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**India's Export Potential to the Gulf Cooperation Council
(GCC) Countries: A Gravity Model Analysis**

by

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Abstract

Using gravity model, we estimate the magnitude of India's export potential to the six-member Gulf Cooperation Council (GCC) countries, namely, Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates (UAE), who are currently negotiating a Free Trade Agreement (FTA). We have used an augmented gravity model to analyze India's world export flows and the coefficients thus obtained are incorporated to predict India's export potentials to the six-member GCC countries. This model has been estimated using the ordinary least square (OLS) technique with panel data. The dependent variable in all our tests is total merchandise exports (constant US dollars), in log-linear form between country-pairs of India with other 150 countries of the world.

The estimated results show that the gravity equations fit the data set and deliver plausible elasticities of the variables incorporated. All specifications of the gravity model are naturally sensible with statistically significant t-statistic, although export potentials differ from one to another.

Our workhorse (augmented) gravity model shows that the magnitude of India's export potential is highest with Oman, followed by Qatar, Bahrain, and Kuwait. However, all the model specifications consistently show no export potential with UAE, and Saudi Arabia. This implies that currently India is overtraded with UAE and Saudi Arabia, as they are the largest two trading partners of India in the GCC and India's export basket is not diversified and confined to limited number of items. Moreover, when we replace the regional trading dummy (RTA) dummy with the value of one, i.e., presuming there is an RTA; the results show sharp increase in the magnitude of India's export potential to Oman, Qatar, Bahrain and Kuwait. In addition, the model using time-specific fixed effects show similar trends of India's export potentials to the GCC countries.

Executive Summary

In the arena of contemporary international trade research, specified gravity models have become conventional procedure due to their sheer empirical appeal and high explanatory values in explaining bilateral trade flows. These models provide a cogent method to test the role of other variables affecting trade. In other words, the high explanatory value of the standard variables used in gravity specifications give significant results on additional variables which envisage their considerable influence on trade flows.

Majority of studies in the gravity framework concentrate on the task of predicting export potentials between/among countries. Specifically, these studies not only quantify the trade enhancing effect of integration by predicting the potentials, but also reflect upon policy prescriptions thereof. Gravity models have been widely used to investigate the impact of preferential trading arrangements (PTAs) on trade among the members of the integration scheme. The basic approach is to include an additional dummy variable in the standard gravity model that captures variations in the levels and direction of trade due to the formation of a preferential trading arrangement among a group of countries. It is assumed that the "normal volume of trade" between a pair of randomly selected countries can be explained by size (GDP, population, land area) and distance (broadly defined as trade costs) between two countries. If the preferential trade arrangement increases the trade among the members of the arrangement above its "normal" value, then the intra-bloc dummy variable (a variable that represents the existence of a preferential agreement between two countries) will get a positive and statistically significant coefficient.

Using gravity model, we estimate the magnitude of India's export potential to the six-member Gulf Cooperation Council (GCC) countries, namely, Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and United Arab Emirates (UAE), who are currently negotiating a Free Trade Agreement (FTA). We have used an augmented gravity model to analyze India's world export flows and the coefficients thus obtained are incorporated to predict India's export potential to the GCC countries. This model has been estimated using the OLS technique with panel data. The dependent variable in all our tests is India's total merchandise exports, in log-linear form between country-pairs of India with other 150 countries of the world.

We have adopted *in-sample* export potential estimates in this study, i.e. India's 150 trading partners including the GCC are included in the regression analysis and the residuals of the estimated equations are incorporated to estimate the export potential. In order to verify the sign of the coefficients we have adopted panel data specifications of the gravity model (for the period, 1994-2004), starting from the basic gravity model to augmented specifications with time-specific fixed effects. Apart from usual explanatory variables and dummies, we have used another dummy called 'trading affinity'. The trading affinity dummy is constructed on the basis of more than one percent share of partner countries in India's total trade for the estimation period. This is based on the assumption that apart from usual other variables, some specific factors like trading affinity of India with GCC, presence of large number of Indians in GCC, and other factors also influence and determine trade flows considerably.

The estimated results show that the gravity equations fit the data set and deliver plausible elasticities of the variables incorporated. All specifications of gravity model are naturally sensible with statistically significant t-statistic, although export potentials differ from one another.

Our workhorse (augmented) gravity model shows that the magnitude of India's export potential is highest with Oman, followed by Qatar, Bahrain, and Kuwait. We found that currently India can increase its exports to Oman by 3.75 times and to Qatar, Bahrain and Kuwait by 2.68, 1.46 and 1.16 times respectively. In absolute numbers, India's export potential with Oman, Bahrain, Qatar and Kuwait are found to be US 62 million dollars, US 62 million dollars, US 706.3 million dollars and US 226.5 million dollars respectively. Moreover, when we replace the RTA dummy with the value of one, the results show sharp increase in the magnitude of India's export potential with Oman, Qatar, Bahrain and Kuwait. With the RTA dummy, India's export potential with these countries increases to US 1892.6 million dollar, US 671.6 million dollar, US 609.6 million dollar and US 303.4 million dollar respectively. However, all the model specifications consistently show no export potential with UAE, and Saudi Arabia. This implies that currently India is overtraded with UAE and Saudi Arabia, as they are the largest two trading partners of India in the GCC and India's export basket to these two countries is not diversified and confined to limited number of items. In addition, the model using time-specific fixed effects also exhibits existence of similar trends about India's export potentials.

I: Introduction

The most astounding aspect of the current global economic environment has been the process of intense integration of economies precipitated through gradual acceleration of multilateralism and emergence of regionalism, primarily facilitated by the growth of regional trading arrangements (RTAs) and bilateral free trade agreements (FTAs). Studies show that FTA framework injects a new dynamism into consideration of the liberalization of trade in goods. In committing to this agreement, countries recognize that multilateral trade negotiations are the most effective mechanism to achieve trade liberalization and thereby to promote national and regional economic development. Each country does, however, also recognize, through their existing bilateral free trade agreements with other selected trading partners, the potential for WTO-consistent free trade environment to deliver welfare at a more rapid pace. To a great extent, such agreements can, in turn, support and reinforce multilateral liberalization in the WTO.

This is clearly evident in the Asian region-the current epicenter of the global economy, though regionalism is a belated development in comparison to other regions. Like other parts of the world, all the fastest moving vibrant economies in Asia are currently negotiating and/or finalizing various RTAs and bilateral FTAs with the sole aim of expanding the horizon of their national economies through synergizing complementarities in a win-win proposition. India is no exception.

Since opening up in the beginning of the 1990s, India has marched great strides to be one of the fastest growing economies of the world owing to the substantial structural economic reforms, especially visible in its trade policy regimes. The forward growth momentum and its structural components have induced India to be aligned with other liberalized countries in order to be fully integrated with the global economy. As a result, in recent years, India has signed a number of bilateral PTAs/FTAs with countries. Towards this will, there are intentions of accelerating the process forward by entering into similar agreements with the Gulf Cooperation Council (GCC), comprising six countries, namely, Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and UAE.

The GCC has emerged as a major trading partner for India. It has vast potential as India's major trade and investment partner for the future. The GCC countries are collectively host the largest expatriate Indian community. The bilateral trade relationship has witnessed impressive growth in recent years; GCC is now India's second-largest merchandise trading partner and India is GCC's ninth-largest. The growth in two-way merchandise trade over the past five years has been almost 20 per cent per annum. Currently GCC economies are on a high growth trajectory due to the higher international oil prices. They are also now more inclined to integrate with the emerging Asian economies like India and China. There are two way linkages between India and GCC, not only in trade but also in investment. GCC as a capital rich region needs to invest abroad and India being capital deficient require investment. Similarly in recent years GCC countries are also attracting foreign investment and India has also emerged as an outward investor. This shows the bilateral complementarities between the two. Moreover, there are other sectors or aspects which are pervasive for strengthening bilateral trade and investment relations. In such a backdrop, an FTA agreement is the adequate platform to take the bilateral economic relationship into a new trajectory.

Recent Initiatives

India and the six-member Cooperation Council for the Arab States of the Gulf (GCC) share a strong and rapidly growing trade and economic relationship. Further strengthening and deepening of this relationship is a major priority for both, with governments committed to sustaining the impressive trade and economic performance achieved in recent years. The signing of the Framework Agreement of Economic Cooperation between India and the Member States of the GCC in New Delhi on 25 August 2004 and consequent first round of negotiations on March 21-22 2006 was a re-affirmation of this commitment.

The Framework is a broad-based and forward-looking document, which has set a clear agenda for the bilateral trade and economic relationship over the coming years. It covers a wide range of activities aimed at improving commercial and policy linkages, and delivering improvements to the overall business environment to both countries' mutual benefit. As part of the Framework, India and GCC countries agreed to undertake possible negotiation of a bilateral free trade agreement (FTA).

The Framework Agreement enhances the strength of this commercial relationship. It reaffirms each country's commitment to the ongoing development of trade and investment, including within the context of the WTO and strengthens bilateral economic cooperation and dialogue. It provides that India and GCC will, through all-round economic and trade cooperation, "achieve balanced and comprehensive trade and investment facilitation and liberalization".

The Framework also provides for a wide range of specific steps to strengthen the trade and economic relationship, including:

- Enhancing the exchange of information on foreign trade.
- Encouraging business communications particularly between the institutions and organizations concerned with foreign trade.
- Giving attention to training and technology transfer.
- Appropriate arrangements for capital flows between them, setting up joint investment projects and facilitating corporate investments in various fields of economy, trade and industry.
- Encourage the exchange of visits of representatives, delegations and economic, commercial and technical missions between them and organizing temporary exhibitions and provide necessary facilities and assistance with a view to further economic cooperation.
- Joint Committee for Economic Cooperation shall be formed under this Agreement. This Committee shall convene alternatively in the countries of the two Parties on mutually agreed periodicity. Level of participation in the Committee will be specified in advance. Functions of the Committee shall be:
 1. Following up implementation of the provisions of this Agreement and other bilateral agreements or protocols made between the two Parties based on this Agreement.

2. Handling any difficulties or disputes that might arise from interpretation/implementation of the provisions of this Agreement
3. Adopting recommendations for enhancing economic, commercial, technical and investment cooperation between the two contracting parties, and fostering their economic relations and increasing the volume of trade between them.
4. The Joint Committee is authorized to set up any subcommittees or specialized working teams, at its discretion and when deemed necessary. The Committee shall designate the duties and functions of such subcommittees and working teams, provided that said subcommittees and working teams shall submit their reports and recommendations to the Joint Committee.

The joint FTA negotiation injects a new dynamism into consideration of the liberalization of trade in goods between India and GCC. In committing to this negotiation, India and GCC recognize that multilateral trade negotiations are the most effective mechanism to achieve trade liberalization and thereby to promote national and regional economic development. Each country does, however, also recognize, through their existing bilateral free trade negotiations with other selected trading partners, the potential for WTO-consistent free trade agreements to deliver benefits at a more rapid pace. Such agreements can, in turn, support and reinforce multilateral liberalization in the WTO. Furthermore, both recognize that free trade agreement negotiations involving products across all sectors serve more broadly as instruments for demonstrating closer relations, and so enhancing mutual interests. The implications of a possible FTA between India and GCC need to be considered in this broader context, as well as in terms of its direct effects on trade in goods.

This study intends to estimate India's export potentials¹ to the six-member Gulf Cooperation Council (GCC) countries by using the gravity model approach. We attempted panel estimations in the specifications of gravity model to obtain the potentials. In particular when we model our equations considering time-specific fixed effects, we obtain different indications about export potentials.

Export potential is indicated in case India's actual export with any country is less than that predicted by the gravity model. The policy implications associated with the results of export potential would extend from the necessity of integration, tariff adjustment to diversification of India's export basket with the GCC countries.

The remaining structure of the study is as follows. Section two gives a brief overview of India's trade pattern with the GCC. In section three, an introduction to the gravity model and its implication for FTA is given. Section four briefly reviews selected existing literature on the application of gravity model to estimate export potentials. Section five gives an outline about methodology, dataset and description of dummies included in estimation. Results are analyzed in section six and the last section concludes the study.

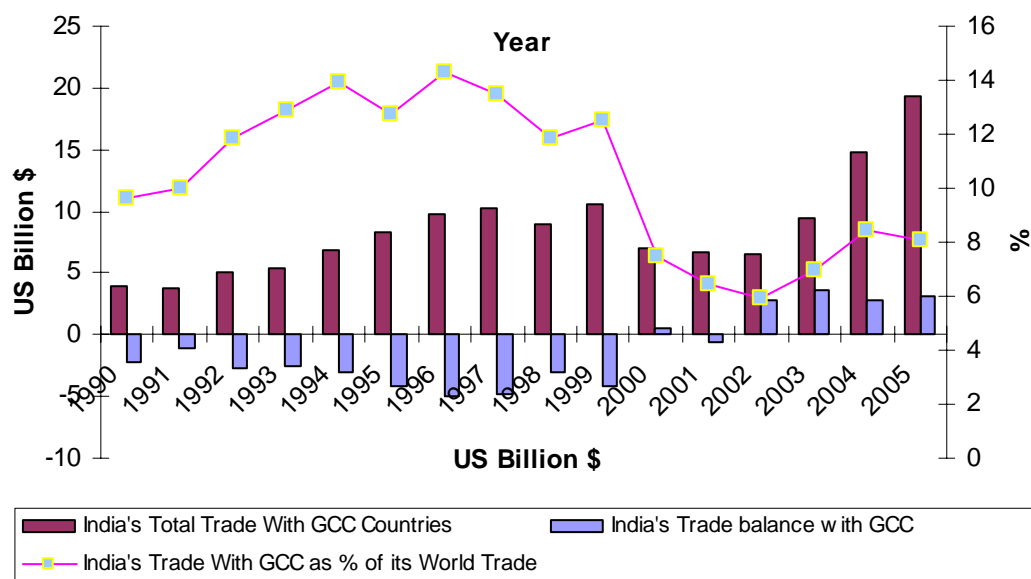
¹ The scope of the study will be limited to the potentials of exports of goods only.

II: Patterns of Trade between India and GCC

The Gulf region with its geo-strategic location is important to India from the economic and security viewpoints. Centuries-old interaction between India and the region and the region's centrality in the Islamic world makes the Gulf also, politically important. India enjoys traditionally cordial relations and cooperation with the GCC countries. India's old, historical ties with GCC states, coupled with increasing imports of oil and gas, growing trade and investment opportunities, and presence of 3.5 million Indian workers in the region, are of vital interest to India. India's economic linkages with the GCC have increased steadily during 1970s, 80s and 90s, especially due to growth in oil imports. These continue to make steady progress to-date.

The GCC countries are important trading partners for India, and bilateral trade has witnessed impressive growth in recent years. During the last five years, India's total trade with the GCC countries has risen nearly three-fold, from US\$ 7 billion in 2000 to US\$ 19.3 billion in the year 2005 (see chart 1). Rise in both exports to and imports from the GCC countries have underlined the buoyancy in India's overall trade with the bloc.

Chart 1: India's Trade with GCC: Various Indicators

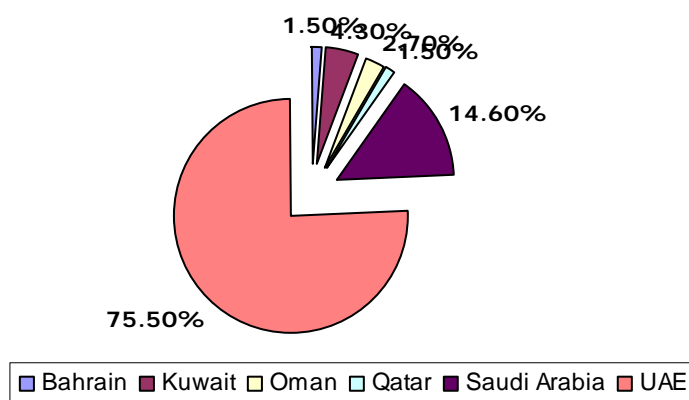


Source: Calculated from Direction of Trade Statistics (DOTS) CD-ROM, IMF, 2006.

India's exports to the GCC have risen from US\$ 3.73 billion in the year 2000 to US\$ 11.22 billion in the year 2005. After a marginal decline in the year 2001, India's exports to the region witnessed a robust a growth thereafter, with an annual average growth rate of 35.3% during 2002-2005. As a result, the share of GCC countries in India's total exports has increased from 8.75% in 2000 to 11.21% in 2005, indicating an increase of 89 percent. Among the GCC countries, UAE is the leading market for India's exports, accounting for as much as three-fourth of India's total exports to the bloc in the year 2005, followed by Saudi Arabia, Kuwait, Oman, Bahrain and Qatar. Due to the

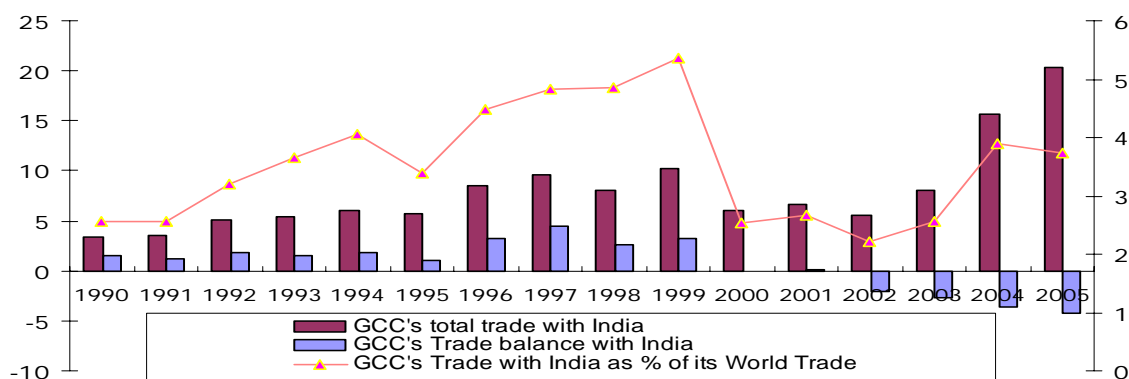
dominant share of UAE, India's export to the GCC has been in line with the trend in exports to that country (chart 2). The GCC countries are also major destinations for India's project exports. This can be assessed from the fact that the GCC as a bloc accounted for as much as 42.5% (Rs. 85.34 billion) of the total value of contracts secured by Indian project exporters during the period 2000-01 to 2004-05 (Rs. 200.8 billion)².

Chart 2: India's Exports to GCC Countries, 2004-05 (% share)



India's total imports from the GCC have also witnessed an increase from US\$ 3.68 billion in the year 2000 to US\$ 8.13 billion in the year 2005. Excluding POL-related imports from the total figures, show that India's imports from GCC have increased from US\$ 1.67 billion in 2000 to US\$ 6.92 billion in 2005, underlined by the sharp increase of imports from UAE, Saudi Arabia and Qatar for the same period. UAE is again the leading import source, accounting for 66.3% of India's total imports from the bloc in the year 2005, followed by Saudi Arabia, Qatar, Kuwait, Bahrain and Oman. Though for GCC, India is not so important trading partner, yet the recent years have witnessed some impressive trends (chart 3).

Chart 3: GCC's Trade with India: Various Indicators



Source: Calculated from Direction of Trade Statistics (DOTS) CD-ROM, IMF, 2006

GCC's total trade with India has increased from US\$ 6.08 billion in the year 2000 to US\$ 20.41 billion in the year 2005. Importantly, GCC countries total imports from India has increased phenomenally from US\$ 3.29 billion in the year 2000 to US\$ 12.30

² EXIM Bank, "GCC Countries: A Study of India's Trade and Investment Potential", Occasional paper No. 110, 2006.

billion in the year 2005, whereas exports to India has registered a moderate increase from US\$ 3.02 billion to US\$ 8.11 billion, during the same period. Moreover, India's share in GCC's world exports and imports has registered moderate growth during the same period. This implies the enormous scope for increasing India's share in GCC's trading profile. Table 1 below shows the relative mutual importance of India and GCC in each other's trade profile.

Table 1: India and GCC: Relative Mutual Importance in Trade Profile

| Indicators/Year | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
|--|------|------|------|-------|-------|-------|
| India's exports to GCC as % of India's world exports | 8.75 | 6.71 | 9.18 | 10.68 | 11.70 | 11.21 |
| India's imports from GCC as % of India's world imports | 6.43 | 6.25 | 3.12 | 3.93 | 6.00 | 5.83 |
| GCC's exports to India as % of GCC's world exports | 1.8 | 2.17 | 1.18 | 1.41 | 2.39 | 2.35 |
| GCC's imports from India as % of GCC's world imports | 4.09 | 3.51 | 3.73 | 4.38 | 6.38 | 6.16 |

Source: Calculated from Direction of Trade Statistics (DOTS) CD-ROM, IMF, 2006

Indo-Gulf economic ties have remained confined to oil, spices and manpower. As the trend shows, the economic relations between India and GCC countries which developed during the oil boom period remained limited in composition despite growth in volume. The GCC countries transacted more extensively with the Western market. But as the decline in oil revenue has forced these countries to diversify their economies by developing the non-oil sector and building capacities to process oil to realize higher value added to their products, India with a market of 100 billion becomes relevant for them. It is not merely energy consumption, but the heavy demand for oil-based products like petrochemicals and fertilizers that provided the basis for a more asserted beneficial economic relationship between the two.

The Gulf region gained prominence in India's foreign trade particularly after the trade policy liberalization which began in 1991. Trade policy reforms have provided an export friendly free trading environment conducive to accelerated export performance with simplified procedures. In order to promote trade interest India has granted Mutual Most Favored nation (MFN) status to the Gulf countries. India's principal exports commodities to this region are tea, spices, fruits, vegetables, tobacco, oil cakes, chemicals, drugs and pharmaceuticals, engineering goods, electronic engineering goods, electrical goods, textiles, etc. India's trade with the GCC countries is conducted against payments in free foreign exchange. India's trade and economic relations with the GCC countries is kept under regular review through bilateral Joint Commissions. India has such institutional arrangements with all GCC countries.

Importantly, the 1990s witnessed large migration of workers from India to the GCC countries and consequent sustained flow of remittances from these countries. As per one study (Mazumdar, 2003), labour migration from India to Middle East picked up momentum since 1992. Also, in recent years a clear shift towards workers with higher skill noticed in outflow of Indian labour primarily to Middle East.

India's Economic Relations with Individual GCC countries

Bahrain

Bahrain and India have enjoyed strong economic and trade relations spanning over several centuries. Since the oil boom of the early seventies these relations received a new impetus. Relative prosperity and higher standard of living boosted global imports of goods and services, including from India. Bahrain Government's policy of industrial diversification also played its role in enhancing economic cooperation between the two countries. In addition, new job opportunities attracted a large number of Indian expatriates to the Island.

Bahrain accounted for 1.5% of India's exports to the GCC region in 2004-05. Exports to the country have risen consistently from US 75.9 million \$ in 2001-02 to US 141.9 million \$ in 2004-05. Imports from Bahrain also occupy a small percentage of 1.6 percent in India's total imports from the region, with imports having declined from US 134.5 million \$ in 2001-02 to US 74.7 million in 2003-04, before rising to US 112.7 million in 2004-05. Major items of export to Bahrain have been presented in table 2.

While cotton yarn and fabrics remain the largest exports to the country, recent trends have witnessed stagnation in exports. On the other hand, items including aluminium other than products, machinery and instruments and manufactures of metals have registered increase. India's import profile from Bahrain is dominated by Metaliferrous ores and metal scrap, and non-ferrous ores. Inorganic chemicals are also an important import item (see table 3).

Table 2: India's major export items to Bahrain (US \$ million)

| commodity | 2000/01 | 2001/02 | 2002/03 | 2003/04 | 2004/05 |
|--------------------------------------|---------|---------|---------|---------|---------|
| Cotton yarn fabrics madeups etc | 23.5 | 18.7 | 26.1 | 22.1 | 23.6 |
| Aluminium other than products | 0.01 | - | - | 4.8 | 14.8 |
| Machinery & instruments | 4.6 | 3.5 | 4.6 | 7.5 | 14.3 |
| Manufacture of metals | 3.5 | 3.9 | 4.1 | 5.8 | 10.2 |
| Paper/wood products | 2.4 | 2.0 | 2.5 | 3.0 | 5.7 |
| Transport equipment | 1.0 | 0.8 | 2.0 | 1.4 | 5.2 |
| Fresh vegetables | 2.1 | 2.5 | 4.6 | 6.2 | 4.7 |
| RMG cotton incl. accessories | 3.8 | 4.6 | 7.2 | 8.3 | 4.6 |
| Manmade yarn fabrics madeups | 2.9 | 3.8 | 4.7 | 3.1 | 3.9 |
| Primary & semi-finished Iron & steel | 0.8 | 1.4 | 2.9 | 3.0 | 3.4 |

Source: DGCIS, Ministry of Commerce and Industry (MoCI)

Table 3: India's major import items from Bahrain (US \$ million)

| commodity | 2000/01 | 2001/02 | 2002/03 | 2003/04 | 2004/05 |
|----------------------------------|---------|---------|---------|---------|---------|
| Metaliferrous ores & metal scrap | 16.9 | 20.0 | 19.9 | 22.4 | 25.7 |
| Non-ferrous metals | 19.7 | 19.8 | 11.9 | 20.0 | 23.3 |
| Inorganic chemicals | 6.2 | 15.5 | 9.5 | 2.3 | 11.6 |
| Pulp & waste paper | 1.0 | 0.8 | 1.5 | 2.2 | 2.8 |
| Sulphur & unroasted iron pyrites | 0.7 | 2.7 | 1.1 | 4.1 | 1.3 |

| | | | | | |
|--------------------------|-----|------|------|-----|-----|
| Crude fertilizer | - | - | - | - | 0.7 |
| Manufactures of metals | 0.1 | 0.7 | 0.1 | 0.1 | 0.5 |
| Transport equipment | 0.2 | 0.01 | 0.01 | 2.0 | 0.5 |
| Cotton yarn fabrics | - | 0.1 | 0.02 | 0.6 | 0.4 |
| Non-electrical machinery | 0.2 | 0.1 | 0.01 | 0.2 | 0.2 |

Source: DGCIS, Ministry of Commerce and Industry (MoCI)

Kuwait

India and Kuwait continue to enjoy traditional friendly relations. Geographical proximity, historical trade links, cultural affinities and presence of a large number of Indian expatriates in Kuwait have all continued to sustain and nurture the longstanding relationship over the years. India was a natural trading partner and a destination for higher learning. Until 1961, the Indian rupee was legal tender in Kuwait. The presence of a huge Indian workforce in Kuwait has ensured close cultural interaction and bond between the two countries. The two countries continue to build on long established commercial relations. This friendship found a new impetus with the discovery of oil in Kuwait with this Kuwait is exporting oil and other petrochemical products to India while numerous commodities are imported from India.

Though India was the first country to establish trade links with Kuwait centuries ago, but with the inflow of goods from other parts of the world, it lost its leading position. In 1989, a joint trade committee met in Kuwait to evolve ways and means of diversifying and augmenting trade.

India's exports to Kuwait have increased consistently; from US\$ 207 million in 2000-01 to US\$ 405 million in 2004-05, with a share of 4.3 percent of India's total exports to the GCC region (see table 4). While basmati rice and RMG cotton have remained traditional export items, sharp rise in the exports of other items such as glassware, primary and semi-finished iron and steel, petroleum products have resulted in recent years.

Table 4: India's major export items from Kuwait (US \$ million)

| commodity | 2000/01 | 2001/02 | 2002/03 | 2003/04 | 2004/05 |
|--------------------------------------|---------|---------|---------|---------|---------|
| Basmati rice | 49.8 | 41.3 | 35.8 | 30.0 | 52.0 |
| Glass/glassware/ceramics | 13.6 | 6.6 | 10.7 | 19.3 | 36.3 |
| RMG cotton incl. accessories | 17.1 | 20.1 | 22.5 | 41.5 | 34.3 |
| Primary & semi-finished iron & steel | 2.2 | 0.9 | 6.4 | 9.9 | 30.2 |
| Petroleum & crude products | 0.02 | 0.1 | 22.3 | 18.3 | 22.1 |
| Manmade yarn fabrics madeups | 10.7 | 14.4 | 12.9 | 20.6 | 19.8 |
| Machinery & instruments | 7.5 | 9.6 | 9.6 | 17.1 | 18.9 |
| Meat & preparations | 5.8 | 4.1 | 6.5 | 13.9 | 18.5 |
| Manufactures of metals | 6.8 | 11.1 | 12.3 | 15.3 | 17.7 |
| Oil meals | 7.1 | 6.4 | 6.2 | 8.0 | 11.7 |

Source: DGCIS, Ministry of Commerce and Industry (MoCI)

Two items such as organic chemicals and metaliferrous ores and metal scrap are the dominant item in India's imports from Kuwait. Imports of these two items have increased considerably recently (see table 5).

Table 5: India's major import items from Kuwait (US \$ million)

| commodity | 2000/01 | 2001/02 | 2002/03 | 2003/04 | 2004/05 |
|--------------------------------------|---------|---------|---------|---------|---------|
| Organic chemicals | 4.7 | 0.03 | 8.7 | 36.5 | 85.8 |
| Metaliferrous ores & metal scrap | 13.8 | 18.0 | 20.6 | 33.0 | 50.4 |
| Sulphur & unroasted iron pyrites | 11.7 | 8.6 | 6.2 | 8.2 | 11.8 |
| Artificial resins, plastic materials | 4.5 | 4.0 | 5.5 | 5.0 | 6.1 |
| Inorganic chemicals | 26.4 | 4.2 | 15.5 | 8.9 | 5.6 |
| Electronic goods | 0.04 | 0.01 | 0.7 | 0.1 | 1.5 |
| Other textile yarn, fabrics, madeups | 0.1 | 0.3 | 0.1 | 0.4 | 1.3 |
| Pulp & waste paper | 0.5 | 0.5 | 0.7 | 0.7 | 1.1 |
| Wool raw | 0.2 | 0.2 | 0.3 | 0.5 | 0.8 |
| Iron & steel | 0.1 | 0.02 | 0.1 | 0.2 | 0.7 |

Source: DGCIS, Ministry of Commerce and Industry (MoCI)

Oman

Exchanges between India and Oman go back to centuries. Until the Omani Renaissance that commenced with Sultan Qaboos taking over the reins of the country, Oman almost entirely depended on India to meet its basic necessities. Such extensive commercial interaction helped greatly in laying the foundation for the development of a multi-dimensional relationship between the two countries, in the modern times. Oman has, of late, taken a conscious decision to make India as its main economic partner in its drive towards industrialization and diversification of the Omani economy, taking into account the size of Indian market, and India's industrial capabilities.

In 2002, India was the eighth largest source for Omani imports (about 3.5%). Major items of Indian exports include textiles and garments, machinery and equipment, electrical and electronic items, chemicals, iron and steel products in addition to traditional items like tea, coffee, spices, rice and meat products. The bilateral trade figures for the last five years have been as follows as depicted in table 6 and 7.

Table 6: India's major export items to Oman (US \$ million)

| commodity | 2000/01 | 2001/02 | 2002/03 | 2003/04 | 2004/05 |
|------------------------------|---------|---------|---------|---------|---------|
| Machinery & instruments | 14.1 | 19.6 | 30.5 | 69.0 | 45.0 |
| Manufactures of metals | 16.4 | 17.9 | 16.8 | 16.0 | 31.3 |
| Non-ferrous metals | 0.3 | 0.6 | 1.7 | 8.4 | 29.7 |
| Manmade yarn fabrics madeups | 10.4 | 12.3 | 15.8 | 14.7 | 11.8 |
| Meat & preparations | 9.6 | 9.0 | 11.5 | 13.0 | 11.3 |
| Electronic goods | 4.1 | 3.6 | 9.1 | 7.8 | 8.1 |
| Poultry products | 2.5 | 3.9 | 5.4 | 7.4 | 7.8 |
| Plastic & linoleum products | 4.7 | 4.6 | 5.0 | 5.3 | 7.6 |
| Transport equipment | 1.8 | 3.1 | 2.7 | 5.4 | 7.4 |
| wheat | 6.0 | 7.5 | 0.03 | 16.5 | 7.0 |

Source: DGCIS, Ministry of Commerce an Industry (MoCI)

Table 7: India's major import items from Oman (US \$ million)

| commodity | 2000/01 | 2001/02 | 2002/03 | 2003/04 | 2004/05 |
|--------------------------------------|---------|---------|---------|---------|---------|
| Metaliferrous ores & metal scrap | 0.6 | 0.9 | 1.7 | 1.7 | 6.2 |
| Non-metallic mineral manufactures | 0.1 | 1.5 | 2.5 | 3.8 | 3.8 |
| Non-ferrous metals | - | - | 1.9 | 6.6 | 3.4 |
| Iron & steel | - | - | - | 0.3 | 1.2 |
| Artificial resins, plastic materials | 0.4 | 0.5 | 1.0 | 0.8 | 0.8 |
| Dying & colouring materials | 0.1 | 0.2 | 0.3 | 0.5 | 0.7 |
| Fruits & nuts | 1.6 | 2.4 | 1.5 | 2.0 | 0.7 |
| Transport equipment | 0.1 | 0.02 | 0.3 | 31.6 | 0.5 |
| Pulp & waste paper | 0.2 | 0.2 | 0.3 | 0.4 | 0.5 |
| Electrical machinery | 0.2 | 0.1 | 0.6 | 0.9 | 0.3 |

Source: DGCIS, Ministry of Commerce an Industry (MoCI)

Qatar

India's traditional and historical friendship with Qatar has over the years matured into a strong relationship, which makes both the sides' reliable economic partners having shared interests in trade and commerce, economic and technical cooperation and energy security. From the economic standpoint, there is a growing synergy between India and Qatar in the hydrocarbons and other industrial sectors (Sayeed, 2006). Indian private sector companies are getting more and more involved in industrial and civil construction and consultancy projects in Qatar.

The Indo-Qatar bilateral trade increased considerably in the recent years. Inorganic chemicals, organic chemicals, artificial resins and plastic materials, and sulphur and unroasted pyrates were the top five commodities of India's import from Qatar. Machinery and instruments, RMG cotton, cotton yarn, fabrics and made-ups, paper and wood products and glass, glassware and ceramics were the top five commodities exported by India to Qatar. Table 8 and 9 shows India's major items of Exports to and imports from Qatar for the period 2000-01 to 2004-05.

Table 8: India's major export items to Qatar (US \$ million)

| commodity | 2000/01 | 2001/02 | 2002/03 | 2003/04 | 2004/05 |
|--------------------------------------|---------|---------|---------|---------|---------|
| Glass/glassware/ceramics | 1.5 | 4.0 | 5.1 | 9.2 | 20.6 |
| Machinery & instruments | 5.0 | 5.0 | 12.0 | 22.3 | 15.4 |
| Manufactures of metals | 3.7 | 4.8 | 8.3 | 9.0 | 14.2 |
| Transport equipment | 1.4 | 1.6 | 19.4 | 22.0 | 12.8 |
| Primary & semi-finished iron & steel | 0.9 | 0.8 | 1.4 | 2.1 | 9.7 |
| Electronic goods | 0.6 | 0.8 | 1.0 | 0.8 | 5.6 |
| Rubber manufactured products | 1.5 | 2.1 | 2.9 | 3.1 | 5.0 |
| Processed minerals | 0.8 | 1.2 | 1.4 | 3.6 | 4.6 |
| Meat & preparations | 0.9 | 1.1 | 2.3 | 3.2 | 4.3 |
| Plastic & linoleum products | 1.4 | 2.6 | 1.9 | 3.3 | 3.3 |

Source: DGCIS, Ministry of Commerce an Industry (MoCI)

Table 9: India's major import items from Kuwait (US \$ million)

| commodity | 2000/01 | 2001/02 | 2002/03 | 2003/04 | 2004/05 |
|--------------------------------------|---------|---------|---------|---------|---------|
| Organic chemicals | 18.2 | 31.9 | 60.8 | | 124.2 |
| Inorganic chemicals | 39.4 | 35.7 | 35.4 | 78.4 | 69.4 |
| Fertiliser manufactured | - | - | - | 67.3 | 35.9 |
| Artificial resins, plastic materials | 10.6 | 12.6 | 7.7 | - | 19.7 |
| Sulphur & unroasted iron pyrites | 8.6 | 4.1 | 8.9 | 12.1 | 11.5 |
| Metaliferrous ores & metal scrap | - | 0.1 | 0.04 | 8.1 | 5.5 |
| Pulp & waste paper | 0.03 | 0.01 | 0.1 | 2.4 | 0.3 |
| Non-electrical machinery | 0.4 | 0.1 | 0.01 | - | 0.3 |
| Electrical machinery | - | - | - | - | 0.3 |
| Dyeing & colouring materials | 0.01 | - | - | 0.3 | 0.1 |

Source: DGCIS, Ministry of Commerce and Industry (MoCI)

Significantly, this increase in exports is not limited to just traditional areas of exports like agricultural products, but extends to diverse areas like project goods, machinery & instruments, Ready-made garments, bulk drugs & pharmaceuticals and ores and minerals.

Saudi Arabia

Saudi Arabia is India's second largest trading partner in the GCC region, having a share of 14.6 percent in the year, 2004-05. Main Indian exports to Saudi Arabia are basmati/non-basmati rice, manmade yarn, fabrics, made-ups, RMG cotton yarn, primary and semi-finished iron and steel, chemicals, plastic & linoleum products, machinery and instruments (see table 10).

Table 10: India's major export items to Saudi Arabia (US \$ million)

| commodity | 2000/01 | 2001/02 | 2002/03 | 2003/04 | 2004/05 |
|------------------------------|---------|---------|---------|---------|---------|
| Basmati rice | 240.9 | 222.8 | 218.0 | 233.0 | 349.6 |
| RMG cotton incl. accessories | 73.3 | 80.2 | 89.5 | 115.5 | 100.7 |
| Manmade yarn fabrics madeups | 43.0 | 48.9 | 72.7 | 106.1 | 99.1 |
| Non-basmati rice | 46.2 | 39.2 | 9.5 | 36.7 | 67.3 |
| Manufactures of metals | 38.0 | 47.7 | 43.5 | 57.2 | 62.5 |
| Non-ferrous metals | 13.9 | 38.7 | 42.4 | 27.0 | 61.8 |
| Machinery & instruments | 27.9 | 34.1 | 44.7 | 58.8 | 60.1 |
| Plastic & linoleum products | 18.1 | 26.0 | 27.2 | 27.9 | 48.6 |
| Meat & preparations | 7.1 | 0.2 | 0.9 | 12.1 | 39.1 |
| Transport equipment | 5.7 | 4.6 | 6.5 | 16.5 | 31.9 |
| RMG manmade fibres | 26.4 | 22.6 | 24.4 | 29.0 | 31.1 |

Source: DGCIS, Ministry of Commerce and Industry (MoCI)

India's major imports from Saudi Arabia are organic and inorganic chemicals, artificial resins and plastic materials (see table 11).

Table 11: India's major import items from Saudi Arabia (US \$ million)

| commodity | 2000/01 | 2001/02 | 2002/03 | 2003/04 | 2004/05 |
|--------------------------------------|---------|---------|---------|---------|---------|
| Organic chemicals | 128.4 | 122.2 | 117.5 | 202.7 | 364.3 |
| Inorganic chemicals | 115.0 | 42.1 | 47.6 | 49.0 | 90.0 |
| Artificial resins, plastic materials | 28.8 | 41.3 | 48.7 | 53.6 | 67.3 |
| Metaliferrous ores & metal scrap | 10.3 | 23.3 | 22.3 | 30.6 | 54.9 |
| Leather | 5.3 | 11.8 | 13.1 | 20.5 | 30.8 |
| Gold & silver | 5.2 | 12.7 | 17.0 | 15.9 | 29.5 |
| Fertiliser manufactured | 3.4 | 1.9 | 1.7 | - | 15.2 |
| Pulp & waste paper | 10.6 | 6.0 | 9.4 | 10.9 | 12.6 |
| Sulphur & unroasted iron pyrites | 20.0 | 9.3 | 6.7 | 9.4 | 10.2 |
| Manufactures of metals | 0.6 | 0.2 | 0.2 | 0.5 | 6.3 |

Source: DGCIS, Ministry of Commerce and Industry (MoCI)

UAE

Trading links between India and UAE have existed since long. Growing Indo-UAE economic and commercial relations over the years has contributed to the stability and strength of a rapidly diversifying and deepening bilateral relationship with both sides striving to further strengthen these ties.

UAE is of crucial significance for India's foreign trade as the second largest destination for India's exports after the United States. During the last fiscal (2004-05), India's exports to the UAE accounted for 9 percent of India's total exports. In the GCC region, UAE is India's largest market accounting for a whopping share of 75.5 percent of India's total exports to the region in the year 2004-05. Over the last five fiscal, both India's exports to and imports from UAE have registered phenomenal growth. Gems and jewellery are the largest item in India's export basket to the UAE, followed by plastic and linoleum products, petroleum products, RMG cotton, manmade yarn, manufactures of metal, etc (see table 12).

Table 12: India's major export items to UAE (US \$ million)

| commodity | 2000/01 | 2001/02 | 2002/03 | 2003/04 | 2004/05 |
|--------------------------------------|---------|---------|---------|---------|---------|
| Gems & jewellery | 440.7 | 544.0 | 663.6 | 1377.2 | 2500.1 |
| Plastic & linoleum products | 66.6 | 73.0 | 75.7 | 257.6 | 786.1 |
| Petroleum products | 30.1 | 5.7 | 399.4 | 332.4 | 500.8 |
| Manmade yarn fabrics madeups | 166.5 | 215.0 | 274.2 | 337.6 | 395.4 |
| RMG cotton incl. accessories | 373.7 | 254.7 | 296.4 | 449.8 | 330.2 |
| Manufactures of metals | 177.1 | 179.1 | 204.5 | 293.7 | 322.5 |
| Machinery & instruments | 109.4 | 105.2 | 141.4 | 242.9 | 238.6 |
| Primary & semi-finished iron & steel | 50.3 | 48.0 | 74.8 | 96.3 | 133.2 |
| Non-ferrous metals | 3.2 | 10.2 | 40.9 | 75.0 | 129.1 |
| Cotton yarn fabrics | 111.0 | 77.1 | 93.1 | 89.1 | 107.2 |

Source: DGCIS, Ministry of Commerce and Industry (MoCI)

UAE is among the fourth largest source of India's imports, after China, USA and Switzerland, with a share of 4.3 percent of India's total imports during the last fiscal.

Two items, viz. pearls, precious and semi-precious stones, and gold and silver dominate India's import basket from the UAE (see table 13).

Table 13: India's major import items from UAE (US \$ million)

| commodity | 2000/01 | 2001/02 | 2002/03 | 2003/04 | 2004/05 |
|--|---------|---------|---------|---------|---------|
| Pearls precious & semi-precious stones | 194.0 | 248.6 | 386.6 | 650.7 | 1904.4 |
| Gold & silver | 42.0 | 239.3 | 189.5 | 820.0 | 1742.8 |
| Metaliferrous ores & metal scrap | 59.7 | 81.7 | 83.9 | 126.2 | 186.9 |
| Transport equipment | 6.8 | 10.4 | 5.8 | 51.6 | 110.6 |
| Artificial resins, plastic materials | 6.7 | 9.0 | 26.8 | 32.0 | 41.6 |
| Non-electrical machinery | 8.4 | 17.8 | 23.6 | 27.0 | 38.1 |
| Fertiliser manufactured | 6.7 | 3.3 | 3.1 | 3.6 | 35.3 |
| Non-ferrous metals | 9.4 | 15.2 | 14.6 | 18.4 | 31.7 |
| Vegetable oil (edible) | 1.0 | 0.4 | 0 | 2.4 | 29.7 |
| Sulphur & unroasted iron pyrites | 24.0 | 16.1 | 20.4 | 9.9 | 27.1 |

Source: DGCIS, Ministry of Commerce and Industry (MoCI)

Besides the burgeoning merchandise trade, GCC region has also become the major destination for India's project exports. The importance of GCC countries in India's project exports sector can be assessed from the fact that the region accounted for 42.5 percent of the total value of contracts secured by Indian project exporters during the period, 2000-01 to 2004-05. The value of contracts secured by Indian companies in the region have risen from Rs. 9.34 billion in 2000-01 to Rs. 21.98 billion in the year 2004-05. During the current fiscal (April to January, 2005-06), India's project exports to the GCC region rose sharply to Rs. 43.48 billion. Table 14 presents the trend.

Table 14: Project Exports to GCC Countries (value in Rs. crore)

| Category | 2000/01 | | 2001/02 | | 2002/03 | | 2003/04 | | 2004/05 | | 2005/06 (Apr-Jan) | |
|----------------------|---------|-------|---------|--------|---------|--------|---------|--------|---------|--------|----------------------|--------|
| | No | value | No | value | No | Value | No | Value | No | Value | No | Value |
| Civil construction | 1 | 52.3 | 1 | 62.6 | 6 | 708.5 | 5 | 800.1 | 6 | 1246.0 | 3 | 248.2 |
| Consultancy services | 9 | 177.2 | 5 | 117.9 | 8 | 10.0 | 6 | 39.3 | 6 | 106.2 | 6 | 19.2 |
| Turnkey projects | 7 | 704.1 | 7 | 1394.2 | 10 | 1141.2 | 11 | 1132.9 | 7 | 845.8 | 7 | 4081.1 |
| Total | 17 | 933.6 | 13 | 1574.7 | 24 | 1859.7 | 22 | 1972.4 | 19 | 2197.9 | 16 | 4348.5 |

Source: EXIM India, 2006.

In the GCC region, UAE is the leading destination for India's project exports accounting for 32.2 percent of the total value of all contracts secured during the period 2000-01 to 2004-05, followed by Oman (26.2%), Saudi Arabia (19.2%), Qatar (16.4%), Kuwait (5.1%) and Bahrain (0.9%).

III: Gravity Model and Export potential: Summary of Relevant Literature

In recent years, there are lots of efforts in empirical international trade research to explain the bilateral volume of trade through the estimation of a gravity equation. The concept of the gravity model is based on Newton's Law of Universal Gravitation relating the force of attraction between two objects to their combined mass and the distance between them. The application of gravity to the social sciences was first proposed by James Stewart in the 1940s (Fitzsimons et al., 1999). Originally applied to international trade by Tinbergen (1962), the gravity model predicts bilateral trade flows between any two countries as a function of their size and the distance between them.

Economic size is measured as Gross Domestic Product, population or per capita income. Distance is typically measured as the distance between the countries capital cities, in some studies this is replaced by measures of remoteness that weight distances by GDP or measure bilateral distances relative to the country's average distance from all trading partners. The model owes its origin to specifications by Tinbergen (1962) and Poyhonen (1963) with the mathematical form as:

$$\text{Trade}_{ij} = \alpha \cdot \frac{\text{GDP}_i \cdot \text{GDP}_j}{\text{Distance}_{ij}} \quad (1)$$

where Trade_{ij} is the value of the bilateral trade between country i and country j , GDP_i and GDP_j are country i 's and j 's respective national incomes. Distance_{ij} is a measure of the bilateral distance between the two countries and α is a constant of proportionality.

Taking logarithms of the gravity model equation as in (1) we get the log-linear form of the model and the following equation:

$$\text{Log}(\text{TT}_{ij}) = \alpha + \beta_1 \text{Log}(\text{GDP}_i) + \beta_2 \text{Log}(\text{GDP}_j) + \beta_3 \text{Log}(\text{Dist}_{ij}) + u_{ij} \quad (2)$$

Where α , β_1 , β_2 , and β_3 are coefficients to be estimated. The error term, u_{ij} captures any other shocks and chance events that may affect bilateral trade between the two countries. This equation is the basic gravity model where bilateral trade is predicted to be a positive function of income and negative function of distance.

The gravity model has been widely applied in international trade studies. Its popularity is due to the simplicity of the concept, the fact that it appears to fit the available data well and the ease with which models can be estimated econometrically³. Increasingly, the model specification has been augmented through the addition of other variables that are thought to impact on trade flows such as dummy variables for a common language, common borders or historical relationships between countries. The gravity model is also used for policy analysis, for example the effects on trade flows between countries of membership of trade agreements or common currency areas can be assessed. A common extension of the gravity approach is to calculate the trade cost of

³ Traditionally the gravity model has been estimated using Ordinary Least Squares (OLS).

different types of barriers and various other restrictions (observed and unobserved) on trade flows by comparing predicted and actual levels of trade.

Most econometric studies take the advantages of gravity models developed by Linder (1961) and Linnemann (1966). The basic idea of the gravity approach is to ignore comparative advantage and concentrate on locational factors instead. These models connect trade flows between two countries to the importer's demand, exporter's supply and the trade costs. The importer's demand and exporter's supply are substituted by countries' gross domestic product (GDP) as well as GDDP per capita. Trade costs (transport and transaction costs) are measured by geographical distance between countries (Fidrmuc, 1999, p. 634). Baldwin (1994) literature survey on gravity models gives more broad views to researchers.

As an empirical strategy, the application of gravity model has become enormously popular. Moreover, since the early 1990s, the large availability of international trade data necessary to fill the standard specification of the model, the relative independence from (or ability to mirror) different theoretical models, and a bandwagoning effect made the gravity model the empirical model of trade flows (Evenett and Kellar, 2002).

Among the many studies using the gravity model, majority of them deal with the task of predicting export potentials⁴. These studies generally concentrate on evidences of trade enhancing effects through integration with the main objective being the prediction of the additional trade that might be expected if integration between two countries (or more than two countries) is fostered. Also gravity model can be used to quantify the effects of trade liberalization.

In the literature, broadly two main approaches have been adopted to quantify the export potentials. The first one derives *out-of-sample* export potential estimates, i.e. the parameters for India and its trading partners are estimated by a gravity model and then the same coefficients are applied to project the natural trade relations between India and other countries. The difference between the observed and predicted trade flows should represent the unexhausted export potential. The second approach derives *in-sample* export potential estimates, i.e. all the trading partners are included in the regression analysis and the residuals of the estimated equation should represent the difference between potential and actual trade relations. Despite the approaches adopted, studies generally derive strong conclusions from the sign of the difference between potential and effective trade flows. When two countries trade currently much more than the gravity models predicts, then there is a very successful bilateral partnership and when two countries trade much less than in theory, there seems to be an untapped export potential; which is considered a common feature of a large body of literature.

The policy implications associated to the findings of a negative sign (untapped export potential) in the difference between effective and potential export potential trade go from the necessity of country-specific export promotion and of broader bilateral integration, to the need to anticipate relevant welfare implications due to the effect of the

⁴ The International Trade Centre (ITC) of the UNCTAD-WTO has developed a gravity model called *TradeSim* (ITC, 2003) with the main objective of estimating bilateral trade flows of developing countries with any of their partner countries. The model has been developed for supporting country member institutions to assess actual export potentials of countries with limited trade relations in the past.

expansion in bilateral trade flows in the near future. A positive sign (successful partnership) in the difference between the effective and potential trade generates different policy implications such as trade has reached its potential level and no social cost has to be expected from future integration (Batra, 2004). However, one suggestion seems that the conclusions are derived with caveats, especially if the signs in the difference between the effective and potential trade is not robust to the use of different estimators of the gravity model (Benedicts and Vicarelli, 2004). Then the question arises-is the sign stable? We have adopted the methods proposed by Benedicts and Vicarelli (2004) with some changes by including additional dummies and time-specific fixed effects to suit our purpose in the present study.

As the empirical applications of the gravity model have grown, the theoretical foundations of the model have also been developed. Beginning with Anderson (1979), who showed that the gravity framework is consistent with a model of world trade in which products are differentiated by the country of origin (the Armington assumption), a series of papers have shown the gravity model framework to be consistent with a number of standard trade theories such as Heckscher-Ohlin and monopolistic competition⁵. Deardorff (1995, p8) goes as far as to state that “just about any plausible model of trade would yield something very like the gravity equation, whose empirical success is therefore not evidence of anything, but just a fact of life.”

There are also several studies that analyze the trade enhancing impact of preferential trading agreements. Frankel (1997) has used the gravity model to investigate a host of issues like the estimates of trading blocs, role of currency links etc using cross section and panel data. Frankel and Wei (1993) have examined bilateral trade patterns throughout the world and analyzed the impact of currency blocs and exchange rate stability on trade.

Using a gravity model, Marius Brühlhart and Mary J. Kelly (1999) have estimated the magnitude of potential trade flows between Ireland and the five CEEC countries. They found that Irish exports were already close to their “normal” level in 1994, but that imports from the CEECs were still less than half of their potential size. The value of estimated potential trade corresponds to 0.8 per cent of Irish GNP. The actual share in 1994 was 0.5 per cent. EU enlargement would raise Ireland-CEEC trade to 1.2 per cent of GNP. The short-term scope for trade expansion therefore appears to be modest. Stronger potential for trade growth emerges in the “long-term” scenario, which assumes partial income convergence of the EU and the CEECs.

Olivier Lamotte (May 2002) have estimated the trade possibilities of Yugoslavia with the EU using the gravity model in order to evaluate the effects of the ongoing process on the Yugoslav economy and the EU role in its transition. He has integrated an indicator of trade composition by product in our evaluation in order to take account of Yugoslavia’s specialisation and weak competitiveness.

Vujcic Boris and Šošić Vedran (2004) have explained why the trade development in Croatia did not observe the canonical transitional behavior through a single country gravity model in order to get more insight into the export potential of Croatia. Three

⁵ See Anderson (1979), Bergstrand (1985, 1989), Helpman and Krugman (1985) and Deardorff (1995).

scenarios are calibrated in order to determine export potential of Croatia with respect to the SEE, EU and CEFTA countries. They also run gravity regressions by sector, which are supposed to reveal which sectors have highest export potential, and look at the link between the trade and FDI's and finally, they discuss the "right" design of the trade regime for Croatia and SEE.

Hassan Kalbasi (2004) has explained the volume and direction of Iran and other 76 countries' trade using the gravity model. He has tried to explore why some countries are over or under-traded relative to the predicted trade flows of the model. The study explores bilateral trade among all the 76 countries, bilateral trade among 19 industrial countries, bilateral trade among 57 developing countries, industrial countries' exports to developing countries and finally developing countries' exports to industrial countries. This is done by analyzing the results of different equations predicting trade flows.

Anderson and van Wincoop (2003) show that the estimation of the gravity model can be greatly improved by incorporating what they refer to as multilateral resistance measures. Trade between any two regions depends negatively on the trade barriers of each region relative to the average barrier of the two regions with all trade partners. If a country has a relatively high average trade barrier, it will trade more with a country with which it has a low bilateral barrier. Anderson and van Wincoop argue that multilateral resistance cannot be measured using remoteness variables based on measures of distance as this does not capture border effects, rather the gravity model must be solved taking into account the impact of barriers on prices⁶.

Recognizing the nature of trading flows between countries as relationships that develop and change over time, there is an increasing use of panel (longitudinal) data approaches to the estimation of gravity models and this method is chosen in this paper. Anderson and van Wincoop (2004, p29) note that "improved econometric techniques based on careful consideration of the error structure are likely to pay off." The use of different panel data methods, such as random or fixed (within) effects estimators, allows for various assumptions regarding trade flows to be analyzed and tested.

Recent literature also exhibit attempts to augment the basic gravity model in order to test the significance of other factors that may have impact on trade flows. Marcus Noland (June 2005) in his work examines the impact of American public attitudes toward foreign countries on the volume of trade. The issue is whether popular attitudes, as elicited in these surveys, convey any information about trust, risk, or transactions costs beyond what can be explained through standard economic models. The results of this paper suggest that they do, with a one standard deviation increase in warmth of feeling associated with a 20 to 31 percent larger trade volume when evaluated at the sample means. These public attitudes are in turn correlated with indices of cultural affinity and political ideology. A one standard deviation increase in the democracy score is associated with a 5 to 7 percent increase in trade. There might be additional secondary effects if democratization was associated with an increased likelihood of the removal of sanctions or the initiation of preferential trade relations. In this study, we have attempted to do so by incorporating a dummy variable called 'trading affinity'.

⁶ Ferrantino (2006, p25) refers to this as taking into account the endogenous nature of prices in a general equilibrium context.

The study by Mehta and Bhattacharya (2000) has used the gravity model to estimate the future trade flows in the South Asian region if the existing South Asian Preferential Trade Agreement (SAPTA) turns into South Asian Free Trade Area (SAFTA). Ghosh (2003) has estimated gravity model to capture the nature of India's trade with different regions of the world such as NAFTA, EU, ASEAN, SAARC, etc. Similar exercise has been done by Batra (2004) to predict India's global export potential. Also, Seekkuwa Wasam Hirantha (2003) has used the gravity model analysis to evaluate the progress of SAPTA and the prospects for SAFTA using trade data for 1996-2002. Both panel data and cross sectional data gravity estimation results show that there is a significant trade creation effect under SAPTA and find no evidence of trade diversion effect with the rest of the world. This supports the proposition that further regional integration may bring about substantial benefits to SAARC region and South Asian Free Trade Area is most likely to promote intra-regional trade through further dismantling of tariff and other non-tariff barriers to trade among members.

IV: Gravity Model Specification and Data

a. The Model

In addition to the basic gravity model equation, we estimated an augmented version known as ‘workhorse gravity model’ to estimate India’s export potential. We consider India’s world export to 150 countries of the world. The estimates refer to the period 1994-2004. The model has been augmented in the sense that, several conditioning variables that account for other relevant factors that may affect trade have been included over and above the variables. In this study we have included one dummy called, ‘trading affinity’. The models-basic and augmented- as specified for estimation are as follows:

Basic Gravity Model Equation

$$\text{Log} (\text{EXP}_{ijt}) = \beta_0 + \beta_1 \text{Log} (\text{GDP}_{jt}) + \beta_2 \text{Log} (\text{Dist}_{ij}) + u_{ij} \quad (3)$$

Workhorse (augmented) Gravity Model Equation

$$\text{Log} (\text{EXP}_{ijt}) = \beta_0 + \beta_1 \text{Log} (\text{GDP}_{jt}) + \beta_2 \text{Log} (\text{Dist}_{ij}) + \gamma_1 (\text{contig}) + \gamma_2 (\text{comlang_ethno}) + \gamma_3 (\text{RTA}) + \gamma_4 (\text{Trading affinity}) + \gamma_5 (\text{comcol}) + u_{ij} \quad (4)$$

Where i and j denotes countries and EXP_{ijt} denotes the value of total merchandise exports from country i to country j for the period t . The explanatory variables in the gravity model are defined as follows:

GDP: There are two ways of measuring the size of countries in the gravity model: GDP (output) or Population. As regards GDP, the model is estimated using constant GDP in US dollars (2000).

Distance: Dist. is the distance between the capital city of country i and that of country j measured “as the crow flies”-technically called the great-circle distance measured between the two latitude-longitude combinations.

To capture the impact of other important factors having relevance to the flow of trade between countries we include dummy variables. These are as follows:

Contig: A dummy variable to identify a pair of countries that are adjacent or contiguous or share a border. This dummy is in addition to the inclusion of the distance variable to account for the possibility of centre-to-centre distance overstating the effective distance neighbouring countries that may often engage in large volumes of border trade. The dummy variable is unity if countries share a common border and 0 when they do not.

Comlang_ethno: Comlang_ethno takes the value one when two countries share a common language (official or commercial) and ethnicity. This is expected to reduce transaction costs of doing trade negotiations.

Regional trading arrangements (RTA): Countries often enter into regional trading arrangements on preferential basis for augmenting trade. This dummy takes the value of one when both countries are members of the same regional group and 0 if they do not. As evident in the studies of Frankel and Rose (2002), FTA's impact positively on the flow of bilateral trade.

Trading affinity: This dummy is constructed on the basis of the trends of bilateral trade of a country for the last decade. Apart from other factors influencing trade, there are countries that seem to trade with the same countries/group of countries in a consistent manner. In the context of India-GCC, this dummy is important in the sense that GCC continues to be major trading partner for India not only due to the trading profile but also due to some other factors such as, historical trading affinity, presence of huge Indians in these countries and other cultural ties. We have developed this dummy on the basis of countries those have an average of more than one percent share in India's total trade for the period 1994 to 2004 continuously would have a value of unity and 0 otherwise. This is based on a recent study by Marcus Noland (2005).

Comcol: This is equal to one if pairs of countries were colonies after 1945 with the same colonizer and 0 otherwise.

U_{ij} : This is a log-normally distributed error term and represents the myriad other influence on bilateral trade. $E(\ln u_{ij}) = 0$.

b. The Dataset

The dependent variable in our analysis is the natural log of total merchandise exports measured in terms of constant US dollars (2000). We have derived the data for maximum possible coverage of India's bilateral trade (selected a sample of 150 countries). Our data source is the Direction of Trade Statistics yearbook (DoTS), published by the International Monetary Fund (IMF). DoTS is derived from the trade direction database of the International Monetary Fund (IMF). The period chosen for our analysis is 1994 to 2004.

GDP is measured in constant US dollars (2000). The data source for GDP is the World Bank published World Development Indicators (WDI CD-ROM, 2006).

Bilateral distance between two capitals of trading partners is derived from CEPII. The data pertaining to other dummies used in the analysis has been derived from CEPII.

c. Model Estimation and Results

We have estimated equation basic gravity equation for India's world trade flows. Our Workhorse Gravity model equation has been estimated using OLS technique with panel data. The dependent variable is total merchandise exports, in log-linear form, between pair of India and other 150 countries. All estimates are checked for heteroskedasticity. Panel estimation enables to capture the relevant relationships over time and monitor unobservable trading-partner-pair's individual effects. Then we used the coefficients from the first stage to analyze India's trading potentials with the GCC

countries individually and GCC as a bloc. We have also attempted fixed effect estimation and calculation of export potentials on the basis of coefficients derived in that.

Following the gravity approach, export flows are expected to be positively influenced by: (i) the dimension and the demand potentiality of host market (proxied by GDP of the partner), (ii) the presence of Trade agreements, (iii) the geographical contiguity (proxied by the presence of land or sea border), (iv) trading affinity, (v) common language and ethnicity; and by (vi) common colonial links. On the other hand, bilateral export flows are expected to be negatively correlated with the geographical distance of host's market, a proxy for trade costs, home bias and time and search costs. Table 15 shows the expected signs of the estimated variables in our study.

Table 15: Expected Signs of Variables

| Independent Variable | Ln (Expind) |
|------------------------------|--|
| Explanatory Variables | Expected Signs of Explanatory variables |
| Ln GDP par | + |
| Ln Dist | - |
| Contig | + |
| Comlang_ethno | + |
| RTA | + |
| Trading affinity | + |
| Comcol | + |

We estimated gravity equations by OLS estimator with White heteroskedasticity correction. The estimated coefficients are statistically significant, as shown in tables 16.

Table 16: Simple OLS Results of the Gravity Model

| Basic Gravity | | |
|---|---------------------------|--------------------|
| Variable | Parameter Estimate | t-statistic |
| Const. | 13.22441 | 16.15 |
| lngdp _i | 0.5653559 | 27.98 |
| Indist | -1.067246 | -14.27 |
| Basic Gravity with time fixed effect | | |
| Const. | 13.45468 | 16.88 |
| lngdp _i | 0.5558706 | 28.23 |
| Indist | -1.068354 | -14.67 |
| Work Horse Model | | |
| Variable | Parameter Estimate | t-statistic |
| Const. | 13.29471 | 16.16 |
| lngdp _i | 0.3833501 | 18.67 |
| Indist | -0.6563155 | -8.54 |
| contig | -2.078311 | -6.84 |
| comlang_ethno | 0.3014686 | 2.81 |
| RTA | 0.8025127 | 3.01 |
| Trading affinity | 2.706603 | 22.59 |
| Comcol | -0.5615141 | -5.01 |

| Work Horse Model with time fixed effect | | |
|--|---------------------------|--------------------|
| Variable | Parameter Estimate | t-statistic |
| Const. | 13.61575 | 17.27 |
| Lngdp _i | 0.3691614 | 18.74 |
| Lndist | -0.6558099 | -8.91 |
| Contig | -2.043682 | -7.02 |
| Comlang_ethno | 0.3063466 | 2.98 |
| RTA | 0.741796 | 2.9 |
| Trading affinity | 2.74551 | 23.91 |
| Comcol | -0.5760201 | -5.37 |

Incorporating the estimated coefficients of the dependent variable, all explanatory variables and the dummies in equation (4), we calculated the export potential using the values of the variable for the year 2004. Then, in order to know the magnitude of export potential we calculated the ratio of potential trade values and the actual trade values.

V: Results and Analysis

a: Analysis of Results

We analyze the results for the workhorse gravity model for both with dummies and also fixed effects.

The dataset fits well for both the basic and workhorse gravity model in our analysis. The standard features and power of explanatory variables in the regression are impressive. The baseline variables are highly significant and have the expected signs and are of reasonable magnitude.

The coefficient of the partner country's GDP variable in our specification is positive, statistically significant and economically reasonable indicating that higher GDP increases trade. Given that the coefficient for partner GDP (0.38) is less than one, an increase in the size of the country increases trade, though less than proportionately.

The estimated coefficient on log distance has the anticipated sign and is less than one, indicating that trade between a pair of countries falls by a little percent for every percent increase in the distance between them. On controlling for contiguity, i.e inclusion of the dummy variable for contiguity or common border, the magnitude of the distance increased slightly.

The estimated coefficient for the dummy trade affinity index shows a positive sign and a value of more than 1, indicating that countries having traditional trading affinity as in the case of India-GCC, they are likely to trade more.

The dummy variable for RTA is highly significant statistically. The common membership of an RTA explains some amount of bilateral trade over and above that explained by the five basic variables- size, per capita income, bilateral distance, common borders, and trading affinity. The coefficient on the dummy variable for RTA is 0.80, implying that the preferential trading arrangement can lead to increase in bilateral trade as well as diversification of bilateral trading portfolio.

We have also estimated time-specific fixed effects in our workhorse gravity model. As evident, all the coefficients have usual signs and are statistically significant and have economically reasonable traits.

b: India's Export Potential to the GCC

Using the coefficients of the workhorse gravity model, we have estimated India's export potentials with the GCC countries. The ratio of export potential (p) as predicted by the model and actual exports (a) i.e., p/a is then used to analyze India's export potential with GCC countries, on the basis of actual export figures for the year 2004. If the value of p/a exceeds one, then there is potential for expansion of exports with the respective country. Table 17 shows India's estimated export potential with the GCC countries.

Table 17: India's export Potential with GCC Countries

| Label1 | | | |
|---|-------------------|----------------------|------|
| Basic Gravity Model | | | |
| | Actual Export (A) | Potential Export (P) | P/A |
| <i>(Values in US million \$)</i> | | | |
| Bahrain | 134.1 | 55.5 | 0.41 |
| Kuwait | 382.9 | 118.1 | 0.31 |
| Oman | 257.2 | 261.4 | 1.02 |
| Qatar | 135.0 | 137.1 | 1.02 |
| Saudi Arabia | 1308.1 | 33.1 | 0.03 |
| UAE | 6605.0 | 229.7 | 0.03 |
| Basic Gravity Model with time-fixed effect | | | |
| <i>(Values in US million \$)</i> | | | |
| | Actual Export (A) | Potential Export (P) | P/A |
| Bahrain | 134.1 | 55.6 | 0.41 |
| Kuwait | 382.9 | 116.9 | 0.31 |
| Oman | 257.2 | 257.1 | 1.00 |
| Qatar | 135.0 | 135.5 | 1.00 |
| Saudi Arabia | 1308.1 | 33.4 | 0.03 |
| UAE | 6605.0 | 225.6 | 0.03 |
| Work Horse Model | | | |
| | Actual Export (A) | Potential Export (P) | P/A |
| <i>(Values in US million \$)</i> | | | |
| Bahrain | 134.1 | 196.1 | 1.46 |
| Kuwait | 382.9 | 444.8 | 1.16 |
| Oman | 257.2 | 963.6 | 3.75 |
| Qatar | 135.0 | 361.5 | 2.68 |
| Saudi Arabia | 1308.1 | 244.5 | 0.19 |
| UAE | 6605.0 | 509.5 | 0.08 |
| Work Horse Model with time fixed effect | | | |
| <i>(Values in US million \$)</i> | | | |
| | Actual Export (A) | Potential Export (P) | P/A |
| Bahrain | 134.1 | 200.6 | 1.50 |
| Kuwait | 382.9 | 447.8 | 1.17 |
| Oman | 257.2 | 969.9 | 3.77 |
| Qatar | 135.0 | 361.8 | 2.68 |
| Saudi Arabia | 1308.1 | 256.1 | 0.20 |
| UAE | 6605.0 | 504.7 | 0.08 |

As evident from the table, Our workhorse (augmented) gravity model shows that the magnitude of India's export potential is highest with Oman, followed by Qatar, Bahrain, and Kuwait. We found that currently India can increase its exports to Oman by 3.75 times and to Qatar, Bahrain and Kuwait by 2.68, 1.46 and 1.16 times respectively. In

absolute numbers, India's export potential with Oman, Bahrain, Qatar and Kuwait are found to be US 62 million dollars, US 62 million dollars, US 706.3 million dollars and US 226.5 million dollars respectively. All the model specifications using time-specific fixed effects also exhibit existence of similar trends about India's export potentials.

Moreover, when we replace the RTA dummy with the value of one, the results show sharp increase in the magnitude of India's export potential with Oman, Qatar, Bahrain and Kuwait. With the RTA dummy, India's export potential with these countries increases to US 1892.6 million dollar, US 671.6 million dollar, US 609.6 million dollar and US 303.4 million dollar respectively (see table 18).

Table 18: India's Export Potential with RTA Dummy Value 1

| Work Horse Model | | | |
|--|------------|---------------|------|
| | Actual (A) | Potential (P) | P/A |
| <i>(Values in US million \$)</i> | | | |
| Bahrain | 134.1 | 437.5 | 3.26 |
| Kuwait | 382.9 | 992.5 | 2.59 |
| Oman | 257.2 | 2149.8 | 8.36 |
| Qatar | 135.0 | 806.6 | 5.97 |
| Saudi Arabia | 1308.1 | 545.6 | 0.42 |
| UAE | 6605.0 | 1136.8 | 0.17 |
| Work Horse Model with time fixed effect | | | |
| | Actual (A) | Potential (P) | P/A |
| <i>(Values in US million \$)</i> | | | |
| Bahrain | 134.1 | 421.2 | 3.14 |
| Kuwait | 382.9 | 940.3 | 2.46 |
| Oman | 257.2 | 2036.4 | 7.92 |
| Qatar | 135.0 | 759.6 | 5.63 |
| Saudi Arabia | 1308.1 | 537.8 | 0.41 |
| UAE | 6605.0 | 1059.8 | 0.16 |

However, all the model specifications consistently show no export potential with UAE, and Saudi Arabia. This implies that currently India is overtraded with UAE and Saudi Arabia, as they are the largest two trading partners of India in the GCC and India's export basket to these two countries is not diversified and confined to limited number of items.

VI: Conclusions

In this study we have estimated India's export potential to the six-member GCC using the workhorse gravity model. Panel data has been analyzed incorporating OLS estimation procedure in STATA package. Our analysis is based on majority of India's export flows to the rest of the world.

The gravity equation fits the data and delivers plausible elasticities of the variables and estimates for the other significant characteristics and traits. We have for the first time also used a dummy called 'trading affinity' to show why a pair of countries continue to trade consistently for years and their effect on predicting export potential between countries. All conventional gravity effects are reasonable in our analysis, with statistically significant t-statistic. We have also estimated time-specific fixed effects. The signs of coefficients and values are reasonable and as usual.

Our estimates reveal that the magnitude of India's export potential is highest in Oman, followed by Qatar, Bahrain, and Kuwait. We have found that the magnitude of India's export potential with the GCC countries increase sharply in the possible scenario of an RTA. However, it seems that, India, UAE and Saudi Arabia are currently overtraded. This is true in the sense that UAE and Saudi Arabia are the two largest trading partners of India in the GCC bloc, so unless India's export basket is diversified, there wouldn't be any potential for augmenting exports. Moreover, while controlling for the time-specific fixed effects in our workhorse gravity model, similar trends of export potential are visible. Moreover, we found that India can potentially expand its exports to the GCC countries in the framework of an RTA.

However, the main limitation of the present study is its restricted scope of estimating India's export potential only. As majority of the trade-related welfare gain accrues from improved ability to import better and also diversifying traded commodity basket, the estimation of trade potential including both merchandise exports and imports from both sides, from India and from GCC would be a logical extension in this regard. Moreover, attempting a commodity-wise estimation of trade potential would also envisage other relevant indications that may be useful for policy making.

References

1. Anderson, J. 1979. A Theoretical Foundation for the Gravity Model. *American Economic Review*, Vol. 69(1), pp. 106-116.
2. Anderson, J. and van Wincoop, E. 2003. Gravity with Gravitas: A Solution to the Border Puzzle. *American Economic Review*, Vol. 93(1), pp. 170-192.
3. Anderson, J. and van Wincoop, E. 2004. Trade Costs. *Journal of Economic Literature*, Vol. 42(3), pp. 691-751.
4. Anderson, James. E and Eric van Wincoop (2001) "Borders, Trade and Welfare", Working Paper 8515, National Bureau of Economic Research.
5. Baier, S. and Bergstrand, J. 2005a. Bonus Versus OLS: A Simple OLS Approach for Addressing the "Border Puzzle" and other Gravity Equation Issues.
6. Baier, S. and Bergstrand, J. 2005b. Do Free Trade Agreements Actually Increase Members' International Trade? *Federal Reserve Bank of Atlanta Working Paper*, No. 2005-3.
7. Baldwin, Richard E. 1994. *Towards an Integrated Europe*. London, CEPR
8. Batra, Amita, (2004), 'India's Global Export potential: The Gravity Model Approach', *Working Paper No. 151*, ICRIER, New Delhi.
9. Benedicts, Luca De and Claudio Vicarelli, (May, 2004), "Export potentials in Gravity Panel Data Models", *ISAE Working paper*, No. 44.
10. Bergstrand, J. 1985. The Gravity Equation in International Trade: Some Microeconomic Evidence and Empirical Evidence. *The Review of Economics and Statistics*, Vol. 67(3), pp. 474-81.
11. Bergstrand, J. 1989. The Generalised Gravity Equation, Monopolistic Competition, and the Factor-Proportions Theory in International Trade. *The Review of Economics and Statistics*, Vol. 71(1), pp. 143-153.
12. Boris, Vujcic and Šošić Vedran (2004) "SEE and the Export potential of Croatia" paper presented at WIIW workshop on Regionalism and Trade.
13. Brühlhart, Marius and Mary J. Kelly (1999) "Ireland's Trading Potential with Central and Eastern European Countries: A Gravity Study", *The Economic and Social Review*, Vol. 30, No. 2, April, 1999, pp. 159-174.
14. Deardorff, A. 1995. Determinants of Bilateral Trade: Does Gravity Work in a Neo-Classical World? National Bureau of Economic Research Working Paper Series, No. 5377.
15. Deardorff, A. and Stern, R. 1997. Measurement of Non-Tariff Barriers. Organisation for Economic Cooperation and Development Economics Department Working Paper, No. 179.
16. Evenett S. and W. Kellar (2002), "On theories explaining the success of the gravity model", *Journal of Political Economy*, 110, 281-316.
17. Feenstra, R. 2004. *Advanced International Trade: Theory and Evidence*. Oxford: Princeton University Press.
18. Ferrantino, M. 2006. Quantifying the Trade and Economic Effects of Non-Tariff Measures. OECD Trade Policy Working Paper, No. 28.

19. Fidrmuc, Jarko. 1999. "Trade Diversion in 'Left-Outs' in Eastward Enlargement of the European Union: The Case of Slovakia". *Europe-Asia Studies*, vol.51, no.4, pp. 633-645.
20. Fitzsimons, E., Hogan, V. and Neary, P. 1999. Explaining the Volume of North-South Trade in Ireland: A Gravity Model Approach. *The Economic and Social Review*, Vol. 30(4), pp. 381-401.
21. Frankel, Jeffrey A (1997) "Regional Trading Blocs", Institute of International Economics.
22. Frenkel, Jeffrey and Shang-jin Wei, (1995) "Trading blocs and the Americas: The natural, the unnatural and the super-natural", *Journal of development Economics*.
23. Ghosh Madanmohan (2002), 'The Revival of Regional Trade Arrangements: Implications for Indian Trade Policy', 'Parthasarathi Banerjee and Frank-Jurgen Richter (eds.), "Economic Institutions in India: Sustainability under Liberalization and Globalization", Palgrave Macmillan, London, New York.
24. Helpman, E. and Krugman, P. 1985. *Market Structure and Foreign Trade: Increasing*
25. Hirantha, Seekkuwa Wasam (2003) "From SAPTA to SAFTA: Gravity Analysis of South Asian Free Trade' University of Nottingham.
26. Jeffrey A. Frankel & Andrew K. Rose, 2002. "Is Trade Good or Bad for the Environment? Sorting Out the Causality," NBER Working Papers 9201, National Bureau of Economic Research, Inc.
27. Jeffrey A. Frankel & Andrew K. Rose, 2005. "Is Trade Good or Bad for the Environment? Sorting Out the Causality," *The Review of Economics and Statistics*, MIT Press, vol. 87(1), pages 85-91, October.
28. Kalbasi, Hassan (2004) "The Gravity Model and Global Trade Flows", Department of Economics, University of Isfahan, Iran.
29. Krueger, Anne O. 1999. "Trade Creation and Trade Diversion under Nafta". NBER Working Paper 7429. Cambridge, MA.
30. Lamotte, Olivier (May 2002) "Export potential between Yugoslavia and EU", paper presented at 7th EACES Conference on Globalisation and Economic Governance, June 6-8 2002.
31. Linder, S.1961. *An essay on Trade and Transformation*. Uppsala, Almqvist and Wicksell.
32. Linneman, Hans.1966. *An Econometric Study of International Trade Flows*. Amsterdam.
33. Majumdar, Manab, "Symposium on Movement of Natural Persons", 19 March 2003, Tokyo, for FICCI, New Delhi.
34. Markusen, James R. 1986. "Explaining the Volume of Trade: An Elected Approach." *American Economic Review*, 76, pp.1002-1011.
35. Mehta R. and S. K. Bhattacharya (2000), "The South Asian Preferential Trading Arrangement: Impact on Intra-Regional Trade", 'The Asia Pacific Journal of Economics and Business' Vol. 4, No.1.
36. Noland, Marcus (June 2005) 'Affinity and International Trade', Institute for International Economics working Paper No W P 0 5 – 3.
37. Piermartini, Roberta and Teh (2005) 'Demystifying Modelling Methods for Trade Policy', WTO Discussion paper, No.10.

38. Returns, Imperfect Competition, and the International Economy. Brighton: Wheatsheaf Books.
39. Roberts, Benjamin A., (2004) "A Gravity Study of the Proposed China-ASEAN Free Trade Area", *The International Trade Journal*, Vol XVIII, No.4.
40. Rose, A. and van Wincoop, E. 2001. National Money as a Barrier to International Trade: The Real Case for Currency Union. *American Economic Review*, Vol. 91(2), pp. 386-390.
41. Sayeed, Ausaf, "India-Qatar: Synergy in the Oil & Gas Sectors", <http://www.indianembassy.gov>, accessed on 26th June 2006.
42. Sohn, Chen-Hyun (2005) "Does the Gravity Model Fit Korea's trade patterns? Implications for Korea's FTA Policy and North-South Korea Trade", CITS Working Paper, Yokohama National University
43. Tinbergen, J. 1962. *Shaping the World Economy: Suggestions for an International Economic Policy*. New York: Twentieth Century Fund.