	Oman	Qatar	Saudi Arabia	UAE	GCC
Bahrain	-	0.1%	0.4%	0.3%	0.0%	0.2%	1.0%
Kuwait	1.2%	-	2.8%	4.2%	1.3%	0.5%	10.0%
Oman	1.7%	0.3%	-	0.6%	1.9%	0.0%	4.5%
Qatar	0.0%	0.0%	0.0%	-	0.2%	0.1%	0.4%
Saudi Arabia	0.3%	1.8%	0.1%	0.5%	-	1.8%	4.6%
UAE	3.4%	7.3%	38.9%	10.3%	20.0%	-	79.9%
GCC	6.7%	9.6%	42.2%	15.9%	23.4%	2.5%	100%

Table 3.9: Shares of GCC Intra –Trade by Origin and Destination in Beverages & Tobacco (Sector 1) During 2003-2007

Exp/Imp	Bahrain	Kuwait	Oman	Qatar	Saudi Arabia	UAE	GCC
Bahrain	-	0.7%	0.0%	4.1%	0.5%	0.1%	5.5%
Kuwait		-	0.4%	1.5%	0.4%	1.4%	4.1%
Oman	0.2%	0.2%	-	0.2%	0.6%	0.3%	1.5%
Qatar	0.0%	0.0%	0.1%	-	0.0%	0.0%	0.1%
Saudi Arabia	5.5%	18.0%	0.5%	15.3%	-	2.3%	41.6%
UAE	1.2%	6.6%	29.6%	4.8%	5.0%	-	47.2%
GCC	7.3%	25.5%	30.6%	25.9%	6.6%	4.1%	100%

Table 3.10: Shares of GCC Intra –Trade by Origin and Destination in Crude Materials (Sector 2) During 1978-1982

Exp/Imp	Bahrain	Kuwait	Oman	Qatar	Saudi Arabia	UAE	GCC
Bahrain	-	0.3%	0.0%	0.2%	1.6%	0.2%	2.3%
Kuwait	0.2%	-	0.0%	0.4%	2.4%	0.9%	3.9%
Oman	0.1%	0.0%	-	0.1%	0.1%	0.0%	0.3%
Qatar	0.1%	0.1%	0.0%	-	0.3%	1.1%	1.6%
Saudi Arabia	0.5%	34.7%	0.0%	1.1%	-	1.8%	38.1%
UAE	16.6%	6.5%	23.1%	1.4%	6.3%	-	53.9%
GCC	17.4%	41.7%	23.1%	3.1%	10.8%	3.9%	100%

Table 3.11: Shares of GCC Intra –Trade by Origin and Destination in Crude Materials (Sector 2) During 2003-2007

Exp/Imp	Bahrain	Kuwait	Oman	Qatar	Saudi Arabia	UAE	GCC
Bahrain	-	0.0%	0.5%	4.2%	14.8%	0.3%	19.9%
Kuwait	0.0%	-	0.0%	0.1%	0.3%	0.2%	0.6%
Oman	0.0%	0.3%	-	0.3%	0.1%	0.2%	1.0%
Qatar	0.0%	0.0%	0.0%	-	0.7%	0.5%	1.3%
Saudi Arabia	1.4%	2.2%	0.5%	1.9%	-	8.8%	14.7%
UAE	4.3%	16.5%	20.6%	20.0%	1.1%	-	62.5%
GCC	5.8%	19.0%	21.7%	26.6%	17.0%	10.0%	100%

Table 3.12: Shares of GCC Intra –Trade by Origin and Destination in Mineral Fuels (Sector 3) During 1978-1982

Exp/Imp	Bahrain	Kuwait	Oman	Qatar	Saudi Arabia	UAE	GCC
Bahrain	-	0.1%	12.0%	0.0%	0.0%	42.0%	54.1%
Kuwait	0.0%	-	1.1%	0.0%	0.1%	10.1%	11.3%
Oman	0.0%	0.2%	-	0	0.0%	0.0%	0.2%
Qatar	0.0%	0.0%	0.0%	-	0.0%	0.1%	0.1%
Saudi Arabia	22.5%	0.0%	0.2%	0.0%	-	3.0%	25.7%
UAE	0.3%	0.2%	6.6%	0.1%	1.3%	-	8.5%
GCC	22.8%	0.5%	20.0%	0.1%	1.3%	55.4%	100%

Table 3.13: Shares of GCC Intra –Trade by Origin and Destination in Mineral Fuels (Sector 3) During 2003-2007

Exp/Imp	Bahrain	Kuwait	Oman	Qatar	Saudi Arabia	UAE	GCC
Bahrain	-	0.0%	10.7%	3.9%	0.0%	2.9%	17.5%
Kuwait	2.2%	-	0.6%	0.0%	1.2%	1.1%	5.2%
Oman	0.1%	0.4%	-	0.2%	0.0%	0.0%	0.9%
Qatar	0.0%	0.0%	0.7%	-	0.2%	0.1%	1.0%
Saudi Arabia	0.3%	2.7%	2.8%	1.2%	-	12.8%	19.8%
UAE	1.9%	4.3%	39.7%	3.5%	6.2%	-	55.7%
GCC	4.5%	7.5%	54.6%	8.9%	7.6%	16.9%	100%

Table 3.14: Shares of GCC Intra –Trade by Origin and Destination in Animal & Vegetable Oils (Sector 4) During 1978-1982

Exp/Imp	Bahrain	Kuwait	Oman	Qatar	Saudi Arabia	UAE	GCC
Bahrain	-	0.0%	0.0%	0.3%	0.4%	1.3%	1.9%
Kuwait	1.6%	-	0.2%	0.0%	6.5%	2.8%	11.0%
Oman	0.0%	0.0%	-	0.0%	0.0%	0.0%	0.0%
Qatar	0.2%	0.0%	0.0%	-	0.0%	0.6%	0.8%
Saudi Arabia	0.2%	0.0%	0.0%	0.2%	-	0.0%	0.4%
UAE	3.0%	5.3%	67.3%	3.0%	7.2%	-	85.9%
GCC	4.9%	5.4%	67.5%	3.6%	14.0%	4.6%	100%

Table 3.15: Shares of GCC Intra –Trade by Origin and Destination in Animal & Vegetable Oils (Sector 4) During 2003-2007

Exp/Imp	Bahrain	Kuwait	Oman	Qatar	Saudi Arabia	UAE	GCC
Bahrain	-	0.0%	0.1%	0.2%	0.0%	0.0%	0.3%
Kuwait	0.0%	-	0.3%	0.0%	0.7%	0.0%	1.1%
Oman	0.4%	0.7%	-	0.5%	16.1%	0.1%	17.8%
Qatar	0.0%	0.0%	0.2%	-	0.0%	0.0%	0.2%
Saudi Arabia	3.2%	1.4%	2.9%	2.4%	-	2.4%	12.2%
UAE	1.9%	5.0%	13.3%	6.1%	42.1%	-	68.4%
GCC	5.6%	7.1%	16.6%	9.3%	58.9%	2.5%	100%

Table 3.16: Shares of GCC Intra –Trade by Origin and Destination in Chemicals (Sector 5) During 1978-1982

Exp/Imp	Bahrain	Kuwait	Oman	Qatar	Saudi Arabia	UAE	GCC
Bahrain	-	0.4%	0.0%	0.6%	1.2%	0.7%	2.9%
Kuwait	1.3%	-	0.2%	3.7%	18.3%	2.9%	26.4%
Oman	0.0%	0.0%	-	0.1%	0.2%	0.1%	0.3%
Qatar	0.3%	1.3%	0.0%	-	6.0%	2.0%	9.5%
Saudi Arabia	2.0%	2.5%	0.1%	1.2%	-	5.6%	11.4%
UAE	3.6%	4.7%	17.4%	9.0%	14.7%	-	49.5%
GCC	7.2%	8.9%	17.8%	14.5%	40.3%	11.2%	100%

Table 3.17: Shares of GCC Intra –Trade by Origin and Destination in Chemicals (Sector 5) During 2003-2007

Exp/Imp	Bahrain	Kuwait	Oman	Qatar	Saudi Arabia	UAE	GCC
Bahrain	-	0.2%	0.1%	0.4%	1.6%	0.8%	3.1%
Kuwait	0.3%	-	0.5%	0.5%	1.9%	2.6%	5.9%
Oman	0.2%	0.2%	-	0.6%	1.4%	0.1%	2.4%
Qatar	0.3%	0.4%	0.6%	-	2.3%	1.6%	5.1%
Saudi Arabia	3.5%	7.9%	4.3%	5.9%	-	17.9%	39.5%
UAE	2.2%	3.6%	12.8%	4.9%	20.4%	-	43.9%
GCC	6.4%	12.4%	18.3%	12.3%	27.7%	23.0%	100%

Table 3.18: Shares of GCC Intra –Trade by Origin and Destination in Manufactured Goods (Sector 6) During 1978-1982

Exp/Imp	Bahrain	Kuwait	Oman	Qatar	Saudi Arabia	UAE	GCC
Bahrain	-	2.1%	0.1%	0.8%	4.3%	1.3%	8.7%
Kuwait	0.4%	-	0.1%	0.9%	24.6%	1.8%	27.7%
Oman	0.0%	0.0%	-	0.0%	0.4%	0.0%	0.4%
Qatar	0.3%	3.5%	0.1%	-	17.1%	7.6%	28.6%
Saudi Arabia	0.7%	0.6%	0.0%	0.5%	-	1.0%	2.8%
UAE	1.9%	2.1%	18.0%	3.9%	5.7%	-	31.7%
GCC	3.2%	8.3%	18.3%	6.1%	52.2%	11.8%	100%

Table 3.19: Shares of GCC Intra –Trade by Origin and Destination in Manufactured Goods (Sector 6) During 2003-2007

Exp/Imp	Bahrain	Kuwait	Oman	Qatar	Saudi Arabia	UAE	GCC
Bahrain	-	0.6%	0.6%	1.0%	11.4%	1.2%	14.8%
Kuwait	0.2%	-	0.1%	0.6%	3.0%	0.6%	4.6%
Oman	0.2%	0.4%	-	0.9%	1.7%	0.2%	3.4%
Qatar	0.7%	0.1%	0.2%	-	0.0%	2.3%	3.3%
Saudi Arabia	5.8%	10.1%	2.4%	8.1%	-	7.0%	33.6%
UAE	1.8%	2.8%	17.3%	8.0%	10.5%	-	40.4%
GCC	8.8%	14.0%	20.7%	18.6%	26.6%	11.2%	100%

Table 3.20: Shares of GCC Intra –Trade by Origin and Destination in Machinery & Transport Equipment (Sector 7) During 1978-1982

Exp/Imp	Bahrain	Kuwait	Oman	Qatar	Saudi Arabia	UAE	GCC
Bahrain	-	0.1%	2.3%	0.6%	1.4%	0.8%	5.2%
Kuwait	1.1%	-	1.0%	2.4%	15.5%	3.1%	23.2%
Oman	0.5%	0.0%	-	0.1%	0.2%	0.0%	0.8%
Qatar	0.7%	0.1%	0.1%	-	0.4%	1.6%	2.9%
Saudi Arabia	1.7%	0.5%	0.6%	2.2%	-	0.8%	6.0%
UAE	2.1%	1.0%	51.9%	3.3%	3.5%	-	61.9%
GCC	6.2%	1.8%	56.0%	8.6%	21.1%	6.3%	100%

Table 3.21: Shares of GCC Intra –Trade by Origin and Destination in Machinery & Transport Equipment (Sector 7) During 2003-2007

Exp/Imp	Bahrain	Kuwait	Oman	Qatar	Saudi Arabia	UAE	GCC
Bahrain	-	0.2%	0.2%	0.5%	1.6%	0.3%	2.8%
Kuwait	0.4%	-	0.2%	1.0%	0.2%	0.9%	2.7%
Oman	0.2%	0.4%	-	1.8%	0.5%	0.4%	3.3%
Qatar	0.0%	0.1%	0.6%	-	0.5%	0.1%	1.2%
Saudi Arabia	1.9%	3.3%	1.2%	7.2%	-	8.6%	22.2%
UAE	1.8%	4.3%	44.0%	5.4%	12.2%	-	67.8%
GCC	4.3%	8.3%	46.2%	15.9%	15.0%	10.3%	100%

Table 3.22: Shares of GCC Intra –Trade by Origin and Destination in Miscellaneous Manufactured Goods (Sector 8) During 1978-1982

Exp/Imp	Bahrain	Kuwait	Oman	Qatar	Saudi Arabia	UAE	GCC
Bahrain	-	0.1%	0.2%	0.4%	47.7%	0.5%	48.9%
Kuwait	0.4%	-	0.2%	1.1%	12.6%	1.3%	15.6%
Oman	0.0%	0.0%	-	0.0%	0.0%	0.0%	0.1%
Qatar	0.1%	0.1%	0.0%	-	0.4%	0.7%	1.2%
Saudi Arabia	0.2%	0.3%	0.0%	0.2%	-	0.6%	1.3%
UAE	1.2%	0.9%	15.4%	4.4%	11.1%	-	32.8%
GCC	1.8%	1.4%	15.9%	6.0%	71.8%	3.0%	100%

Table 3.23: Shares of GCC Intra –Trade by Origin and Destination in Miscellaneous Manufactured Goods (Sector 8) During 2003-2007

Exp/Imp	Bahrain	Kuwait	Oman	Qatar	Saudi Arabia	UAE	GCC
Bahrain	-	0.6%	0.7%	0.9%	2.1%	4.5%	8.9%
Kuwait	0.1%	-	0.2%	0.3%	1.1%	2.8%	4.7%
Oman	0.2%	0.5%	-	0.8%	2.4%	0.1%	4.1%
Qatar	0.1%	0.1%	0.2%	-	0.2%	0.3%	0.8%
Saudi Arabia	1.8%	4.5%	1.2%	2.8%	-	10.1%	20.5%
UAE	3.5%	5.2%	27.3%	13.9%	11.2%	-	61.0%
GCC	5.7%	10.9%	29.7%	18.8%	17.1%	17.9%	100%

Table 3.24: Shares of GCC Intra –Trade by Origin and Destination in Other Commodities (Sector 9) During 1978-1982

Exp/Imp	Bahrain	Kuwait	Oman	Qatar	Saudi Arabia	UAE	GCC
Bahrain	-	0.2%	2.1%	0.0%	0.0%	14.6%	17.0%
Kuwait	0.6%	-	0.6%	0.1%	0.0%	3.0%	4.3%
Oman	0.1%	0.0%	-	0.0%	0.0%	0.0%	0.2%
Qatar	0.2%	0.0%	0.3%	-	0.0%	0.2%	0.7%
Saudi Arabia	2.0%	0.4%	0.3%	0.5%	-	1.6%	4.9%
UAE	3.5%	0.6%	67.7%	1.1%	0.0%	-	72.9%
GCC	6.5%	1.3%	70.9%	1.7%	0.0%	19.5%	100%

Table 3.25: Shares of GCC Intra –Trade by Origin and Destination in Other Commodities (Sector 9) During 2003-2007

Exp/Imp	Bahrain	Kuwait	Oman	Qatar	Saudi Arabia	UAE	GCC
Bahrain	-	6.7%	0.1%	0.2%	0.0%	0.0%	6.9%
Kuwait	0.0%	-	0.1%	0.1%	1.1%	0.1%	1.4%
Oman	0.0%	3.6%	-	0.6%	3.1%	0.9%	8.2%
Qatar	0.0%	1.0%	0.2%	-	1.0%	0.2%	2.4%
Saudi Arabia	0.0%	48.8%	0.5%	1.1%	-	0.3%	50.7%
UAE	0.1%	21.5%	4.0%	2.7%	2.1%	-	30.4%
GCC	0.1%	81.5%	4.9%	4.7%	7.3%	1.4%	100%

Table 3.26: Value of GCC Exports ($ Billions)

Sector/Year	78-82	83-87	88-92	93-97	98-02	03-07
Food & Live Animals	0.67	1.38	2.93	4.18	6.69	11.96
Beverages & Tobacco	0.07	0.14	0.44	1.08	2.16	1.44
Crude Materials	0.56	1.78	2.88	3.61	4.43	12.14
Mineral Fuels	544.85	292.08	322.52	406.92	504.44	1,269.9
Animal & Vegetable Oils	0.01	0.02	0.12	0.34	0.71	1.70
Chemicals	1.18	5.50	14.22	22.65	35.39	90.13
Manufactured Goods	3.25	4.72	8.40	14.13	23.51	61.15
Machinery & Transport	3.21	4.31	5.36	10.81	15.37	39.69
Misc. Manufactured Goods	1.51	2.13	4.83	9.44	13.19	16.80
Other Commodities	0.57	0.96	1.13	2.09	5.06	5.87

Table 3.27: Sector Shares of GCC Exports (% Total Exports)

Sector/Year	78-82	83-87	88-92	93-97	98-02	03-07
Food & Live Animals	0.1%	0.4%	0.8%	0.9%	1.1%	0.8%
Beverages & Tobacco	0.0%	0.0%	0.1%	0.2%	0.4%	0.1%
Crude Materials	0.1%	0.6%	0.8%	0.8%	0.7%	0.8%
Mineral Fuels	98.0%	93.3%	88.9%	85.6%	82.6%	84.1%
Animal & Vegetable Oils	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%
Chemicals	0.2%	1.8%	3.9%	4.8%	5.8%	6.0%
Manufactured Goods	0.6%	1.5%	2.3%	3.0%	3.8%	4.0%
Machinery & Transport	0.6%	1.4%	1.5%	2.3%	2.5%	2.6%
Misc. Manufactured Goods	0.3%	0.7%	1.3%	2.0%	2.2%	1.1%
Other Commodities	0.1%	0.3%	0.3%	0.4%	0.8%	0.4%

Table 3.28: Value of GCC Imports ($ Billions)

Sector/Year	78-82	83-87	88-92	93-97	98-02	03-07
Food & Live Animals	24.26	23.17	22.76	22.61	37.73	56.56
Beverages & Tobacco	3.14	2,524	2.77	2.65	4.96	5.56
Crude Materials	2.85	2.39	3.02	3.45	4.99	10.33
Mineral Fuels	6.02	1.76	1.58	3.78	1.8	7.32
Animal & Vegetable Oils	0.92	0.74	086	1.18	1.79	3.03
Chemicals	9.89	10.9	15.29	15.88	25.97	53.08
Manufactured Goods	57.01	41.63	36.26	35.92	51.96	124.01
Machinery & Transport	96.69	71.88	75.75	73.53	119.3	268.8.
Misc. Manufactured Goods	27.82	25.16	22.32	20.94	35.82	64.03
Other Commodities	0.88	2.03	2.45	2.42	19.73	16.19

Table 3.29: Sector Shares of GCC Imports (% Total Imports)

Sector/Year	78-82	83-87	88-92	93-97	98-02	03-07
Food & Live Animals	10.6%	12.7%	12.4%	12.4%	12.4%	9.3%
Beverages & Tobacco	1.4%	1.4%	1.5%	1.5%	1.6%	0.9%
Crude Materials	1.2%	1.3%	1.7%	1.9%	1.6%	1.7%
Mineral Fuels	2.6%	1.0%	0.9%	2.1%	0.6%	1.2%
Animal & Vegetable Oils	0.4%	0.4%	0.5%	0.6%	0.6%	0.5%
Chemicals	4.3%	6.0%	8.4%	8.7%	8.5%	8.7%
Manufactured Goods	24.8%	22.8%	19.8%	19.7%	17.1%	20.4%
Machinery & Transport	42.1%	39.5%	41.4%	40.3%	39.2%	44.1%
Misc. Manufactured Goods	12.1%	13.8%	12.2%	11.5%	11.8%	10.5%
Other Commodities	0.4%	1.1%	1.3%	1.3%	6.5%	2.7%

Table 3.30: Regression Results by Sector Using Exporter, Importer and Time Effects

Variable	Aggregate	Food & Live Animals	Beverages & Tobacco	Crude Materials	Mineral Fuels
GDP Exporter	0.65***	-0.1**	0.05	0.07	0.26***
GDP Importer	0.77***	0.77***	0.78***	0.74***	0.65***
Distance	-1.09***	-1.28***	-1.15***	-1.3***	-2.11***
Border	-0.18	0.07	0.3	-0.27**	0.003
Language	0.31***	0.83***	0.63***	0.3***	-0.61***
Pre-Colonizer	0.72***	0.60***	0.84***	0.71***	0.98***
Co-Colonizer	0.52***	0.32***	0.54***	0.28***	0.4**
Island	-0.24**	-0.16	-0.03	-0.34***	-0.46**
Land Locked	-0.62**	-0.41*	-0.44	-1.44***	-3.87***
GCCFTA	0.08	1.23***	1.37***	1.36***	-4.97***
PTA	-0.02	0.11**	-0.48***	-0.27***	0.11
R-Square	0.775	0.709	0.604	0.678	0.577
Obs.	87266	77689	55836	77557	51287

Dependent Variable: Log of Exports.

GDP and Distance are in logs, the remaining variables are dummy variables.

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

Table 3.30 (continued): Regression Results by Sector Using Exporter, Importer and Time Effects

Variable	Animal &Veg. Oils	Chemical	Manuf. Goods	Machine.& Transport	Misc. Manuf.	Other Comm.
GDP Exporter	0.17**	0.52***	0.22***	0.77***	0.27***	0.47***
GDP Importer	0.42***	0.48***	0.83***	0.78***	1.02***	0.61***
Distance	-1.22***	-1.46***	-1.34***	-1.18***	-1***	-1.18***
Border	0.35*	-0.36**	-0.24	-0.18	-0.19	0.09
Language	0.46***	0.42***	0.7***	0.56***	1***	0.45***
Pre-Colonizer	0.51***	0.64***	0.54***	0.8***	0.66***	0.76***
Co-Colonizer	0.54***	0.48***	0.26***	0.34***	0.3***	0.18*
Island	-0.08	-0.27**	-0.45***	-0.29***	-0.3***	-0.31**
Land Locked	-1.55***	-0.75***	-0.63***	-0.19	0.36	-0.21
GCCFTA	1.4***	0.01	1.56***	1.28***	1.26***	-0.27
PTA	-0.06	-0.52***	-0.11***	-0.13***	0.08*	-0.12**
R-Square	0.55	0.766	0.786	0.826	0.82	0.608
Obs.	48664	76664	81555	79831	80898	56534

Dependent Variable: Log of Exports.

GDP and Distance are in logs, the remaining variables are dummy variables.

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

Table 3.31: Regression Results by Sector Using Exporter, Importer and Time Effects

Variable	Aggregate	Food & Live Animals	Beverages & Tobacco	Crude Materials	Mineral Fuels
Distance	-1.09***	-1.28***	-1.15***	-1.3***	-2.11***
Border	-0.18	0.07	0.3	-0.28*	-0.002
Language	0.31***	0.83***	0.63***	0.3***	-0.62***
Pre-Colonizer	0.72***	0.6***	0.84***	0.71***	0.99***
Co-Colonizer	0.52***	0.33***	0.55***	0.28***	0.4**
Island	-0.24**	-0.16	-0.03	-0.34***	-0.46**
Landlocked	-0.62**	-0.42*	-0.44	-1.44***	-3.87***
GCCFTA	0.11	1.19***	1.29***	1.43***	-4.92***
PTA	-0.02	0.11**	-0.48***	-0.27***	0.11
R-Square	0.476	0.706	0.602	0.502	0.577
Observations	87266	77689	55836	77557	51287

Dependent Variable: Log {Exports / (GDPi*GDPj)}

Distance is in log, the remaining variables are dummy variables.

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

Table 3.31 (continued): Regression Results by Sector Using Exporter, Importer and Time Effects

Variable	Animal &Veg. Oils	Chemical	Manuf. Goods	Machine.& Transport	Misc. Manuf.	Other Comm.
Distance	-1.22***	-1.46***	-1.33***	-1.18***	-1***	-1.18***
Border	0.35*	-0.36**	-0.24	-0.18	-0.19	0.09
Language	0.45***	0.42***	0.69***	0.56***	0.99***	0.44***
Pre-Colonizer	0.52***	0.64***	0.55***	0.8***	0.66***	0.77***
Co-Colonizer	0.54***	0.48***	0.26***	0.34***	0.3***	0.18*
Island	-0.09	-0.27**	-0.45***	-0.3***	-0.31***	-0.32**
Landlocked	-1.54***	-0.74***	-0.63***	-0.19	0.36	-0.21
GCCFTA	1.49***	0.06	1.62***	1.3***	1.31***	-0.22
PTA	-0.06	-0.52***	-0.11***	-0.13***	0.08*	-0.12**
R-Square	0.562	0.585	0.615	0.674	0.655	0.436
Observations	48664	76664	81555	79831	80898	56534

Dependent Variable: Log {Exports / (GDPi*GDPj)}

Distance is in log, the remaining variables are dummy variables.

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

Table 3.32: Regression Results by Sector Using Country Pair and Time Effects

Variable	Aggregate	Food & Live Animals	Beverages & Tobacco	Crude Materials	Mineral Fuels
GDP Exporter	0.64***	-0.1**	0.1	0.1*	0.44***
GDP Importer	0.78***	0.8***	0.93***	0.77***	0.78***
GCCFTA	0.73***	1.36***	0.65**	1.46***	-0.42
PTA	-0.11**	0.13**	0.02	-0.05	-0.14
R Square	0.888	0.846	0.786	0.821	0.742
Observations	87266	77689	55836	77557	51287

Dependent Variable: Log of Exports.

GDP is in logs, the remaining variables are dummy variables.

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

Table 3.32 (continued): Regression Results by Sector Using Country Pair and Time Effects

Variable	Animal &Veg. Oils	Chemical	Manuf. Goods	Machine.& Transport	Misc. Manuf.	Other Comm.
GDP Exporter	0.27***	0.56***	0.25***	0.78***	0.25***	0.45***
GDP Importer	0.46***	0.53***	0.88***	0.84***	1.06***	0.83***
GCCFTA	2.79***	1.46***	1.32***	0.35	0.33	0.8**
PTA	0.21*	-0.07	0.16**	-0.05	0.34***	0.4***
R Square	0.741	0.863	0.873	0.89	0.902	0.703
Observations	48664	76664	81555	79831	80898	56534

Dependent Variable: Log of Exports.

GDP is in logs, the remaining variables are dummy variables.

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

Table 3.33: Regression Results by Sector Using Country Pair and Time Effects

Variable	Aggregate	Food & Live Animals	Beverages & Tobacco	Crude Materials	Mineral Fuels
GCCFTA	0.86***	1.18***	0.35	1.75***	-0.25
PTA	-0.13***	0.14**	0.04	-0.06	-0.16
R Square	0.737	0.843	0.782	0.719	0.742
Observations	87266	77689	55836	77557	51287

Dependent Variable: Log {Exports / (GDPi*GDPj)}

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

Table 3.33 (continued): Regression Results by Sector Using Country Pair and Time Effects

Variable	Animal &Veg. Oils	Chemical	Manuf. Goods	Machine.& Transport	Misc. Manuf.	Other Comm.
GCCFTA	3.11***	1.7***	1.54***	0.44*	0.5*	1.03***
PTA	0.17	-0.09	0.14**	-0.05	0.32***	0.37***
R Square	0.747	0.757	0.77	0.794	0.811	0.573
Observations	48664	76664	81555	79831	80898	56534

Dependent Variable: Log {Exports / (GDPi*GDPj)}

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

Table 3.34: Regression Results by Sector Using Country Pair, Exporter-Time and Importer-Time Effects

Variable	Aggregate	Food & Live Animals	Beverages & Tobacco	Crude Materials	Mineral Fuels
GCCFTA	0.9***	0.67**	0.59	0.65**	2.28***
PTA	-0.22***	-0.03	0.002	-0.06	0.08
R Square	0.905	0.868	0.822	0.848	0.783
Observations	87266	77689	55836	77557	51287

Dependent Variable: Log Exports

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

Table 3.34 (continued): Regression Results by Sector Using Country Pair, Exporter-Time and Importer-Time Effects

Variable	Animal &Veg. Oils	Chemical	Manuf. Goods	Machine.& Transport	Misc. Manuf.	Other Comm.
GCCFTA	3.29***	-0.05	0.06	0.5*	0.19	1.45***
PTA	-0.08	-0.09	-0.05	-0.18***	0.15**	0.06
R Square	0.78	0.894	0.903	0.92	0.933	0.813
Observations	48664	76664	81555	79831	80898	56534

Dependent Variable: Log Exports

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

Table 3.35: Sensitivity Results, Accounting for Major Non-GCC Trade Agreements Using Country Pair and Time Effects

Variable	Aggregate	Food & Live Animals	Beverages & Tobacco	Crude Materials	Mineral Fuels
GDP Exporter	0.63***	-0.11**	0.09	0.09*	0.43***
GDP Importer	0.78***	0.79***	0.91***	0.76***	0.77***
GCCFTA	0.49*	1.03***	0.73**	1.24***	-0.47
PTA2	-0.12**	0.11*	-0.05	-0.02	-0.15
ASEAN	0.42***	0.6**	1.63***	0.77**	0.86*
COMESA	0.42	0.4	-0.09	0.22	-0.84
ECO	0.48	-0.61	-1.33***	2.07***	0.81
EU	-0.21***	0.55***	0.9***	-0.08	-0.47***
EURO	-0.11***	0.08	0.24***	-0.08	-0.04
GAFTA	0.53***	0.75***	-0.01	0.46***	0.108
NAFTA	0.42**	0.49***	1***	0.17	1.28***
UMA	0.95*	0.14	-2.1***	-0.09	1.55***
R Square	0.888	0.847	0.788	0.821	0.743
Observations	87266	77689	55836	77557	51287

Dependent Variable: Log of Exports.

GDPs are in logs, the remaining variables are dummy variables.

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

Table 3.35 (Continued): Sensitivity Results, Accounting for Major Non-GCC Trade Agreements Using Country Pair and Time Effects

Variable	Animal &Veg. Oils	Chemical	Manuf. Goods	Machine.& Transport	Misc. Manuf.	Other Comm.
GDP Exporter	0.28***	0.55***	0.23***	0.77***	0.24***	0.47***
GDP Importer	0.44***	0.53***	0.87***	0.83***	1.05***	0.85***
GCCFTA	2.52***	1.23***	0.95***	0.35	0.34	0.5
PTA2	0.11	-0.09	0.15**	-0.04	0.33***	0.18
ASEAN	0.84	0.41*	0.78***	1.32***	1.2***	-0.76
COMESA	2.27**	0.19	0.36	-0.05	-0.33	1.17***
ECO	1.3	1.09**	1.94***	0.07	0.98***	1.91***
EU	0.69***	-0.3***	-0.05	-0.24***	-0.12	1.31***
EURO	0.36***	-0.05	-0.36***	-0.39***	-0.38***	0.59***
GAFTA	0.66***	0.47***	0.76***	-0.03	-0.08	0.82***
NAFTA	1.7***	0.15	0.64***	0.13	0.83**	1.24***
UMA	-0.47**	-0.02	0.81	0.17	0.41	-1.93**
R Square	0.743	0.864	0.874	0.891	0.903	0.706
Observations	48664	76664	81555	79831	80898	56534

Dependent Variable: Log of Exports.

GDPs are in logs, the remaining variables are dummy variables.

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

Table 3.36: Sensitivity Results, Accounting for Major Non-GCC Trade Agreements Using Country Pair and Time Effects

Variable	Aggregate	Food & Live Animals	Beverages & Tobacco	Crude Materials	Mineral Fuels
GCCFTA	0.64**	0.84***	0.37	1.58***	-0.25
PTA2	-0.13***	0.13**	-0.04	-0.03	-0.17
ASEAN	0.29	0.73***	1.83***	0.53	0.67
COMESA	0.62	0.19	-0.36	0.59	-0.58
ECO	0.62	-0.57	-1.42***	2.4***	1.21
EU	-0.22***	0.57***	0.91***	-0.1	-0.48***
EURO	-0.09***	0.06	0.22**	-0.04	-0.02
GAFTA	0.48***	0.8***	0.11	0.36**	-0.01
NAFTA	0.44**	0.46***	0.95**	0.23	1.31***
UMA	1.1**	-0.07	-2.46***	0.2	1.8**
R Square	0.738	0.844	0.784	0.72	0.742
Observations	87266	77689	55836	77557	51287

Dependent Variable: Log {Exports / (GDPi*GDPj)}

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

Table 3.36 (Continued): Sensitivity Results, Accounting for Major Non-GCC Trade Agreements Using Country Pair and Time Effects

Variable	Animal &Veg. Oils	Chemical	Manuf. Goods	Machine.& Transport	Misc. Manuf.	Other Comm.
GCCFTA	2.93***	1.52***	1.22***	0.46*	0.55**	0.77**
PTA2	0.08	-0.1*	0.14*	-0.05	0.31***	0.17
ASEAN	0.58	0.24	0.6**	1.24***	1.05***	-0.91
COMESA	2.7**	0.48	0.64	0.09	-0.17	1.16***
ECO	1.74***	1.24*	2.22***	0.14	1.2***	2.1***
EU	0.7***	-0.31***	-0.06	-0.25***	-0.13	1.31***
EURO	0.41***	-0.01	-0.32***	-0.37***	-0.34***	0.62***
GAFTA	0.48**	0.39***	0.68***	-0.06	-0.15	0.73***
NAFTA	1.78***	0.2	0.69***	0.15	0.87***	1.27***
UMA	-0.02	0.23	1.03	0.27	0.59	-1.75***
R Square	0.749	0.758	0.772	0.795	0.812	0.577
Observations	48664	76664	81555	79831	80898	56534

Dependent Variable: Log {Exports / (GDPi*GDPj)}

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

Table 3.37: Sensitivity Results, Accounting for Major Non-GCC Trade Agreements Using Country Pair, Exporter-Time and Importer-Time Effects

Variable	Aggregate	Food & Live Animals	Beverages & Tobacco	Crude Materials	Mineral Fuels
GCCFTA	0.76**	0.38	0.48	0.58**	1.78***
PTA2	-0.19***	0.03	0.04	0.002	0.07
ASEAN	-0.29	0.09	1.93***	0.52	0.43
COMESA	0.8**	0.57	0.33	0.28	1.5
ECO	-0.61	-1.96	-0.53	0.94	0.72
EU	0.19**	0.91***	1.31***	0.46***	-0.11
EURO	0.33***	0.35***	0.1	0.2**	0.28
GAFTA	0.32**	0.71***	0.13	0.1	1.1***
NAFTA	-0.15	0.01	0.39	0.22	1.53**
UMA	0.32	0.21	-0.39	0.08	1.25*
R Square	0.93	0.869	0.824	0.849	0.783
Observations	87266	77689	55836	77557	51287

Dependent Variable: Log Exports

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

Table 3.37 (continued): Sensitivity Results, Accounting for Major Non-GCC Trade Agreements Country Pair, Exporter-Time and Importer-Time Effects

Variable	Animal &Veg. Oils	Chemical	Manuf. Goods	Machine.& Transport	Misc. Manuf.	Other Comm.
GCCFTA	3.01***	-0.14	-0.03	0.42	0.31	1.01***
PTA2	-0.05	-0.08	-0.04	-0.16***	0.12**	0.04
ASEAN	-0.11	-0.55***	0.1	-0.43*	0.22	0.34
COMESA	3.46***	1.49**	0.78**	0.72	0.16	2.79***
ECO	-0.45	-0.16	0.3	-1.14	-0.43	-0.01
EU	1.11***	0.08	0.28***	-0.04	0.15*	0.9***
EURO	0.6***	0.13*	0.08	0.09	0.09	0.24
GAFTA	0.71***	0.19	0.17	0.19	0.36***	1.02***
NAFTA	1.13*	0.11	0.29	-0.13	0.01	-0.17
UMA	-0.36	0.4	0.54	-0.83	-0.31	0.22
R Square	0.783	0.894	0.903	0.92	0.933	0.814
Observations	48664	76664	81555	79831	80898	56534

Dependent Variable: Log Exports

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

Table 3.38: Sensitivity Results, Accounting for Major Non-GCC Trade Agreements & FTA Phases Using Country Pair and Time Effects

Variable	Aggregate	Food & Live Animals	Beverages & Tobacco	Crude Materials	Mineral Fuels
GDP Exporter	0.64***	-0.11**	0.09	0.09*	0.43***
GDP Importer	0.78***	0.8***	0.91***	0.76***	0.77***
GCCFTA	0.26	0.44**	0.42	0.41*	-0.96**
GCC88	0.52***	0.81***	0.28	0.74***	0.47
GCC93	0.26*	0.34***	0.26	0.29	0.5
GCC98	-0.88***	-0.71***	-0.19	0.15	-0.27
Net GCC	-0.1	0.88	{0.77}	1.91	-0.96
PTA2	-0.12**	0.11*	-0.05	-0.02	-0.15
ASEAN	0.42**	0.6**	1.63***	0.78**	0.86*
COMESA	0.43	0.41	-0.08	0.22	-0.83
ECO	0.48	-0.61	-1.33***	2.08***	0.81
EU	-0.2***	0.55***	0.9***	-0.09	-0.47***
EURO	-0.11***	0.08	0.25***	-0.08	-0.04
GAFTA	0.64***	0.81***	-0.04	0.31*	0.1
NAFTA	0.42**	0.49***	1***	0.17	1.29***
UMA	0.93*	0.13	-2.1***	-0.04	1.56***
R Square	0.888	0.847	0.788	0.822	0.743
Observations	87266	77689	55836	77557	51287

Dependent Variable: Log of Exports.

GDPs are in logs, the remaining variables are dummy variables.

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

{} indicates that the Net GCC sum is insignificant.

Table 3.38 (continued): Sensitivity Results, Accounting for Major Non-GCC Trade Agreements & FTA Phases Using Country Pair and Time Effects

Variable	Animal &Veg. Oils	Chemical	Manuf. Goods	Machine. & Transport	Misc. Manuf.	Other Comm.
GDP Exporter	0.31***	0.55***	0.24***	0.78***	0.24***	0.47***
GDP Importer	0.46***	0.53***	0.88***	0.84***	1.06***	0.84***
GCCFTA	0.81**	0.73***	0.63**	-0.24	0.23	0.14
GCC88	1.74***	0.74***	0.78**	1.16***	0.24	0.28
GCC93	1.25***	0.13	0.2*	-0.19	0.17	0.08
GCC98	-1.33**	-0.45**	-1.12***	-0.68***	-0.47***	0.68
Net GCC	2.47	1.04	0.49	0.48	-0.47	{1.18}
PTA2	0.11	-0.09	0.15**	-0.04	0.33***	0.18
ASEAN	0.84	0.41*	0.78***	1.32***	1.2***	-0.77
COMESA	2.29**	0.2	0.37	-0.04	-0.32	1.17***
ECO	1.33	1.09**	1.95***	0.08	0.98***	1.91***
EU	0.69***	-0.29***	-0.05	-0.24**	-0.12	1.31***
EURO	0.36***	-0.05	-0.35***	-0.39***	-0.38***	0.59***
GAFTA	0.72**	0.51***	0.94***	0.08	-0.02	0.53**
NAFTA	1.71***	0.16	0.65***	0.1	0.83**	1.24***
UMA	-0.45***	-0.03	0.77	0.15	0.39	-1.81**
R Square	0.744	0.864	0.874	0.891	0.903	0.706
Obs.	48664	76664	81555	79831	80898	56534

Dependent Variable: Log of Exports.

GDPs are in logs, the remaining variables are dummy variables.

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

{} indicates that the Net GCC sum is insignificant.

Table 3.39: Sensitivity Results, Accounting for Major Non-GCC Trade Agreements & FTA Phases Using Country Pair and Time Effects

Variable	Aggregate	Food & Live Animals	Beverages & Tobacco	Crude Materials	Mineral Fuels
GCCFTA	0.31*	0.36**	0.26	0.55**	-0.88**
GCC88	0.72***	0.56**	-0.12	1.17***	0.47
GCC93	0.24*	0.35***	0.29	0.29	-0.79
GCC98	-1.07***	-0.47**	0.16	-0.24	-0.16
Net GCC	0.2	0.8	{0.59}	1.72	-0.88
PTA2	-0.13**	0.13**	-0.04	-0.03	-0.17
ASEAN	0.3	0.73***	1.83***	0.54	0.68
COMESA	0.62	0.2	-0.36	0.59	-0.58
ECO	0.63	-0.57	-1.42***	2.41***	1.22
EU	-0.22***	0.57***	0.91***	-0.1	-0.48***
EURO	-0.09**	0.05	0.22**	-0.04	-0.02
GAFTA	0.63***	0.82***	-0.003	0.28	0.1
NAFTA	0.44**	0.47***	0.95**	0.23	1.31***
UMA	1.07*	-0.08	-2.43***	0.23	1.8**
R Square	0.739	0.844	0.785	0.72	0.742
Observations	87266	77689	55836	77557	51287

Dependent Variable: Log {Exports / (GDPi*GDPj)}

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

{} indicates that the Net GCC sum is insignificant.

Table 3.39 (continued): Sensitivity Results, Accounting for Major Non-GCC Trade Agreements & FTA Phases Using Country Pair and Time Effects

Variable	Animal &Veg. Oils	Chemical	Manuf. Goods	Machine. & Transport	Misc. Manuf.	Other Comm.
GCCFTA	0.95***	0.84***	0.73***	-0.2	0.31	0.27
GCC88	2.22***	1.09***	1.11***	1.31***	0.51**	0.54**
GCC93	1.26***	0.11	0.18*	-0.19	0.16	-0.08
GCC98	-1.73***	-0.75***	-1.4***	-0.81***	-0.7***	0.44
Net GCC	2.7	1.18	0.62	0.5	-0.19	0.54
PTA2	0.08	-0.1*	0.14**	-0.04	0.31***	0.17
ASEAN	0.6	0.24	0.6**	1.25***	1.06***	-0.9
COMESA	2.71**	0.48	0.65	0.09	-0.17	1.16***
ECO	1.75***	1.24*	2.22***	0.15	1.2***	2.1***
EU	0.71***	-0.3***	-0.05	-0.24***	-0.13	1.31***
EURO	0.41***	-0.01	-0.32***	-0.37***	-0.34***	0.62***
GAFTA	0.66**	0.49***	0.9***	0.07	-0.05	0.5*
NAFTA	1.79***	0.21	0.7***	0.16	0.87**	1.28***
UMA	-0.02	0.21	0.98	0.24	0.57	-1.66**
R Square	0.75	0.758	0.772	0.795	0.812	0.577
Obs.	48664	76664	81555	79831	80898	56534

Dependent Variable: Log {Exports / (GDPi*GDPj)}

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

Table 3.40: Sensitivity Results, Accounting for Major Non-GCC Trade Agreements & FTA Phases Using Country Pair, Exporter-Time and Importer-Time Effects

Variable	Aggregate	Food & Live Animals	Beverages & Tobacco	Crude Materials	Mineral Fuels
GCCFTA	0.42*	-0.16	0.5	-0.31	0.58
GCC88	0.53**	0.41	-0.21	0.97***	1.27***
GCC93	0.45***	0.36**	0.23	0.17	1.11***
GCC98	-0.91***	-0.03	0.01	-0.02	-1.26*
Net GCC	0.49	0.36	{0.53}	0.97	1.12
PTA2	-0.19***	0.03	0.04	0.003	0.08
ASEAN	-0.29	0.09	1.93***	0.52	0.32
COMESA	0.8**	0.56	0.39	0.28	1.48
ECO	-0.67	-1.96	-0.53	0.94	0.72
EU	0.19**	0.91***	1.31***	0.46***	-0.11
EURO	0.33***	0.35***	0.1	0.2**	0.28
GAFTA	0.42***	0.71***	0. 1	0.007	1.17***
NAFTA	-0.16	0.01	0.39	0.22	1.53**
UMA	0.31	0.21	-0.39	0.1	1.26*
R Square	0.929	0.869	0.824	0.849	0.784
Observations	87266	77689	55836	77557	51287

Dependent Variable: Log Exports

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

{} indicates that the Net GCC sum is insignificant.

Table 3.40 (continued): Sensitivity Results, Accounting for Major Non-GCC Trade Agreements & FTA Phases Using Country Pair, Exporter-Time and Importer-Time Effects

Variable	Animal &Veg. Oils	Chemical	Manuf. Goods	Machinery & Transport	Misc. Manuf.	Other Comm.
GCCFTA	1.84***	-0.26	-0.08	-0.45***	-0.26	0.18
GCC88	1.15*	0.36	0.34	1.33***	0.47	0.58*
GCC93	1.07***	0.2	0.07	-0.12	0.27	0.32
GCC98	-1.1**	-0.73***	-0.68**	-0.38*	0.08	0.76*
Net GCC	2.96	-0.73	-0.68	0.5	{0.59}	1.34
PTA2	-0.05	-0.08	-0.04	-0.15***	0.12**	0.04
ASEAN	-0.11	-0.55***	0.1	-0.43*	0.22	0.33
COMESA	3.46***	1.51**	0.78**	0.72	0.15	2.76***
ECO	-0.49	-0.16	0.3	-1.14	-0.43	-0.01
EU	1.11***	0.08	0.28***	-0.04	0.15*	0.9***
EURO	0.6***	0.13*	0.08	0.09	0.09	0.24
GAFTA	0.8***	0.32**	0.3*	0.21	-0.46***	0.54***
NAFTA	1.13*	0.11	0.29	-0.13	0.01	-0.17
UMA	-0.37	0.38	0.53	-0.84	-0.3	0.36
R Square	0.783	0.894	0.903	0.92	0.934	0.814
Observations	48664	76664	81555	79831	80898	56534

Dependent Variable: Log Exports

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

{} indicates that the Net GCC sum is insignificant.

Table 3.41: Major Commodity Groups of Sector 7 "Machinery and transport equipment" Commodities among GCC Countries

Year	Construction and mining machinery	Heating & cooling equipment	Insulated wire & cable	Bodies & parts of motor vehicles	Total Share of GCC Intra-Trade
1983	34.3%	4.4%	5.0%	9.2%	52.9%
1989	19.6%	8.9%	29.8%	3.6%	61.8%
1999	15.9%	16.0%	12.1%	7.5%	51.5%
2007	11.6%	10.3%	27.2%	3.4%	52.5%

Table 3.42: Country Pairs with the Highest Share of GCC Intra-Trade in Construction and Mining Machinery Commodities

Year	Exporter	Importer	Share of Total GCC Intra-Trade in Commodity Group
1983	784	512	99.4%
1989	784	512	94.2%
1999	784	512	96.7%
2007	784	512	94.4%

Table 3.43: Country Pairs with the Highest Share of GCC Intra-Trade in Heating and Cooling Equipment Commodities

Year	Exporter	Importer	Share of Total GCC Intra-Trade in Commodity Group
1983	784	512	43.0%
1989	784	512	21.3%
1999	784	682	22.0%
2007	682	784	26.8%

Table 3.44: Country Pairs with the Highest Share of GCC Intra-Trade in Insulated Wire and Cable Commodities

Year	Exporter	Importer	Share of Total GCC Intra-Trade in Commodity Group
1983	784	512	39.6%
1989	48	682	33.2%
1999	682	634	24.6%
2007	682	784	35.0%

Table 3.45: Country Pairs with the Highest Share of GCC Intra-Trade in Bodies & Parts of Motor Vehicles Commodities

Year	Exporter	Importer	Share of Total GCC Intra-Trade in Commodity Group
1983	784	512	61.4%
1989	784	512	82.7%
1999	784	512	81.9%
2007	784	512	80.6%

Appendix 3.A

Table 3.A.1: 1st Digit SITC Classification

Code	Description
TOTAL	Name: All commodities
0	Name: Food and live animals
1	Name: Beverages and tobacco
2	Name: Crude materials, inedible, except fuels
3	Name: Mineral fuels, lubricants and related materials
4	Name: Animal and vegetable oils and fats
5	Name: Chemicals
6	Name: Manufactured goods classified chiefly by material
7	Name: Machinery and transport equipment
8	Name: Miscellaneous manufactured articles
9	Name: Commodities & transactions not classified according to kind

Table 3.A.2: Country pairs with the highest frequency of zero/missing observations (Aggregate Trade)

Exporter	Importer	Frequency
12	144	28
12	364	28
736	364	27
360	702	25
702	760	25
834	364	25
12	554	24
12	736	24
12	834	24
404	364	23
410	364	23
784	364	23
12	48	22
36	364	22
40	364	22
48	364	22
50	364	22
56	364	22
76	364	22
124	364	22
144	364	22
156	364	22
196	364	22
208	364	22

Table 3.A.3: Frequency of zero/missing observations by year (Aggregate Trade)

Year	Frequency
1978	310
1979	284
1980	282
1981	290
1982	378
1983	349
1984	317
1985	360
1986	450
1987	386
1988	337
1989	321
1990	265
1991	320
1992	203
1993	247
1994	349
1995	191
1996	241
1997	234
1998	180
1999	183
2000	21
2001	20
2002	19
2003	10
2004	8
2005	59
2006	6
2007	57
2008	115
2009	219
2010	169
Sum of zero/missing	7180
% Zero of total possible observations	7.6%

Table 3.A.4: Frequency of zero/missing observations among GCC countries (Aggregate Trade)

Exporter	Importer	Frequency
48	414	4
48	634	4
48	682	1
48	784	3
414	48	3
414	634	4
414	682	2
414	784	3
512	48	3
512	414	4
512	634	4
512	682	1
512	784	1
634	48	3
634	414	6
634	682	5
634	784	10
682	48	3
682	414	8
682	634	4
682	784	16
784	48	3
784	414	7
784	512	1
784	634	4
784	682	8
Sum of zero/missing		115
% Zero of total possible observations		11.6%

Table 3.A.5: Frequency of zero/missing observations by year among GCC countries (Aggregate Trade)

Year	Frequency
1978	1
1979	0
1980	1
1981	1
1982	1
1983	2
1984	4
1985	8
1986	9
1987	12
1988	7
1989	2
1990	4
1991	0
1992	0
1993	0
1994	0
1995	0
1996	0
1997	18
1998	6
1999	7
2000	1
2001	0
2002	1
2003	1
2004	1
2005	6
2006	0
2007	0
2008	1
2009	12
2010	9

Table 3.A.6: Country pairs with the highest frequency of zero/missing observations (Sector 0)

Exporter	Importer	Frequency
12	364	33
12	608	33
48	76	33
400	364	33
414	76	33
512	76	33
634	76	33
634	504	33
634	554	33
736	364	33
12	50	32
12	344	32
48	788	32
50	834	32
414	246	32
414	484	32
634	36	32
736	834	32
12	36	31
12	144	31
12	404	31
12	834	31
48	246	31
48	504	31
50	364	31

Frequency =33 means that there are no trade observations for the country pair during the 1978-2010 period.

Table 3.A.7: Frequency of zero/missing observations by year (Sector 0)

Year	Frequency
1978	742
1979	762
1980	748
1981	758
1982	794
1983	789
1984	727
1985	769
1986	808
1987	737
1988	679
1989	641
1990	581
1991	634
1992	508
1993	532
1994	584
1995	460
1996	493
1997	488
1998	427
1999	406
2000	248
2001	265
2002	217
2003	217
2004	214
2005	239
2006	169
2007	216
2008	258
2009	345
2010	302
Sum of zero/missing	16757
% Zero of total possible	17.7%

Table 3.A.8: Frequency of zero/missing observations among GCC countries (Sector 0)

Exporter	Importer	Frequency
48	414	4
48	634	4
48	682	1
48	784	3
414	48	3
414	512	1
414	634	4
414	682	2
414	784	3
512	48	3
512	414	4
512	634	4
512	682	1
512	784	1
634	48	6
634	414	6
634	512	7
634	682	5
634	784	12
682	48	3
682	414	8
682	512	2
682	634	4
682	784	16
784	48	3
784	414	8
784	512	1
784	634	4
784	682	9
Sum of zero/missing		133
% Zero of total possible observations		13.3%

Table 3.A.9: Frequency of zero/missing observations by year among GCC countries (Sector 0)

Year	Frequency
1978	4
1979	3
1980	2
1981	2
1982	2
1983	3
1984	6
1985	9
1986	10
1987	12
1988	7
1989	4
1990	4
1991	0
1992	0
1993	0
1994	0
1995	0
1996	0
1997	18
1998	6
1999	7
2000	1
2001	0
2002	1
2003	1
2004	1
2005	6
2006	0
2007	0
2008	1
2009	12
2010	9

Table 3.A.10: Country pairs with the highest frequency of zero/missing observations (sector 1)

Exporter	Importer	Frequency
12	48	33
12	50	33
12	76	33
12	144	33
12	196	33
12	344	33
12	364	33
12	422	33
12	458	33
12	586	33
12	608	33
12	699	33
12	736	33
12	764	33
48	12	33
48	76	33
48	144	33
48	156	33
48	208	33
48	246	33
48	360	33
48	392	33
48	404	33
48	579	33
48	736	33
48	760	33
48	764	33
48	788	33
48	834	33
50	246	33
50	372	33
50	392	33
50	422	33

Frequency =33 means that there are no trade observations for the country pair during the 1978-2010 period.

Table 3.A.11: Frequency of zero/missing observations by year (Sector 1)

Year	Frequency
1978	1508
1979	1463
1980	1476
1981	1461
1982	1472
1983	1485
1984	1478
1985	1494
1986	1515
1987	1460
1988	1354
1989	1372
1990	1314
1991	1297
1992	1226
1993	1223
1994	1259
1995	1169
1996	1157
1997	1183
1998	1136
1999	1091
2000	947
2001	948
2002	883
2003	827
2004	804
2005	790
2006	739
2007	753
2008	763
2009	824
2010	739
Sum of zero/missing observations	38610
% Zero of total possible observations	40.9%

Table 3.A.12: Frequency of zero/missing observations among GCC countries (Sector 1)

Exporter	Importer	Frequency
48	414	10
48	512	10
48	634	8
48	682	2
48	784	3
414	48	5
414	512	12
414	634	6
414	682	3
414	784	5
512	48	3
512	414	4
512	634	4
512	682	2
512	784	3
634	48	9
634	414	20
634	512	18
634	682	15
634	784	14
682	48	4
682	414	9
682	512	9
682	634	5
682	784	16
784	48	3
784	414	8
784	512	4
784	634	4
784	682	9
Sum of zero/missing		227
% Zero of total possible observations		22.9%

Table 3.A.13: Frequency of zero/missing observations by year among GCC countries (Sector 1)

Year	Frequency
1978	11
1979	9
1980	12
1981	7
1982	6
1983	10
1984	11
1985	13
1986	14
1987	14
1988	11
1989	7
1990	7
1991	5
1992	2
1993	3
1994	3
1995	2
1996	1
1997	18
1998	9
1999	8
2000	2
2001	2
2002	1
2003	2
2004	2
2005	7
2006	2
2007	2
2008	2
2009	12
2010	10

Table 3.A.14: Country pairs with the highest frequency of zero/missing observations (Sector 2)

Exporter	Importer	Frequency
12	48	33
12	144	33
12	834	33
48	12	33
48	554	33
48	788	33
414	196	33
414	579	33
484	834	33
512	484	33
512	504	33
512	579	33
620	736	33
634	554	33
634	579	33
834	736	33
12	36	32
12	364	32
12	404	32
12	414	32
12	554	32
12	702	32
12	736	32
48	504	32
144	736	32
414	246	32
414	554	32
512	554	32
512	757	32
512	788	32
608	736	32
634	12	32
634	76	32
634	300	32
634	484	32
634	788	32
788	364	32
788	760	32

Frequency =33 means that there are no trade observations for the country pair during the 1978-2010 period.

Table 3.A.15: Frequency of zero/missing observations by year (Sector 2)

Year	Frequency
1978	736
1979	718
1980	719
1981	720
1982	782
1983	713
1984	683
1985	698
1986	758
1987	723
1988	640
1989	634
1990	604
1991	653
1992	536
1993	558
1994	616
1995	508
1996	538
1997	505
1998	455
1999	447
2000	304
2001	271
2002	250
2003	243
2004	229
2005	250
2006	196
2007	237
2008	294
2009	376
2010	295
Sum of zero/missing observations	16889
% Zero of total possible observations	17.9%

Table 3.A.16: Frequency of zero/missing observations among GCC countries (Sector 2)

Exporter	Importer	Frequency
48	414	5
48	512	8
48	634	7
48	682	1
48	784	3
414	48	3
414	512	9
414	634	9
414	682	2
414	784	3
512	48	5
512	414	9
512	634	8
512	682	5
512	784	1
634	48	9
634	414	9
634	512	10
634	682	5
634	784	12
682	48	3
682	414	8
682	512	4
682	634	4
682	784	16
784	48	3
784	414	8
784	512	1
784	634	4
784	682	9
Sum of zero/missing		183
% Zero of total possible observations		18.5%

Table 3.A.17: Frequency of zero/missing observations by year among GCC countries (Sector 2)

Year	Frequency
1978	7
1979	7
1980	6
1981	6
1982	7
1983	4
1984	7
1985	10
1986	15
1987	15
1988	10
1989	9
1990	6
1991	2
1992	4
1993	1
1994	1
1995	2
1996	0
1997	18
1998	6
1999	7
2000	1
2001	0
2002	1
2003	1
2004	2
2005	0
2006	0
2007	6
2008	1
2009	12
2010	9

Table 3.A.18: Country pairs with the highest frequency of zero/missing observations (Sector 3)

Exporter	Importer	Frequency
12	144	33
12	364	33
12	512	33
12	736	33
12	834	33
48	12	33
48	246	33
48	484	33
48	788	33
50	12	33
50	48	33
50	56	33
50	144	33
50	196	33
50	208	33
50	246	33
50	300	33
50	344	33
50	372	33
50	400	33
50	404	33
50	422	33
50	504	33
50	512	33
50	579	33
50	620	33
50	634	33
50	736	33
50	757	33
50	760	33
50	788	33
50	792	33
50	818	33
50	834	33
50	842	33

Frequency =33 means that there are no trade observations for the country pair during the 1978-2010 period.

Table 3.A.19: Frequency of zero/missing observations by year (Sector 3)

Year	Frequency
1978	1585
1979	1585
1980	1510
1981	1530
1982	1539
1983	1507
1984	1510
1985	1536
1986	1533
1987	1490
1988	1461
1989	1481
1990	1404
1991	1415
1992	1329
1993	1334
1994	1371
1995	1294
1996	1269
1997	1255
1998	1190
1999	1168
2000	1154
2001	1132
2002	1120
2003	1110
2004	1069
2005	1094
2006	1022
2007	1012
2008	1032
2009	1095
2010	1023
Sum of zero/missing observations	43159
% Zero of total possible observations	45.7%

Table 3.A.20: Frequency of zero/missing observations among GCC countries (Sector 3)

Exporter	Importer	Frequency
48	414	18
48	512	8
48	634	12
48	682	4
48	784	6
414	48	12
414	512	3
414	634	6
414	682	4
414	784	4
512	48	16
512	414	17
512	634	13
512	682	17
512	784	1
634	48	24
634	414	27
634	512	24
634	682	21
634	784	12
682	48	6
682	414	11
682	512	6
682	634	5
682	784	17
784	48	3
784	414	8
784	512	1
784	634	4
784	682	9
Sum of zero/missing		319
% Zero of total possible observations		32.2%

Table 3.A.21: Frequency of zero/missing observations by year among GCC countries (Sector 3)

Year	Frequency
1978	11
1979	12
1980	9
1981	11
1982	12
1983	13
1984	14
1985	15
1986	15
1987	16
1988	11
1989	12
1990	13
1991	10
1992	6
1993	5
1994	5
1995	6
1996	6
1997	20
1998	8
1999	11
2000	7
2001	5
2002	5
2003	8
2004	8
2005	11
2006	2
2007	3
2008	5
2009	13
2010	11

Table 3.A.22: Country pairs with the highest frequency of zero/missing observations (Sector 4)

Exporter	Importer	Frequency
12	36	33
12	50	33
12	144	33
12	156	33
12	196	33
12	208	33
12	246	33
12	300	33
12	344	33
12	364	33
12	392	33
12	404	33
12	410	33
12	458	33
12	512	33
12	554	33
12	620	33
12	634	33
12	702	33
12	736	33
12	764	33
12	792	33
12	834	33
40	834	33
48	12	33
48	40	33
48	56	33
48	76	33
48	124	33
48	144	33
48	246	33
48	276	33
48	300	33
48	344	33
48	360	33
48	372	33

Frequency =33 means that there are no trade observations for the country pair during the 1978-2010 period.

Table 3.A.23: Frequency of zero/missing observations by year (Sector 4)

Year	Frequency
1978	1700
1979	1685
1980	1687
1981	1669
1982	1688
1983	1690
1984	1662
1985	1660
1986	1702
1987	1633
1988	1602
1989	1565
1990	1550
1991	1550
1992	1488
1993	1500
1994	1494
1995	1403
1996	1391
1997	1352
1998	1298
1999	1279
2000	1133
2001	1123
2002	1120
2003	1075
2004	1050
2005	1000
2006	959
2007	991
2008	1014
2009	1071
2010	998
Sum of zero/missing observations	45782
% Zero of total possible	48.5%

Table 3.A.24: Frequency of zero/missing observations among GCC countries (Sector 4)

Exporter	Importer	Frequency
48	414	20
48	512	18
48	634	10
48	682	8
48	784	7
414	48	6
414	512	22
414	634	15
414	682	6
414	784	3
512	48	13
512	414	13
512	634	14
512	682	12
512	784	3
634	48	24
634	414	30
634	512	25
634	682	27
634	784	12
682	48	6
682	414	12
682	512	11
682	634	9
682	784	19
784	48	3
784	414	12
784	512	1
784	634	5
784	682	12
Sum of zero/missing		378
% Zero of total possible observations		38.2%

Table 3.A.25: Frequency of zero/missing observations by year among GCC countries (Sector 4)

Year	Frequency
1978	19
1979	18
1980	16
1981	17
1982	19
1983	15
1984	18
1985	19
1986	18
1987	20
1988	18
1989	16
1990	12
1991	9
1992	8
1993	4
1994	5
1995	3
1996	3
1997	19
1998	10
1999	11
2000	5
2001	3
2002	5
2003	7
2004	5
2005	10
2006	7
2007	6
2008	6
2009	14
2010	13

Table 3.A.26: Country pairs with the highest frequency of zero/missing observations (Sector 5)

Exporter	Importer	Frequency
48	76	33
736	422	33
834	196	33
834	414	33
834	422	33
834	634	33
12	144	32
12	344	32
12	834	32
50	760	32
736	344	32
736	579	32
736	620	32
834	504	32
834	620	32
834	788	32
404	12	31
404	364	31
736	76	31
736	144	31
736	208	31
736	364	31
834	12	31
834	76	31
834	144	31
834	300	31
834	554	31
834	760	31
12	364	30
50	12	30
144	736	30
512	246	30
736	12	30
736	196	30
736	300	30
736	392	30

Frequency =33 means that there are no trade observations for the country pair during the 1978-2010 period.

Table 3.A.27: Frequency of zero/missing observations by year (Sector 5)

Year	Frequency
1978	920
1979	922
1980	872
1981	884
1982	932
1983	890
1984	845
1985	833
1986	871
1987	789
1988	708
1989	693
1990	636
1991	683
1992	584
1993	559
1994	630
1995	497
1996	513
1997	481
1998	389
1999	382
2000	195
2001	212
2002	191
2003	175
2004	166
2005	189
2006	120
2007	167
2008	243
2009	337
2010	274
Sum of zero/missing observations	17782
% Zero of total possible observations	18.8%

Table 3.A.28: Frequency of zero/missing observations among GCC countries (Sector 5)

Exporter	Importer	Frequency
48	414	4
48	512	1
48	634	4
48	682	1
48	784	3
414	48	3
414	634	4
414	682	2
414	784	3
512	48	3
512	414	7
512	634	8
512	682	2
512	784	1
634	48	4
634	414	7
634	512	6
634	682	5
634	784	11
682	48	3
682	414	8
682	512	3
682	634	4
682	784	16
784	48	3
784	414	8
784	512	1
784	634	4
784	682	9
Sum of zero/missing		138
% Zero of total possible observations		13.9%

Table 3.A.29: Frequency of zero/missing observations by year among GCC countries (Sector 5)

Year	Frequency
1978	6
1979	5
1980	6
1981	2
1982	2
1983	5
1984	5
1985	8
1986	9
1987	12
1988	7
1989	4
1990	4
1991	0
1992	0
1993	0
1994	0
1995	0
1996	0
1997	18
1998	6
1999	7
2000	1
2001	0
2002	1
2003	1
2004	1
2005	6
2006	0
2007	0
2008	1
2009	12
2010	9

Table 3.A.30: Country pairs with the highest frequency of zero/missing observations (Sector 6)

Exporter	Importer	Frequency
12	144	32
12	364	32
12	554	32
414	76	31
788	364	31
12	404	30
634	76	30
736	422	30
736	554	30
834	760	30
12	414	29
404	364	29
512	246	29
736	364	29
12	50	28
12	246	28
404	12	28
422	50	28
512	76	28
634	554	28
736	144	28
736	504	28
736	579	28
736	608	28
760	608	28
788	608	28
144	736	27
504	50	27
504	834	27
608	736	27
634	834	27
702	760	27
736	36	27
834	48	27
834	364	27
834	634	27

Frequency =33 means that there are no trade observations for the country pair during the 1978-2010 period.

Table 3.A.31: Frequency of zero/missing observations by year (Sector 6)

Year	Frequency
1978	666
1979	634
1980	612
1981	602
1982	689
1983	652
1984	613
1985	648
1986	704
1987	630
1988	552
1989	528
1990	458
1991	519
1992	392
1993	404
1994	504
1995	331
1996	357
1997	364
1998	311
1999	287
2000	124
2001	115
2002	106
2003	90
2004	90
2005	126
2006	58
2007	103
2008	158
2009	260
2010	204
Sum of zero/missing observations	12891
% Zero of total possible	13.6%

Table 3.A.32: Frequency of zero/missing observations among GCC countries (Sector 6)

Exporter	Importer	Frequency
48	414	4
48	634	4
48	682	1
48	784	3
414	48	3
414	634	4
414	682	2
414	784	3
512	48	3
512	414	7
512	634	6
512	682	1
512	784	1
634	48	3
634	414	6
634	512	1
634	682	5
634	784	10
682	48	3
682	414	8
682	512	1
682	634	4
682	784	16
784	48	3
784	414	8
784	512	1
784	634	4
784	682	9
Sum of zero/missing		124
% Zero of total possible observations		12.5%

Table 3.A.33: Frequency of zero/missing observations by year among GCC countries (Sector 6)

Year	Frequency
1978	4
1979	2
1980	2
1981	1
1982	2
1983	2
1984	4
1985	8
1986	9
1987	12
1988	7
1989	4
1990	4
1991	0
1992	0
1993	0
1994	0
1995	0
1996	0
1997	18
1998	6
1999	7
2000	1
2001	0
2002	1
2003	1
2004	1
2005	6
2006	0
2007	0
2008	1
2009	12
2010	9

Table 3.A.34: Country pairs with the highest frequency of zero/missing observations (Sector 7)

Exporter	Importer	Frequency
12	364	33
834	634	33
12	48	32
12	144	32
404	760	32
736	144	32
736	504	32
834	364	32
834	400	32
404	12	31
404	364	31
404	422	31
834	196	31
834	504	31
834	760	31
12	404	30
404	400	30
512	504	30
736	76	30
834	48	30
834	414	30
12	422	29
12	554	29
50	400	29
736	608	29
834	422	29
834	620	29
12	50	28
12	414	28
12	834	28
50	504	28
404	196	28
414	76	28
736	364	28
736	414	28
736	760	28
788	144	28
788	608	28
834	12	28
834	792	28

Frequency =33 means that there are no trade observations for the country pair during the 1978-2010 period.

Table 3.A.35: Frequency of zero/missing observations by year (Sector 7)

Year	Frequency
1978	778
1979	740
1980	705
1981	711
1982	766
1983	745
1984	699
1985	704
1986	775
1987	704
1988	619
1989	595
1990	539
1991	586
1992	456
1993	471
1994	536
1995	382
1996	418
1997	389
1998	345
1999	335
2000	158
2001	130
2002	137
2003	114
2004	101
2005	138
2006	67
2007	122
2008	175
2009	262
2010	213
Sum of zero/missing observations	14615
% Zero of total possible	15.5%

Table 3.A.36: Frequency of zero/missing observations among GCC countries (Sector 7)

Exporter	Importer	Frequency
48	414	5
48	634	4
48	682	1
48	784	3
414	48	3
414	634	4
414	682	2
414	784	3
512	48	5
512	414	7
512	634	5
512	682	1
512	784	1
634	48	4
634	414	10
634	682	5
634	784	12
682	48	3
682	414	8
682	634	4
682	784	16
784	48	3
784	414	8
784	512	1
784	634	4
784	682	9
Sum of zero/missing		131
% Zero of total possible observations		13.2%

Table 3.A.37: Frequency of zero/missing observations by year among GCC countries (Sector 7)

Year	Frequency
1978	5
1979	1
1980	1
1981	3
1982	1
1983	2
1984	6
1985	9
1986	10
1987	13
1988	8
1989	4
1990	4
1991	0
1992	0
1993	0
1994	0
1995	0
1996	0
1997	19
1998	6
1999	7
2000	1
2001	0
2002	1
2003	1
2004	1
2005	6
2006	0
2007	0
2008	1
2009	12
2010	9

Table 3.A.38: Country pairs with the highest frequency of zero/missing observations (Sector 8)

Exporter	Importer	Frequency
834	760	33
12	364	32
736	144	32
736	364	32
834	12	32
834	364	32
834	608	32
834	788	32
12	144	31
12	404	31
12	834	31
404	760	31
414	76	31
736	76	31
736	620	31
736	760	31
12	458	30
404	364	30
736	344	30
760	608	30
12	76	29
12	344	29
12	608	29
48	76	29
144	736	29
504	364	29
634	76	29
736	12	29
760	144	29
834	144	29
834	400	29
834	504	29
12	50	28
12	512	28
12	554	28
12	586	28
50	760	28
736	422	28
736	579	28
788	364	28

Frequency =33 means that there are no trade observations for the country pair during the 1978-2010 period.

Table 3.A.39: Frequency of zero/missing observations by year (Sector 8)

Year	Frequency
1978	662
1979	651
1980	640
1981	629
1982	695
1983	661
1984	625
1985	656
1986	711
1987	676
1988	597
1989	565
1990	502
1991	552
1992	407
1993	434
1994	499
1995	358
1996	392
1997	401
1998	333
1999	311
2000	147
2001	142
2002	126
2003	102
2004	97
2005	132
2006	71
2007	123
2008	182
2009	263
2010	206
Sum of zero/missing observations	13548
% Zero of total possible observations	13.5%

Table 3.A.40: Frequency of zero/missing observations among GCC countries (Sector 8)

Exporter	Importer	Frequency
48	414	4
48	634	4
48	682	1
48	784	3
414	48	3
414	634	4
414	682	2
414	784	3
512	48	3
512	414	4
512	634	7
512	682	1
512	784	1
634	48	3
634	414	6
634	682	5
634	784	12
682	48	3
682	414	8
682	634	4
682	784	16
784	48	3
784	414	7
784	512	1
784	634	4
784	682	9
Sum of zero/missing		121
% Zero of total possible observations		12.2%

Table 3.A.41: Frequency of zero/missing observations by year among GCC countries (Sector 8)

Year	Frequency
1978	3
1979	1
1980	1
1981	1
1982	2
1983	2
1984	4
1985	9
1986	9
1987	12
1988	7
1989	2
1990	4
1991	1
1992	0
1993	0
1994	0
1995	0
1996	0
1997	18
1998	6
1999	7
2000	1
2001	0
2002	1
2003	1
2004	1
2005	6
2006	0
2007	0
2008	1
2009	12
2010	9

Table 3.A.42: Country pairs with the highest frequency of zero/missing observations (Sector 9)

Exporter	Importer	Frequency
12	36	33
12	48	33
12	50	33
12	76	33
12	144	33
12	196	33
12	364	33
12	404	33
12	504	33
12	554	33
12	818	33
12	834	33
48	12	33
48	76	33
48	156	33
48	300	33
48	504	33
50	12	33
50	300	33
50	364	33
50	422	33
50	504	33
50	554	33
50	757	33
50	834	33
144	12	33
144	196	33
144	300	33
144	504	33
144	788	33
144	792	33
144	818	33
196	12	33
196	76	33
196	554	33
208	12	33
208	504	33
246	504	33
360	504	33
364	12	33
364	196	33

Frequency =33 means that there are no trade observations for the country pair during the 1978-2010 period.

Table 3.A.43: Frequency of zero/missing observations by year (Sector 9)

Year	Frequency
1978	1633
1979	1594
1980	1498
1981	1467
1982	1495
1983	1392
1984	1405
1985	1442
1986	1399
1987	1387
1988	1195
1989	1194
1990	1244
1991	1241
1992	1182
1993	1151
1994	1199
1995	1145
1996	1132
1997	1191
1998	1096
1999	1156
2000	877
2001	886
2002	796
2003	885
2004	850
2005	811
2006	821
2007	634
2008	798
2009	873
2010	843
Sum of zero/missing observations	37912
% Zero of total possible observations	40.1%

Table 3.A.44: Frequency of zero/missing observations among GCC countries (Sector 9)

Exporter	Importer	Frequency
48	414	6
48	512	3
48	634	10
48	682	7
48	784	3
414	48	5
414	512	2
414	634	14
414	682	7
414	784	6
512	48	13
512	414	13
512	634	12
512	682	16
512	784	2
634	48	6
634	414	15
634	512	3
634	682	14
634	784	12
682	48	3
682	414	9
682	512	2
682	634	7
682	784	23
784	48	3
784	414	9
784	512	3
784	634	7
784	682	18
Sum of zero/missing		253
% Zero of total possible observations		25.6%

Table 3.A.45: Frequency of zero/missing observations by year among GCC countries (Sector 9)

Year	Frequency
1978	22
1979	22
1980	14
1981	9
1982	10
1983	7
1984	9
1985	15
1986	12
1987	13
1988	9
1989	6
1990	5
1991	8
1992	2
1993	3
1994	4
1995	2
1996	1
1997	18
1998	8
1999	9
2000	4
2001	2
2002	1
2003	3
2004	3
2005	6
2006	2
2007	2
2008	1
2009	12
2010	9

4 Intensive and Extensive Margins of Trade: Decomposing the Effect of GCC FTA on Trade

4.1 Introduction

Studies estimating the GCC FTA effect on trade at the aggregate and disaggregate levels have concentrated on whether GCC FTA led to trade creation or diversion among GCC countries. To my knowledge none of the studies assessing GCC FTA effect on trade have examined how GCC FTA influenced trade among GCC countries. In the previous two chapters, I have examined the effect of GCC FTA on trade among GCC countries. The results for aggregate and disaggregate trade suggest that GCC FTA had a trade creating effect on GCC intra-trade at the aggregate level and for some trade sectors. In chapter four, I aim to discover through which channel did GCC FTA influence trade among GCC countries, and if GCC FTA has resulted in an increase in new trade relations among GCC countries during the period 1983-2010. To my knowledge this is the first study that investigates the effect of GCC FTA along the margins of trade. This study adds a new dimension of GCC FTA effect on trade among GCC countries and presents another aspect of welfare gains/losses from GCC FTA that has never been addressed before. In this chapter, I investigate the effect GCC FTA on new trade relations (extensive margin) among GCC countries and on existing trade relations (intensive margin) among GCC countries. To accomplish this, I apply different variations of the gravity model of international trade on a set of bilateral trade flows for 54 countries (including GCC countries) during the 1978-2010 time period.

The two main findings of this chapter are, 1) for aggregate trade and sectoral trade, GCC FTA trade creation is attributed mostly to trade along the intensive margin (existing trade relations). This finding is consistent with the findings of Baier et al. (2011) and Dutt et al. (2011), and suggests that products/brands that were already established in a market will gain more benefit from lowering trade barriers among trade partners. 2) GCC FTA has a negative effect on trade along the extensive margin among GCC countries for most trade sectors. The extensive margin results suggest that the set of commodities (or exporting firms) that was traded among GCC countries prior to 1983 (or in the early years of GCC FTA) benefited more than new commodities (exporting firms) from the elimination of customs among GCC countries, and this elimination of customs served as a barrier of entry for new trade products. The negative effect of GCCFTA on new trade relations should be considered carefully by GCC countries, as diversification of production/exports is an important goal for all GCC countries to offset the potential risks of volatility of

oil prices and the exhaustion of the finite oil reserves that dominate their production structure.

The rest of this chapter is organized as follows. Section 4.2 provides a summary of the literature on the effect of FTAs on the extensive and intensive margins of trade. Section 4.3 presents the methodology used to estimate GCC FTA effect along the extensive and intensive margins of trade. Section 4.4 provides an overview on GCC countries patterns of extensive and intensive margins of trade by sector and how they evolved during the 1978-2010 time period. Section 4.5 presents data description and results. Section 4.6 presents sensitivity analysis of the results, and the last section provides an overall conclusion and summary of chapter four.

4.2 Extensive and Intensive Margins

Both the extensive and intensive margins have welfare enhancing implications. An increase in the intensive margin of trade for a certain product category increases its supply and thus more consumers are exposed to this product, while an increase in the extensive margin provides more varieties for consumers. Theoretical studies such as Melitz (2003) and Chaney (2008) indicate that a decline in variable costs associated with PTAs (such as exchange rates fluctuations in currency unions) increase both margins of trade. Melitz (2003) states that the extensive margin effects are due to increase in average productivity of firms in a country, while Chaney (2008) argues that reduction in fixed costs (being a member of a PTA might send a signal to exporters that a country is more trade liberalising than other countries and thus reduce information costs for exporters) is the channel that effects the extensive margin of trade.

According to Baier et al. (2011), the extensive margins fall under three main categories: country, goods and firms. The first category refers to the number of exporter –importer relations a country has (e.g. the United States imports (total or a particular product import) originate from 50 countries in the year 1980), the second category refers to the number of products categories a country imports a year (e.g. the United States imports 10000 products from all export partners in the year 1980) and third categories refers to the number of foreign firms that a country import from (e.g. the United States total imports comes from 100 foreign firms in the year 1980). With regards to the intensive margin it can fall also under the three categories by dividing total trade by the extensive margin (by country or product or firm).

Some of the most notable and recent studies that examined the effect of FTAs or trade agreements among countries along the extensive and intensive margins of trade include (Flam and Nordstrom 2006), Helpman et al. (2008), Foster et al. (2011) and Baier et al. (2011). (Flam and Nordstrom 2006) investigated the effect of the Euro on the extensive and intensive margins of trade among Euro members. They found that the adoption of the Euro has increased both margins significantly during the 1999-2005 time period with larger effects for the extensive margin. Helpman et al. (2008) used bilateral trade flows reported in 1986 from a set of 158 countries using firm level data, they found that FTAs and currency unions led to trade creation along the extensive margin of trade only. Foster et al. (2011) used a panel of 174 countries during 1962-2000 time period to assess the impact of Preferential Trade Agreements (PTA) on the extensive and intensive margins of trade. Their main findings were that much of the increase in exports attributed to PTAs occurs along the extensive margin and that the extensive margin responds more strongly to the formation of a PTA in larger exporters and for larger country-pairs. One major drawback of their study is the omission of multilateral resistance terms. Baier et al. (2011) used a panel of 149 countries during 1962-2000 time period to assess the impact of PTAs on the extensive and intensive margins of trade. Baier et al. (2011) decomposed PTAs into four dummies, one-way PTA, two-way PTA, FTA and common markets, custom unions and economic unions. They also avoided the pitfall of Foster et al. (2011) by including multilateral resistance terms (using fixed effects). Baier et al. (2011) main findings were that deeper agreements (FTAs, economic unions) have a positive impact on the margins of trade, with sooner and larger effects along the intensive margin of trade.

4.3 Methodology

I use trade in products to construct the extensive and intensive margins because data on firms are not available for a large sample of countries over a long period of time. There are two common methods to construct the extensive and intensive margins; the first is the count method, based on the count method the extensive margin is the number (N_{ijt}) of exports from country *i* to country *j* in year *t,* while the intensive margin in the count method is constructed by dividing the value of exports from country *i* to country *j* in year *t* by the corresponding extensive margin(X_{ijt}/N_{ijt}). This means that the intensive margin is a simple average of exports from country *i* to country *j* in year *t*. The second method is the weighted average method, or the Hummels and Klenow (2005) (HK) method which is probably one of the most notable pioneering studies on the extensive and intensive

margins. Hummels and Klenow (2005) explored whether large economies (measured by GDP/GDP per capita) have more exports due to high exports values/volumes of certain goods, or due to the fact that large economies export more types (varieties) of goods. There results suggest that 60 percent of exports were due to the extensive margin while 40 percent of exports were due to the intensive margin. Using Baier et al. (2011) notation the extensive margin is,

$$EM_{ijt} = \sum_{m \in M_{ijt}} X^m_{Wjt} / \sum_{m \in M_{Wjt}} X^m_{Wjt} \quad (4.1)$$

Where X^m_{Wjt} is the value of country *j*'s imports from the world of product *m* in year *t*, M_{Wjt} is the set of all products exported from the world to country *j* in year *t*, and M_{ijt} is the set of all products exported from *i* to *j*. The extensive margin for aggregate trade is the share of all products exported from *i* to *j* (numerator) given that each product is weighted by *j*'s total imports from the world (denominator), while for sectoral trade it is the share of all products of sector *k* that are exported from *i* to *j* given that each product is weighted by *j*'s total imports of sector *k*'s products from the world.

The Intensive margin is defined as,

$$IM_{ijt} = \sum_{m \in M_{ijt}} X^m_{ijt} / \sum_{m \in M_{ijt}} X^m_{Wjt} \quad (4.2)$$

Where X^m_{ijt} is the value of exports from *i* to *j* of product *m* in year *t*. The intensive margin is the share of *i* exports (numerator) of *j*'s total imports from the world (denominator) in year *t*, while for sectoral trade it is the share of *i* exports of *j*'s imports from the world of sector *k* products in year *t*.

If both margins are multiplied together we get,

$$EM_{ijt} IM_{ijt} = \sum_{m \in M_{ijt}} X^m_{ijt} / \sum_{m \in M_{wjt}} X^m_{Wjt}$$

Then (dropping *m* superscript to denote aggregate trade),

$$EM_{ijt} IM_{ijt} = X_{ijt} / X_{Wjt} \quad (4.3)$$

Taking logs and rearranging we get,

$$\ln X_{ijt} = \ln X_{Wjt} + \ln EM_{ijt} + \ln IM_{ijt} \quad (4.4)$$

For trade by sector:

$$\ln X^k_{ijt} = \ln X^k_{Wjt} + \ln EM^k_{ijt} + \ln IM^k_{ijt}$$

From chapter 2 the empirical gravity trade equation (with country pair effects, exporter-time and importer time effects) was

$$\ln X_{ijt} = \beta_0 + \beta_1 GCCFTA_{ijt} + \beta_2 PTA_{ijt} + \gamma_j\theta_t + \sigma_i\theta_t + \gamma_j\sigma_i + u_{ijt} \quad (4.5)$$

Where,

$GCCFTA_{ijt}$: A dummy that takes value of one if both countries are GCC members[44], and zero otherwise;

PTA_{ijt} : A dummy that takes value of one if both countries are members of a preferential trade agreement at time t, and zero otherwise;

$\sigma_i\theta_t$: Exporter-Time effect;

$\gamma_j\theta_t$: Importer-Time effect;

$\sigma_i\gamma_j$: Country-Pair effect;

The use of exporter-time and importer-time accounts for variation GDP of exporter and importer countries, thus eliminating the need to include them in the intensive and extensive margin estimations, this solves many problems that usually stem in the literature with the gravity model, the first is causality between trade and GDP, the second is that exporter-time and importer-time effects account for variations in value added per sector as a measure of economic size of the exporting country in a specific sector, and expenditure per sector as a measure of economic size in the importing country. Usually data on value added and consumption per sector are hard to obtain for a large sample of countries and a long period of time. Finally, the use of country pair effects eliminates the need to include time invariant gravity variables such as distance and language.

Plugging in (4.5) into (4.4),

$$\ln EM_{ijt} + \ln IM_{ijt} + \ln X_{Wjt} = \beta_0 + \beta_1 GCCFTA_{ijt} + \beta_2 PTA_{ijt}$$
$$+ \gamma_j\theta_t + \sigma_i\theta_t + \gamma_j\sigma_i + u_{ijt} \quad (4.6)$$

X_{Wjt} is included in importer-time fixed effects, and (4.6) becomes

$$\ln EM_{ijt} + \ln IM_{ijt} = \beta_0 + \beta_1 GCCFTA_{ijt} + \beta_2 PTA_{ijt}$$
$$+ \gamma_j\theta_t + \sigma_i\theta_t + \gamma_j\sigma_i + u_{ijt} \quad (4.7)$$

Since the empirical estimation will be via OLS and since OLS is a linear operator, then the equation for each margin is,

$$\ln EM_{ijt} = \alpha_0 + \alpha_1 GCCFTA_{ijt} + \alpha_2 PTA_{ijt} + \gamma_j\theta_t + \sigma_i\theta_t + \gamma_j\sigma_i + e_{ijt} \quad (4.8)$$

[44] The effect of the GCC dummy starts at 1983.

$$\ln IM_{ijt} = \delta_0 + \delta_1 GCCFTA_{ijt} + \delta_2 PTA_{ijt} + \sigma_i\theta_t + \gamma_j\theta_t + \gamma_j\sigma_i + v_{ijt} \quad (4.9)$$

Where,

$\alpha_0 + \delta_0 = \beta_0;$

$\alpha_1 + \delta_1 = \beta_1;$

$\alpha_2 + \delta_2 = \beta_2;$

$e_{ijt} + v_{ijt} = u_{ijt}.$

The above equations are for aggregate trade, I also estimate the effect of GCCFTA on the intensive and extensive margins of 10 disaggregate trade sectors according to the first digit level of disaggregation of the Standard International Trade Classification Revision1 (SITC Rev.1) system. Thus for sectoral trade the equation estimated are,

$$\ln EM_{ijt}^k = \alpha_0^k + \alpha_1^k GCCFTA_{ijt} + \alpha_2^k PTA_{ijt} + \gamma_j\theta_t + \sigma_i\theta_t + \gamma_j\sigma_i + e_{ijt}^k \quad (4.10)$$

$$\ln IM_{ijt}^k = \delta_0^k + \delta_1^k GCCFTA_{ijt} + \delta_2^k PTA_{ijt} + \sigma_i\theta_t + \gamma_j\theta_t + \gamma_j\sigma_i + v_{ijt}^k \quad (4.11)$$

Where k = 0, 1,…, 9, k represents trade in a specific sector.

The equations for both margins will be estimated for both the count and HK decompositions of trade margins, since it is essential to use importer-time effects for the HK decomposition. For comparison reasons the same (full) fixed effects specification will be the only fixed effects specification used in this chapter. Using both decomposition methods will allow to test the claim of Dutt et al. (2011) that the extensive and intensive margins of aggregate trade in both methods are highly correlated and thus will deliver close estimates, and also if this extends to sectoral estimates.

4.4 Extensive and Intensive Margins of GCC Countries

Figures 4.1-4.44 present the evolution of the extensive and intensive margins for GCC intra-trade and GCC trade with the world (excluding GCC intra-trade), the figures present both margins according to the Hummels and Klenow (2005) (HK) decomposition (see methodology section).

Figures 4.1-4.11 show that the extensive margin of aggregate trade among GCC countries was more smooth (less volatile) in nature than the extensive margin of most disaggregate sectors during the 1978-2010 time period, the picture is very similar when looking at figures 4.12-4.22 representing the extensive margin for aggregate and disaggregate trade between GCC countries and the world (excluding

GCC intra-trade) during the 1978-2010 time period. The figures indicate that GCC intra-trade has experienced higher growth compared with the GCC trade with the world along the extensive margin of trade at the aggregate and disaggregate levels and it is possible that a part of this increase in the extensive margin among GCC countries is attributed to GCC FTA.

Turning to the intensive margin of trade among GCC countries, figures 4.23-4.33 show that the intensive margin of aggregate and sectoral trade is very volatile, while figures 4.34-4.44 show that the intensive margin of GCC trade with the world (excluding GCC intra-trade) at the aggregate and disaggregate level decreased along the intensive during the 1978-2010 period. The volatile nature of the intensive margin among GCC countries makes it hard to predict the effect of GCC FTA along the intensive margin by just looking at the plots.

The figures show that the extensive and intensive margins of trade among GCC countries are very volatile, especially for trade by sector. One might wonder whether this volatility is induced by fluctuations in oil prices during the 1978-2010 period. Table 4.1 presents the correlation between the logs of the trade margins and the log of oil price for the 1978-2010 period. The table suggests that for aggregate trade and most sectors the correlation is low, which means that new and existing trade relations among GCC countries are not very sensitive to changes in the price of oil.

For the extensive margin the sectors that are more affected by oil price changes are sectors 4 (Animal & vegetable oils and fat) and sector 9 (Other commodities) with a correlation of -0.51 and 0.52 respectively, while for the intensive margin the most affected sector is sector 5 (Chemicals) with a correlation of -0.47.

4.5 Data Description and Results

4.5.1 Data Description

The data used in this chapter are:

Exports: Annual data from UN Comtrade database covering the 1978-2010 period, the data represent the values (in current US dollars) of bilateral exports between 54 countries (including GCC countries) at the 4-digit aggregation level of the Standard International Trade Classification (SITC). These countries were chosen because they represent major trade partners of GCC countries, they represent about 75-90 percent of GCC trade at the aggregate and sectoral level, they also represent more than 80% of world trade; mirror exports (imports of the importing countries from exporting countries) are used rather than exports as they provide more observations

for GCC countries. Exports data were used to construct the extensive and intensive margins at the aggregate level and 1st digit level of aggregation for 10 trade sectors using the count methodology and the HK methodology. According to Dutt et al. (2011), the two methods should deliver close estimates at the aggregate level. They indicate that in their sample (1988-2006) the correlation between the two methods is 86 percent for the extensive margin, and 88 percent for the intensive margin. Exports are not deflated because inclusion of exporter-time and importer-time effects eliminates the need for using a price deflator.

The 4-digit aggregation (SITC-REV 1) was selected for two reasons, first, the UN Comtrade database provides data according to SITC REV 1 up to the 5-digit level, yet when examining GCC intra-trade data I find that 4-digit classification returns 113414 observations while the 5 digit classification returns 90312 observations. The fact that for GCC countries the 4th digit delivers more observation than the 5th digit is probably because GCC countries do not observe the data at the 5th digit level as intensely as they do it for the 4th digit level, this may cause a bias. Hummels and Klenow (2005) report the correlation between the extensive margin and factor endowments of countries (determinants of intensive and extensive margins) for 1-digit of aggregation up to the 6-digit level of aggregation. They found that the impact of extensive margin is lower as the data becomes more aggregated and that the correlation between the extensive margin and factor endowments decreased the higher aggregation level used. Yet when using 6-digit level data the factor endowment variable returned extensive margins shares of the elasticity between per capita GDP and trade was 66 percent, while the same elasticity was 62 percent when using data at the 4-digit level, so as noted by Baier et al. (2011) the bias is probably not very large.

GCC FTA is a dummy variable that takes the value of 1 from 1983 onwards if both the exporter and the importer are GCC members and zero otherwise.

PTA is a dummy variable that takes the value of one if both the exporter and the importer are members of the same PTA at time *t* and zero otherwise. Data for the construction of the PTA dummy were obtained from the Database on Economic Integration Agreements[45] constructed by Scott Baier and Jeffrey Bergstrand.

One thing to note is that since exporter-time and importer-time effects are included in all models, then all the variations in exporter and importer GDPs are accounted

[45] http://www.nd.edu/~jbergstr/DataEIA2009/EIA_Data_June30_2009.zip

for and there is no need to include them in any of the regressions. Also, since country pair effects are included in all models then the standard time invariant gravity variables such as distance or language are absorbed into the country-pair effects and they do not show up in any of the regressions.

4.5.2 Results

Results are presented in tables (4.1-4.3) for trade, extensive margin and intensive margin of aggregate trade and sectors 0-9. Since the extensive and intensive margins of trade are linear combinations of the log of trade, then the sum of the coefficients of any independent variable of the two margins is exactly the same as the coefficient of that variable in the log of trade regression.

The results discussed in this section are for extensive and intensive margins using the count and HK methods. For the aggregate model there is marginal difference in the value of GCCFTA coefficients between the count and HK models for both margins. However, the differences are quite substantial when it comes to sectoral results; this indicates the importance of accounting for relative importance of a product within a specific sector. Overall, the results show that most of the positive effects on trade attributed to GCCFTA happened along the intensive margins of trade, while the effect of GCC FTA on the extensive margin of trade is either insignificant or negative for most trade sectors (negative for aggregate trade).

Two things stand out from the results, the first observation is that the count and HK margins predict very close estimates of the effect GCC FTA on trade margins, yet in some sectors the differences between estimates of the count method and the estimates of the HK method are significantly big. This indicates that using relative weights as in the HK method is important in some sectors more than others. The use of a weighted average is justified as one set of products like mobile phones and another set like pens have different values in trade, this might be more apparent in some sectors where a set of products has a very large share of the sectors total trade value compared to other sets within the same sector. The second observation is that GCCFTA had an insignificant effect on trade among GCC countries after 1983 for sectors 5, 6 and 8. However, when trade is decomposed into extensive and intensive margins, GCCFTA had a significant effect on trade along both margins for these sectors (HK results), but sense the extensive margin coefficients are negative and the intensive margin coefficients are positive and they are very close in absolute value there summation results in a very small and insignificant GCC FTA effect on trade among GCC countries. A good example is sector 5, the

coefficient on the extensive margin is -0.52 and for the intensive margin it is 0.47, and both are significant. Since the two margins are a linear combination of trade, then combining the two coefficients (0.47 - 0.52 = -0.05) gives an insignificant coefficient for GCC FTA effect on trade for sector 5.

4.5.2.1 Extensive Margin Results

Results are presented in table (4.2) for the count model and the HK model. With regards to aggregate trade, GCCFTA reduced trade among GCC countries along the extensive margin by 37 and 30 percent ($e^{-0.46}$-1, $e^{-0.36}$-1) according to the count and HK models respectively during the 1983-2010 time period (1.3 and 1.07 percent per year). Moving to sectoral results, according to the count model, GCCFTA had no significant impact on the extensive margin of trade among GCC countries during the 1983-2010 time period for sectors 0, 1, 2, 3, 5 and 6, had a negative impact on the extensive margin of trade among GCC countries during the 1983-2010 time period for sectors 7 and 8 (33 and 36 percent), and had a positive impact on the extensive margin of trade among GCC countries during the 1983-2010 time period for sectors 4 and 9 (60 and 15 percent). According to the HK model sectoral results GCCFTA had no significant impact on the extensive margin of trade among GCC countries during the 1983-2010 time period for sectors 0, 1 and 9, had a negative impact on the extensive margin of trade among GCC countries during the 1983-2010 time period for sectors 5, 6, 7 and 8 (41, 43, 50 and 49 percent), and had a positive impact on the extensive margin of trade among GCC countries during the 1983-2010 time period for sectors 2, 3 and 4 (40, 103 and 239 percent). The large variations in GCCFTA effects on sectoral trade between the count and HK models indicate the significance of accounting for the weight of a product within a specific sector compared to other products in the same sector. The main message from these results is that although trade among GCC countries along the extensive margin has experienced strong growth during the 1978-2010 time period, yet this growth was not attributed to GCCFTA. In fact, in many cases GCCFTA have reduced trade along the extensive margin among GCC countries. While GCC FTA trade creation along the extensive margin among GCC countries happened only in sectors 3 and 4, which have very low shares of GCC intra-trade.

4.5.2.2 Intensive Margin Results

Results are presented in table (4.3) for the count model and the HK model. With regards to aggregate trade, GCCFTA increased trade among GCC countries along the intensive margin by 290 and 253 percent according to the count and HK models

respectively during the 1983-2010 time period (10.4 and 9 percent per year). Moving to sectoral results, according to the count model, GCCFTA had no significant impact on the intensive margin of trade among GCC countries during the 1983-2010 time period for sectors 1, 5 and 6, and had a positive impact (trade creation) on the intensive margin of trade among GCC countries during the 1983-2010 time period for sectors 0, 2, 3, 4, 7, 8 and 9 (68, 75, 839, 1560, 146, 88 and 274 percent). According to the HK model sectoral results, GCCFTA had no significant impact on the intensive margin of trade among GCC countries during the 1983-2010 time period for sector 2 only, and had a positive impact on the intensive margin of trade among GCC countries during the 1983-2010 time period for sectors 0, 1, 3, 4, 5, 6, 7, 8 and 9 (132, 136, 381, 685, 60, 86, 232, 136 and 339 percent). The large variations in GCCFTA effects on sectoral trade between count model results and HK model results suggest the significance of accounting for the weight of a product within a specific sector compared to other products in the same sector. The main message from these results is that trade among GCC countries along the intensive margin has been boosted by GCCFTA during the 1983-2010 time period.

4.6 Sensitivity Analysis[46]

This section aims to test the sensitivity of the results in the previous section. Since the results of section 4.5 have emphasized the importance of the HK decomposition. Thus, I will limit the analysis to the HK specification of the extensive and intensive margins of trade. Similar to the sensitivity analysis in chapters two and three, I will test for the sensitivity of the results by replacing "breaking up" the PTA dummy to nine dummy variables representing the major preferential trade agreements existing among non-GCC countries, I also will account for the possibility that GCCFTA has been implemented in phases rather than on a single initiation date.

The first step in the sensitivity analysis is to "break up" the PTA dummy into several trade agreements. According to Baldwin (2006), a lump sum PTA variable does not control properly for other nations (non-GCC members in this study) trade arrangements, which may change the effect of GCC FTA on the extensive and intensive margins of trade across sectors. The PTA variable is broken up into nine

[46] Sensitivity was done also by including a variable that accounts for changes in oil prices/production and variable to account for the Iraqi invasion of Kuwait (dummy variable) the results showed very small differences in GCC FTA coefficient for the country pair and time effects specification and no changes for the exporter-time and importer-time specification, these results are not included and are available upon request.

PTA dummies; ASEAN, COMESA, ECO, EU, EURO, GAFTA, NAFTA, UMA and the PTA dummy becomes PTA2 which accounts for any other trade agreements that are still present after removing eight PTAs. The second part of the sensitivity analysis involves adding three dummies, GCC 88, GCC 93 and GCC 98. These dummies will account for any possible implementation phases of GCC FTA. Although the GCC FTA declaration agreement did not specify any phases and there is no information to my knowledge on such phases, yet according to Baier and Bergstrand (2007) almost every FTA has "phase-in" periods that follows the announcement date. Baier et al. (2011) have shown that accounting for phases influences the estimates of PTAs significantly for both trade margins at the aggregate level. Phases can be set prior to the announcement, yet this is not testable assumption since the dataset begins in 1978, and GCC FTA was announced in 1983. Overall, sensitivity results confirm those from the results section, that most of the positive effects on GCC intra-trade attributed to GCCFTA happened along the intensive margins of trade, while the effect of GCC FTA on the extensive margin of trade is either insignificant or negative for most trade sectors (negative for aggregate trade). Sensitivity results suggest that summing up PTAs into one variable and ignoring possible implementation phases of GCC FTA (or allowing the terms of trade to change in phases) leads to a bias in the estimation of the effect of GCC FTA on the extensive and intensive margins of trade among GCC countries.

4.6.1 Accounting for Major PTAs among GCC Trade Partners

The major changes in GCC FTA effect on trade margins among GCC countries after accounting for major PTAs among GCC trade partners happened along the intensive margin of trade, while there are minor changes along the extensive margin. Overall, sensitivity results from this section confirm the overall conclusion of the results section, that GCC FTA trade creation among GCC countries was concentrated along the intensive margin, while for most sectors GCC FTA had a negative or insignificant effect on trade among GCC countries along the extensive margin.

Extensive margin results are presented in table (4.5). For aggregate trade, breaking up the PTA variable into major trade agreements among GCC trade partners changes GCC FTA effect on the extensive margin of trade among GCC countries during the 1983-2010 time period from negative and significant to insignificant. Moving to sectoral results breaking up the PTA variable into major trade agreements among GCC trade partners had no impact on the effect of GCC FTA

along the extensive margin of trade among GCC countries during the 1983-2010 time period for sectors 0, 1, and 9 as they all remain insignificant, reduced the positive effect of GCC FTA on the extensive margin of trade among GCC countries during the 1983-2010 time period for sectors: 2 (drops from 40 to 39 percent), 3 (drops from 103 to 54 percent) and 4 (drops from 239 to 210 percent), and finally breaking up the PTA variable reduced the negative effect of GCC FTA on the extensive margin of trade among GCC countries during the 1983-2010 time period for sectors: 5 (drops from 41 to 32 percent), 6 (drops from 43 to 34 percent), 7 (drops from 50 to 39 percent) and 8 (drops from 49 to 38 percent). Overall, breaking up the PTA dummy into 9 dummies had small changes on the effect of GCC FTA on trade along the extensive margin among GCC countries. The two exceptions were aggregate trade which becomes insignificant, and sector 3 where the effect of GCC FTA on the extensive margin is almost halved.

Intensive margin results are presented in table (4.6). For aggregate trade breaking up the PTA variable into major trade agreements among GCC trade partners lowers the positive effect of GCC FTA on the intensive margin of trade among GCC countries during the 1983-2010 time period from 252 percent to 161 percent. Moving to sectoral results, breaking up the PTA variable into major trade agreements among GCC trade partners had no impact on the effect of GCC FTA along the intensive margin of trade among GCC countries during the 1983-2010 time period for sectors 1, and 5 as GCC FTA effect remained insignificant, reduced the positive effect of GCC FTA on the intensive margin of trade among GCC countries during the 1983-2010 time period for sectors: 3 (drops from 839 to 282 percent), 4 (drops from 1560 to 555 percent) and 9 (drops from 274 to 213 percent), increased the positive effect of GCC FTA on the intensive margin of trade among GCC countries during the 1983-2010 time period for sectors: 0 (increases from 68 to 77 percent), 6 (changes from insignificant to 46 percent), 7 (increases from 146 to 148 percent), and 8 (increases from 88 to 120 percent), and finally, breaking up the PTA variable changes GCC FTA effect on the intensive margin of trade among GCC countries during the 1983-2010 time period in sector 2 from positive to insignificant. Overall, breaking up the PTA dummy into 9 dummies had significant changes on the effect of GCC FTA on trade along the intensive margin among GCC countries for aggregate and sectoral trade. It seems that using a lump sum PTA variable leads to an upward bias of GCC FTA effect on trade along the intensive margin among GCC countries at the aggregate and disaggregate levels. However there are some exceptions where the effect becomes larger.

4.6.2 Accounting for Major PTAs among GCC Trade Partners and GCC FTA Phases

In this section, the PTA variable is broken up to 9 variables as in section 4.6.1. In addition, three dummies: GCC 88, GCC 93 and GCC 98 are added to the regression equations. These GCC dummies represent three additional implementation phases of GCC FTA for the years 1988, 1993 and 1998. These dummies will account for any possible implementation phases of GCC FTA; the Net GCC row in tables (4.8-4.9) represents the sum of the significant GCC FTA dummies coefficients and represents the net effect of GCC FTA on the extensive and intensive margins of trade after accounting for 3 additional implementation phases. Overall, adding implementation phases confirms the results from the previous sections with some switches in significance and sign of GCC FTA coefficient in some sectors, also the results show the importance (change in the magnitude when compared with the results in sections 4.5 and 4.6.1) of allowing GCC FTA to impact the margins of trade in phases as the GCC FTA effect (in absolute terms) is reduced along the extensive and intensive margins of trade among GCC countries.

Extensive margin results are presented in table (4.8). For the aggregate model, breaking up the PTA variable into major trade agreements among GCC trade partners and adding three GCC phases increased the negative the effect (Net GCC compared to GCCFTA in section 4.5) of GCC FTA on the extensive margin of trade among GCC countries during the 1983-2010 time period from 30 percent to 33 percent. Moving to sectoral results, breaking up the PTA variable into major trade agreements among GCC trade partners and adding three GCC phases had no impact (Net GCC compared to GCCFTA in section 4.5) on the effect of GCC FTA along the extensive margin of trade among GCC countries during the 1983-2010 time period for sector 0 where GCC FTA effect remained insignificant, reduced the positive effect of GCC FTA on the extensive margin of trade among GCC countries during the 1983-2010 time period for sectors 3 (drops from 103 to 38 percent) and 4 (drops from 239 to 16 percent), increased the positive effect of GCC FTA on the extensive margin of trade among GCC countries during the 1983-2010 time period for sector 2 (increases from 40 to 43 percent), reduced the negative effect of GCC FTA on the extensive margin of trade among GCC countries during the 1983-2010 time period for sectors 5 (drops from 43 to 22 percent) and 8 (drops from 49 to 30 percent), increased the negative effect of GCC FTA on the extensive margin of trade among GCC countries during the 1983-2010 time period for sector

7 (increases from 50 to 55 percent), changed GCC FTA effect on the extensive margin of trade among GCC countries during the 1983-2010 time period for sectors 1 and 9 from insignificant to negative, and finally changed GCC FTA effect on the extensive margin of trade among GCC countries during the 1983-2010 time period for sector 6 from negative to insignificant. Overall, breaking up the PTA dummy into 9 dummies and adding three GCC phases confirms the results from section 4.5 and section 4.6.1, that the effect of GCC FTA on trade along the extensive margin among GCC countries during the 1983-2010 time period was either negative or insignificant. It is worth mentioning that although the effect of GCC FTA is still positive on the extensive margin for sectors 3 and 4, yet this effect is reduced considerably.

Intensive margin results are presented in table (4.9). For the aggregate model, breaking up the PTA variable into major trade agreements among GCC trade partners and adding three GCC phases lowered the positive effect (Net GCC compared to GCCFTA in section 4.5) of GCC FTA on the intensive margin of trade among GCC countries during the 1983-2010 time period from 253 percent to 118 percent. Moving to sectoral results, breaking up the PTA variable into major trade agreements among GCC trade partners and adding three GCC phases changed the effect of GCC FTA on GCC intra-trade for sector 1 from positive to insignificant, reduced the positive effect of GCC FTA on the intensive margin of trade among GCC countries during the 1983-2010 time period for sectors: 0 (drops from 132 to 63 percent), 3 (drops from 381 to 97 percent), 4 (drops from 685 to 416 percent), 7 (drops from 232 to 101 percent) and 8 (drops from 136 to 134 percent), reduced the positive effect of GCC FTA on the intensive margin of trade among GCC countries during the 1983-2010 time period in sector 9 (increases from 339 to 481 percent), and finally, breaking up the PTA variable and adding three GCC phases changed GCC FTA effect on the intensive margin of trade among GCC countries during the 1983-2010 time period for sectors: 2 (from insignificant to increasing trade along intensive margin by 84 percent), 5 (from increasing trade along intensive margin by 60 percent to decreasing the intensive margin by 46 percent) and 6 (from increasing trade along intensive margin by 86 percent to decreasing the intensive margin by 11 percent).

4.7 Conclusion

In this chapter, I utilized the gravity model of international trade to assess the impact of GCC FTA on the extensive and intensive margins of trade among GCC countries at the aggregate level and the first digit level of the SITC Revision 1

classification system. A gravity model augmented with exporter-time, importer-time and country pair effects was applied to a set of bilateral exports representing trade between 54 countries that are the major trade partners of GCC countries (including GCC countries) for the period 1978-2010. To my knowledge, this is the first study to examine the effect of GCC FTA on the extensive and intensive margins of trade among GCC countries.

A dummy variable was included in all models to assess the impact of GCC FTA on the extensive and intensive margins of trade among GCC countries. Two decompositions of trade margins were constructed, a count model and HK model (see methodology section for details of models). The results suggest that for aggregate trade there was a marginal difference in the value of GCC FTA coefficients between the count and HK models for both margins. However, the differences were quite substantial when it comes to sectoral results. This indicates the importance of accounting for relative importance of a product within a specific sector. Overall, the results suggest that most of the positive effects on trade attributed to GCCFTA happened along the intensive margins of trade, while the effect of GCCFTA along the extensive margin of trade was negative for aggregate trade and most disaggregate sectors.

The main results were subjected to sensitivity analysis to test their sensitivity to variations in the independent variables. The first step in the sensitivity analysis was to "break up" the PTA dummy into several trade agreements. The second part of the sensitivity analysis involved adding three dummies to account for any possible implementation phases of GCC FTA. Although the GCC FTA declaration agreement did not specify any phases and there is no information to my knowledge on such phases. According to Baier and Bergstrand (2007), almost every FTA has "phase-in" periods that follows the announcement date. Baier et al. (2011) have shown that accounting for phases influences the estimates of PTAs significantly for both trade margins at the aggregate level the results of this chapter confirm their findings for aggregate trade and suggests that this influence extends to disaggregate trade. Overall, the results of the sensitivity analysis confirm those from the results section, that most of the positive effects on trade attributed to GCCFTA happened along the intensive margins of trade, while the effect of GCC FTA on the extensive margin of trade is either insignificant or negative for most trade sectors (negative for aggregate trade). Sensitivity results suggest that similar to trade analysis in the previous two chapters it is important to account for PTA's independently and to account for implementation phases of GCC FTA (or allowing GCC FTA to change

the terms of trade in phases) for a more accurate estimation of the effect of GCC FTA on the margins of trade among GCC countries. The results of this chapter might be bias to sample selection and selection into exporting as indicated by Helpman et al. (2008), Baier et al. (2011) and Dutt et al. (2011). These authors recommend using TSHS to correct for these two selection problems. Unfortunately there are limitations to implementing TSHS to the data of this dissertation and these limitations lower the credibility of the TSHS results. In appendix 4.A I provide a brief discussion of TSHS methodology, limitation and results.

The results from chapter four suggest that GCC FTA served as trade barrier (on average) for new trade in most trade sectors among GCC countries. The results suggest that the set of commodities (or exporting firms) that was traded among GCC countries prior to 1983 (or in the early years of GCC FTA) benefited more than new commodities (exporting firms) from the elimination of customs among GCC countries.

The finding that FTA influences trade more through the intensive margin is not foreign to the literature. This is consistent with the findings of Baier et al. (2011) and Dutt et al. (2011). Yet the negative effect of FTA on the intensive margin is not. Comparing GCC FTA with findings on other Middle East and North Africa (MENA) countries, the GCC FTA negative effect on extensive margin stands out. Bensassi et al. (2012) finds that the impact of FTA between 6 MENA countries (Algeria, Egypt, Jordan Lebanon Morocco and Tunisia) and 4 European countries (France, Germany, Italy and Spain) on the extensive margin to be insignificant[47] for total trade and positive only for sector 5 (Chemicals). Also Amurgo-Pacheco and Pierola (2008) find small positive and significant effects of FTA on the extensive margin for Morocco and Tunisia trade with 24 developed and developing countries during the 1990-2005 period.

This negative effect of GCC FTA on the extensive margin is puzzling; if one would guess on the reason behind it, I would say that probably in the years post 1983 non-tariff barriers (especially government bureaucracy) have risen and served as a barrier to new trade. Since the exporting firms from GCC countries that operated in GCC markets before 1983 were already established, this rise in non-tariff barriers did not harm their trade substantially. According to Malik and Awadallah (2013), although GCC countries have the lowest behind the border barriers in the middle east, yet they still underperform when compared with countries that have similar

[47] For the period 1995-2008.

income levels. Almezaini (2012) and Valeri (2012) provide evidence from UAE, Oman and Bahrain, that the private sector is dominated by large players close to the power, they provide lists of high government officials who are also members of the elite merchant class. Both authors provide evidence that lobbying from the private sector on government economic policies tend to defend existing privileges (intensive margin), for instance the chambers of commerce in Bahrain which is controlled by the merchant elites was successful in freezing the nationalization policy of the Bahraini labour market a few years after it was implemented. According to Almezaini (2012), state companies and large companies that have proximity to the state have benefited largely from state privileges such as low interest loan s and subsidised lands. In this context it is plausible to assume that large companies have more support from GCC governments to export than smaller companies due to the advantages and protection they gain from the state. De Melo and Ugarte (2012) provide further evidence on non-tariff barriers for GCC by providing ad valorem equivalent estimates of non-tariff barriers for Oman and Saudi Arabia. Using 2002-2004 data de Melo and Ugarte (2012) estimate that the weighted average ad valorem equivalent of non-automatic licensing and technical regulations is 16.4% and 38.6% respectively for Saudi Arabia compared with a weighted average of the tariffs (applied on the products that face these type of non-tariff barriers) of 5.5% and 10.8% respectively. In the case of Oman the ad valorem equivalent for technical regulations is 56% percent while the applied tariff rate is 3.2%.

This negative effect of GCC FTA on the extensive margin should be considered carefully by GCC countries as diversification of production/exports is an important goal for all GCC countries to offset the potential risks of volatility of oil prices and the exhaustion of the finite oil reserves that dominate their production structure. Thus, GCC countries efforts should be directed to reducing these barriers from GCC FTA to encourage GCC intra-trade in more commodities.

Table 4.1: Correlation between Extensive Margin & Oil Price, and Intensive Margin & Oil Price during 1978-2010 (Trade among GCC Countries Only)

Sector	Extensive Margin	Intensive Margin
Aggregate	-0.10307	-0.2834
Food & Live Animals	-0.29995	-0.20906
Beverages & Tobacco	0.279783	-0.1547
Crude Materials	-0.08518	-0.25653
Mineral Fuels	-0.04682	-0.14015
Animal & Vegetable Oils	-0.50994	0.091948
Chemicals	-0.2445	-0.21233
Manufactured Goods	-0.10006	-0.47111
Machinery & Transport	0.210719	-0.27613
Misc. Manufactured Goods	-0.16285	-0.34138
Other Commodities	0.521368	0.314877

Correlations calculated using trade data from UN Comtrade database and oil prices from BP Statistical Review of World Energy 2012.

Table 4.2: Regression Results, Dependent Variable: Log of Trade

Sector/Variable	GCCFTA	PTA	R-Square	Obs.
Aggregate	0.9***	-0.22***	0.905	87266
Food & Live Animals	0.67**	-0.03	0.868	77689
Beverages & Tobacco	0.59	0.002	0.822	55835
Crude Materials	0.65**	-0.06	0.848	77557
Mineral Fuels	2.28***	0.08	0.783	51287
Animal & Vegetable Oils	3.29***	-0.08	0.78	48664
Chemicals	-0.05	-0.09*	0.894	76664
Manufactured Goods	0.06	-0.05	0.903	81555
Machinery & Transport	0.5*	-0.18***	0.92	79831
Misc. Manufactured Goods	0.19	0.15***	0.933	80898
Other Commodities	1.45***	0.06	0.813	56534

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

Table 4.3: Regression Results, Dependent Variable: Log of Extensive Margin

Sector/Variable	GCCFTA	PTA	R-Square	Observations
Aggregate	-0.46***	-0.22***	0.95	87266
Food & Live Animals	0.15	-0.02	0.907	77689
Beverages & Tobacco	-0.14	0.01	0.816	55835
Crude Materials	0.09	-0.03*	0.957	77557
Mineral Fuels	0.04	-0.02	0.795	51287
Animal & Vegetable Oils	0.47***	-0.04*	0.823	48664
Chemicals	-0.14	-0.06***	0.927	76664
Manufactured Goods	-0.2	-0.02	0.934	81555
Machinery & Transport	-0.4***	-0.04*	0.905	79831
Misc. Manufactured Goods	-0.44***	0.14	0.908	80898
Other Commodities	0.14***	0.14	0.717	56534
Method		Count		

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

Table 4.3 (continued): Regression Results, Dependent Variable: Log of Extensive Margin

Sector/Variable	GCCFTA	PTA	R-Square	Observations
Aggregate	-0.36**	-0.12***	0.834	87266
Food & Live Animals	-0.17	-0.05	0.741	77689
Beverages & Tobacco	-0.27	0.1**	0.55	55835
Crude Materials	0.34*	-0.07*	0.697	77557
Mineral Fuels	0.71***	0.04	0.628	51287
Animal & Vegetable Oils	1.22***	-0.14*	0.59	48664
Chemicals	-0.52***	-0.14***	0.749	76664
Manufactured Goods	-0.56***	-0.04	0.805	81555
Machinery & Transport	-0.7***	-0.03	0.754	79831
Misc. Manufactured Goods	-0.68***	0.03	0.735	80898
Other Commodities	-0.03	0.04	0.452	56534
Method	HK			

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

Table 4.4: Regression Results, Dependent Variable: Log of Intensive Margin

Sector/Variable	GCCFTA	PTA	R-Square	Observations
Aggregate	1.36***	-0.18***	0.814	87266
Food & Live Animals	0.52***	-0.02	0.784	77689
Beverages & Tobacco	0.72	-0.005	0.776	55835
Crude Materials	0.56**	-0.03	0.753	77557
Mineral Fuels	2.24***	0.09	0.758	51287
Animal & Vegetable Oils	2.81***	-0.03	0.721	48664
Chemicals	0.09	-0.03	0.827	76664
Manufactured Goods	0.27	-0.03	0.822	81555
Machinery & Transport	0.9***	-0.14***	0.886	79831
Misc. Manufactured Goods	0.63**	0.13***	0.903	80898
Other Commodities	1.32***	0.04	0.784	56534
Method		Count		

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

Table 4.4 (continued): Regression Results, Dependent Variable: Log of Intensive Margin

Sector/Variable	GCCFTA	PTA	R-Square	Observations
Aggregate	1.26***	-0.1**	0.792	87266
Food & Live Animals	0.84***	0.01	0.767	77689
Beverages & Tobacco	0.86*	-0.1	0.7369	55835
Crude Materials	0.31	0.01	0.659	77557
Mineral Fuels	1.57***	0.04	0.626	51287
Animal & Vegetable Oils	2.06***	0.06	0.653	48664
Chemicals	0.47*	0.05	0.8	76664
Manufactured Goods	0.62***	-0.01	0.806	81555
Machinery & Transport	1.2***	-0.15***	0.878	79831
Misc. Manufactured Goods	0.86***	0.12**	0.88	80898
Other Commodities	1.48***	0.02	0.714	56534
Method	HK			

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

Table 4.5: Sensitivity Results, Accounting for Major PTAs, Dependent Variable: Log of Trade

Variable	Aggregate	Food & Live Animals	Beverages & Tobacco	Crude Materials	Mineral Fuels	Animal & Veg.Oil
GCCFTA	0.76**	0.38	0.48	0.58**	1.78***	3.01***
PTA2	-0.19***	0.03	0.04	0.002	0.07	-0.05
ASEAN	-0.29	0.09	1.93***	0.52	0.43	-0.11
COMESA	0.8**	0.57	0.39	0.28	1.5	3.46***
ECO	-0.61	-1.96	-0.53	0.94	0.72	-0.45
EU	0.19**	0.91***	1.31***	0.46***	-0.11	1.11***
EURO	0.33***	0.35***	0.1	0.2**	0.28	0.6***
GAFTA	0.32**	0.71***	0.13	0.1	1.1***	0.71***
NAFTA	-0.15	0.01	0.39	0.22	1.53**	1.13*
UMA	0.32	0.21	-0.39	0.08	1.25*	-0.36
R-Square	0.93	0.869	0.824	0.849	0.783	0.783
Obs.	87266	77689	55835	77557	51287	48664

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

Table 4.5 (continued): Sensitivity Results, Accounting for Major PTAs, Dependent Variable: Log of Trade

Variable	Chemicals	Manuf. Goods	Machinery & Transport	Misc. Manuf. Goods	Other Commodities
GCCFTA	-0.14	-0.03	0.42	0.31	1.01***
PTA2	-0.08	-0.04	-0.16***	0.12**	0.04
ASEAN	-0.55***	0.1	-0.43*	0.22	0.34
COMESA	1.49**	0.78**	0.72	0.16	2.79***
ECO	-0.16	0.3	-1.14	-0.43	-0.01
EU	0.08	0.28***	-0.04	0.15*	0.9***
EURO	0.13*	0.08	0.09	0.09	0.24
GAFTA	0.19	0.17	0.19	0.36***	1.02***
NAFTA	0.11	0.29	-0.13	0.01	-0.17
UMA	0.4	0.54	-0.83	-0.31	0.22
R-Square	0.894	0.903	0.92	0.933	0.814
Obs.	76664	81555	79831	80898	56534

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

Table 4.6: Sensitivity Results, Accounting for Major PTAs, Dependent Variable: Log of Extensive Margin (HK Decomposition)

Variable	Aggregate	Food & Live Animals	Beverage & Tobacco	Crude Materials	Mineral Fuels	Animal & Veg.Oil
GCCFTA	-0.2	-0.19	-0.28	0.33*	0.43*	1.13***
PTA2	-0.12***	-0.02	0.12**	-0.05	0.02	-0.09
ASEAN	-0.85***	-0.39***	0.67**	-0.12	0.34	-0.22
COMESA	-0.43	-0.23	0.91**	0.24	0.7	2.09**
ECO	-0.59**	-0.39	-0.56**	0.84**	0.42	1.53***
EU	-0.16***	0.24***	0.29***	-0.1	0.04	0.35***
EURO	0.13***	0.02	-0.09*	-0.06	0.51***	-0.1
GAFTA	-0.41***	0.04	-0.01	0.04	0.54***	0.23
NAFTA	-0.66***	-0.59***	0.03	-0.4***	-0.01	-0.09
UMA	-0.29	0.26	-1.51*	0.35	0.59*	2.56***
R-Square	0.836	0.741	0.551	0.697	0.629	0.591
Obs.	87266	77689	55835	77557	51287	48664

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

Table 4.6 (continued): Sensitivity Results, Accounting for Major PTAs, Dependent Variable: Log of Extensive Margin (HK Decomposition)

Variable	Chemicals	Manuf. Goods	Machinery & Transport	Misc. Manuf. Goods	Other Commodities
GCCFTA	-0.38**	-0.41**	-0.49***	-0.48***	-0.13
PTA2	-0.13***	-0.04	-0.03	0.01	0.06
ASEAN	-0.81***	-0.8***	-0.79***	-0.46***	-0.13
COMESA	0.24	0.15	-0.51*	-0.71***	1.48***
ECO	-0.13	0.75	-0.48**	1.04***	-0.23*
EU	-0.29***	-0.08	-0.17***	-0.12***	0.24**
EURO	-0.13***	0.02	0.05	0.05	-0.47***
GAFTA	-0.32***	-0.38***	-0.52***	-0.53***	0.28**
NAFTA	-0.52***	-0.78***	-0.53**	-0.4**	-0.04
UMA	-0.35	-0.17	-0.01	-0.37*	0.42
R-Square	0.75	0.806	0.757	0.738	0.454
Obs.	76664	81555	79831	80898	56534

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

Table 4.7: Sensitivity Results, Accounting for Major PTAs, Dependent Variable: Log of Intensive Margin (HK Decomposition)

Variable	Aggregate	Food & Live Animals	Beverage & Tobacco	Crude Materials	Mineral Fuels	Animal & Veg.Oil
GCCFTA	0.96***	0.57**	0.76	0.25	1.34**	1.88***
PTA2	-0.07*	0.05	-0.08	0.05	0.06	0.04
ASEAN	0.57***	0.48***	1.26***	0.64***	0.09	0.12
COMESA	1.22***	0.8**	-0.52	0.04	0.79	1.37
ECO	-0.02	-1.57	0.02	0.1	0.3	-1.98***
EU	0.34***	0.67***	1.02***	0.56***	-0.15	0.76***
EURO	0.2***	0.33***	0.19	0.26***	-0.23	0.7***
GAFTA	0.73***	0.67***	0.14	0.06	0.56**	0.48**
NAFTA	0.51***	0.6***	0.35	0.62***	1.54***	1.21***
UMA	0.61***	-0.05	1.12**	-0.26	0.66	-2.9***
R-Square	0.794	0.77	0.74	0.66	0.627	0.656
Obs.	87266	77689	55835	77557	51287	48664

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

Table 4.7 (continued): Sensitivity Results, Accounting for Major PTAs, Dependent Variable: Log of Intensive Margin (HK Decomposition)

Variable	Chemicals	Manuf. Goods	Machinery & Transport	Misc. Manuf. Goods	Other Commodities
GCCFTA	0.25	0.38*	0.91***	0.79***	1.14***
PTA2	0.05	-0.003	-0.12**	0.12**	-0.02
ASEAN	0.26	0.9***	0.37*	0.68***	0.47
COMESA	1.25**	0.63**	1.22***	0.87**	1.31*
ECO	-0.03	-0.46	-0.66	-1.47***	0.22
EU	0.37***	0.36***	0.13	0.27***	0.66***
EURO	0.26***	0.06	0.04	0.04	0.72***
GAFTA	0.51***	0.55***	0.7***	0.16	0.74***
NAFTA	0.62***	1.07***	0.4*	0.41	0.13
UMA	0.76*	0.71**	-0.82**	0.06	-0.2
R-Square	0.801	0.808	0.879	0.88	0.716
Obs.	76664	81555	79831	80898	56534

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

Table 4.8: Sensitivity Results, Accounting for Major PTAs & Possible Implementation Phases, Dependent Variable: Log of Trade

Variable	Aggregate	Food & Live Animals	Beverage & Tobacco	Crude Materials	Mineral Fuels	Animal & Veg.Oil
GCCFTA	0.42*	-0.16	0.5	-0.31	0.58	1.84***
GCC 88	0.53**	0.41	-0.21	0.97***	1.27**	1.15*
GCC 93	0.45***	0.36**	0.23	0.17	1.11***	1.07***
GCC 98	-0.91***	-0.03	0.01	-0.02	-1.26*	-1.1***
Net GCC	0.49	0.36	{0.53}	0.97	1.12	2.96
PTA2	-0.19***	0.03	0.04	0.003	0.08	-0.05
ASEAN	-0.29	0.09	1.93***	0.52	0.42	-0.11
COMESA	0.8**	0.56	0.39	0.28	1.48	3.46***
ECO	-0.67	-1.96	-0.53	0.94	0.72	-0.49
EU	0.19**	0.91***	1.31***	0.46***	-0.11	1.11***
EURO	0.33***	0.35***	0.1	0.2**	0.28	0.6***
GAFTA	0.42***	0.71***	0.1	0.007	1.17***	0.8***
NAFTA	-0.16	0.01	0.39	0.22	1.53**	1.13*
UMA	0.31	0.21	-0.39	0.1	1.26*	-0.37
R-Square	0.929	0.869	0.824	0.849	0.784	0.783
Obs.	87266	77689	55835	77557	51287	48664

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

{} indicates that the Net GCC sum is insignificant.

Table 4.8 (continued): Sensitivity Results, Accounting for Major PTAs & Possible Implementation Phases, Dependent Variable: Log of Trade

Variable	Chemicals	Manuf. Goods	Machinery & Transport	Misc. Manuf. Goods	Other Commodities
GCCFTA	-0.26	-0.08	-0.45*	-0.26	0.18
GCC 88	0.36	0.34	1.33***	0.47	0.58*
GCC 93	0.2	0.07	-0.12	0.27	0.32
GCC 98	-0.73***	-0.68***	-0.38*	0.08	0.76*
Net GCC	-0.73	-0.68	0.5	{0.56}	1.14
PTA2	-0.08	-0.04	-0.15***	0.12**	0.04
ASEAN	-0.55***	0.1	-0.43*	0.22	0.33
COMESA	1.51**	0.78**	0.72	0.15	2.76***
ECO	-0.16	0.3	-1.14	-0.43	-0.01
EU	0.08	0.28***	-0.04	0.15*	0.9***
EURO	0.13*	0.08	0.09	0.09	0.24
GAFTA	0.32**	0.3*	0.21	-0.46***	0.54***
NAFTA	0.11	0.29	-0.13	0.01	-0.17
UMA	0.38	0.53	-0.84	-0.3	0.36
R-Square	0.894	0.903	0.92	0.934	0.814
Obs.	76664	81555	79831	80898	56534

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

{} indicates that the Net GCC sum is insignificant.

Table 4.9: Sensitivity Results, Accounting for Major PTAs & Possible Implementation Phases, Dependent Variable: Log of Extensive Margin (HK Decomposition)

Variable	Aggregate	Food & Live Animals	Beverage & Tobacco	Crude Materials	Mineral Fuels	Animal & Veg.Oil
GCCFTA	-0.26**	-0.19	0.27	-0.09	-0.12	0.89*
GCC 88	0.19	0.13	-0.42***	0.36**	0.74**	0.38
GCC 93	-0.07	-0.13	-0.02	0.09	0.43**	0.38
GCC 98	-0.14*	-0.09	-0.43	0.15	-0.85***	-0.74***
Net GCC	-0.4	{-0.28}	-0.42	0.36	0.32	0.15
PTA2	-0.12***	-0.02	0.12**	-0.05	0.02	-0.09
ASEAN	-0.85***	-0.85***	0.67**	-0.12	0.34	-0.22
COMESA	-0.42	-0.23	0.92***	0.24	0.7	2.1**
ECO	-0.59**	-0.39	-0.55**	0.83**	0.42	1.52***
EU	-0.16***	0.24***	0.29***	-0.1	0.04	0.35***
EURO	0.13***	0.02	-0.09*	-0.06	0.51***	-0.1
GAFTA	-0.38***	0.07	0.14	-0.04	0.69**	0.36*
NAFTA	-0.66***	-0.59***	0.03	-0.4***	-0.01	-0.09
UMA	-0.29	0.26	-1.53*	0.36	0.59*	2.56***
R-Square	0.836	0.741	0.552	0.698	0.629	0.591
Obs.	87266	77689	55835	77557	51287	48664

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

{} indicates that the Net GCC sum is insignificant.

Table 4.9 (continued): Sensitivity Results by Sector, Accounting for Major PTAs & Possible Implementation Phases, Dependent Variable: Log of Extensive Margin (HK Decomposition)

Variable	Chemicals	Manuf. Goods	Machinery & Transport	Misc. Manuf. Goods	Other Commodities
GCCFTA	-0.56***	-0.21	-0.49***	-0.36***	0.15
GCC 88	0.31**	-0.09	0.21	-0.09	-0.41***
GCC 93	-0.05	-0.1	-0.31**	-0.02	0.07
GCC 98	-0.13	-0.16	0.04	-0.08	-0.02
Net GCC	-0.25	{0.56}	-0.8	-0.36	-0.41
PTA2	-0.13***	-0.04	-0.03	0.01	0.06
ASEAN	-0.81***	-0.8***	-0.79***	-0.46***	-0.13
COMESA	0.24	0.16	-0.51*	-0.71***	1.48***
ECO	-0.13	0.76	-0.48**	1.04***	-0.23*
EU	-0.29***	-0.08	-0.17***	-0.12***	0.24**
EURO	-0.13***	0.02	0.05	0.05	-0.47***
GAFTA	-0.3***	-0.32***	-0.48***	-0.5***	0.32**
NAFTA	-0.52***	-0.78***	-0.53**	-0.4**	-0.04
UMA	-0.36	-0.17	-0.02	-0.37*	0.41
R-Square	0.75	0.806	0.757	0.738	0.454
Obs.	76664	81555	79831	80898	56534

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

{} indicates that the Net GCC sum is insignificant.

Table 4.10: Sensitivity Results by Sector, Accounting for Major PTAs & Possible Implementation Phases, Dependent Variable: Log of Intensive Margin (HK Decomposition)

Variable	Aggregate	Food & Live Animals	Beverage & Tobacco	Crude Materials	Mineral Fuels	Animal & Veg.Oil
GCCFTA	0.68***	0.03	0.23	-0.22	0.69	0.95*
GCC 88	0.34*	0.27	0.22	0.61***	0.53	0.77
GCC 93	0.52***	0.49***	0.25	0.07	0.68*	0.69**
GCC 98	-0.76***	0.06	0.44	-0.17	-0.41	-0.35
Net GCC	0.78	0.49	{1.24}	0.61	0.68	1.64
PTA2	-0.07*	0.05	-0.08	0.05	0.06	0.04
ASEAN	0.57***	0.48***	1.26***	0.64***	0.09	0.12
COMESA	1.22***	0.79**	-0.54	0.04	0.78	1.37
ECO	-0.02	-1.57	0.01	0.1	0.3	-2.01***
EU	0.34***	0.67***	1.02***	0.56***	-0.15	0.76***
EURO	0.2***	0.33***	0.19	0.26***	-0.23	0.7***
GAFTA	0.79***	0.56***	-0.04	0.05	0.48	0.44*
NAFTA	0.51***	0.6***	0.35	0.62***	1.54***	1.21***
UMA	0.61***	-0.04	1.14**	-0.26	0.67	-2.93***
R-Square	0.794	0.77	0.74	0.66	0.627	0.656
Obs.	87266	77689	55835	77557	51287	48664

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

{} indicates that the Net GCC sum is insignificant.

Table 4.10 (continued): Sensitivity Results by Sector, Accounting for Major PTAs & Possible Implementation Phases, Dependent Variable: Log of Intensive Margin (HK Decomposition)

Variable	Chemicals	Manuf. Goods	Machinery & Transport	Misc. Manuf. Goods	Other Commodities
GCCFTA	0.3	0.13	0.04	0.1	0.03
GCC 88	0.05	0.44*	1.12***	0.56**	0.98***
GCC 93	0.25	0.18	0.2	0.29*	0.24
GCC 98	-0.61**	-0.52***	-0.42**	0.16	0.78*
Net GCC	-0.61	-0.12	0.7	0.85	1.76
PTA2	0.05	-0.003	-0.12**	0.12**	-0.02
ASEAN	0.26	0.9***	0.37*	0.68***	0.46
COMESA	1.26**	0.64**	1.22***	0.86**	1.27*
ECO	-0.03	-0.46	-0.66	-1.48***	0.21
EU	0.37***	0.36***	0.13	0.27***	0.66***
EURO	0.26***	0.06	0.04	0.04	0.72***
GAFTA	0.61***	0.61***	0.7***	0.04	0.23
NAFTA	0.62***	1.07***	0.4*	0.41	0.13
UMA	0.74*	0.7*	-0.82**	0.07	-0.04
R-Square	0.801	0.808	0.879	0.881	0.716
Obs.	76664	81555	79831	80898	56534

***, ** and * represent 1%, 5% and 10% significance levels, respectively using heteroskedasticity and autocorrelation consistent standard errors.

{} indicates that the Net GCC sum is insignificant.

Figure 4.1: Log of Extensive Margin of Trade (Aggregate Trade) among GCC countries, 1978-2010

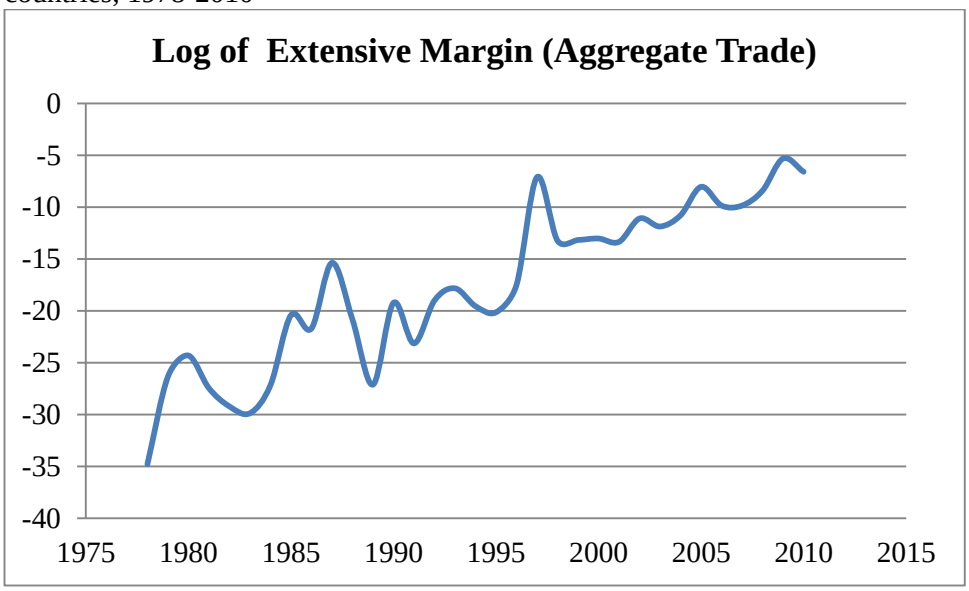


Figure 4.2: Log of Extensive Margin of Trade (Aggregate Trade) between GCC countries and the rest of the world, 1978-2010

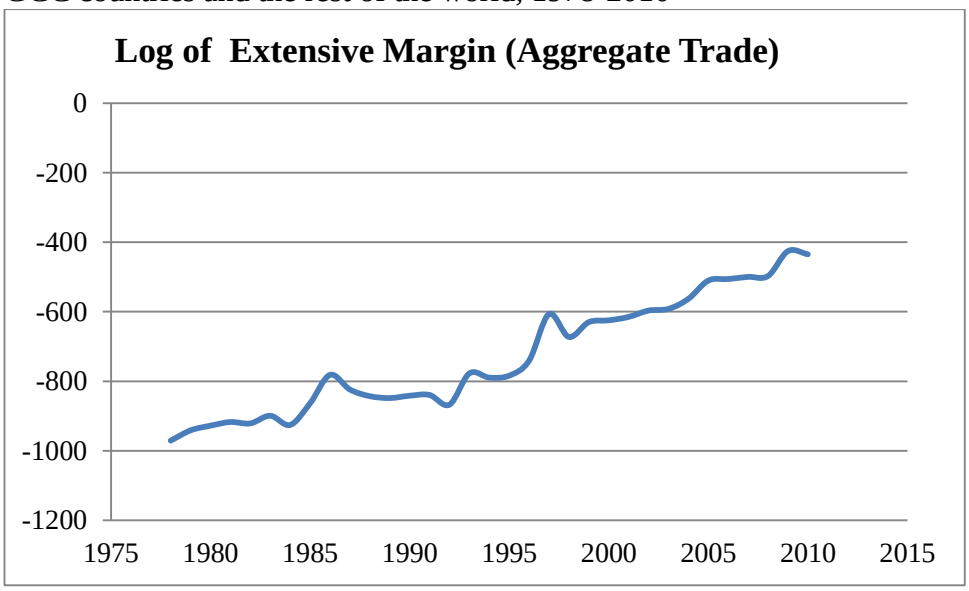


Figure 4.3: Log of Extensive Margin of Trade (Sector 0: Food and live animals) among GCC countries, 1978-2010

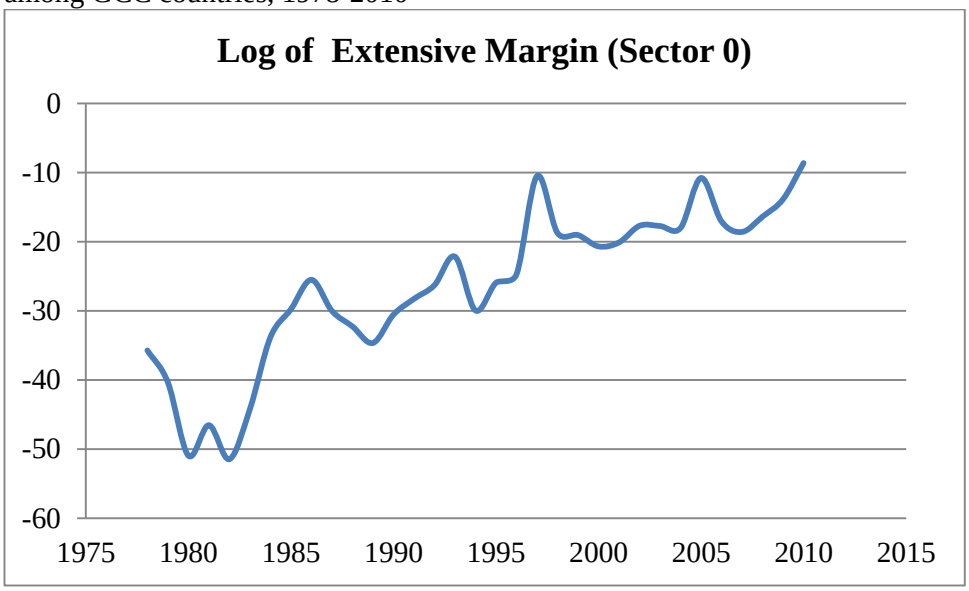


Figure 4.4: Log of Extensive Margin of Trade (Sector 0: Food and live animals) between GCC countries and the rest of the world, 1978-2010

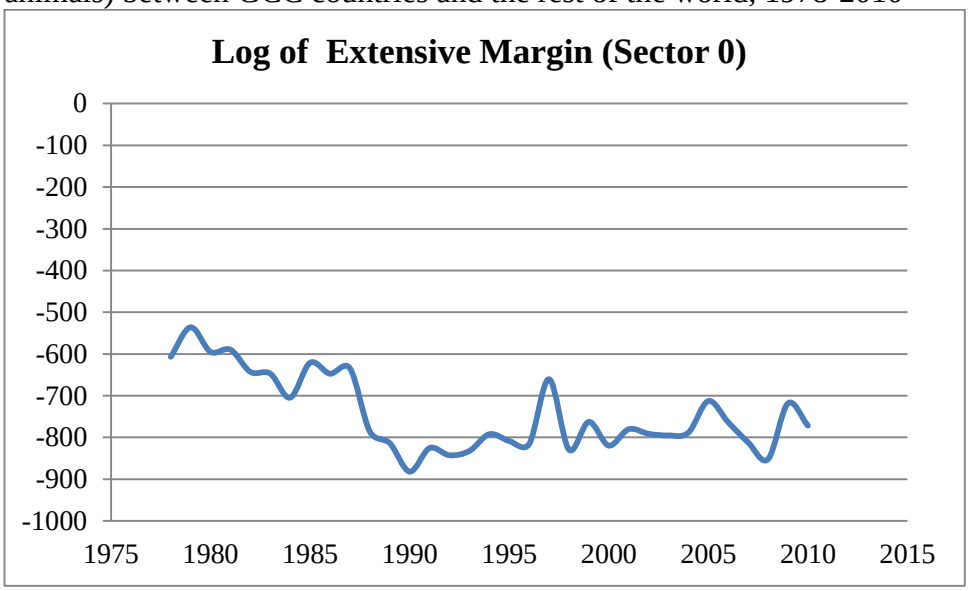


Figure 4.5: Log of Extensive Margin of Trade (Sector 1: Beverages and tobacco) among GCC countries, 1978-2010

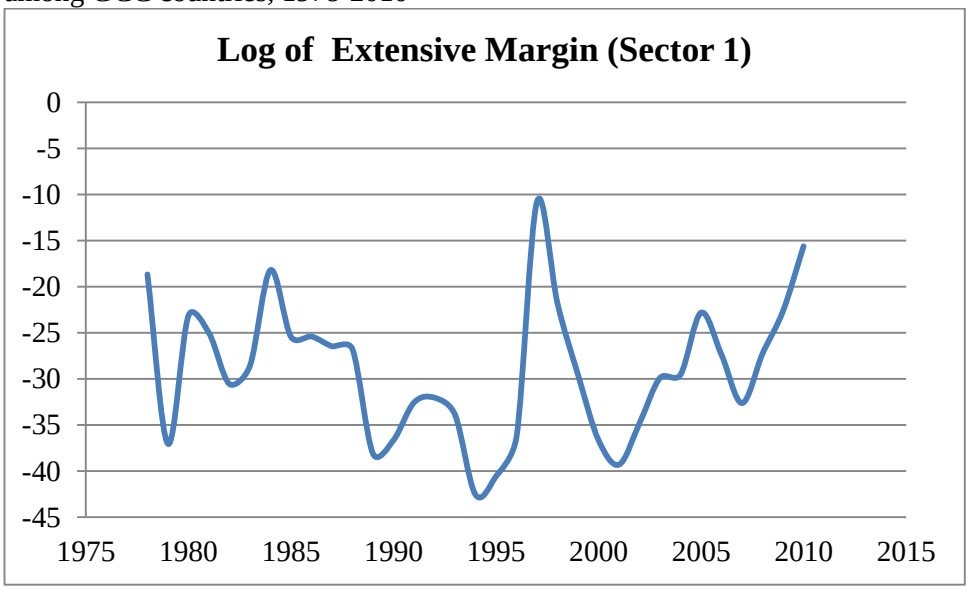


Figure 4.6: Log of Extensive Margin of Trade (Sector 1: Beverages and tobacco) between GCC countries and the rest of the world, 1978-2010

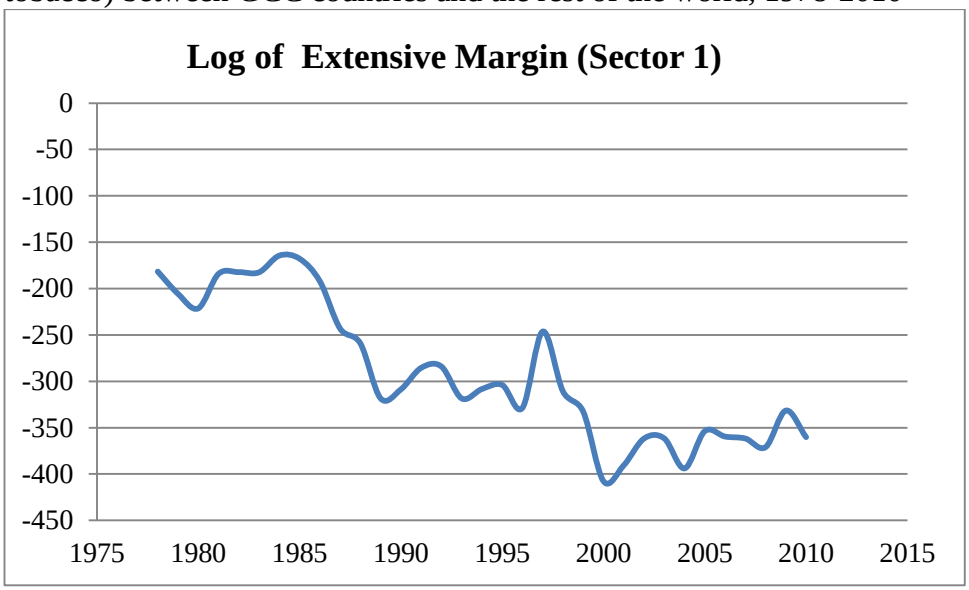


Figure 4.7: Log of Extensive Margin of Trade (Sector 2: Crude materials, inedible, except fuels) among GCC countries, 1978-2010

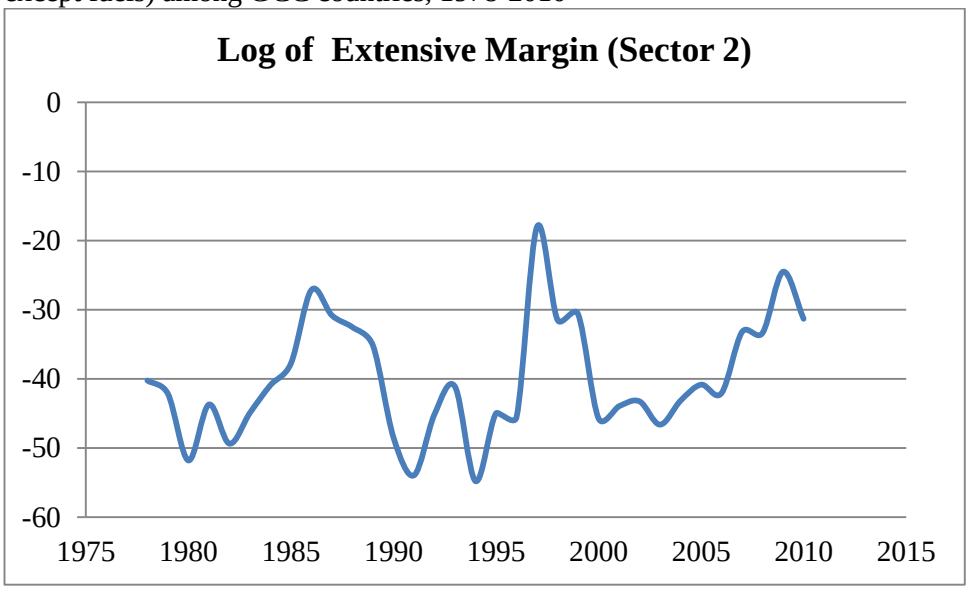


Figure 4.8: Log of Extensive Margin of Trade (Sector 2: Crude materials, inedible, except fuels) between GCC countries and the rest of the world, 1978-2010

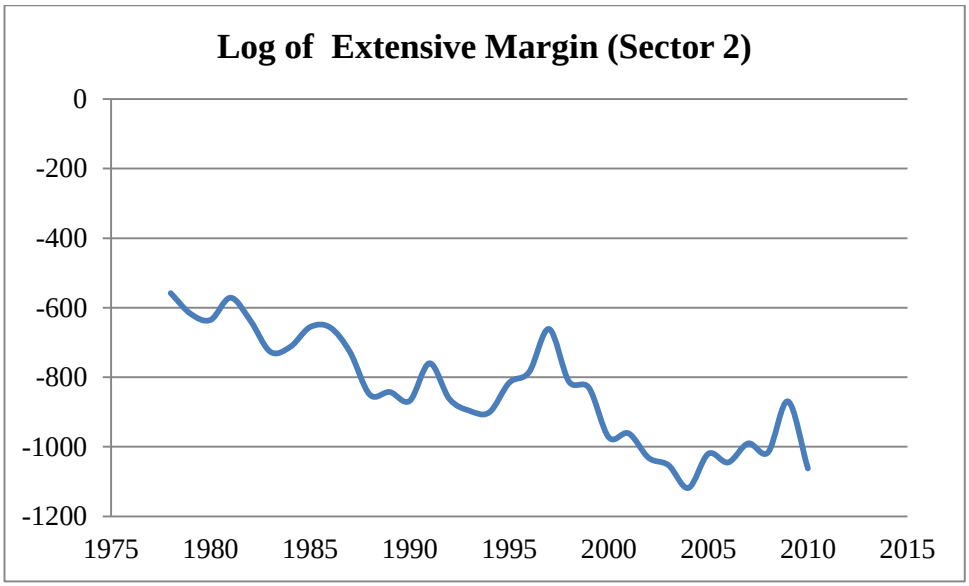


Figure 4.9: Log of Extensive Margin of Trade (Sector 3: Mineral fuels, lubricants and related materials) among GCC countries, 1978-2010

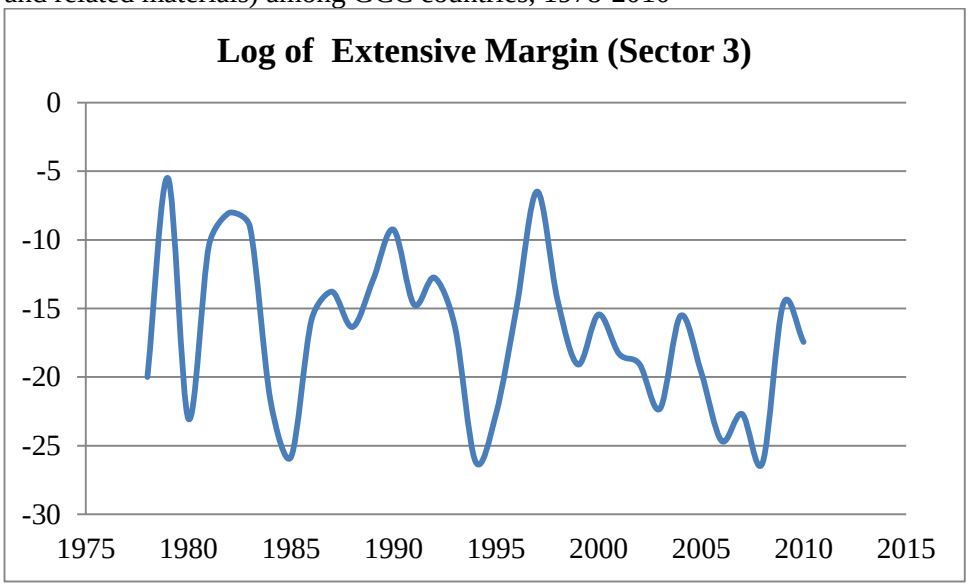


Figure 4.10: Log of Extensive Margin of Trade (Sector 3: Mineral fuels, lubricants and related materials) between GCC countries and the rest of the world, 1978-2010

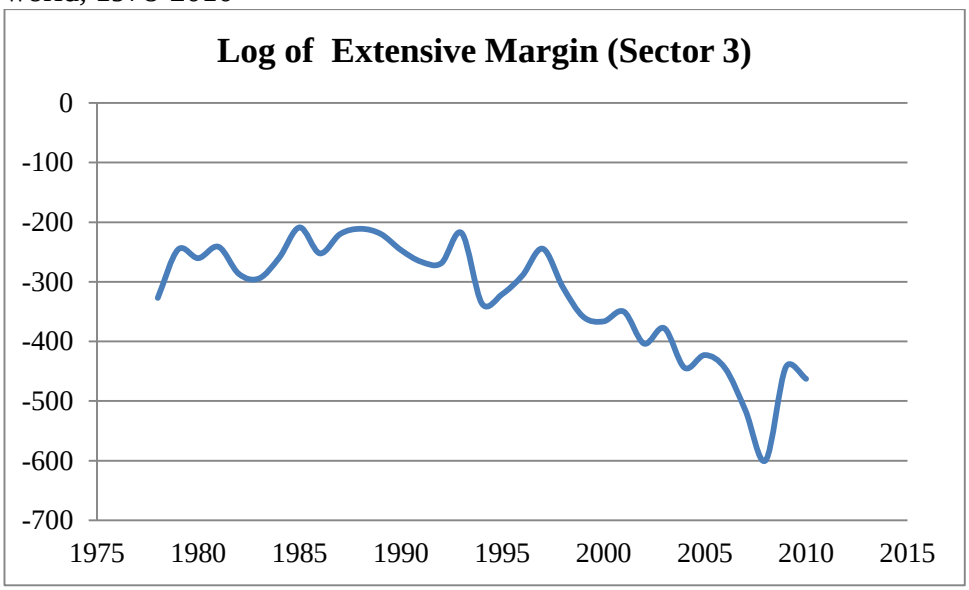


Figure 4.11: Log of Extensive Margin of Trade (Sector 4: Animal and vegetable oils and fats) among GCC countries, 1978-2010

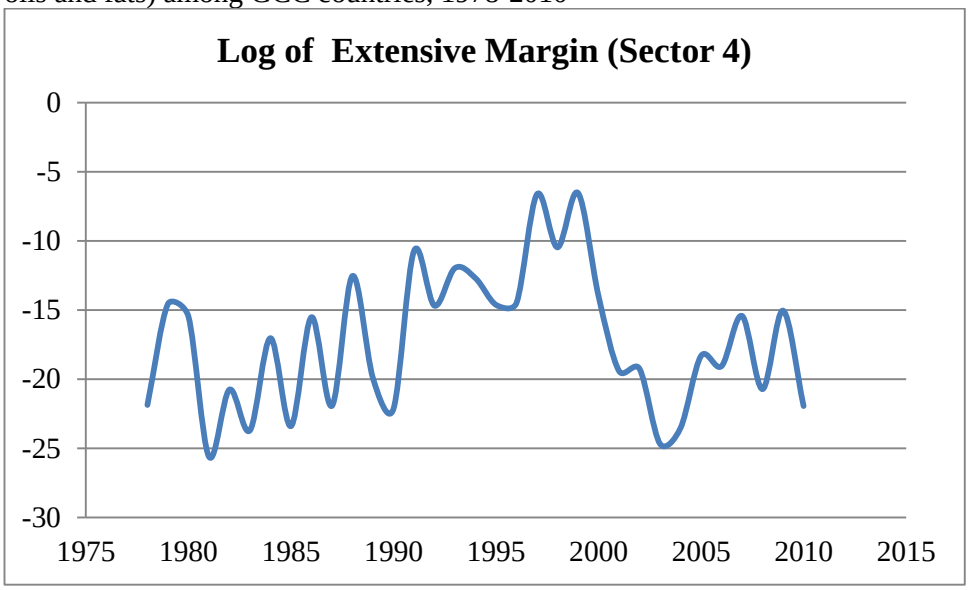


Figure 4.12: Log of Extensive Margin of Trade (Sector 4: Animal and vegetable oils and fats) between GCC countries and the rest of the world, 1978-2010

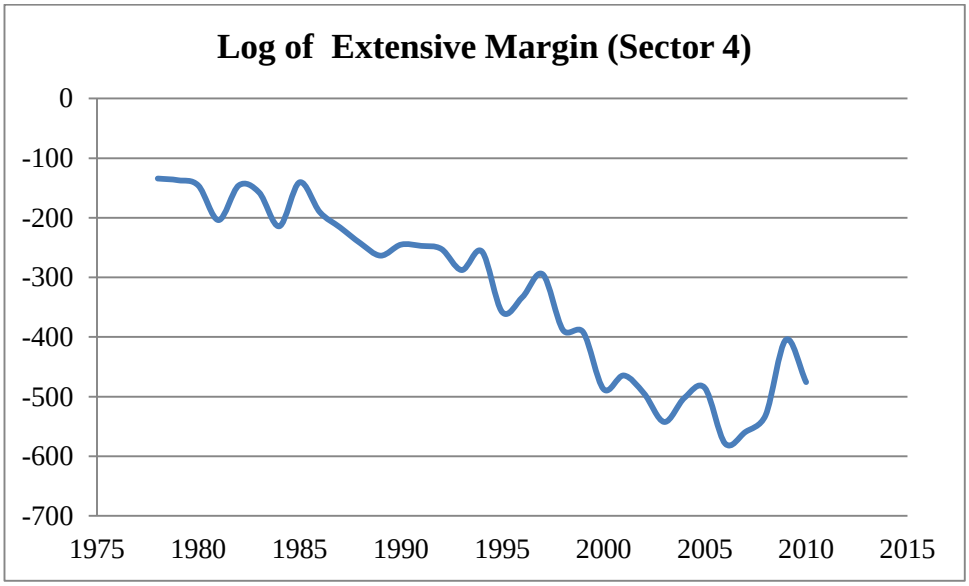


Figure 4.13: Log of Extensive Margin of Trade (Sector 5: Chemicals) among GCC countries, 1978-2010

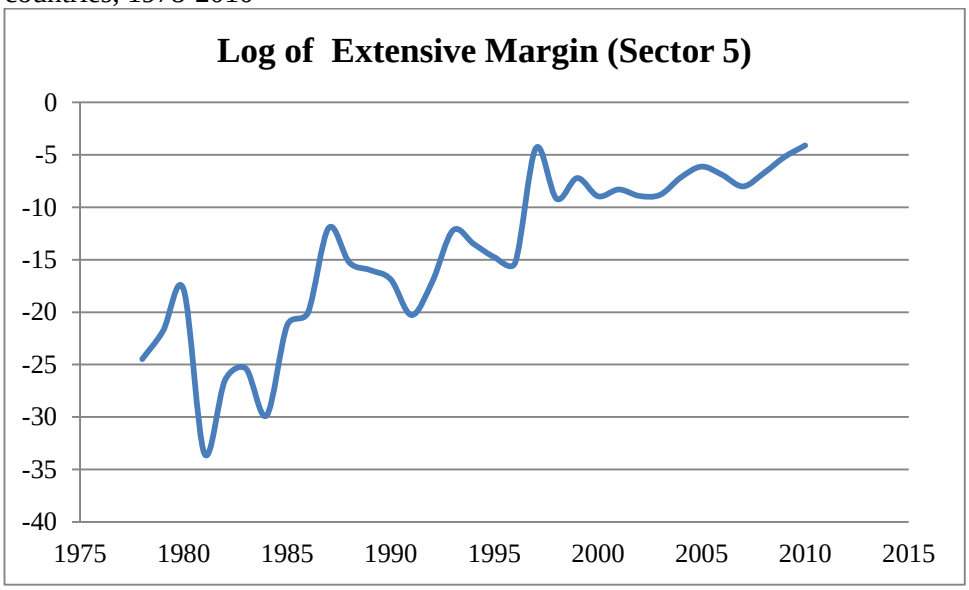


Figure 4.14: Log of Extensive Margin of Trade (Sector 5: Chemicals) between GCC countries and the rest of the world, 1978-2010

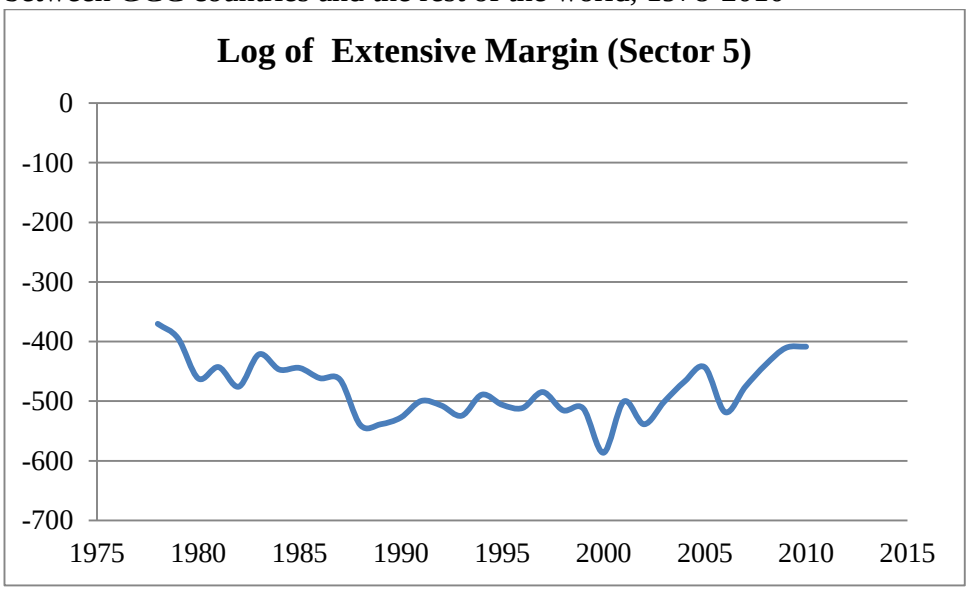


Figure 4.15: Log of Extensive Margin of Trade (Sector 6: Manufactured goods) among GCC countries, 1978-2010

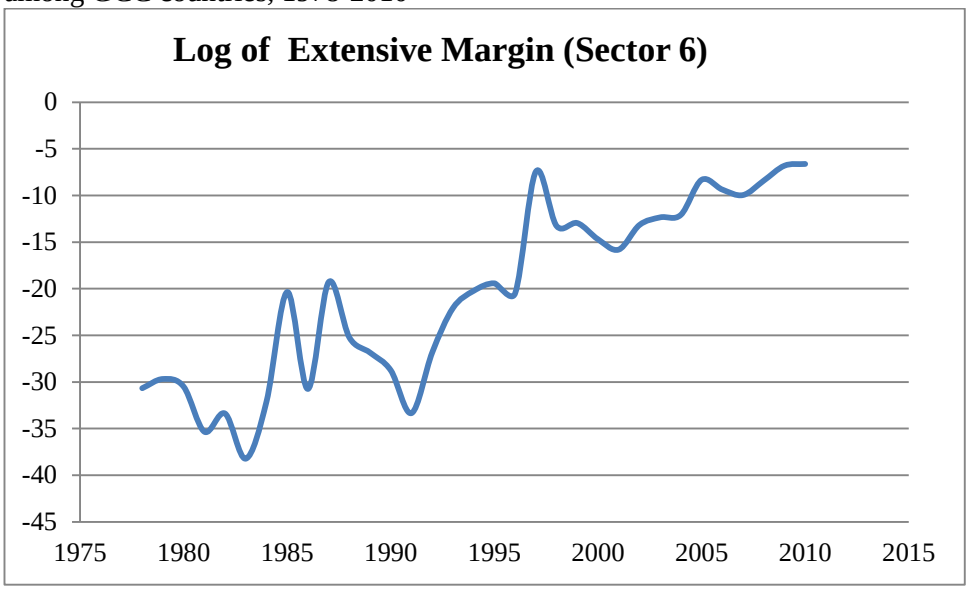


Figure 4.16: Log of Extensive Margin of Trade (Sector 6: Manufactured goods) between GCC countries and the rest of the world, 1978-2010

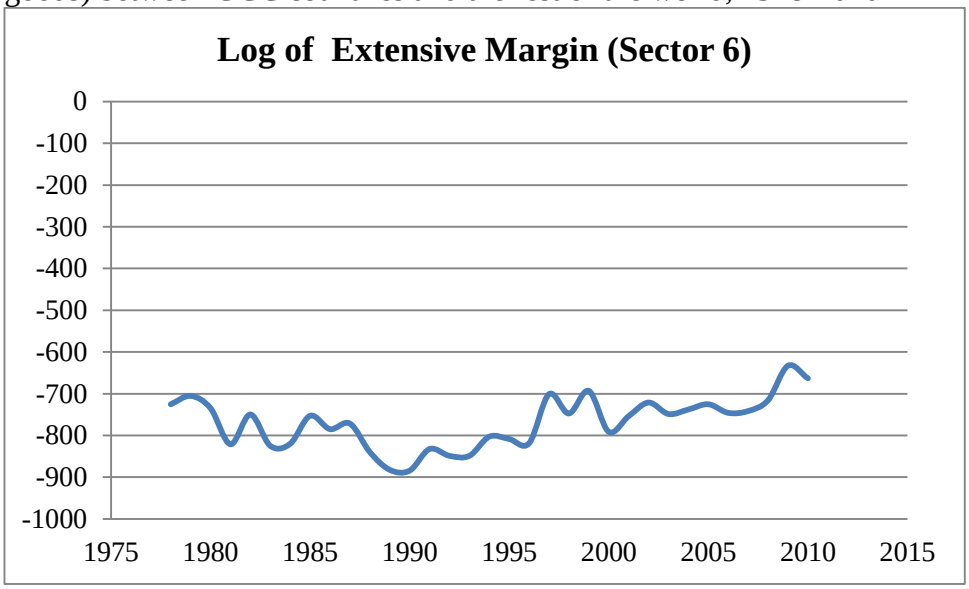


Figure 4.17: Log of Extensive Margin of Trade (Sector 7: Machinery and transport equipment) among GCC countries, 1978-2010

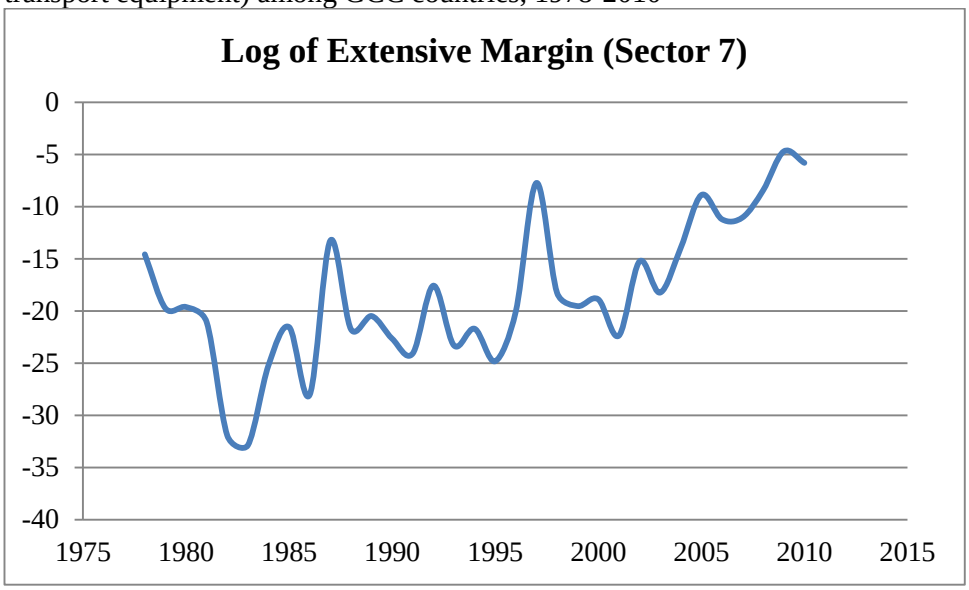


Figure 4.18: Log of Extensive Margin of Trade (Sector 7: Machinery and transport equipment) between GCC countries and the rest of the world, 1978-2010

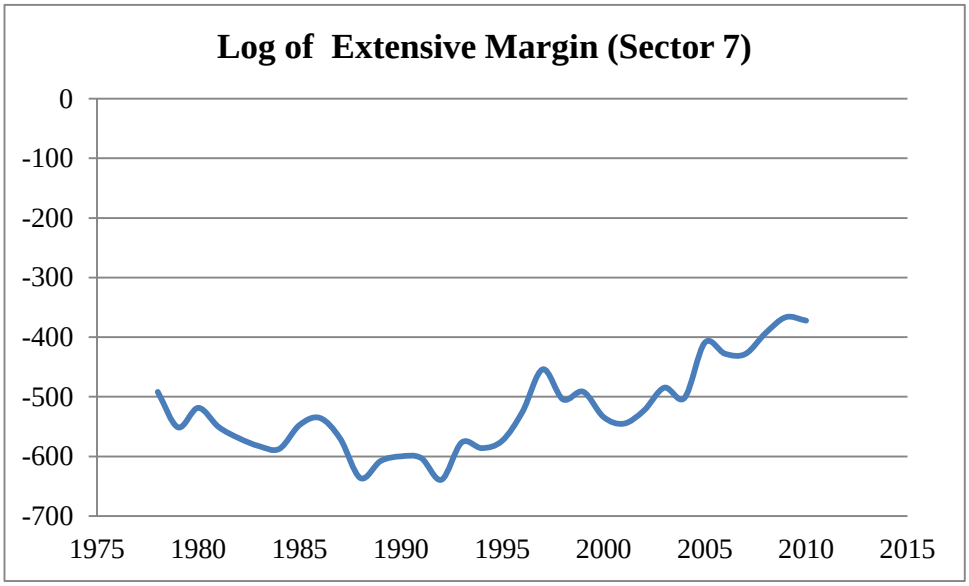


Figure 4.19: Log of Extensive Margin of Trade (Sector 8: Miscellaneous manufactured articles) among GCC countries, 1978-2010

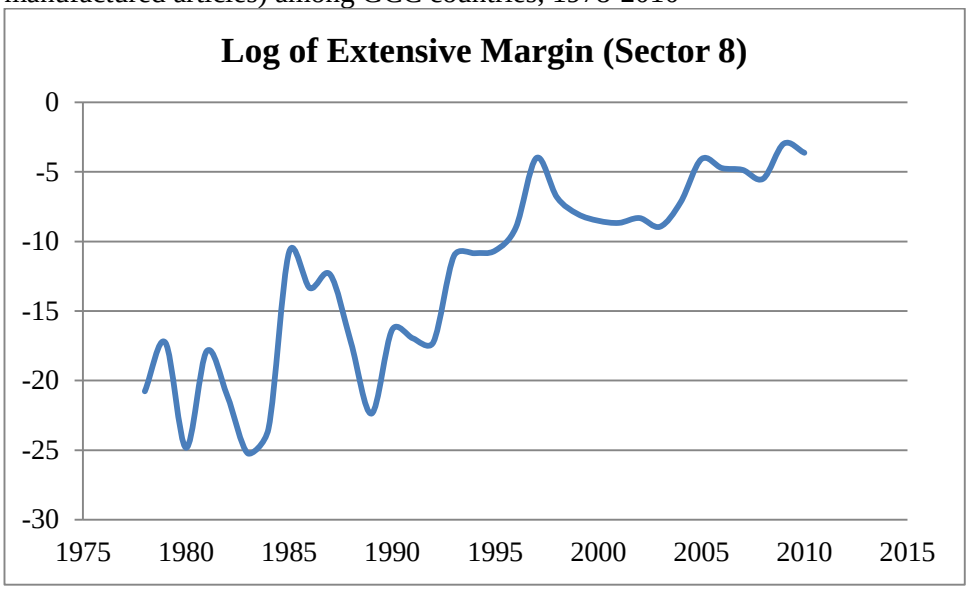


Figure 4.20: Log of Extensive Margin of Trade (Sector 8: Miscellaneous manufactured articles) between GCC countries and the rest of the world, 1978-2010

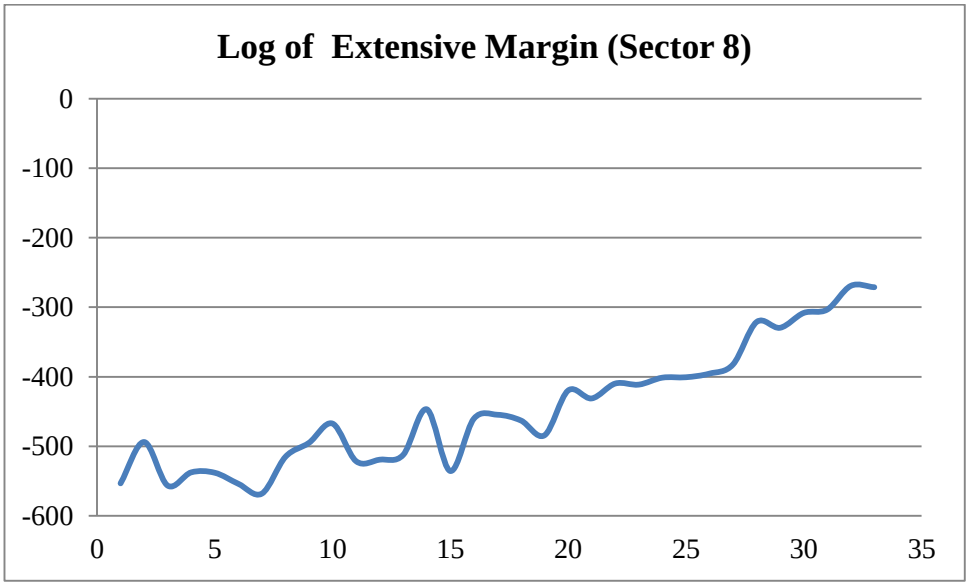


Figure 4.21: Log of Extensive Margin of Trade (Sector 9: Commodities and transactions not classified according to kind) among GCC countries, 1978-2010

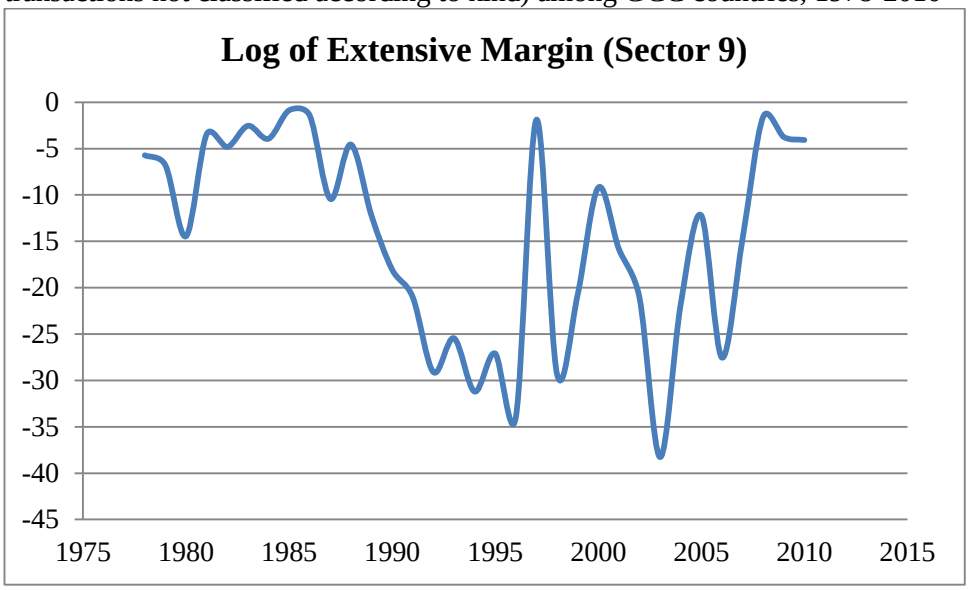


Figure 4.22: Log of Extensive Margin of Trade (Sector 9: Commodities and transactions not classified according to kind) between GCC countries and the rest of the world, 1978-2010

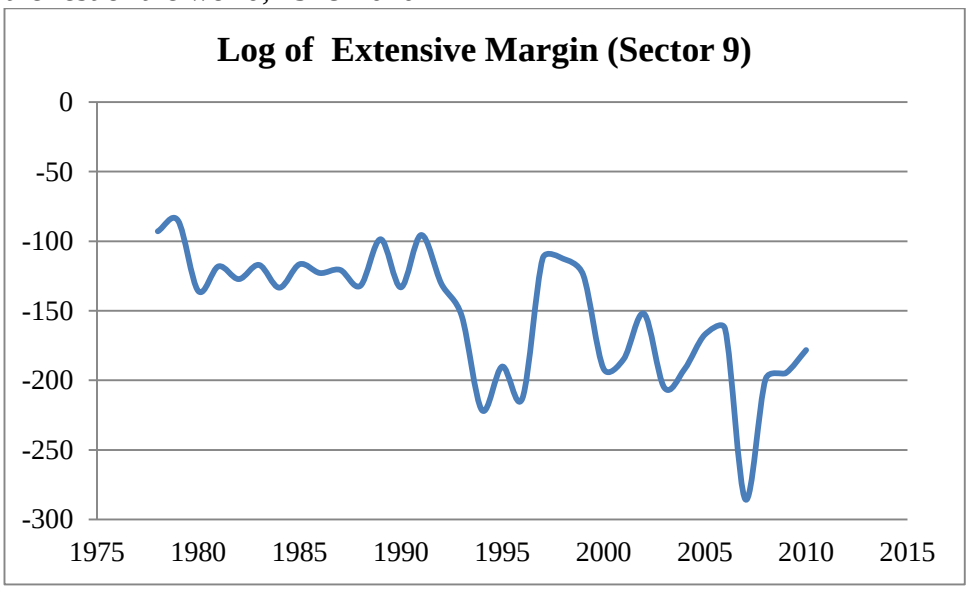


Figure 4.23: Log of Intensive Margin of Trade (Aggregate Trade) among GCC countries, 1978-2010

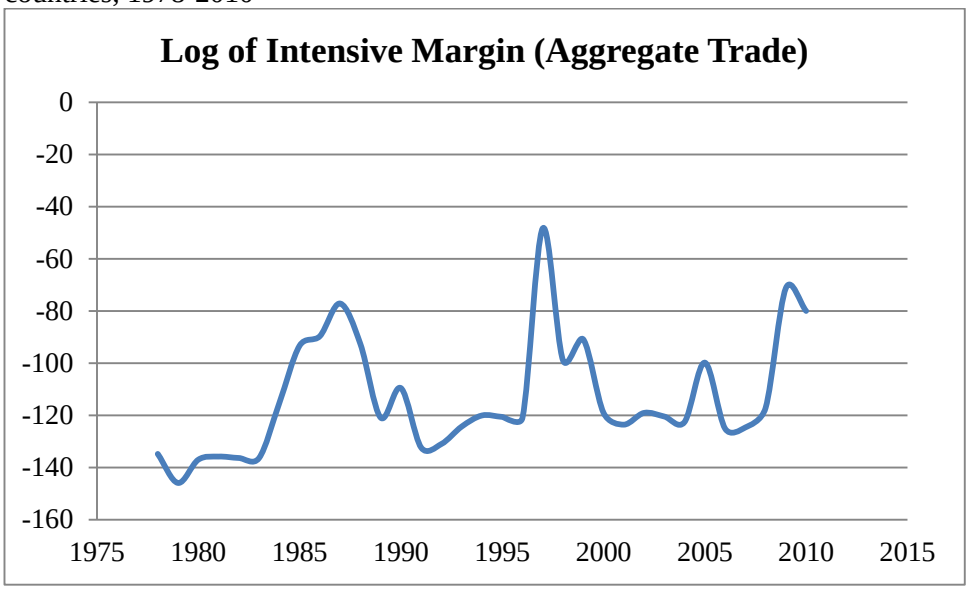


Figure 4.24: Log of Intensive Margin of Trade (Aggregate Trade) between GCC countries and the rest of the world, 1978-2010

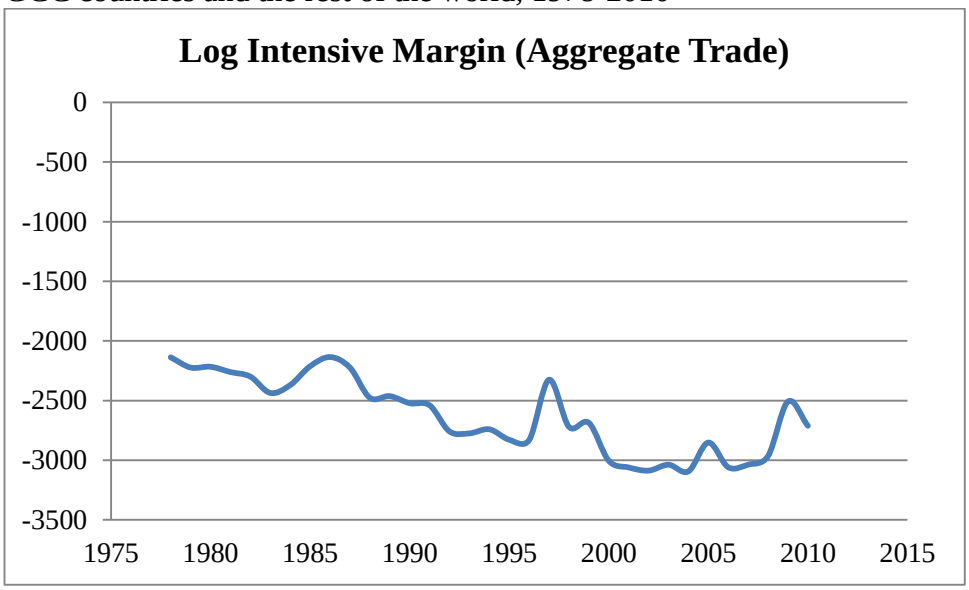


Figure 4.25: Log of Intensive Margin of Trade (Sector 0: Food and live animals) among GCC countries, 1978-2010

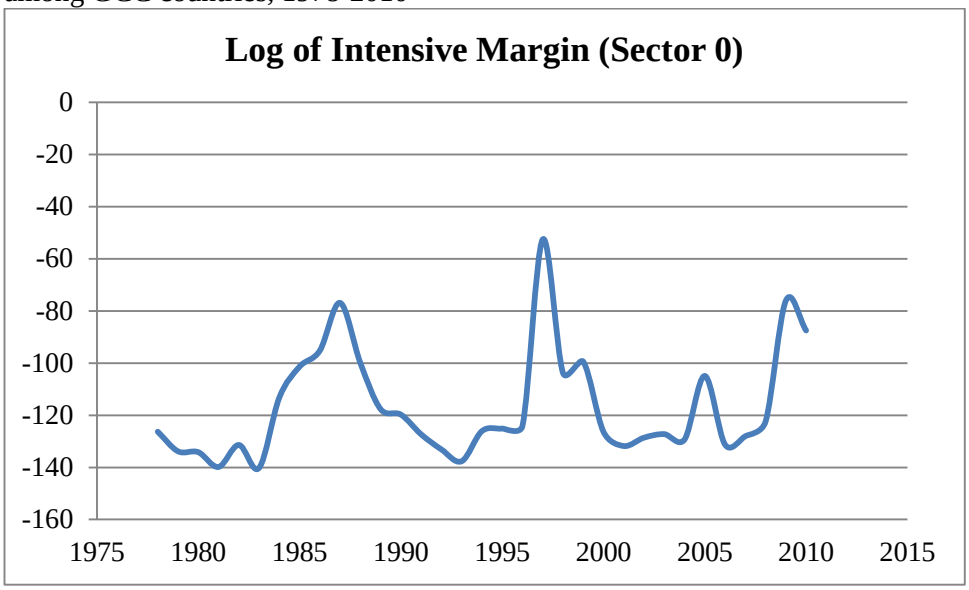


Figure 4.26: Log of Intensive Margin of Trade (Sector 0: Food and live animals) between GCC countries and the rest of the world, 1978-2010

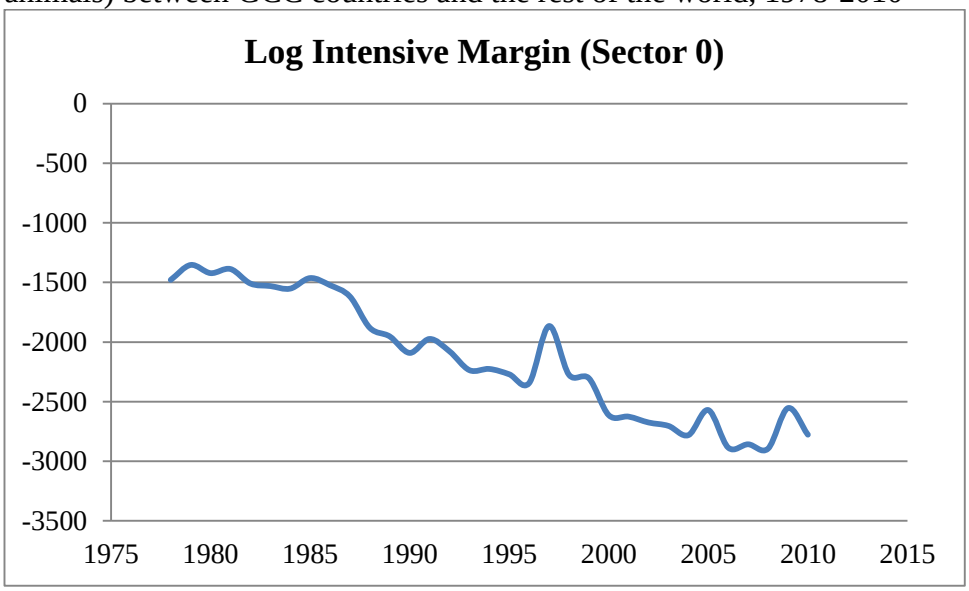


Figure 4.27: Log of Intensive Margin of Trade (Sector 1: Beverages and tobacco) among GCC countries, 1978-2010

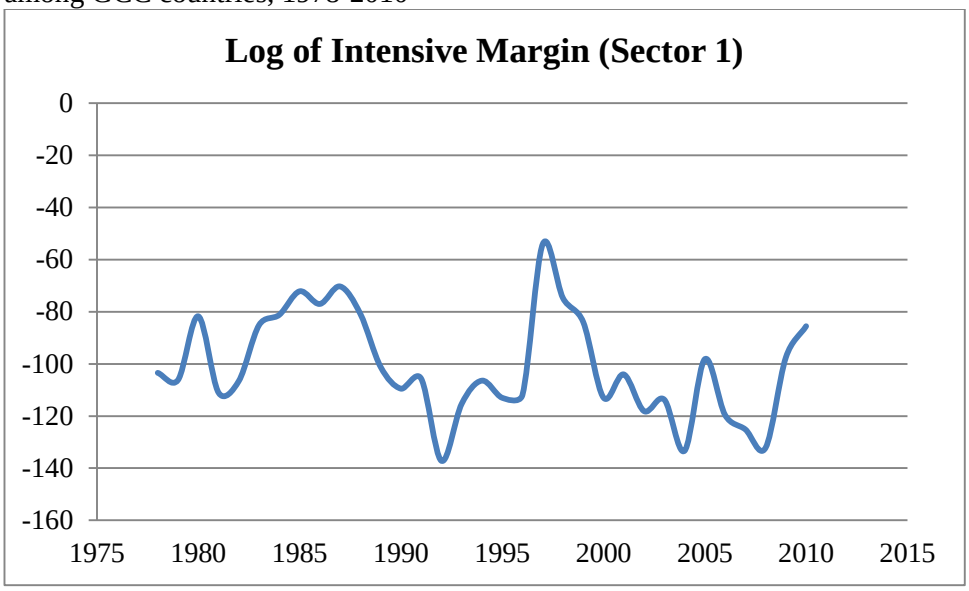


Figure 4.28: Log of Intensive Margin of Trade (Sector 1: Beverages and tobacco) between GCC countries and the rest of the world, 1978-2010

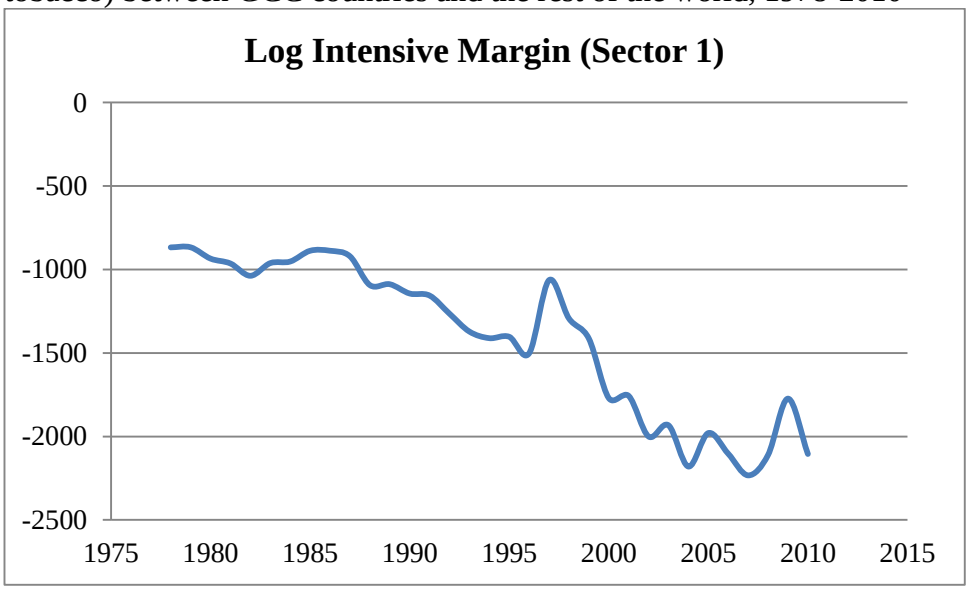


Figure 4.29: Log of Intensive Margin of Trade (Sector 2: Crude materials, inedible, except fuels) among GCC countries, 1978-2010

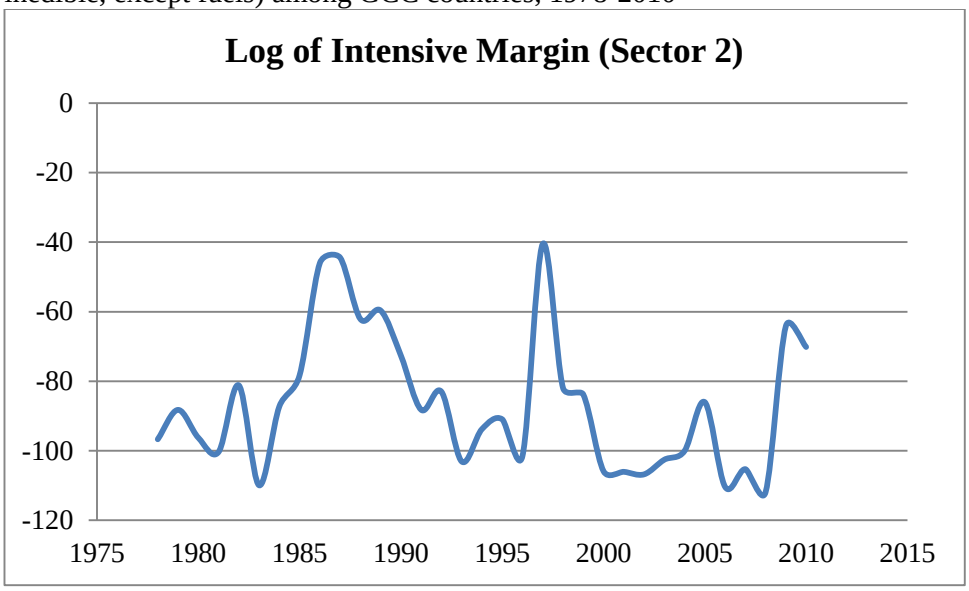


Figure 4.30: Log of Intensive Margin of Trade (Sector 2: Crude materials, inedible, except fuels) between GCC countries and the rest of the world, 1978-2010

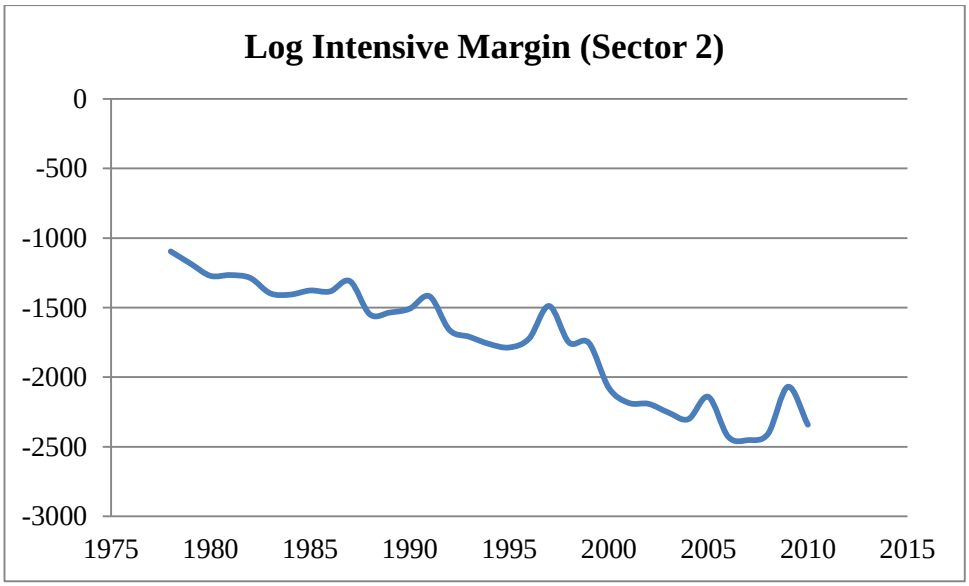


Figure 4.31: Log of Intensive Margin of Trade (Sector 3: Mineral fuels, lubricants and related materials) among GCC countries, 1978-2010

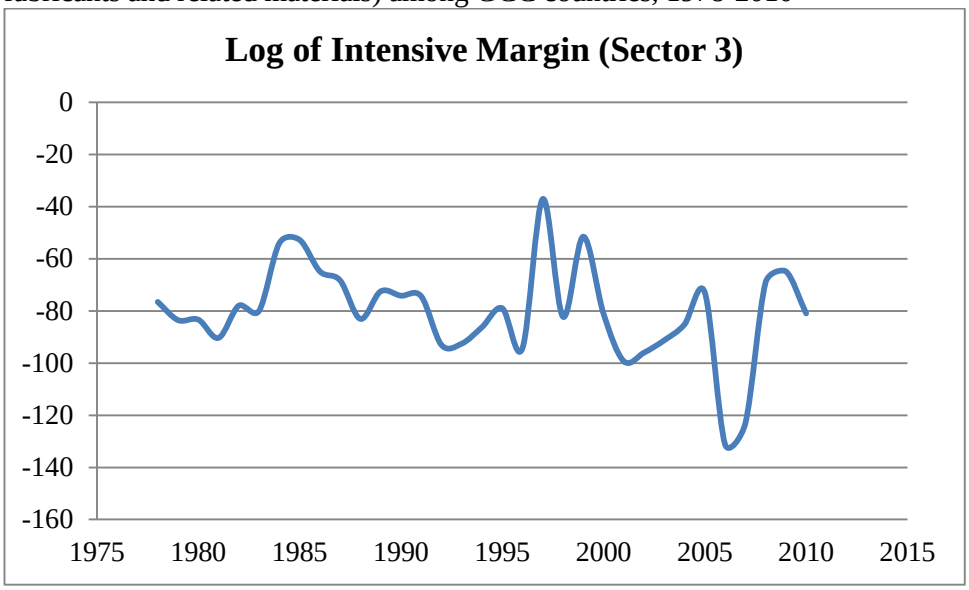


Figure 4.32: Log of Intensive Margin of Trade (Sector 3: Mineral fuels, lubricants and related materials) between GCC countries and the rest of the world, 1978-2010

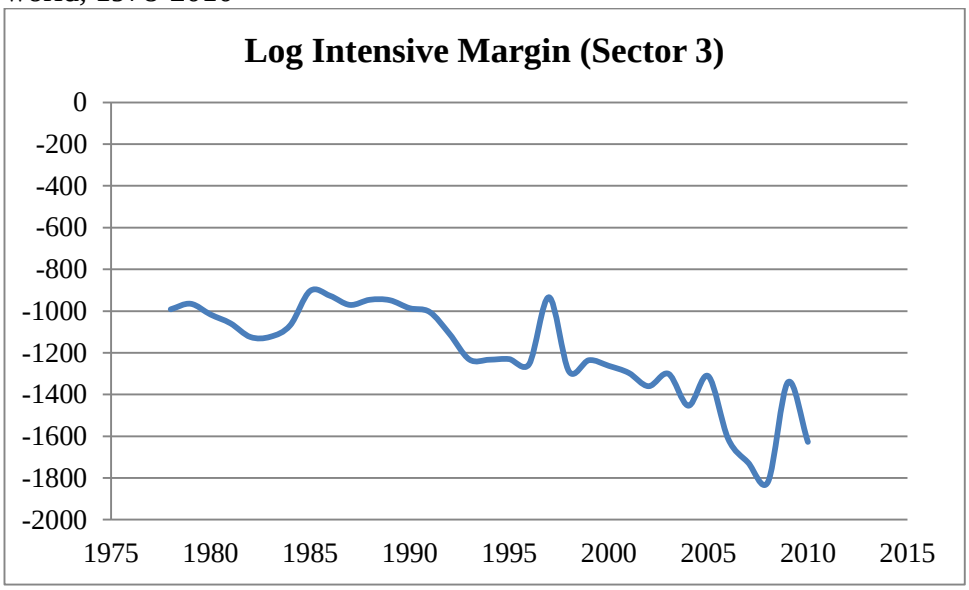


Figure 4.33: Log of Intensive Margin of Trade (Sector 4: Animal and vegetable oils and fats) among GCC countries, 1978-2010

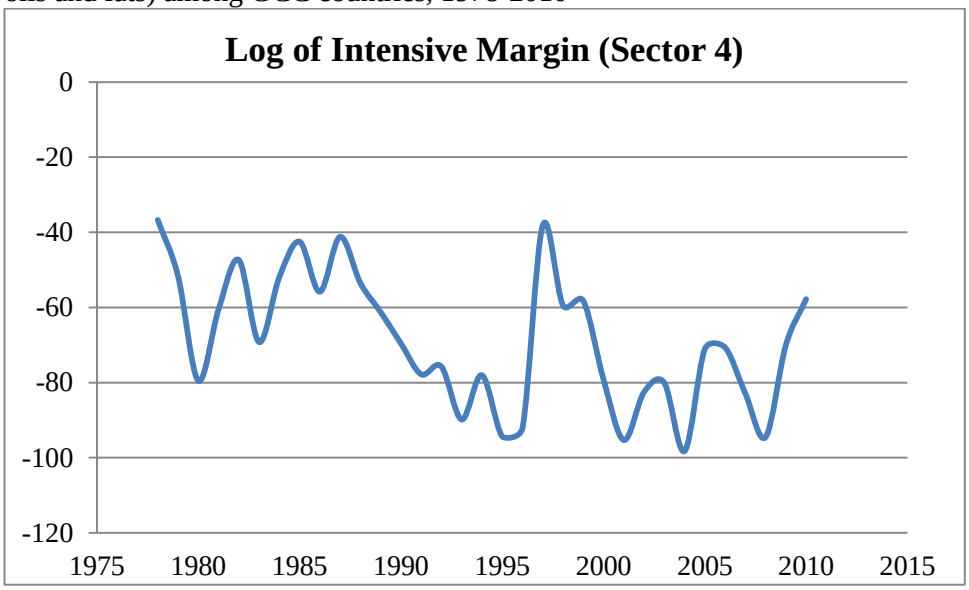


Figure 4.34: Log of Intensive Margin of Trade (Sector 4: Animal and vegetable oils and fats) between GCC countries and the rest of the world, 1978-2010

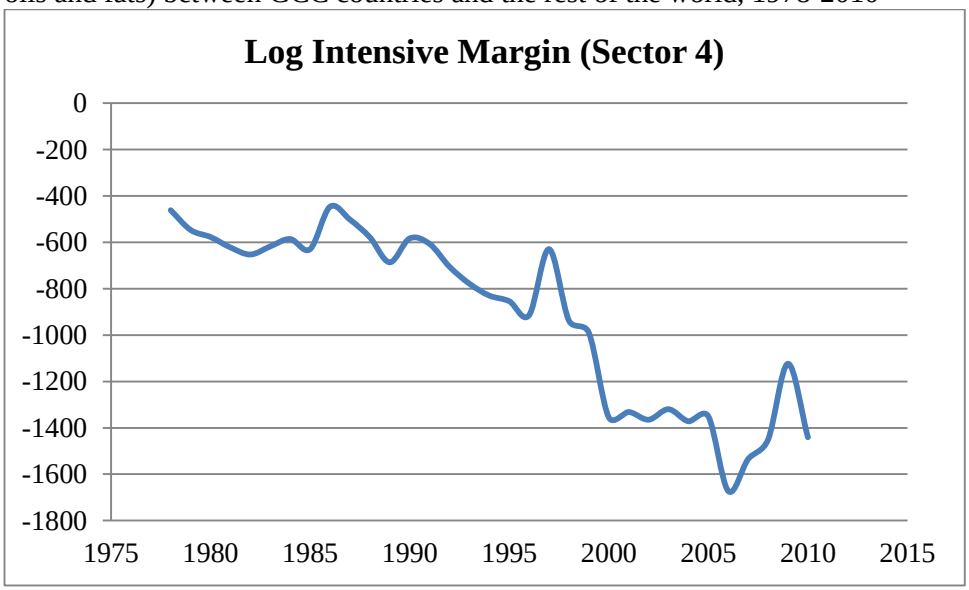


Figure 4.35: Intensive Margin of Trade (Sector 5: Chemicals) among GCC countries, 1978-2010

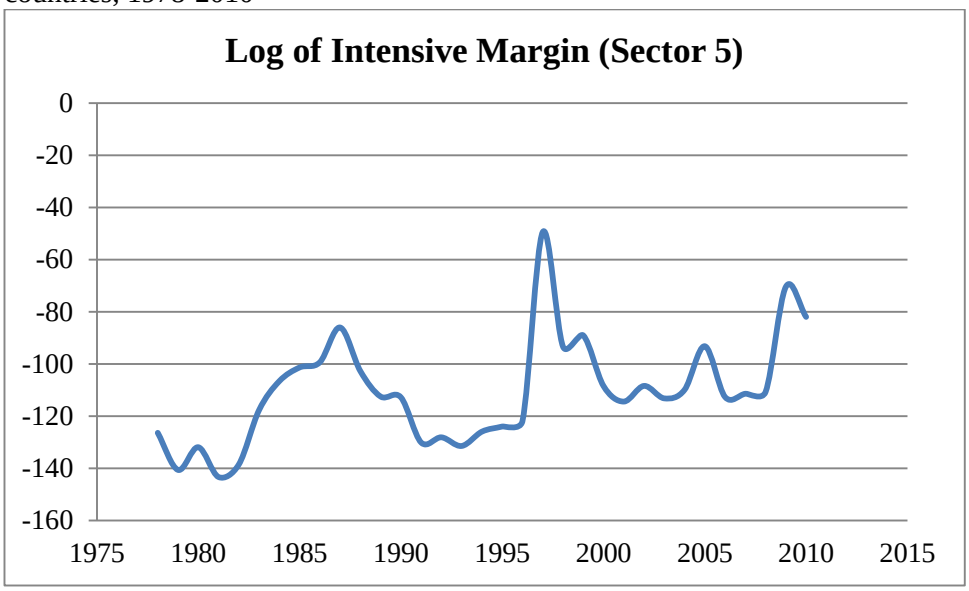


Figure 4.36: Log of Intensive Margin of Trade (Sector 5: Chemicals) between GCC countries and the rest of the world, 1978-2010

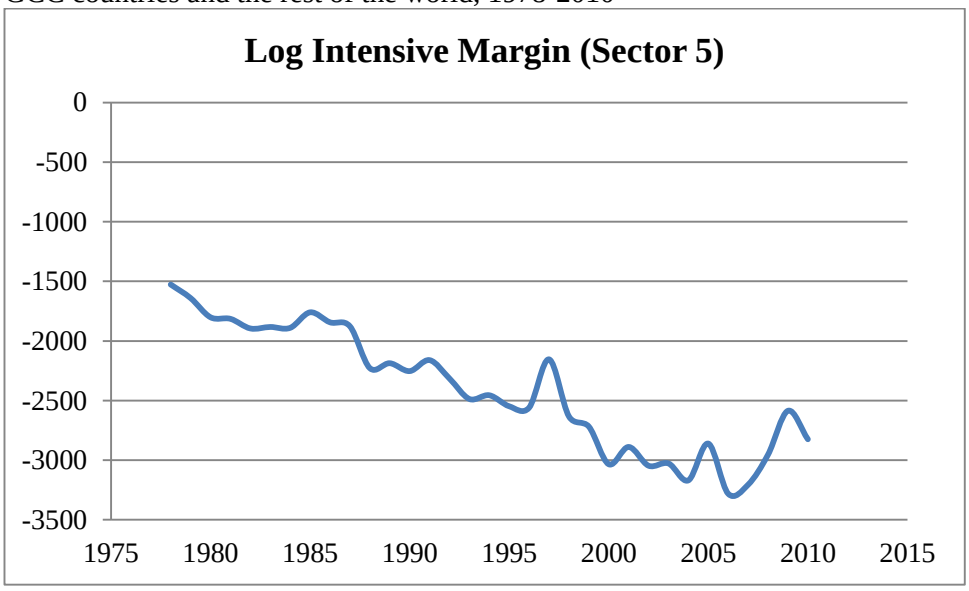


Figure 4.37: Log of Intensive Margin of Trade (Sector 6: Manufactured goods) among GCC countries, 1978-2010

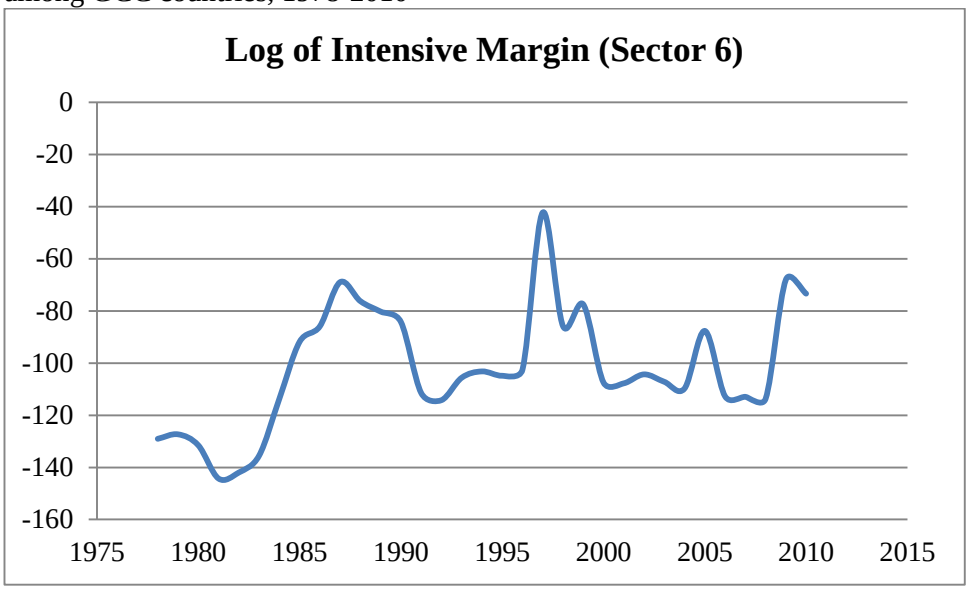


Figure 4.38: Log of Intensive Margin of Trade (Sector 6: Manufactured goods) between GCC countries and the rest of the world, 1978-2010

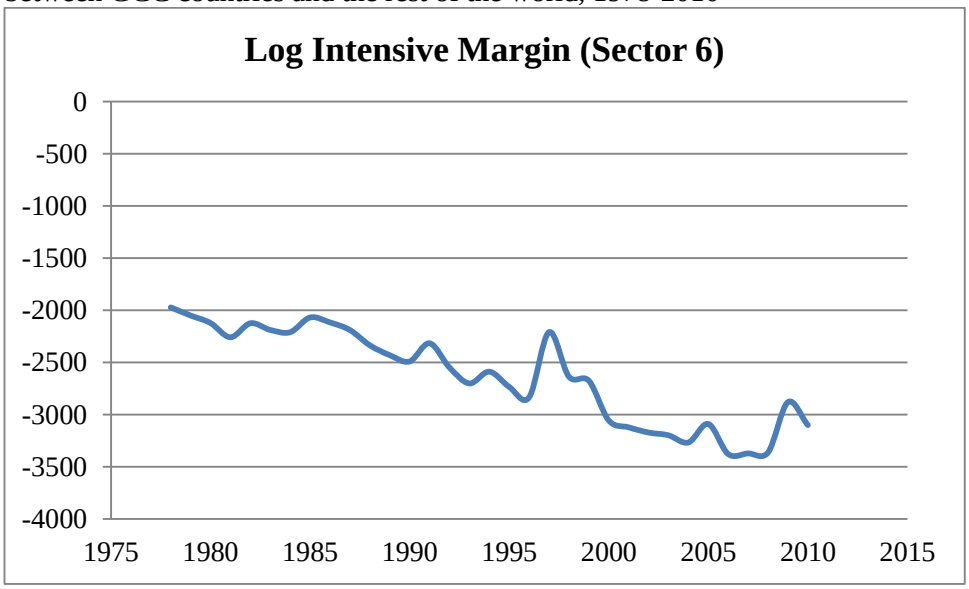


Figure 4.39: Log of Intensive Margin of Trade (Sector 7: Machinery and transport equipment) among GCC countries, 1978-2010

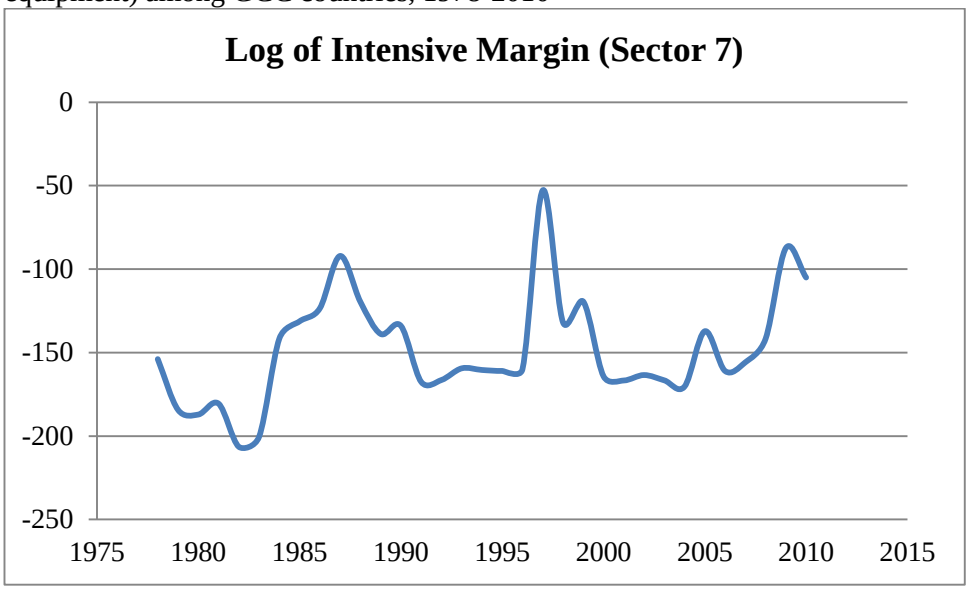


Figure 4.40: Log of Intensive Margin of Trade (Sector 7: Machinery and transport equipment) between GCC countries and the rest of the world, 1978-2010

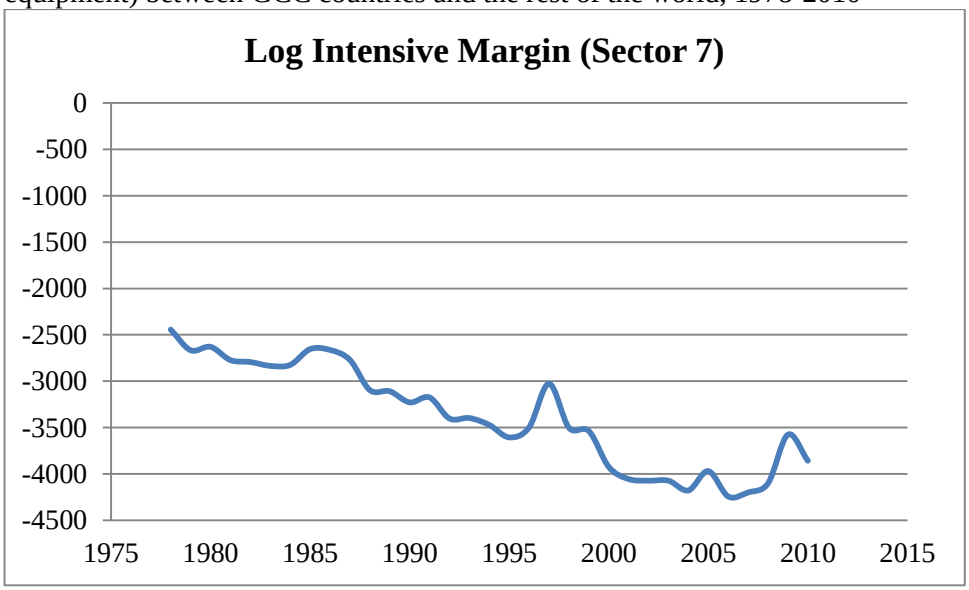


Figure 4.41: Log of Intensive Margin of Trade (Sector 8: Miscellaneous manufactured articles) among GCC countries, 1978-2010

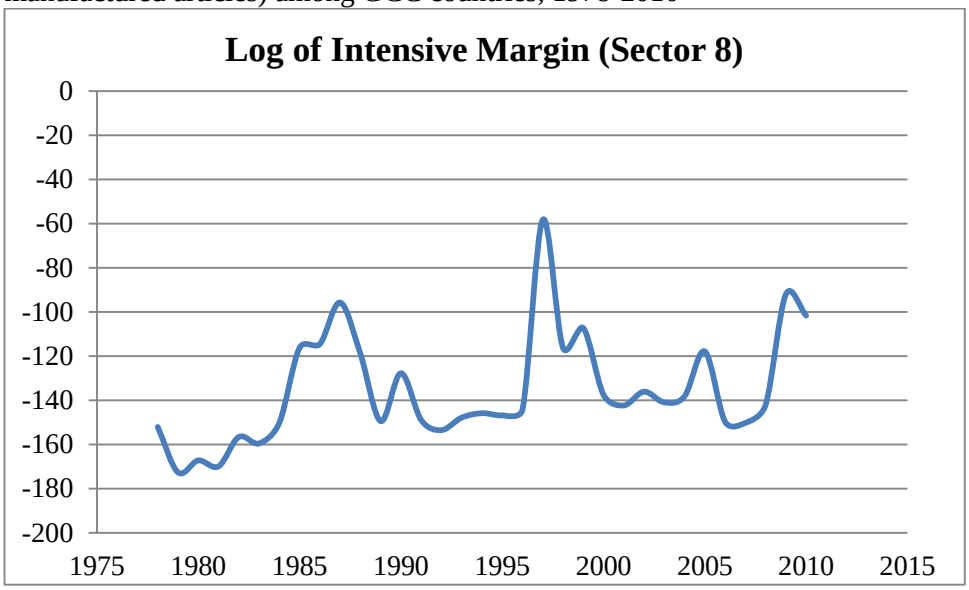


Figure 4.42: Log of Intensive Margin of Trade (Sector 8: Miscellaneous manufactured articles) between GCC countries and the rest of the world, 1978-2010

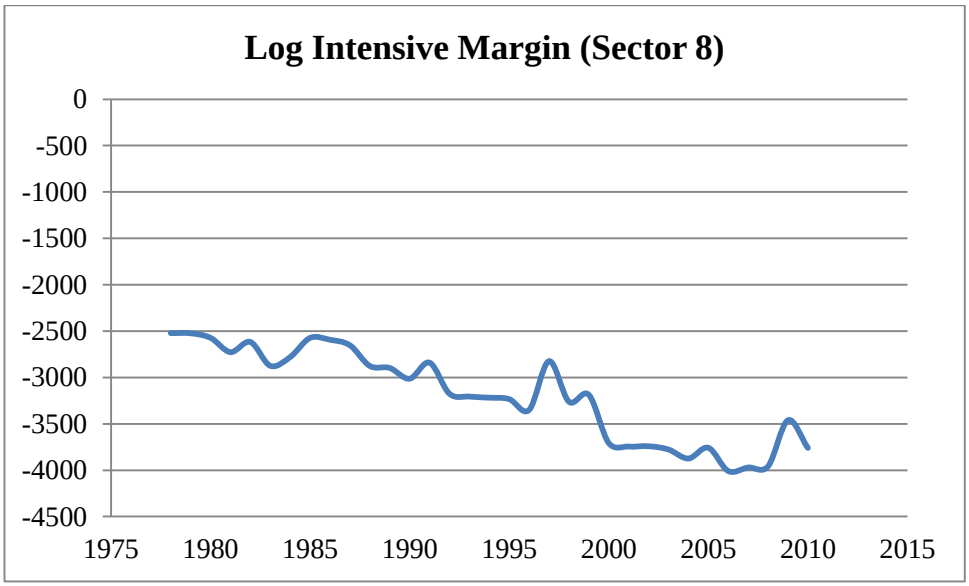


Figure 4.43: Log of Intensive Margin of Trade (Sector 9: Commodities and transactions not classified according to kind) among GCC countries, 1978-2010

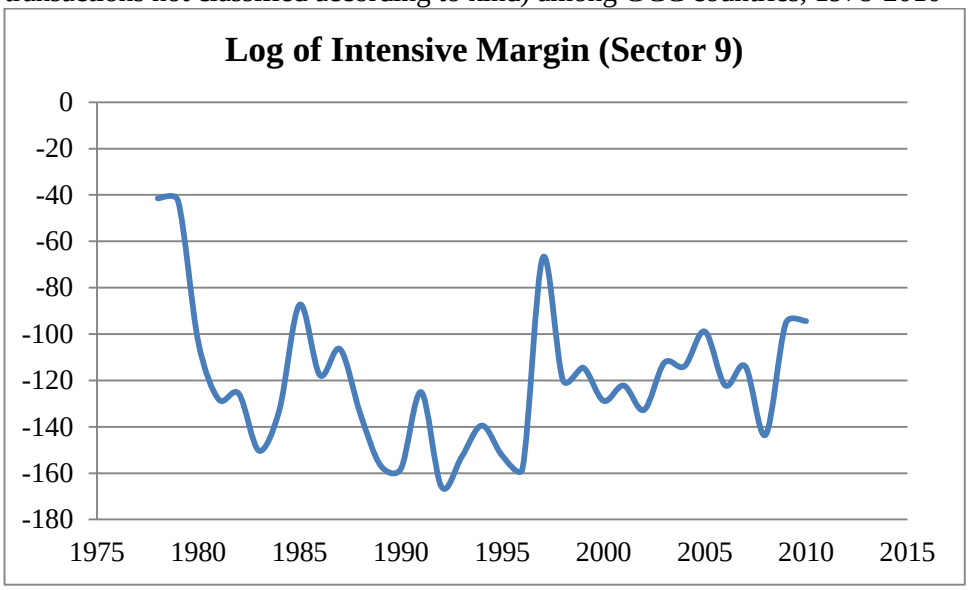
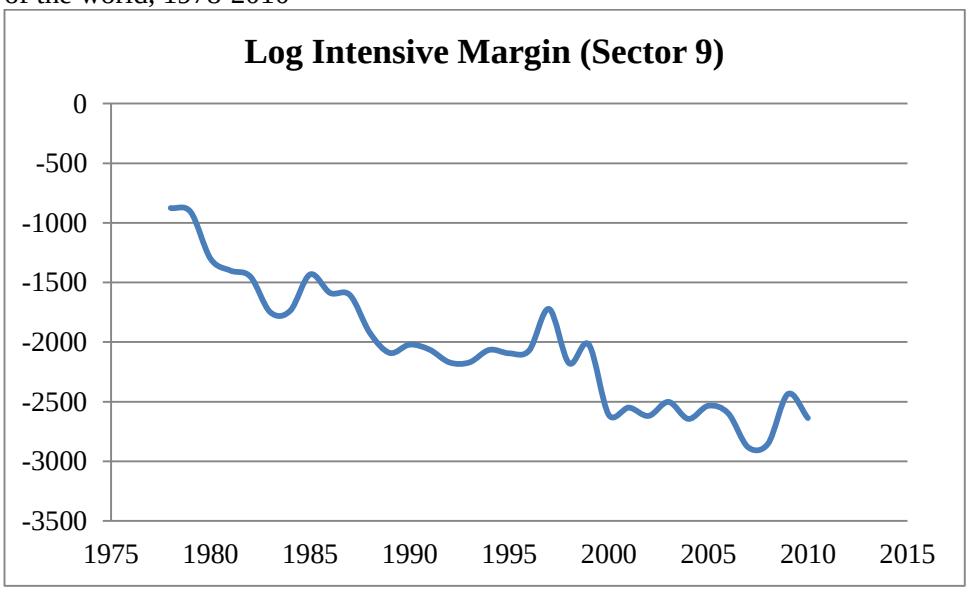


Figure 4.44: Log of Intensive Margin of Trade (Sector 9: Commodities and transactions not classified according to kind) between GCC countries and the rest of the world, 1978-2010



Appendix 4.A

Applying Helpman et al. (2008) Two Stage Heckman Selection Model to GCC Trade and GCC Margins of Trade

Helpman et al. (2008) developed a two stage estimation procedure to account for potential problems that are associated with the gravity model of international trade. The first problem is a heterogeneity problem that originates from omitting firms self-selection (decision of a firm to export or not to export) into exporting. The second problem is a sample selection problem stemming from the exclusion of zero trade flows in the gravity model due to the log specification of the gravity model. According to Helpman et al. (2008) these two problems can be solved by estimating a modified two step Heckman selection equation.

Applying the Helpman et al. (2008) to GCC FTA trade equation, the first step probit equation is estimated by

$$PR(X_{ij} = \{0,1\}) = CDF(\beta_1 \ln D_{ij} + \beta_2 GCCFTA_{ij} + \beta_3 PTA_{ij} + \beta_4 Border_{ij} + \beta_5 Lang_{ij} + \beta_6 Locked_{ij} + \beta_7 PCol_{ij} + \beta_8 CCol_{ij} + \beta_9 Island_{ij} + \beta_{10} ER_{ij} + \gamma_j + \sigma_i)$$

Where,

PR: is the probability of positive export from *i* to *j* (this is done in STATA by constructing a dummy that is 1 if there is trade between *i* and *j* and zero otherwise);

CDF: is a cumulative density function of the unit- normal distribution;

D_{ij}: Distance between country *i* and country *j*;

$GCCFTA_{ij}$: Dummy Variable that takes value of 1 from 1983 onwards if both i and j are GCC countries;

PTA_{ij}: Dummy Variable that takes a value of 1 if both *i* and *j* are members of the same trade agreement;

$Border_{ij}$: A dummy that takes a value of one if country *i* and country *j* share a border and zero otherwise;

$Lang_{ij}$: A dummy that takes a value of one if country *i* and country *j* share the same official language and zero otherwise;

$PCol_{ij}$: A dummy that takes a value of one if country *j* was a previous colonizer of country *i*, and zero otherwise;

$CCol_{ij}$: A dummy that takes a value of one if both countries *i* and *j* have been previously colonized by the same colonizer, and zero otherwise;

$Island_{ij}$: A dummy that takes value of one if either country *i* or *j* is an island, and zero otherwise;

$Locked_{ij}$: A dummy that takes a value of one if either country is land locked and zero otherwise;

ER_{ij}: A variable that is a determinant of trade and a firm decision to export (proxy for fixed costs of exporting, since firms can observe fixed costs more than variable costs and thus build their decision to export on them) from *i* to *j* . This is needed because the latent variables predicted by the probit include variable and fixed costs. Helpman et al. (2008) state this is because they do not want the identification of the second stage estimates to rely on the normality assumptions of unobserved trade costs . Suggested variables are doing business index or a religion index;

σ_i: exporter fixed effects;

γ_j: importer fixed effects.

The first stage probit equation is used to construct two variables:

Inverse Mills Ratio (INV)[48], $INV_{ij} = CDF(Z_{ij})$/PDF(Z_{ij}) , where $Z_{ij} = CDF^{-1}$

$Z*_{ij} = Z_{ij} + INV_{ij}$ which is a consistent approximation of increasing function that corrects for firms self-selection into exporting.

Note that the first stage probit and its predicted variables are estimated using cross sectional year by year data, then as suggested by Baier et al. (2011) and Dutt et al. (2011), all the cross sections are pooled in the second stage gravity equation.

The second stage equation is:

$$X_{ijt} = \beta_0 + \beta_1 GCCFTA_{ijt} + \beta_2 PTA_{ijt} + \beta_3 INV_{ijt} + \beta_4 Z*_{ijt}$$

$$+ \beta_5 Z*^2_{ijt} + \beta_6 Z*^3_{ijt} + \sigma_i\theta_t + \gamma_j\theta_t + \sigma_i\gamma_j + u_{ijt}$$

For extensive and intensive margins:

$$EM_{ijt} = \alpha_0 + \alpha_1 GCCFTA_{ijt} + \alpha_2 PTA_{ijt} + \alpha_3 INV_{ijt} + \alpha_4 Z*_{ijt} + \alpha_5 Z*^2_{ijt}$$

$$+ \alpha_6 Z*^3_{ijt} + \sigma_i\theta_t + \gamma_j\theta_t + \sigma_i\gamma_j + e_{ijt}$$

[48] PDF stands for Probability Density Function of unit normal.

$$IM_{ijt} = \delta_0 + \delta_1 GCCFTA_{ijt} + \delta_2 PTA_{ijt} + \delta_3 INV_{ijt} + \delta_4 Z*_{ijt} + \delta_5 Z*_{ijt}^2$$

$$+ \delta_6 Z*_{ijt}^3 + \sigma_i\theta_t + \gamma_j\theta_t + \sigma_i\gamma_j + v_{ijt}$$

Limitations:

When the probit equation is estimated with exporter/importer effects most of the observations are dropped because the fixed effects predict the probability of trade perfectly

The doing business index does not cover all countries in the sample for 1978-2010 period and the religion index is not available publicly, so it is not possible to include an exclusion restriction in the first stage equation,

Given A and B, the best approximation for the first stage probit is:

$$PR(X_{ij} = \{0,1\}) = CDF(\beta_1 \ln D_{ij} + \beta_2 GCCFTA_{ij} + \beta_3 PTA_{ij} + \beta_4 Border_{ij}$$

$$+ \beta_5 Lang_{ij} + \beta_6 Locked_{ij} + \beta_7 PCol_{ij} + \beta_8 CCol_{ij} + \beta_9 Island_{ij})$$

Results of the second stage estimates are presented in tables 4.A.1- 4.A.3 for trade, extensive margin and intensive margin. The major differences in these results for GCC FTA effect and the results from tables 4.1-4.3 are: 1) for trade results in all of the significant sectors GCC FTA effect becomes lower after adjusting for selection into exporting and sample selection yet most of the differences are small except for sector 3 where GCC FTA coefficient drops from 2.28 to 1.63 and sector 7 where the GCC FTA changes from significant at the 10 percent level to insignificant; 2) for the extensive margin results there are no significant changes in aggregate or disaggregate trade. Overall, most GCC FTA coefficients have dropped by a small margin (in absolute terms); 3) for the intensive margin results all of the significant sectors GCC FTA effect becomes lower after adjusting for selection into exporting and sample selection yet most of the differences are small except for changes in sector 1 in which the GCC FTA coefficient was positive and significant at the 10 percent level and became insignificant. Changes in sector 3 where the GCC FTA coefficient dropped from 1.57 to 1.18, and changes in sector 5 in which the GCC FTA coefficient was positive and significant at the 10 percent level and became insignificant. Sensitivity results are presented in tables 4.A.4-4.A.9, comparing the sensitivity results (Net GCC) with sensitivity results from section 4.6, the major change in trade results is for sector 4 as Net GCC drops from 2.96 to 1.89. For the extensive margin the most notable differences from section 4.6 results are in sector 0 which becomes insignificant and sector 6 where Net GCC changes from

insignificant to significant (-0.13). Finally for the intensive margin the most notable changes in Net GCC from section 4.6 results are in sector 0 where Net GCC changes from significant (0.49) to insignificant, sector 3 which changes from significant (0.68) to insignificant, sector 5 which becomes significant (-0.61) and sector 6 as Net GCC changes from -0.12 to 0.61.

Accounting for sample selection and firm heterogeneity using Two Stage Heckman Selection Model does not have any significant changes for most sectors for trade, extensive margin and intensive margin results. These results also confirm the results and the conclusion of chapter four that GCC FTA has served as a trade barrier (on average) to new trade among GCC countries during the 1983-2010 time period. Unfortunately due to the practical limitations the results in appendix 4.A of the two stage selection model are unreliable for the effect of GCC FTA on trade among GCC countries.

Table 4.A.1: Trade Results after Correcting for Sample Selection and Firm Heterogeneity

Sector	Aggregate	0	1	2	3	4
GCCFTA	0.8**	0.57**	0.3	0.54*	1.63***	3.01***
PTA	-0.3***	-0.06	0.01	-0.07	0.02	-0.12
INV	-1.04***	0.62	2.68***	0.76**	0.85**	1.06***
Z	0.1	1.3*	7.2***	1.41**	3.92***	3.81***
Z^2	-0.02	-0.39	-2.62***	-0.4**	-0.84***	-1.25***
Z^3	0.001	0.05*	0.32***	0.04**	0.08**	0.15***
R^2	0.903	0.867	0.823	0.848	0.784	0.781
Obs	81030	77021	55835	77091	51287	48664

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

Table 4.A.1 (continued): Trade Results after Correcting for Sample Selection and Firm Heterogeneity

Sector	5	6	7	8	9
GCCFTA	-0.07	0.11	0.35	0.17	1.25***
PTA	-0.1*	-0.13**	-0.21***	0.09	0.04
INV	-0.17	0.11	0.21	0.57**	0.61
Z	0.38	1.38***	0.73**	2***	1.31
Z^2	-0.09	-0.39***	-0.19***	-0.62***	-0.34
Z^3	0.01	0.04***	0.02***	0.06***	0.05
R^2	0.894	0.903	0.92	0.933	0.813
Obs	75768	79559	77835	79738	56534

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

Table 4.A.2: Extensive Margin (HK Decomposition) Results after Correcting for Sample Selection and Firm Heterogeneity

Sector	Aggregate	0	1	2	3	4
GCCFTA	-0.35***	-0.1	-0.34	0.36*	0.45**	1.12**
PTA	-0.16***	-0.11***	0.08	-0.1**	0.03	-0.18**
INV	-0.45***	-0.39	0.56***	0.18	0.63**	-0.16
Z	0.46***	0.89*	2.46***	1.56***	1.18**	1.47**
Z^2	-0.13***	-0.32**	-0.92***	-0.53***	-0.17	-0.53*
Z^3	0.01***	0.03**	0.11***	0.05***	0.01	0.06*
R^2	0.835	0.741	0.551	0.697	0.629	0.59
Obs	81030	77021	55835	77091	51287	48664

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

Table 4.A.2 (continued): Extensive Margin (HK Decomposition) Results after Correcting for Sample Selection and Firm Heterogeneity

Sector	5	6	7	8	9
GCCFTA	-0.4***	-0.42**	-0.58***	-0.53***	0.08
PTA	-0.15***	-0.11***	-0.09***	-0.05*	0.04
INV	-0.43***	-0.69***	-0.79***	-0.79***	-0.12
Z	0.65***	0.72**	0.4***	0.54**	0.46
Z^2	-0.24***	-0.27***	-0.16***	-0.24***	-0.38
Z^3	0.02***	0.03***	0.02***	0.03***	0.07
R^2	0.751	0.806	0.757	0.739	0.452
Obs	75768	79559	77835	79738	56534

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

Table 4.A.3: Intensive Margin (HK Decomposition) Results after Correcting for Sample Selection and Firm Heterogeneity

Sector	Aggregate	0	1	2	3	4
GCCFTA	1.15***	0.67***	0.65	0.18	1.18**	1.89***
PTA	-0.14**	0.05	-0.07	0.02	-0.007	0.05
INV	-0.59***	1***	2.2***	0.58*	0.23	1.22***
Z	-0.36***	0.41	4.75***	-0.16	2.74***	2.33**
Z^2	0.11**	-0.07	-1.7***	0.12	-0.68***	-0.72**
Z^3	-0.008***	0.01	0.21***	-0.01	0.07***	0.09**
R^2	0.785	0.767	0.738	0.659	0.627	0.654
Obs	81030	77021	55835	77091	51287	48664

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

Table 4.A.3 (continued): Intensive Margin (HK Decomposition) Results after Correcting for Sample Selection and Firm Heterogeneity

Sector	5	6	7	8	9
GCCFTA	0.33	0.53**	0.93***	0.7***	1.17***
PTA	0.05	-0.02	(-0.12)**	0.14***	-0.002
INV	0.26	0.8***	1***	1.35***	0.73*
Z	-0.27	0.66*	0.33	1.47***	0.85
Z^2	0.14*	-0.13	-0.03	(-0.38)***	0.04
Z^3	0.01	0.01	0.001	0.03***	-0.02
R^2	0.799	0.804	0.877	0.88	0.715
Obs	75768	79559	77835	79738	56534

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

Table 4.A.4: Trade Results after Correcting for Sample Selection, Firm Heterogeneity and Accounting for Major PTAs

Sector	Aggregate	0	1	2	3	4
GCCFTA	0.64**	0.27	0.35	0.48*	1.28**	2.82***
PTA2	-0.27***	0.01	0.04	-0.01	0.02	0.09
ASEAN	-0.29	0.06	1.8**	0.5	0.23	-0.21
COMESA	0.72*	0.58	0.37	0.19	1.13	3.42***
ECO	-0.69	-2	0.41	0.9	0.42	-0.47
EU	0.16**	0.89***	1.28***	0.44***	-0.19	1.04***
EURO	0.36***	0.37***	0.17	0.22***	0.26	0.63***
GAFTA	0.33**	0.72***	0.12	0.13	0.92***	0.69***
NAFTA	-0.15	0.04	0.44	0.22	1.53*	1.15*
UMA	0.49	0.15	-0.37	0.06	0.8	-0.53
INV	-0.91***	0.82**	2.03***	0.78***	0.74*	0.63
Z	0.26	2.07***	6.4***	1.67***	3.68***	3.47***
Z^2	-0.06	-0.68***	-2.46***	-0.51***	-0.78**	-1.21***
Z^3	0.004	0.08***	0.3***	0.05***	0.07*	0.14**
R-Square	0.903	0.868	0.825	0.848	0.784	0.783
Observations	81030	77021	55835	77091	51287	48664

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

Table 4.A.4 (continued): Trade Results after Correcting for Sample Selection, Firm Heterogeneity and Accounting for Major PTAs

Sector	5	6	7	8	9
GCCFTA	-0.19	0.01	0.22	0.29	0.86**
PTA2	-0.1*	-0.13**	-0.19***	0.06	0.02
ASEAN	-0.53***	0.13	-0.44*	0.25	0.29
COMESA	1.43**	0.65*	0.76	0.26	2.72***
ECO	-0.25	0.19	-1.03*	-0.52	-0.006
EU	0.08	0.23**	-0.06	0.12	0.87***
EURO	0.16**	0.13**	0.13*	0.16**	0.22
GAFTA	0.26*	0.19	0.27*	-0.31**	1.01
NAFTA	0.1	0.26	-0.1	0.07	-0.34
UMA	0.37	0.47	-0.85	-0.37	0.17
INV	-0.12	0.18	0.3	0.58**	0.46
Z	0.54*	1.67***	0.94***	2.07***	1.66
Z^2	-0.14	-0.47***	-0.25***	-0.64***	-0.63
Z^3	0.01*	0.05***	0.02***	0.06***	0.1
R-Square	0.894	0.903	0.92	0.933	0.814
Observations	75768	79559	77835	79738	56534

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

Table 4.A.5: Extensive Margin (HK Decomposition) Results after Correcting for Sample Selection, Firm Heterogeneity and Accounting for Major PTAs

Sector	Aggregate	0	1	2	3	4
GCCFTA	-0.17	-0.12	-0.33	0.34*	0.26	1.06**
PTA2	-0.17***	-0.09**	0.1*	-0.07	0.01	-0.12*
ASEAN	-0.84***	-0.32***	0.67**	-0.08	0.22	-0.21
COMESA	-0.4	-0.27	0.97***	0.22	0.57	2.12**
ECO	-0.65**	-0.46	-0.54**	0.79**	0.36	1.47***
EU	-0.18***	0.21***	0.28**	-0.11*	0.004	0.33***
EURO	0.14***	0.05	-0.03	-0.01	0.48***	-0.05
GAFTA	-0.44***	0.04	0.05	0.07	0.46**	0.23
NAFTA	-0.66***	-0.55***	0.16	-0.36***	-0.04	-0.004
UMA	-0.11	0.23	-1.49*	0.33	0.48	2.44***
INV	-0.56***	-33	0.41**	0.2	0.57**	-0.27
Z	0.38***	1.08**	2.19***	1.56***	1.22**	1.27*
Z^2	-0.1***	-0.4**	-0.85***	-0.53***	-0.22	-0.49*
Z^3	0.007***	0.04***	0.1***	0.05***	0.02	0.06
R-Square	0.837	0.742	0.552	0.697	0.629	0.591
Observations	81030	77021	55835	77091	51287	48664

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

Table 4.A.5 (continued): Extensive Margin (HK Decomposition) Results after Correcting for Sample Selection, Firm Heterogeneity and Accounting for Major PTAs

Sector	5	6	7	8	9
GCCFTA	-0.28*	-0.25	-0.36***	-0.35***	-0.04
PTA2	-0.15***	-0.11***	-0.1***	-0.07**	0.06
ASEAN	-0.71***	-0.69***	-0.66***	-0.35***	-0.1
COMESA	0.23	0.15	-0.4	-0.69***	1.54***
ECO	-0.2	0.64	-0.59**	-0.91***	-0.24*
EU	-0.26***	-0.1*	-0.16***	-0.15***	0.26***
EURO	-0.06***	0.04	0.09***	0.06*	-0.44***
GAFTA	-0.27***	-0.4***	-0.5**	-0.48***	0.31***
NAFTA	-0.44***	-0.81***	-0.5**	-0.42**	-0.05
UMA	-0.33	-0.15	-0.006	-0.32*	0.45
INV	-0.39***	-0.7***	-0.81***	-0.78***	-0.15
Z	0.6***	0.62**	0.29*	0.42**	0.29
Z^2	-0.21***	-0.24***	-0.13***	-0.2***	-0.31
Z^3	0.02	0.03***	0.01***	0.02***	0.05
R-Square	0.752	0.807	0.759	0.74	0.454
Observations	75768	79559	77835	79738	56534

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

Table 4.A.6: Intensive Margin (HK Decomposition) Results after Correcting for Sample Selection, Firm Heterogeneity and Accounting for Major PTAs

Sector	Aggregate	0	1	2	3	4
GCCFTA	0.81***	0.39	0.68	0.14	1.02*	1.76***
PTA2	-0.09**	0.1*	-0.06	0.06	0.01	0.03
ASEAN	0.57***	0.38***	1.14***	0.58**	0.009	-0.002
COMESA	1.12***	0.85**	-0.6	-0.02	0.56	1.3
ECO	-0.04	-1.54	0.13	0.11	0.06	-1.94***
EU	0.33***	0.68***	1***	0.55***	-0.19	0.71***
EURO	0.21***	0.32***	0.19	0.24***	-0.22	0.68***
GAFTA	0.76***	0.68***	0.07	0.06	0.45*	0.46**
NAFTA	0.51***	0.51***	0.28	0.58***	1.57***	1.16***
UMA	0.61***	-0.08	1.12**	-0.27	0.32	-2.96***
INV	-0.35*	1.15***	1.63***	0.58*	0.17	0.9***
Z	-0.13	0.99*	4.2***	0.1	2.46***	2.2**
Z^2	0.04	-0.29	-1.61***	0.03	-0.56**	-0.71**
Z^3	0.003	0.03	0.2***	-0.004	0.05**	0.08*
R-Square	0.787	0.77	0.74	0.66	0.627	0.656
Observations	81030	77021	55835	77091	51287	48664

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

Table 4.A.6 (continued): Intensive Margin (HK Decomposition) Results after Correcting for Sample Selection, Firm Heterogeneity and Accounting for Major PTAs

Sector	5	6	7	8	9
GCCFTA	0.09	0.27	0.58***	0.63**	0.9***
PTA2	0.05	-0.01	-0.09*	0.13***	-0.04
ASEAN	0.17	0.82***	0.22	0.59***	0.39
COMESA	1.2*	0.5*	1.17***	0.96**	1.18*
ECO	-0.05	-0.46	-0.62	-1.43***	0.23
EU	0.33***	0.3***	0.1	0.27***	0.61***
EURO	0.22***	0.09	0.05	0.11*	0.67***
GAFTA	0.53***	0.58***	0.77***	0.17	0.7***
NAFTA	0.54**	1.06***	0.4*	0.49	-0.29
UMA	0.7*	0.62*	-0.84**	-0.04	-0.29
INV	0.27	0.88***	1.11***	1.36***	0.6
Z	-0.06	1.05***	0.65***	1.66***	1.37
Z^2	0.07	-0.25**	-0.12*	-0.44***	-0.33
Z^3	-0.005	0.02**	0.009	0.04	0.04
R-Square	0.8	0.805	0.878	0.88	0.716
Observations	75768	79559	77835	79738	56534

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

Table 4.A.7: Trade Results after Correcting for Sample Selection, Firm Heterogeneity, Accounting for Major PTAs and GCC FTA Phases

Sector	Aggregate	0	1	2	3	4
GCCFTA	0.36	-0.17	0.54	-0.33	0.61	1.88***
GCC 88	0.07	0.21	-0.31	0.94***	0.71	0.97
GCC 93	1.6***	0.84**	0.15	0.08	0.79**	0.92***
GCC 98	-1.19***	-0.27	-0.09	0.09	-0.85	-0.93**
Net GCC	0.41	0.84	{0.29}	0.94	0.79	1.89
PTA2	-0.26***	-0.004	0.04	-0.008	0.03	-0.08
ASEAN	-0.29	0.06	1.8***	0.5	0.22	-0.19
COMESA	0.71*	0.57	0.37	0.19	1.16	3.45***
ECO	-0.7	-2.02	-0.4	0.9	0.46	-0.49
EU	0.15**	0.88***	1.27***	0.45***	-0.18	1.05***
EURO	0.36***	0.37***	0.16	0.22***	0.26	0.62***
GAFTA	0.26*	0.61***	0.14	0.03	0.98**	0.78***
NAFTA	-0.15	-0.04	0.44	0.22	1.52*	1.15*
UMA	0.5	0.16	-0.37	0.09	0.86	-0.48
INV	-1.05***	0.7*	2.04***	0.72**	0.78*	0.7*
Z	0.22	2.03***	6.44***	1.59***	3.44***	3.27***
Z^2	-0.05	-0.66***	-2.47***	-0.49***	-0.74**	-1.17**
Z^3	0.003	0.07***	0.3***	0.05**	0.06*	0.14**
R-Square	0.903	0.868	0.825	0.848	0.784	0.783
Observations	81030	77021	55835	77091	51287	48664

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

{} indicates that the Net GCC sum is insignificant.

Table 4.A.7 (continued): Trade Results after Correcting for Sample Selection, Firm Heterogeneity, Accounting for Major PTAs and GCC FTA Phases

Sector	5	6	7	8	9
GCCFTA	-0.23	-0.13	-0.48**	-0.28	0.11
GCC 88	0.19	0.56*	1.22***	0.31	0.49
GCC 93	0.61	0.42	0.05	0.55	0.24
GCC 98	-0.84***	-0.95***	-0.37	0.16	0.86**
Net GCC	-0.84	-0.39	0.74	{0.74}	0.86
PTA2	-0.1*	-0.13**	-0.19***	0.05	0.01
ASEAN	-0.53***	0.13	-0.43*	0.25	0.29
COMESA	1.43**	0.65*	0.76	0.24	2.71***
ECO	-0.25	0.19	-1.22*	-0.54	-0.03
EU	0.08	0.23**	-0.06	0.11	0.88***
EURO	0.16**	0.13**	0.13*	0.17**	0.24
GAFTA	0.29*	0.23	0.21	-0.44***	0.53**
NAFTA	0.1	0.26	-0.1	0.06	-0.34
UMA	0.37	0.47	-0.84	-0.36	0.33
INV	-0.13	0.16	0.23	0.47*	0.14
Z	0.53	1.65***	0.91***	2.08***	1.08
Z^2	-0.14	-0.49***	-0.24***	-0.63***	-0.44
Z^3	0.01*	0.05***	0.02	0.06***	0.07
R-Square	0.894	0.903	0.92	0.933	0.814
Observations	75768	79559	77835	79738	56534

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

{} indicates that the Net GCC sum is insignificant.

Table 4.A.8: Extensive Margin Results after Correcting for Sample Selection, Firm Heterogeneity, Accounting for Major PTAs and GCC FTA Phases

Sector	Aggregate	0	1	2	3	4
GCCFTA	-0.28***	-0.22	0.25	-0.07	-0.13	0.92*
GCC 88	-0.01	-0.03	-0.48*	0.29	0.66**	0.18
GCC 93	0.51	0.65***	-0.02	0.04	0.34**	0.32
GCC 98	-0.27**	-0.44**	-0.4*	0.43***	-0.91***	-0.43*
Net GCC	-0.04	0.21	-0.88	0.43	0.09	0.49
PTA2	-0.17***	-0.09**	0.11*	9-0.07)*	0.02	-0.12
ASEAN	-0.84***	-0.32***	0.66**	-0.08	0.21	-0.2
COMESA	-0.4	-0.27	0.98***	0.21	0.61	2.13**
ECO	-0.65**	-0.47	-0.52**	0.79**	0.37	1.47***
EU	-0.18***	0.2***	0.28***	-0.11*	0.005	0.34***
EURO	0.14***	0.05	-0.03	-0.01	0.48***	-0.05
GAFTA	-0.47***	0.01	0.18	-0.05	0.68**	0.3
NAFTA	-0.66***	-0.55***	0.15	-0.35***	-0.05	-0.007
UMA	-0.11	0.23	-1.51*	0.36	0.52	2.46***
INV	-0.61***	-0.38	0.5**	0.13	0.67***	-0.22
Z	0.38***	1.05**	2.33***	1.53***	1.1*	1.23*
Z^2	-0.1***	-0.39**	0.89***	-0.53***	-0.2	-0.49*
Z^3	0.007***	0.04**	0.01***	0.05***	0.01	0.06
R-Square	0.837	0.742	0.553	0.697	0.63	0.591
Observations	81030	77021	55835	77091	51287	48664

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

{} indicates that the Net GCC sum is insignificant.

Table 4.A.8 (continued): Extensive Margin Results after Correcting for Sample Selection, Firm Heterogeneity, Accounting for Major PTAs and GCC FTA Phases

Sector	5	6	7	8	9
GCCFTA	-0.57***	-0.26*	-0.53***	-0.37***	0.16
GCC 88	0.31**	-0.11	0.14	-0.19**	-0.37**
GCC 93	0.54***	0.75***	0.23	0.74***	0.14
GCC 98	-0.42**	-0.62***	-0.08	-0.44***	-0.001
Net GCC	-0.14	-0.13	-0.53	-0.26	-0.37
PTA2	-0.15***	-0.12***	-0.1***	-0.08**	0.06
ASEAN	-0.7***	-0.69***	-0.66**	-0.35***	-0.1
COMESA	0.22	0.15	-0.41	-0.7***	1.54***
ECO	-0.2	0.64	-0.6**	0.9***	-0.24*
EU	-0.25*	-0.11**	-0.17***	-0.15***	0.26**
EURO	-0.06***	0.04	0.09***	0.06*	-0.44***
GAFTA	-0.31***	-0.4***	-0.54***	-0.51***	0.31**
NAFTA	-0.44***	-0.81***	-0.51**	-0.42**	-0.05
UMA	-0.32	-0.14	-0.001	-0.33*	0.45
INV	-0.44***	-0.74***	-0.85***	-0.83***	-0.15
Z	0.59***	0.6**	0.28*	0.41*	0.34
Z^2	-0.21***	-0.23***	-0.12***	-0.19***	-0.31
Z^3	0.02***	0.03***	0.01	0.02***	0.05
R-Square	0.752	0.807	0.759	0.741	0.454
Observations	75768	79559	77835	79738	56534

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

{} indicates that the Net GCC sum is insignificant.

Table 4.A.9: Intensive Margin Results after Correcting for Sample Selection, Firm Heterogeneity, Accounting for Major PTAs and GCC FTA Phases

Sector	Aggregate	0	1	2	3	4
GCCFTA	0.65***	0.04	0.29	-0.25	0.73	0.96*
GCC 88	0.08	0.24	0.17	0.65***	0.05	0.79
GCC 93	1.09***	0.19	0.17	0.04	0.45	0.6*
GCC 98	-0.92***	0.17	0.31	-0.34	0.06	-0.5
Net GCC	0.82	{0.64}	{0.94}	0.65	{1.29}	1.56
PTA2	-0.09**	0.09*	-0.07	0.07	0.01	0.04
ASEAN	0.55***	0.38***	1.14***	0.58**	0.01	0.008
COMESA	1.11***	0.84**	-0.6	-0.02	0.55	1.32
ECO	-0.05	-1.55	0.12	0.11	0.06	-1.96**
EU	0.33***	0.68***	1***	0.55***	-0.19	0.72***
EURO	0.21***	0.32***	0.2	0.24***	-0.22	0.67***
GAFTA	0.74***	0.59***	-0.05	0.09	0.3	0.48*
NAFTA	0.51***	0.51***	0.29	0.58***	1.57***	1.16***
UMA	0.62***	-0.07	1.14**	-0.27	0.34	-2.94***
INV	-0.44**	1.08***	1.54***	0.59**	0.11	0.92***
Z	-0.15	0.98	4.11***	0.05	2.35***	2.04**
Z^2	0.05	-0.28	-1.58***	0.03	-0.53**	-0.68*
Z^3	-0.004*	0.03	0.02***	-0.004	0.05**	0.08*
R-Square	0.787	0.77	0.74	0.66	0.627	0.656
Observations	81030	77021	55835	77091	51287	48664

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

{} indicates that the Net GCC sum is insignificant.

Table 4.A.9 (continued): Intensive Margin Results after Correcting for Sample Selection, Firm Heterogeneity, Accounting for Major PTAs and GCC FTA Phases

Sector	5	6	7	8	9
GCCFTA	0.34	0.13	0.06	0.09	-0.05
GCC 88	-0.12	0.67**	1.08***	0.5**	0.85***
GCC 93	0.07	-0.34	-0.18	-0.19	0.11
GCC 98	-0.43	-0.33	-0.29	0.6**	0.86**
Net GCC	{-0.13}	0.67	1.08	1.1	1.71
PTA2	0.05	-0.01	-0.09*	0.12**	-0.04
ASEAN	0.17	0.82***	0.22	0.6***	0.4
COMESA	1.2*	0.5*	1.17***	0.94**	1.17*
ECO	-0.05	-0.45	-0.62	-1.44***	0.21
EU	0.33***	0.34***	0.1	0.26***	0.62***
EURO	0.22***	0.09	0.05	0.11*	0.68***
GAFTA	0.6***	0.63***	0.74***	0.06	0.22
NAFTA	0.54**	1.06***	0.4*	0.49	-0.29
UMA	0.69*	0.61*	-0.84**	-0.03	-0.12
INV	0.31	0.91***	1.07***	1.3***	0.29
Z	-0.06	1.05***	0.64**	1.67***	0.74
Z^2	0.07	-0.25**	-0.12*	-0.44***	-0.13
Z^3	-0.005	0.02**	0.008	0.04***	0.02
R-Square	0.8	0.805	0.878	0.88	0.716
Observations	75768	79559	77835	79738	56534

***, ** and * represent 1%, 5% and 10% significance levels respectively, using heteroskedasticity and autocorrelation consistent standard errors.

{} indicates that the Net GCC sum is insignificant.

5 Conclusion

The process of economic integration among GCC countries can be dated back to 1981 when the GCC council was established as a political entity aimed to coordinate political, social and economic policies of GCC countries to achieve welfare and prosperity for member countries. On the economic side the UEA was signed in 1981 to coordinate and standardize economic, financial, monetary, commercial, industrial, and customs regulations among the members with the ultimate goal of introducing a unified currency for the GCC countries. This was followed by GCC FTA coming into force in 1983; under GCC FTA all customs on products of member states were eliminated. GCC intra-trade have increased post 1983 from 1 percent to 2.6 percent in 2007, a modest increase which sheds doubts on the depth of economic and trade integration among GCC countries and the effectiveness of GCC FTA in promoting trade among GCC members, and as a starting point towards a unified currency.

In this thesis, I investigated trade integration among GCC countries by identifying the potential benefits of GCC FTA on aggregate and disaggregate trade among GCC countries. If trade integration among GCC countries was high, then the gains from GCC FTA should be high too. In chapters two, three and four different variations of the gravity model of international trade were applied to a set of bilateral trade flows among GCC countries and their major trade partners during the 1978-2010 time period. A dummy variable representing GCC FTA was included in all variations of the gravity equation in order to capture the effect of GCC FTA on different areas of trade among GCC countries.

The main contributions of this dissertation to existing literature on GCC FTA effect on trade are: 1) augmenting the gravity model with exporter-time and importer-time effects. The importance of these effects comes from that fact that they account for changes across time in multi-lateral resistance and exporter and importer heterogeneity as well as accounting for value added per sector and consumption per sector. To my knowledge, these effects were ignored in all of the previous literature focusing on GCC FTA effects on trade at the aggregate and disaggregate levels. 2) Accounting for possible implementation phases of GCC FTA or allowing GCC FTA to effect trade among GCC countries in phases rather than a single point in time. To my knowledge Alsadoun (2009), is the only study on GCC trade that accounted for these phases. However, his study covered aggregate trade only, while this dissertation covers aggregate and disaggregate trade. 3) Estimating the effect of GCC FTA on the margins of trade among GCC countries at the aggregate and

disaggregate levels; to my knowledge no previous work has investigated GCC FTA effects on the margins of trade.

Chapter two investigated the effect of GCC FTA on aggregate trade among GCC countries during the 1983-2010 time period. The results of chapter two suggest that GCC FTA have resulted in trade creation among GCC countries during 1983-2010 by 62-146 percent (depending on the specification of the most demanding version of the gravity equation). This result suggests that GCC FTA had a positive impact on aggregate trade among GCC countries during the period 1983-2010. However, this effect should not be exaggerated considering the low share of GCC intra-trade of GCC total trade with the world.

Chapter three investigated the effect of GCC FTA on intra-industry trade among GCC countries during the 1983-2010 time period. The results of chapter two suggest that GCC FTA have resulted in trade creation in sectors 0, 2, 3, 4, 7 and 9 with the largest effects in sectors 3, 4 and 9. These results confirm the weak positive effect attributed to aggregate trade. The sectors where GCC FTA was more effective had very low shares of aggregate GCC intra-trade (the sectors with positive coefficients represent about 43 percent of GCC trade during the 2003-2007 time period). GCC FTA has resulted in trade diversion among GCC countries in sectors that represent larger shares of GCC intra-trade. Also, the results of chapter two suggest that GCC FTA has resulted in trade creation among GCC countries in sector 9 only from the year 1998. All of this reveals that GCC FTA has not been very effective in boosting resource/exports diversification in GCC countries, which is a major challenge that faces GCC economies.

Chapter four investigated the effect of GCC FTA on the extensive (new trade relations) and intensive (existing trade relations) margins of aggregate and disaggregate trade among GCC countries during the 1983-2010 time period. This investigation was done to explore the channel(s) GCC FTA effects trade through, and to determine whether GCC FTA have led to an improvement in consumer welfare by providing more products to the consumer and boosting GCC countries efforts to diversify their production structure. Results from chapter 4 suggest that GCC FTA trade creation among GCC countries at the aggregate and disaggregate levels was mainly attributed to trade along the intensive margin during the 1983-2010 time period. While GCC FTA had a negative or no significant effect on trade among GCC countries at the aggregate level and in the majority of sectoral trade during the 1983-2010 time period. These results suggest that trade integration is

still low among GCC countries. Results of chapter four also affirm the finding of chapter three that GCC FTA has not been effective in boosting resource/exports diversification in GCC countries.

The results of chapters 2-4 might be bias to sample selection and selection into exporting as indicated by Helpman et al. (2008), Baier et al. (2011) and Dutt et al. (2011). Unfortunately there are limitations to implementing TSHS, which accounts for sample selection and selection into exporting in this dissertation. These limitations lower the credibility of the TSHS results. In appendix 4.A, I provide a brief discussion of TSHS methodology, limitation and results. Generally speaking results from appendix 4.A confirm the overall conclusions from chapters 2-4 for trade and trade margins at the aggregate and disaggregate levels.

The overall conclusion that can be drawn from the results of chapters two, three and four is that the level of trade integration is still low among GCC countries although efforts to eliminate trade barriers and coordinate trade policies started more than thirty years ago. The low level of integration is mainly due to the similarity of production/export structure of GCC economies which is dominated by oil/gas production. This conclusion sheds doubt on the viability of a proposed unified currency. Gains through trade are one of the major benefits of a unified currency. If trade is not integrated then gains through trade would be minimal. Also, a currency union is considered to be a high level of economic integration while an FTA is a low level of economic integration. Since GCC countries gains from GCC FTA are not big, it is doubtful that a high level of economic integration that precedes a currency union has been established among GCC countries. To conclude, it seems that GCC countries still have a long way to go in coordinating economic and trade policies before a unified currency can be a realistic goal in the near future.

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