ASSESSING THE TRADE ARRANGEMENTS OF PAKISTAN: BY GRAVITY MODEL

Dr.Etzaz Ahmand[1] and Madiha Riaz[2]

Abstract

Trade is fundamental part of all economic and development efforts, national economic growth, industrialization and technological knowledge. In this paper we estimated the trade performance of Pakistan and find out the major determining factors of Pakistan's trade by applying the augmented gravity model. We inferred that most important variable that significantly impact the trade flows of Pakistan are foreign GDP which is used as substitute for economic size of a country it shows the absorption capacity for imports and production of competitive low cost exports. Distance between Islamabad and its trading partners is also considered very crucial as it defines the trade hindrance and transportation cost. Absolute difference in per capita income between Pakistan and its trading countries is yet another variable impacting trade flows which indicates the development level, taste structure and factor abundance of a country. The bilateral trade might be enhanced with the countries having larger economic size; same development level and taste and last but not least is closer proximity.

Introduction

Trade is a fundamental part of the total development effort and national growth of an economy. This is in fact a vital instrument for industrialization. It provides opportunities that are essential for economic development. Trade is the main source for the dissemination of the technological knowledge, ideas, skills, managerial talents and entrepreneurship. International trade get good reward due to many benefits it has presented to different countries across the world .It accounts for increasing gross domestic products ,investment and one of vital source of revenue. With the help of modern production techniques, transportation system and rapid industrialization trade is growing and spreading swiftly.

[1] Dr Etazaz Ahmad-.Professor at Department Of Economics,Quaid-e-Azam University,Islamabad,Pakistan
[2] Ms Madiha Riaz-Lecturer at Department of Ecomomics-The Islamia University Of Bahawalpur,Pakistan

Trade is not a new concept. In 14th and 15th century silk route was used to transport silk and spices in 17th century clippers (fast sailing ships) were used to transport tea from China and spices from East Indies to different European countries .The major drivers of growth in 20th century is attributed to international trade. It enhances the domestic competitiveness, takes advantage of international technology, increase sales and profits, maintains cost competitiveness, expands business, reduces dependence on existing markets and gains a global market share.

The maintenance of free competition is also facilitated only when there is free international trade. It has long lasting effect on economic growth in the form of invention, innovation and efficiency. The most incredible example is China .Among others one of the most re marked-upon features of Chinese economic development since 1978 has been the speed at which the People's Republic has opened up to foreign trade. Western shops are saturated with cheap Chinese goods. Foreign direct investment has flooded in. The country's share of world exports of manufactures rose from 0.8 per cent in 1980 to 8.3 per cent by 2004.The share of exports in Chinese GDP appears to have increased even more rapidly .it rose from about 5 per cent in the late 1970s to 37 per cent by 2006, a extremely high figure for a comparatively large economy like China. It is widely believed that foreign trade and FDI have been the motors of Chinese economic growth over the last thirty years. As far as Pakistan's trade is concerned it observed rapid expansion during initial years of 2000s, as it increased from US$ 18.8 billion (25.5 percent of GDP) in FY00 to US$ 47.5 billion (33.1 percent of GDP) in FY07 due to better trade & tariff reforms. The rise in the overall trade seems to be more prominent in imports rather than export. Exports lean towards traditional markets and concentrated in traditional products. As a result, our share in the world exports not only remained low (0.14 percent) in FY06 but also turn down over the period. This compares unfavorably with India (1.02 percent), China (8.22 percent) and overall Asian regional counterparts (27.8 percent)[3]. The total trade percentage share of Pakistan export is less with countries having closer border and other advantageous factors such as proximity, transportation costs, common border, cultural and language characteristic as compared to the rest of world. It shows greater trade potential for Pakistan at regional and global

[3] All above data information is collected from State bank Survey Reports different Issues.

level and an opportunity to get rid of poverty circle and other deprivations by mounting their trade volumes.

The basic idea of trade is still based on the assumption that each country specializes in the production of those commodity which it can produce cheaper and exchange a part of it with other nations for the commodities which others can provide at a lower cost. Trade rests on the concept that it exists due to the difference of factor endowment, technologies, production capacities and entrepreneurial expertise. All these factors contribute towards the new structure of an economy and the improvement in this structure is only possible through the effects of direct and indirect benefits of trade for an economy. Subsequently the most important task is to come across the main factors going on which trade of a country is dependent.

We use gravity model in our study, because gravity models have been used in empirical studies of changes in international trade pattern and integration of economies. It provide useful multivariate framework to analyze the patterns of international trade. We estimate the trade performance of Pakistan with its 150 trade partner countries by applying gravity model using cross-section-OLS estimation technique over the time span of 1980-2002, making eight segments of three year averages. This has been done first time in literature that cross-section OLS estimation is applied for series of years taking their averages. Previous studies either consider Cross-Section OLS estimation only for a specific year or they rely on panel data estimation they both have their own shortfalls.

We augment our gravity model with several dummy variables to understand the basic concept of trade that trade is not a mere exchange of goods and services across borders, it is in fact interchange of different ideas, norms, concepts, customs, and life styles. The paper thus investigates the role of heritage and culture, political history; etc on trade patterns of Pakistan vis-à-vis its trading partners. Thus the paper illustrates how gravity model of trade is use efficiently as an empirical tool to asses trade flows of Pakistan with its trading partners. The model helps to identify the major determinants of export and imports. Although there are a number of variables, which are considered important to trade flows, however, given data

constraint only few of them can be incorporated for empirical analysis.

Numerous studies originating from Tinbergen (1962) and Linneman (1966), showed that trade flows follow the physical principles of gravity: two opposite forces find out the volume of bilateral trade between countries. Gravity equation has been used widely in the empirical literature on international trade. There are various categories of empirical application of gravity equation, that are estimating the cost of a border (Anderson and van Wincoop (2003), explaining trade patterns (Bergstrand (1989), Hummels and Levinsohn(1993), identifying effects related to regionalism and calculating the trade potentials (Wang and Winters (1991),Baldwin(1993), Gros and Gorciarz(1995). The theoretical support for the Gravity model was initially very poor, but after the second half of the 1970s several theoretical developments have filled this gap.

Anderson (1979) makes the first formal attempt by assuming a model of product differentiation for the derivation of Gravity model. Bergstrand (1985,1989) in a series of papers links gravity equation with simple monopolistic competition models. A differentiated product framework with increasing returns to scales are used by Helpman (1987) to give good reason for the gravity equation. Deardorf (1995) has shown that gravity model is derivable from standard trade theories. CES expenditure system is maneuvered in the derivation of gravity model by Anderson and Wincoop (2003). Eaton and Kortum (1997) derive gravity equation from Ricardian framework, while Deardorff (1997) derives it from H-O viewpoint. It is shown by Eventt and Keller (1998) that gravity equation can be obtained from the H-O model with both perfect and imperfect product specialization.

Transaction costs into the gravity model are introduced by Gould (1994). He argues that these costs arise from the lack of knowledge that a person possesses about one country’s laws, customs, tastes, and riskiness of markets. A measure of linguistic similarity based on the proportion of a population that speaks a particular language as a first language is constructed by Boisso and Ferantino (1997). The study attempts to capture the language effects by constructing a measure of likelihood that an exporter from one country would encounter an importer in another country, who speaks the same language.

The volume and direction of trade for Iran in a 76 country sample is analyzed by Kalbasi (2001**)**.The groups of countries are divided into developing and industrial countries and trade flows are examined to determine the impact of the stage of development on bilateral trade flows of Iran. Rehman (2003) estimates trade potential for Bangladesh using panel data approach with economic factors like openness, exchange rates etc rather than natural factors and Sohn (2005) applied the gravity model to explain South Korea's trade flows and to extract practical trade policy applications. Christos (2006) applies gravity equation to bilateral trade flows among EU member's states and their main trading partners. Bilateral trade balances are derived between each transitional and individual country within the EU in the study. There are different categories of empirical applications of the gravity equation which can be mentioned to investigate issues in international trade.

Previous studies have taken the product of GDP and GNP for the measurement of bilateral Export and Import level following the Newton Gravity Formula, For single country case this product give constant value and biased result therefore we estimate our models using the proxy Population variable and GDP of target country. The main contributions of this paper are: it reaffirms a theoretical justification for using the gravity model in applied research of bilateral trade; it applies, for the first time, cross section-OLS estimation for a series of Year Averages in a gravity model framework to identify the determinants of Pakistan's trade.

The remainder of this paper is organized as follows: section 2 discusses the Methodology. Section 3 presents the empirical result obtained from the technique applied and section 4 will discuss the conclusions and policy implication.

Methodology

Modeling and predicting foreign trade flows has long been an important task in international economics. One of the most fruitful ways to formalize this has been through the use of gravity models. The gravity model has been tested both for the aggregate bilateral trade and also for product level trade. Aggregate model has been estimated using different data set by

[Wang and Winters (1991), Hamilton and Winter (1992), Baldwin (1994), Breuss and Egger (1999)] etc. On the other hand, Bergstand (1989), Feenstra *et al*. (2001) are product specific models.

The correct econometric representation of gravity model takes the form of a triple-indexed model. Matyas (1997) argues that the proper specification of gravity model takes the following representation:

$$T_{ijt} = \alpha_i + \gamma_j + \lambda_t + \beta' x_{ijt} + \delta' z_{ij} + u_{ijt}$$

where α_i, γ_j and λ_t are well- known specific effects attributed to the panel data modeling approach. If only cross section data are used, $\lambda_t = 0$ and when only time series data are used then $\alpha_i, \gamma_j = 0$. Finally when panel data are used, there are no restrictions. From an econometric point of view, $\alpha_i, \gamma_j = 0$ and λ_t specific effects can be treated as random variables. Matyas is not specific about fixed and random effect model estimation in case of above mentioned model. It is observed that gravity model works well at product or sectoral levels.

Model (1) should be viewed as the generic form of all gravity models and is a direct generalization. When cross-section data are used then T=1 and implicitly restriction $\lambda_t = 0$ is imposed on the model [(e.g.; Aitken (1973), Bergstrand (1985), Brad (1994), Oguledo and Macphee (1994), and Frankel *et al*, (1995)].

It is argued that standard cross-sectional methods yield biased results because they do not control for heterogeneous trading relationship. With such heterogeneity, a country exports different amounts to two different countries, even though the two export markets have the same GDP and are equidistant from the exporter. This can be because there are historical, cultural, ethnic, political, or other geographic factors that affect the level of trade and are correlated with the gravity variables (GDP, population, distance, etc). If so, then estimates that do not account for these factors will suffer from heterogeneity bias. The studies using cross-section try to avoid this heterogeneity bias by introducing some additional variables such as common language,

colonial history and military alliance, etc. The country- pair intercepts include the effects of all omitted variables that are Cross-sectionals specific but remain constant over time, such as distance, contiguity, language, culture, etc.

To capture the variables, which are responsible for the heterogeneity bias, we use various dummy variables in our model; the main purpose to include these variables is to grasp the effect of

cultural differences of trading pairs on trade. If it is considered that trade is a static process, and within estimator is consistent for a finite time dimension T, and there is an infinite number of country-pairs N, then in this situation cross-section process is more appropriate for analysis. Cross-section analysis is mainly static and it refers to long run relationship. It is worth noting that the fixed effects approach does not allow for estimating coefficients on time invariant variables such as distance, common border or language dummies.

We used cross-section OLS for our analysis to estimate gravity models. Classical gravity models generally use cross-section data to estimate trade effects and trade relationships for a particular time period.

The generalized gravity model of trade states that the volume of trade / exports / imports between pairs of countries, T_{ij} is a function of their incomes (GNPs or GDPs), their populations, their distance (proxy of transportation costs) and a set of dummy variables either facilitating or restricting trade between pairs of countries. That is,

$$T_{ij} = \beta_{\circ} Y_i^{\beta_1} Y_j^{\beta_2} N_i^{\beta_3} N_j^{\beta_4} D_{ij}^{\beta 5} e^{\beta_m A_{IJ}} U_{ij} \quad (2)$$

Where $Y_i(Y_j)$ indicates the GDP or GNP of the country ' i ' and ' j ', $N_i(N_j)$ are populations of the country ' i 'and ' j ', D_{ij} measures the distance between the two countries' capitals (or economic centeres.) A_{ij} represents dummy variables, U_{ij} is the error term and β 's are parameters of the model. 'i' is used for home country and 'j' for target country.

Using per capita income instead of population, an alternative formulation of equation (2) can be

written as

$$T_{ij} = \beta_{\circ} Y_i^{\beta_1} Y_j^{\beta_2} y_i^{\beta_3} y_j^{\beta_4} D_{ij}^{\beta_5} e^{\beta_m A_{ij}} U_{ij}$$

(3)

Where $y_i (y_j)$ are per capita incomes of country ' i ' and 'j'. As the gravity model is originally formulated in multiplicative form, we can linearize the model by taking the natural logarithm of all variables. The log form of general gravity model is as follow.

$$\ln T_{ij} = \beta^* + \beta_1 \ln Y_i + \beta_2 \ln Y_j + \beta_3 \ln y_i + \beta_4 \ln y_j + \beta_5 \ln D_{ij} + \sum_{m=1}^{M} \beta_m A_{ij} + u_{ij}$$

(4)

Where

$$\beta^* = \ln \beta_0$$

Where "ln" denotes natural logs. A_{ij} is the sum of (trade) dummy variables. Dummy variables take the value of one when a certain condition is satisfied and zero otherwise.

Using our data set, we estimate gravity models for Pakistan trade:

(a) The gravity model of Pakistan's exports, and

(b) The gravity model of Pakistan's imports.

For our models we have followed Frankel (1993), Hassan (2000) and Rehman (2003).

The dependent variable in the gravity model is total Export and Import of Pakistan toward its specific trading partner. One of the important independent variable used in gravity model is product of GNP or GDP and the product of per capita GDP or GNP. We did not use the product of these variables because it is more appropriate in panel data analysis where we analyze different pairs of countries for different time periods and estimate their relationship over the period of time. In our analysis cross-section is used where for a segment of year GDP and GNP of Pakistan is constant. We took GDP and per capita GDP of foreign country independently to see the effect of economic size and structure of development of those countries on Pakistan's exports and imports demand.

The Gravity Model of Exports in our study is:

$$\ln X = \beta_1 + \beta_2 \ln Y_f + \beta_3 \ln(P_f) + \beta_4 \ln(Ay) + \beta_5 \ln(TOF) + \beta_6 \ln(FCR) + \beta_7 \ln(RER) + \beta_8 \ln(Dis) + \beta_9 D_1 + \beta_{10} D_2 + \beta_{11} D_3 + \beta_{12} D_4 + \beta_{13} D_5 + \beta_{14} D_6 + \beta_{15} OIC + \beta_{16} SAARC + \beta_{17} OECD + \beta_{18} ECO + \beta_{19} ASEAN + \beta_{20} CMEA \quad (5)$$

The gravity model for Imports in our study is:

$$\ln M = \beta_1 + \beta_2 \ln Y_f + \beta_3 \ln(P_f) + \beta_4 \ln(Ay) + \beta_5 \ln(TOF) + \beta_6 \ln(FCR) + \beta_7 \ln(RER) + \beta_8 \ln(Dis) + \beta_9 D_1 + \beta_{10} D_2 + \beta_{11} D_3 + \beta_{12} D_4 + \beta_{13} D_5 + \beta_{14} D_6 + \beta_{15} OIC + \beta_{16} SAARC + \beta_{17} OECD + \beta_{18} ECO + \beta_{19} ASEAN + \beta_{20} CMEA \quad (6)$$

Whichever specification of the augmented gravity model is used, the main purpose of this specification is to allow for non-homothetic preferences in the importing country and to proxy for the capital/labor ratio in the exporting country (Bergstrand, 1989).

Data

Pakistan's exports to and imports from all other trading partners is considered on Annual basis from 1982-2002. This data was obtained from the Direction of Trade Statistics yearbook (various issues) published by the International Monetary Fund (IMF).

Data on GDP, GDP per capita, exchange rates, total imports, and total exports were obtained from the World Development Indicators (2005) database. Likewise, data on the consumer price index (CPI) was obtained from the International Financial Statistics database.CPI data was used in construction of Real Exchange rate variable. Data on distance (km) between Islamabad (the capital of Pakistan) and the capital cities of other countries were obtained from The World fact Book (CIA,2006). Construction of variables and Unit of measurement with other details are presented in Appendix-A

ESTIMATION RESULTS AND DISCUSSION

This section presents the basic statistics and estimation results of gravity model with augmented significant variables. Gravity model with all of the augmented variables depicts the relationship of these variables with bilateral trade flows of Pakistan. This analysis is based on cross-section data for the sample of 150 countries. For each cross-section, periods from 1980-2002 are considered.

1- GRAVITY MODEL

In order to have a precise idea that how trade flows have been affected over the course of time, data on Pakistan's trade flows covering the period from 1980-2002 from IMF Direction of Trade Statistics have been collected. Gravity models both for exports and imports have been estimated. From early 1980s Pakistan has taken various measures such as de-linking Rupee form US Dollar in 1982 and thereafter a series of structural reforms. As a result of these reforms the economy has become more open and moved from inward looking to outward looking economy. Similarly, tariffs have been reduced considerably. Keeping in view the fact that in different time periods different policy initiatives have been implemented, therefore the sample size is divided into eight distinct time periods for which a separate gravity model is estimated. This method of estimating gravity model will give us deeper insights about the trade dynamics.

To test the Heteroskedasticity in the models we have run our regressions corrected for white Heteroskedasticity.

All variables were also tested for multicollinearity. To check whether there was multicollinearity in our model, we regressed each independent variable of the model on the remaining independent variables and computed R_i-squares. If any of these R_i-squares was greater than the original R-square then we conclude that there was severe multicollinearity in the model. From the results we observed that the model did not have multicollinearity problem except in per capita GDP and population variable. So we dropped per capita GDP from our final selected model.

To drop insignificant variable we applied Walt test. Before dropping insignificant variables from model we checked them at 1percent, 5 percent and 10 percent level of significance.

2 GRAVITY MODEL FOR EXPORTS

In this section we are discussing the results estimated for exports flows of Pakistan. The data is divided into eight distinct groups. The results obtained are given in the APPENDIX-Table 7.1(a) and 7.1(b).

The first model estimated for export flows for sample 1980-82 suggest that target countries GDP are significant and positive and our exports have elastic response with respect to the GDP of trade partner. It depicts that target country GDP is a measure of the extent that exports are "sucked in" as the foreign economy grows. It shows that a one percent increase in foreign GDP will lead to about 2.3 percent increase in our export demand. It implies that our trade pattern's follow a GDP pattern relying more on its trading partners overall economic size than its per capita income level and level of development.

As expected distance variable has the correct negative sign and is significant as well, showing that geographical distance is an important resistance factor for Pak bilateral trade flows. The coefficient of the log of the distance turns out to be very similar to those estimated in other previous studies (Frankel, 1997; Wall, 1999). The distance coefficient reflects not only a simple

elasticity of absolute distance on trade volume, but also the effect of relative distances. Relative distance means all type of transaction cost that an exporter has to face during the transportation of commodity from home country to foreign country. The size of the distance coefficient is different in different models and regressions because of this relative cost.

The population of trading countries carries the negative sign. It implies that foreign population variable has the trade inhibiting affect on our export flows. It implies that a larger population size may be treated as large resource endowments and thus an indication of self sufficiency and thereby less reliance on international trade. On the other hand it also indicates that Pakistan's export are not competitive ,the cost is also high so when it has to trade with larger economies it loses its bargaining power as compare to home producer of importing country and our demand of export decreases. The larger economies by population size has more attraction for FDI, from developed economies that are lower cost producer and had a access to economies of scale, as they provide an opportunity of wider market size and a large number of buyers. So they invest in the countries where there is growing population, as a result demand of exports from countries like us will reduce which are less efficient in production. India is a live example as USA and other developed nations are more interested to invest there because she is large in size of population. More over there is a common concept of bell curve in mass production/distribution systems. Mass production achieves efficiency gains only to the point at which the costs of distribution more than cancel the gain. The Bell Curve maximum efficiency is between too small and too big. So if there is too big population size than too big economies of scale. The optimum theory of population also assists our result that an increase in population will permit a fuller utilization of the natural resources and capital equipment ,that is if the population increases and more laborers become available to be combine with the given stock of natural resources and capital equipment ,output per worker will rise. Another fact due to which production increases as population expands is an increase in the market size, and an advantage to take the benefit of economies of large scale production, which adds to the economies productivity and economies of scale. As a matter of fact, literature on gravity model provides support that the effect of population is indeterminate. It could be positive; in which case it is considered as trade enhancing affect and it is equally possible that population has the trade inhibiting affect when it is negative.

Among other variables colony and trade openness of trading countries are significant, carries perverse signs. It shows that these variables played negative role in enhancing the export demand during this time period. Though during the 1980s, there was a shift in trade policies globally from ISI (Import substituting) to export led growth (ELG). The success of ELG adopted by South Korea and Taiwan set an example for other developing countries. Taking the lesson from the experience of developing countries, Pakistan maintained its liberalization policies towards more export oriented industries. these policies included the conversion of fixed into flexible exchange rate, duty free imports of essential machinery and raw material to certain export-industries, and the export rebates, yet Pakistan was not able to produce at lower cost as there were other economies like South Korea and Taiwan so the trade openness of foreign countries could not be proved helpful to enhance the export level during 80's. This can also be attributed to the weak inherited base of industry since the time of independence of Pakistan. So till that time we were not able to compete with other economies and we have seen the negative effect of trade-openness on our export demand.

Model-2 estimated for period 1983-85 shows that income of the trading partners has positive and significant impact on Pakistan's export flows and that distance variable has the correct sign once again emphasizing the fact that long distance between trading partners leads to higher costs thus lower profit margin to importers. Dummy variable for common colony has the expected positive sign and is significant as well. In our gravity models, the dependant variable is in log form but the dummy variables are not, therefore to interpret the impact of dummy variable we have followed Halvorsen and Palmquist (1980)[4]. Thus the coefficient of dummy for common colony implies that Pakistan's export flows [exp {1.259824-1}*100] are higher by 252 percent with the economies having common colony than with the rest of the world. If we say that trade (exports plus imports) is a dynamic process than export function is better explained by lagged years because policies which are made today will show their affects in subsequent years. So the polices measure taken at the start of eighty by government for the growth of export led industries in the form of compensatory rebates scheme, export credit guarantee scheme, and

[4] Halvorsen, R. and Raymond Palmquist (1980), "The Interpretation of Dummy Variables in Semi logarithmic Equations", *The American Economic Review*, Vol. 70, No. 3, pp 474-475.

concessionary credit for exporters, showed their significant impacts in the successive years in this way our few variables which were showing insignificant results become significant. because our trade relations with the rest of world get improved, the common colony, colony, common language showed positive effect on the demand of our export in the model estimated for 83-85,89-91,and1998-2000.

Foreign exchange reserves of the trading partner that also show the strength of an economy, has also been included, however, it is only significant in model-4, model-7 and model-8. It shows the countries having more reserves will demand more exports from Pakistan.

According to Linder (1961), economies with similar demand structure will tend to trade more than otherwise. The Linder effect has been captured by introducing a variable that is defined as the differential in absolute per capita of Pakistan with trading countries. Now if the coefficient associated with this variable turns out to be negative, it may be treated as an empirical support for Linder hypothesis and a positive sign will indicate that trade flows are following Heckscher-Ohlin (H-O) hypothesis. In Model-2, the results support the Linder hypothesis and the coefficient is significant at 10% level of significance. The results of the Model-3, Model-4, Model-5, Model-6 and Model-7 again support the Linder hypothesis and the coefficient is significant as well. It relates to the trade in real world. It depicts that the presence of increasing return in production causes the production of each good to be located in either of the countries but not in both of them. It also suggests that demand structure will be similar for the similarities of per capita income. The coefficient value is elastic which imply that export with specific foreign country decreases as the per capita GDP differential between Pakistan an that country increases.

Among the class of dummy variable, adjacency was used to see the trade relations of Pakistan with its neighbors sharing same border. Our coefficient in the study shows negative relations with our neighbors the significant negative effect of adjacency in model estimated are due to unfavorable relations of Pakistan with its neighbors in different time periods due to several reasons. Relation between Pakistan and India has been based on rivalry and suspicion

since the time of partition. Although there are many issues throughout the history which divide the two countries, the most sensitive issue has been the status of Kashmir. Pakistan's trade with India accounts, on average, for only 15 percent of its overall regional trade. India enforced very restrictive trade policies. Most products that Pakistan can export to India were blocked by high tariffs, quotas, and even outright bans. Not a single exported item presents a consistent trend. For example, residual fuel oil and naphtha accounted for more than 90 percent of Pakistan's exports to India in the early 1980s. This category completely disappeared from the list of exports after 1984. Similarly, pig iron exports accounted for one half of total exports to India in the 1982–84 periods, but it does not even appear in the list of exported products in other years. It seems that Pakistan's trade with India is guided by temporary exportable surpluses or is used to counter temporary shortages. Political difficulties created artificial barriers to trade between them, which helps no one but the smugglers. On other side Iran and Pakistan has had close geo-political and cultural religion linkages but the conflict strains appeared since the Iranian revolution started. Pakistan and Iran supported different factions in the Afghan conflicts. One of our adjacent countries is Afghanistan; she has had to face the Soviet invasion since 1979 to 1989. In all these circumstances it is obvious to have negative trade relations with neighbors.

The responsiveness of our export demand with respect to foreign income is elastic and the coefficient associated with distance variable also has the correct sign in all models estimated. A careful inspection of the results obtained from gravity models for exports indicate that dummy for Regional Trade Agreements (RTA) such as SAARC, OIC, ECO, ASEAN and CMEA remain insignificant throughout in all the models. It points out the fact that these trade agreements have not contributed significantly in enhancing our export flows during the period of our estimation because of structural instability and conflicts within the region. The main reason for this is that, unlike many East Asian countries, Pakistan has not adopted an effective trade liberalization regime.

Dummy for common language show that export flows tends towards countries having common official language in Model-2 and Model-7 only, that covers the period from 1983-85 and 1998-2000.All the other models do not support the view that export flows necessarily be affected because of language.

At the end of 20th century the world economy has to face radical fluctuations due to which trade sector was strongly effected all over the world. Status of Pakistan also changed because of its performance as a front-line-state on war on terror against Afghanistan. It affected our economy in many ways; first, the slower pace of economic activity in Pakistan's major trading partner countries (the United States and European Union, in particular) reduced their demands for Pakistani products, and as a result Pakistan's exports remained lower than targeted. Furthermore, increases in freight rates and imposition of war risk insurance increased the cost of imports and it made Pakistani exports more expensive. Second, cancellation of air cargo flights by foreign airlines disrupted the trade flows. Third, manufacturing units had to maintain higher inventories because of the risk of instability. Fourth, the departure of expatriates from the country and the suspension of visits by foreign buyers did not allow the country to maintain normal trade relations. In May 1998, Pakistan conducted nuclear tests, which resulted in economic sanctions from the international community. Furthermore, the army chief resigned amid rumors about an imminent military coup in the country, which was followed by an intensification of the political crisis in October 1999, when the military took over the reins of government. All these factors adversely affected the economy as political uncertainty led to the evaporation of foreign investors' confidence. The continuous tension and threat of war with India has similar effects. Furthermore, the terrorist attack on the Indian parliament in December 2001 and successive troop deployments on the international border between India and Pakistan has affected foreign investment and the trade balance of Pakistan. The continuous fluctuation in the world economy has greatly affect our trade and our results in different model estimated for export flows get changed abruptly because of the export variable sensitivity to exogenous factor.

In 2000, the government made significant macroeconomic reforms: Privatizing Pakistan's state-subsidized utilities, reforming the banking sector, instituting a world-class anti-money laundering law, cracking down on piracy of intellectual property, and moving to quickly resolving investor disputes. After September 11, 2001, and Pakistan's proclaimed commitment to fighting terror, many international sanctions, particularly those imposed by the United States, were lifted. In 2002, the United States led Paris Club efforts to reschedule Pakistan's debt on generous terms, and in April 2003 the United States reduced Pakistan's bilateral official debt by

$1 billion. Pakistan's economic prospects began to increase significantly due to unprecedented inflows of foreign assistance at the end of 2001. This trend is expected to continue through 2009. The change in the attitude of world economy towards Pakistan indicates that export performance will be changed in the coming years and variables for export will show more reliable and consistent result in accordance with theory. As we see in our study the real exchange rate is showing its significant result in accordance with the theory only in model estimated for 2001-02.

3 GRAITY MODEL FOR IMPORTS

In this section we present the discussion of results regarding gravity models estimated for import flows of Pakistan, with significant variables. Reference Tables are 7.2(a) and7.2 (b) in APPENDIX

The relationship of Pakistan's import and foreign income is positive which shows the supply condition of trading country. It shows that with the increase in foreign income, import of Pakistan will increase, because according to literature whenever there is increase in income, new means of productions are invented due to which cost of production may decrease, generating economies of scale so in this way imported goods become cheaper for us and we demand more. The coefficient value is different for eight models estimated but it lie between the range from 1 to 3%, so the overall result interpret the same meaning that if foreign income is increased by 1% import will increase in average by 2%. For example Model-1 for import indicates that a one percent increase in foreign income lead to two percent increase in import flows from the foreign countries.

Distance variable is significant and carries negative sign throughout in all the model estimated showing import coming from distant countries is lower than that countries which are near in proximity, because distance causes to increase all type of cost. Proximity does not mean that countries are in our neighborhood. it shows the extent of relative cost incurred in the process of transportation of a commodity from one place to another.

In most of the cases, the coefficient associated with differential in absolute per capita income is insignificant. Although Model-5 estimated for 1992-94 and Model-7 estimated for 1998-2000 show that import flows could be explained by H-O model as the sign of variable is

positive and is significant at 10 percent level. Our result in favor of H-O model depicts the base of our import. It shows that our import will increase with an increase in the per capita Gdp differential with foreign country and it further assist the concept of Hecscher-Ohlin which based the trade between countries
(on the comparative advantage) on difference in factor endowments among nations.

The effect of foreign population on our import is negative and it is significant only in model estimated for 1989-91 and 1992-94 showing negative imports relation with larger economies, which indicates toward absorption effect in these economies. It shows with larger population size countries consume most of the portion of their production and export less.

As for as the coefficient of trade-openness is concerned, it is significant and showing negative relationship with import flows of Pakistan in model estimated for 1992-94 and 1998-2000.The maximum import duty rate has been reduced from 250 percent in 1987-88 to 128.6 percent in 1989-90 and further to 110 percent in 1995-96. On the other hand, minimum import duty rate has declined from 13.3 percent in 1987-88 to 10 percent in 1989-90. Subsequently, it declined to 0.5 percent in 1995-96. In result, average duty rate (un weighted) declined from 40.7 percent in 1987-88 to 25.5 percent in 1995-96. The number of duty slabs has been reduced to 5 with tariff rates 10 percent, 15 percent, 25 percent, 35 percent, and 45 percent. After 1987-88 growth rates of imports have decelerated, respectively, from 19.5 percent and 24.7 percent in 1987-88 to –11.1 percent and –10.2 percent in 1998-99. It seems that despite of all the efforts for trade liberalization, the external sector remained under pressure. There was no healthy sign for our trade and for our economy during 80’s and 90’s.This is also evident from the result of our variable trade openness.

The impact of exchange rate volatility on the volume of international trade has been studied intensively since the late 1970’s when the exchange rate moved from fixed to flexible exchange rate all over the world, means facing a volatile real exchange rate. The theory says that higher exchange rate volatility will reduce trade by creating uncertainty about future profit from export trade and exchange rate volatility may also affect trade indirectly by influencing firm’s investment decision because on one side it is increasing uncertainty but on

other side it increases the cost of production in term of prices (exchange rate act as an proxy for prices in world market) if real exchange rate of certain currency with respect to its partner increases and vice versa. Pakistan follows the flexible exchange rate system since 1982. At the initial stage the
fluctuation of exchange rate was very nominal. Pakistan's share in world imports was stable during the last 24 years, ranging between a minimum of 0.12 percent in 1980 and a maximum of 0.18 percent in 1992. In 2002-2003 the share was 0.17 percent. This suggests that Pakistan's import demand was not much affected by the instability of exchange rate but it does effect by the rise in exchange rate. In our analysis real exchange rate has depicted significant result in model-5 and model-7 which shows that our import demand decrease with an increase in the real exchange rate and vice versa. The rise in exchange rate increases the cost of import in terms of their prices so demand decreases.

Foreign currency reserves (FCR) has significant effect on our import demand in model-4 and model-7. Its positive relationship with our import demand shows that Pakistan import demand is more from the economies which are economically stronger. This might be because of their competitive position in world economy. As we know that the main source of foreign currency reserves are exports of a country. The country which possesses more FCR implicitly depict the strong position of that country from exports side, more export implicitly shows the export competitiveness of that country over world so obviously demand from such countries will be more than that of other.

The dummy variable adjacency was used to capture the import flow of Pakistan from its neighbor's countries with which it is sharing a common border. But unfortunately we have suffered from decades a internal political disputes and ongoing confrontation with neighboring India. Similarly we did not enjoy friendly relations with other neighbors except China. Our adjacency variable in the study is showing negative relationship in the models estimated for the period of 1980-82 and 1995-97. While it is positive when estimated for the period 1992-94 which shows the friendly attitude towards neighbors in this period which was the need of time. In the Indo-Pakistan context, the role of the South Asian Association for Regional Cooperation (SAARC) has also generated greater awareness among the political leaderships in the

subcontinent on the need to increase intra-regional cooperation and trade. Moreover, an enlargement of India–Pakistan economic relations has also played very important role for increasing the level of trade flows as a whole. On April 11, 1993, the SAARC member states signed an agreement on a South Asian Preferential Trade Agreement (SAPTA) at the SAARC summit at Dhaka. The agreement provides a broad framework of rules for a phased liberalization of intra-regional trade. In 1994-95, India liberalized its coffee industry Pakistan is estimated to be the second largest tea consumer in the world with market size of around 130-150 million kg per annum and for several years it did not import tea from India. Pakistan's main imports from India include tea, vegetables, and iron ore. They also include a number of manufactured products, showing a relatively more stable pattern than exhibited by Pakistan's exports to India. India and Pakistan propose to expand economic linkages with each other despite problems persisting in their political relations. So this change in policies has made our variable positive and significant in this period.

As for as the dummy variable for religion is concerned it is significant only in the period estimated for 1992-94 and 2001-02.Similarly the dummy use for regional trade agreement is significant for OIC and CMEA in 1992-94 and for SAARC in 1998-2000.It may be because of the pace of trade liberalization which was accelerated under a Structural Adjustment Programme (SAP) with the IMF in 1988. The government removed the non-tariff barriers (NTB) and replaced them with tariffs measures, accompanied by reduction in maximum tariff rate. In early 1990s, imports rose steeply primarily due to the continued import liberalization policies together with the international oil price shocks. For further liberalization of imports, the restriction on import license scheme (except for commodities on the negative list) was abolished. The government took various steps for liberalizing imports which included abolishment of the system of free and banned imports in 1983 and the introduction of a negative list items. Furthermore, in 1997, reforms were aimed at the liberalization of the economy. These reforms provided for tariff cuts on imports, reducing the top rates for customs duties from 65 percent to 45 percent import duties on a host of raw materials. The import of a few items like chilies and pharmaceuticals were allowed from India. Furthermore, the new trade policy removed the restrictions on importation of gold and silver. All these policies changes have changed the behavior of our variable used in the model. As it is evident from the significance of regional trading agreements

during the decade of 1990. Though there was greater political instability in our country and greater fluctuating events in the world. Pakistan timely understood the needs to pull down the pillars on which it built a delicate structure of relationship with its large neighbor. There is still a large scope to expand mutually beneficial trade relations between the countries of our region and also with adjacent Muslim countries. Due to certain political and economic constraints, the potential has not been fully realized in the past. Furthermore Pakistan has conducted reduction and simplification of its tariff schedules, which have resulted in the average applied MFN tariff rate falling from 56% in 1993/94 to 20.4% in 2001/0.

The significant result of SAARC dummy is due to the change in the status of this regional trade organization during 90,s. The eighth SAARC summit held in India had decided to establish a South Asian Free Trade Area (SAFTA) on the lines of the European Free Trade Area (EFTA) in order to liberalize intra-regional trade As SAPTA (South Asian Preferential Trade Agreement, 1993) excluded 90% of all tariff lines and quotas for its member countries. It envisages periodic rounds of trade negotiations for exchange of trade concessions on tariff, Para-tariff and non-tariff lines. Such preferential trading arrangements imply a reduction of tariffs on trade among SAARC member states. Pakistan and India are two major countries in SAARC. Pakistan holds consultations with India on the issue of granting Most Favored Nation (MFN) status to India which indicates scope for restoration of bilateral trade ties. In tune with such positive signs it is observed that India–Pakistan bilateral trade has risen 14-fold over the past decade from Rs 47.15 crore in 1987-88 to Rs 463.92 crore in 1998-99.On April 10, 1999, the largest sub continental neighbors signed a memorandum of understanding in New Delhi to set up the India–Pakistan Chamber of Commerce. This economic cooperation has increased the significance of SAARC and it is depicted in our result estimated for the period of 1998-2000.

The results show that common colony is the variable that turns out to be significant in Mode-2, Model-6, Model-7 and Model-8. It shows that our import flows are [exp {1.6-1}*100] are 395 percent higher with countries have common colony. Similarly Model-8 shows that due to common colony our import flows are [exp {2.2-1}*100] are 803 percent and is significant at 10 percent level of significance. The significance of this variable shows cultural similarities among nations play a vital role in trade relations among themselves as this variable reveals Pakistan

trade more from the countries which remained a colony for England because such countries have historical linkages and cultural similarities.

Among other dummy variables landlocked shows its significant result in model estimated for period 19980-82 and for1992-94 which is an indication that cost of transportation increased if a country has no access to water. So demand of import from such economies is low than that of others.

CONCLUSION AND POLICY IMPLICATIONS

There is a great deal of uncertainty regarding the theoretical basics of gravity model which can be categorized into economic and non-economic explanations. All models and estimation techniques developed over time has a long process of development, controversy and improvement yet it has own strengths and weakness dependent on availability and credibility of data. Empirically, it has been noticed that R-square in gravity equation turns out to be in between 0.65 and 0.95 depending upon the specification of the equation but many economists have the argument that the gravity equation does not have much link with the neoclassical trade theory as it does not incorporate the role of comparative advantage or importance of relative factor endowments or relative level of technology among the trading countries. Per Capita Income differential is used as a proxy for this purpose but per capita income differential is not the proper representation of the factor endowment differential. Also the H-O hypothesis assumes zero transportation cost and perfect competition which are unlikely.

A related observation is that neoclassical trade theory is generally not concerned with bilateral trade; rather a country's trade is determined by its difference from the rest of world. It is evident from our results that trade policies and economic status of a country play important role in decisive relationship of trade between two countries. The behavior of all variables change with a change in economic status of a country.

After analyzing the gravity model for export and import, it can be inferred that most importantvariable that significantly impact the trade flows is foreign GDP which confirms that International trade is strongly affected by the trading partners' income It represent production capacity and size of markets. The propensity of all partners to export and import must be taken into account adequately when a trade policy is set. There is need to explore the new markets with competitive quality products provided at a lower cost.

Distance between Pakistan and its trading partners is another crucial variable for trade. It indicates the trade barriers impact of transportation costs. Costs increasing trade friction reduce the amount of trade observed; the greater the friction, the higher will be the proportion of given expenditure that goes on costs rather than the good itself and smaller will be the incentives for trade. One of the main problems in South Asian trade is the inadequacy of the region's transport and infrastructure network. Improvements in infrastructure are a prerequisite for successful trade flows within South Asia. Second main reason is political instability chaos and traditional enmity among neighboring countries like Pak-India, India- China. etc

Absolute difference in per capita income between Pakistan and its trading countries is yet another variable impacting trade flows. It measures the difference in term of relative factor endowments between two countries and takes a minimum value of zero when there is equality in relative factor endowments. The larger is the difference, the higher will be the volume of inter-industry trade and lower will be the share of intra-industry trade. Favorable results are obtained in supports of the Linder hypothesis for exports and H-O model hypothesis for import demand in our study.

Foreign currency reserves of trading countries has also significant impact on our trade flows as increase in reserves level of trading economies resulted in increasing the demand for our export flows. It depicts the economic strength of a country. The higher the level of a country's reserves, the easier it can pay for its trade deficits.

Common colony appears to be the only variable in the class of qualitative variables that has significant and positive influence on our export flows. It is meant to capture cultural and historical similarities between trading pairs, which are thought to increase the volume of trade.

Dummy for regional trade agreement in almost all the models is insignificant implying that such trade arrangements are not very effective in enhancing our trade; countries often enter into trading agreement with the intension of facilitating bilateral trade. One of the reasons behind insignificance of RTA's behavior is that we are measuring it for a single country in our study, it is different when measured for a complete bloc of countries. Trade barriers need to be reduced. However, this depends on the behavior of trading partners toward Pakistan who most often impose restrictions on Pakistani products. So far, regional economic groupings, particularly SAARC and ECO, have failed to show any significant impacts on bilateral trade. Regional trade is inhibited by restrictive rules, regulations and uncoordinated efforts, in addition the existing political tensions between India and Pakistan, China and India; etc who are major players. All these factors are currently the main cause of RTA's failures it threaten to limit the trade potential of Pakistan within South Asia.

Overall gravity model seems to be a better tool in explaining out trade flows and it also shows that the gravity model is applicable to the single country case.

POLICY IMPLICATIONS

The trade relations with the larger economies would be very rewarding for our growing economy because larger countries by economic size tend to have bilateral trade surpluses with smaller ones. A high level of income in the exporting country indicates a high level of production, which increases availability of goods for exports and more likely to achieve economies of scale. They also pose larger domestic markets which are able to absorb more imports. Larger economies account for a larger share of world income and consumption. There is dire need of time to make good friendly relations with larger economies like India. Pakistan will have to get better the quality of its exports and reduce the cost of production to facilitate it to fighting fit in the international market.

Pakistan would do better if it trades more with its neighbors as it is evident from the results of distance variable. The distance variable is a trade resistance factor that represents trade barriers such as delivery time, cultural unfamiliarity and market access barriers. The lower are the resistance factors the higher will be the supply of goods to other markets.

For boosting exports policies would be more tilting towards the countries with similar income per capita or similar characteristics and development level in general. In this way specialization occurs within the sectors and consumers get benefits from the resulting increased range of products available. The more similar the demand structure of two countries, the more incentives will be the potential trade between them.

In order to take benefits from the Regional trade arrangements Pakistan would give special preference to their regional countries.

Appendix

Result Tables

Table 7.1(a)

Gravity model for exports
(1980-91)

Years	**Model-1**		**Medel-2**		**Model-3**		**Model-4**	
	1980-1982		**1983-1985**		**1986-88**		**1989-91**	
Variables	Coefficient	T-value	C-efficient	T-value	Coefficient	T-value	Coefficient	T-value
Foreign GDP	3.217077	1.434284	1.349298	2.715911	1.05092	1.120291	3.091617	4.238673
Distance	-2.98234	-1.20868	-2.49834	-4.18068	-2.75283	-2.23901	-2.06819	-2.25948
Foreign population	-1.85669	-0.81892	-0.97843	-1.8042	-1.12898	-1.21563	-2.25822	-3.07408
Absolute GDP Differential	-2.38581	-1.70347	-0.5529	-1.67582	-0.98868	-1.88242	-1.3116	-2.73462
Trade-Openess	0.943075	0.341303	-0.12214	-0.17005	-1.21432	-0.78358	-0.31108	-0.26867
Real Exchange Rate	0.214183	1.288946	-0.0459	-1.05658	-0.08344	-0.78958	-0.03406	-0.59486
Foreign Currency Reserves	0.466346	0.437543	0.254788	1.161731	0.75938	1.400211	-0.37257	-0.92249
Adjacency	-1.22306	-0.14764	-3.99974	-1.50915	-5.24482	-0.99135	-5.48529	-1.32178
Common Language	-4.85885	-1.85954	1.279336	2.125648	-0.75625	-0.60292	1.067428	1.072739
Colony	5.843421	0.640741	1.352208	0.625426	3.14499	0.684198	1.489242	0.406957
Common Colony	-0.42132	-0.14977	0.29429	0.447677	0.2293	0.166258	0.969931	0.883294
Religion	-1.10212	-0.3431	1.279082	1.821827	-0.21552	-0.15827	0.267929	0.26294
Land-locked	0.68995	0.254487	-0.33874	-0.52038	-0.73118	-0.56715	0.018852	0.01942
OIC	2.267283	0.410822	-0.87695	-0.69681	0.04852	0.019604	0.294252	0.153073
SAARC	-0.47819	-0.09408	0.088212	0.073746	1.00706	0.400403	1.936522	0.9585
OECD	-2.33431	-0.55328	-0.31736	-0.31642	0.20445	0.097889	-0.2881	-0.17398
ECO	2.503106	0.322382	-1.88615	-0.90203	-1.567	-0.34978	0.873179	0.248108
ASEAN	-1.86307	-0.25681	-0.6003	-0.34826	-0.741	-0.22447	1.33663	0.528455
CMEA	0.335	0.002	1.16799	0.566384	1.8422	0.420621	1.132056	0.327524
R-squared		0.302682		0.642052		0.342515		0.447177
Adjusted R-squared		0.123371		0.540545		0.180278		0.317502

Table 7.1(b)

Gravity Model for export

(1992-02)

	Model-5		**Model-6**		**Model-7**		**Model-8**	
Years	**1992-94**		**1995-1997**		**1998-2000**		**2001-02**	
Variables	Co-efficient	T-value	Co-efficient	T-value	Co-efficient	T-value	Co-efficient	T-value
Foreign GDP	2.086768	2.308393	1.656191	3.926006	0.421211	0.754163	0.37401	-0.64672
Distance	-0.99116	-0.88361	-0.81076	-1.95419	-1.08163	-1.87486	-0.78588	-1.16591
Foreign population	-2.2707	-2.77518	-0.85339	-2.11975	-0.43061	-0.85656	0.08863	0.162832
Absolute GDP Differential	-1.50191	-2.49008	-0.6975	-2.21383	0.051385	0.142042	-0.2341	-0.62008
Trade-Openess	-1.74248	-1.26659	-0.64078	-1.17034	-1.21414	-1.71526	-0.18944	-0.22855
Real Exchange Rate	0.059936	0.541621	0.014384	0.355207	-0.03018	-0.45998	0.015223	0.267764
Foreign Currency Reserves	0.643386	1.141562	0.025297	0.105268	0.6516	2.102742	1.515186	4.012487
Adjacency	-2.3421	-0.55329	-1.5963	-0.90428	-0.04339	-0.01739	-2.73405	-0.94444
Common Language	-0.5814	-0.46045	0.108943	0.194475	1.023585	1.256885	0.316693	0.30972
Colony	2.855608	0.612177	1.97701	0.887147	1.53166	0.472419	2.208434	0.590669
Common Colony	2.650926	1.953643	1.126991	1.850572	0.745341	0.832159	0.570516	0.50861
Religion	0.396349	0.310677	0.504689	0.946315	0.977063	1.292028	0.395682	0.447861
Land-locked	0.561445	0.48082	0.009193	0.018436	-0.32581	-0.475	-0.09154	-0.11382
OIC	0.811919	0.358256	0.648466	0.651435	-0.47597	-0.32381	-0.04899	-0.02838
SAARC	2.348933	0.917574	0.761823	0.651959	0.958811	0.556453	-0.90527	-0.46088
OECD	0.808382	0.398172	-0.49933	-0.53653	-0.18013	-0.13293	0.420254	0.266036
ECO	2.204232	0.481393	0.60069	0.280903	-0.52602	-0.16949	-0.01923	-0.00544
ASEAN	-0.01487	-0.00535	0.183325	0.169278	0.254195	0.161063	-0.06866	-0.03718
CMEA	0.264324	0.112754	-0.36728	-0.37213	-0.38478	-0.2674	-1.57751	-0.94416
R-squared		0.318606		0.568492		0.393005		0.4354
Adjusted R-squared		0.179396		0.49529		0.291839		0.3456

Table 7.2(a)

Gravity Model for Imports

(1980-91)

Years	**Model-1**		**Model-2**		**Model-3**		**Model-4**	
	1980-1982		**1983-85**		**1986-88**		**1989--91**	
Variables	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
Foreign GDP	2.351073	0.831871	1.0383	1.4409	0.79857	-0.45985	3.330076	3.709373
Distance	-5.63509	-1.75586	-2.11166	-2.923	-3.35069	-1.78367	-2.12852	-1.838
Foreign Populatin	0.267567	0.094595	0.088588	0.1267	0.920408	0.540951	-1.75739	-1.96386
Absolute GDP Differential	0.214649	0.121302	0.371767	0.7195	0.679425	0.578846	-1.27122	-2.13486
Trade-Openess	0.660975	0.179396	0.361118	0.401	2.16766	-0.92373	0.362813	0.244369
Real Exchange Rate	0.274954	1.253821	0.006919	0.1422	0.017002	0.097548	0.024943	0.320493
Foreign Currency Reserves	0.164492	0.122425	-0.20194	-0.608	1.185719	1.487379	-0.1988	-0.40147
Adjacency	-9.75394	-0.93752	-5.59528	-1.854	-7.48801	-0.96521	-5.85006	-1.16376
common Language	-6.92062	-2.13009	-0.27656	-0.406	-2.54736	-1.41059	-0.67454	-0.56454
Colony	6.600106	0.576283	1.382041	0.568	3.728886	0.557612	1.346949	0.304057
common Colony	4.361264	1.23953	1.587744	2.1589	1.23322	0.616508	1.326788	1.005821
Religion	-2.99693	-0.70637	-1.16074	-1.26	-2.30839	-1.1133	0.410161	0.320564
land-locked	-3.79472	-0.96959	-1.00824	-1.194	0.473632	0.21753	0.38479	0.287831
OIC	0.232505	0.033359	1.312124	0.9053	1.67316	0.461168	1.305579	0.562344
SAARC	1.905488	0.300506	1.568983	1.1671	1.740006	0.480756	0.733126	0.303142
OECD	-4.3358	-0.78192	-0.19293	-0.163	-0.65645	-0.20446	-1.01698	-0.48136
ECO	5.596236	0.572305	1.000061	0.4296	1.386245	0.214154	0.092205	0.021872
ASEAN	-0.33322	-0.03689	0.697847	0.3592	-2.17585	-0.4522	0.878886	0.287189
CMEA	0.135	0.005	1.232338	0.534	0.931624	0.147328	0.989621	0.238434
R-squared		0.442234		0.7148		0.418195		0.532847
Adjusted R-squared		0.287776		0.6197		0.260276		0.412902

Table-7.2(b)

Gravity model for Imports

(1992-02)

Years	**Model-5**		**Model-6**		**Model-7**		**Model-8**	
	1992-95		**1995-97**		**1998-2000**		**2001-2002**	
Variables	Coefficient	T-value	Coefficient	T-value	Coefficient	T-value	Coefficient	T-value
Foreign GDP	2.421137	1.8661	2.288941	4.1103	0.634116	0.9861	1.275355	1.275
Distance	-3.09584	-1.929	-1.9085	-3.513	-1.96022	-2.949	-1.45174	-1.246
Foreign population	-2.24836	-1.922	-1.02916	-1.909	0.126502	0.2185	-0.67134	-0.713
Absolute GDP Differential	-1.38112	-1.598	-0.63095	-1.463	0.345902	0.8304	-0.1241	-0.19
Trade-Openess	-2.59233	-1.311	-0.58174	-0.826	-1.11142	-1.365	-1.33785	-0.933
Real Exchange Rate	0.13882	0.8776	-0.01628	-0.298	0.044153	0.5844	-0.0121	-0.123
Foreign Currency Reserves	0.842974	1.0446	-0.11464	-0.374	0.451629	1.2653	0.68889	1.055
Adjacency	-6.50335	-1.072	-3.50095	-1.544	-2.89768	-1.008	-2.14172	-0.428
Common Language	-1.06174	-0.588	-0.29743	-0.425	-0.29227	-0.319	-0.42214	-0.239
Colony	3.377264	0.5065	2.438583	0.8602	2.109075	0.5654	2.661652	0.412
Common Colony	3.111904	1.6038	2.08599	2.7353	1.980785	1.9572	2.795223	1.441
Religion	1.340435	0.7205	0.059444	0.0856	-0.84513	-0.97	1.79519	1.175
Land-locked	0.632581	0.3746	0.176537	0.2725	1.380476	1.75	0.26204	-0.188
OIC	0.5864	-0.181	0.536032	0.4189	1.526039	0.9017	-0.79367	-0.266
SAARC	1.887598	0.5158	1.499598	1.005	2.480001	1.249	1.976548	0.582
OECD	-0.96194	-0.331	-1.6255	-1.37	-1.1512	-0.737	-1.06295	-0.389
ECO	0.401503	0.0613	0.123039	0.0449	1.826242	0.5107	0.342	-0.056
ASEAN	-1.34163	-0.338	-0.29437	-0.21	-0.11599	-0.064	0.327218	0.102
CMEA	2.16434	0.6458	1.020817	0.809	0.260105	0.1569	1.656008	0.573
R-squared		0.3713		0.6472		0.5308		0.613
Adjusted R-squared		0.2415		0.5862		0.4533		0.607

APPENDIX-A

VARIABLES EXPLANATION

Variables	Exact definition	Notations	Source	Unit	Expected Sign
Volume of Exports	Total volume of exports from Pakistan to "j" trading partner in a specific year.	X_j	IMF Direction of Trade Statistics	Current US dollar Million	----------
Volume of Imports	Total volume of imports from "j" trading partner to Pakistan in a specific year	M_j	IMF Direction of Trade Statistics	Current US dollar Millions	----------
Gross Domestic Product	GDP of "j" trading partner in a specific year	y_f	World Development Indicators	Current US dollar Billions	Positive
Population	Population of "j" trading partner in a specific year.	p_f	World Development Indicators	Million of inhabitants	Ambiguous
Relative absolute difference	Relative absolute difference=difference of per capita GDP of Pakistan and its "j" trading partner in a specific year	AY	World Development indicators	Current US dollar	Positive(HO theory) Negative(Linder theory)
Real Exchange	Real exchange rate	RER	IMF International	LCU/US	Positive

Rate	for Pakistan is defined as RER=NER/NERj* CPIj/CPI Where NER is Nominal Exchange rate and CPI is Consumer Price Index.		Financial Statistics.	dollar constant at 2000	
Distance	It is great circle distance between geographic centers of Pakistan and its "j" trading partner.	DIS	Coordinates from the CIA (The World Fact Book 2006)	Kilometers	Negative
Trade Openness	It is trade / GDP ratio of "j" trading partner in a specific year.	TOF	World Development Indicators	Local units	Positive
Foreign Currency Reserves	It is total currency reserves minus gold for "j" trading partner in a specific year.	FCR	IMF International Financial Statistics .	Current US dollar	Positive
Common Language	It is a dummy for common official language, it is equal to 1 if "j" trading partner share a common official language with Pakistan. English in our study	D2	The CIA(The World Fact Book 2006)	----------	Positive

Contingency	It is a Border dummy, it takes the value of"1" if the border of "j" trading partner is adjacent with Pakistan	D1	The CIA(The World Fact Book 2006)	----------	Positive
Religion	It is a Religion dummy; it takes the value of 1 if "j" trading partner is Muslin country	D5	The CIA(The World Fact Book 2006)	----------	Positive
Common Colony	This dummy takes the value of 1 if "j" trading partner country remained the colony of British.	D4	The CIA (The World Fact Book 2006)	----------	Positive.
Landlocked	Landlocked dummy takes the value of "1" if "j"trading partner is landlocked having no access to water transport.	D6	The CIA (The World Fact Book 2006)	----------	Negative
OIC (Regional Trade Agreement)	This dummy takes the value of "1" for the countries who are member of OIC, and 0 otherwise.	OIC	The CIA (The World Fact Book 2006)	----------	Positive
OECD(Regional Trade Agreement)	This dummy takes the value of "1" for the countries who are member of OECD,	OECD	The CIA (The World Fact Book 2006)	----------	Positive

	and 0 otherwise.				
ECO(Regional Trade Agreement)	This dummy takes the value of “1” for the countries who are member of ECO, and 0 otherwise.	ECO	The CIA (The World Fact Book 2006)	----------	Positive
SAARC(Regional Trade Agreement)	This dummy takes the value of “1” for the countries who are member of SAARC, and 0 otherwise.	SAARC	The CIA (The World Fact Book 2006)	----------	Positive
CMEA(Regional Trade agreement)	This dummy takes the value of “1” for the countries who are member of CMEA, and 0 otherwise.	CMEA	The CIA (The World Fact Book 2006)	----------	Positive
ASEAN(Regional Trade Agreement)	It takes the value of “1” for the countries who are member of ASEAN, and 0 otherwise	ASEAN	The CIA (The World Fact Book 2006)	----------	Positive

REFERENCES

Aitken, N.D.(1973); The Effect of the EEC and EFTA on European Trade: A Temporal Cross-Section Analysis, *American Economic Review*, Vol.68,pp.5-28.

Anderson, J.E (1979), "A Theoretical Foundation for the Gravity Equation", *The American Economic Revie*w, Vol. 69: 106-16.

Anderson, J.E. and Wincoop E. V (2003), "Gravity with Gravitas: A Solution to the Border Puzzle", *The American Economic Revie*w, Vol. 93, issue 1, pp. 170-92, Nashville.

Baldwin, R.E.(1994), Towards an Integrated Europe, London, CEPR.

The Evolution of the EC and EFTA".Review of Economics and Statistics,vo,.23,pp.143-153.
Bergstrand J.H (1989), "The Generalized Gravity Equation, Monopolistic Competition, and the Factor Proportion Theory in International Trade", *Review of Economics and Statistic*s: 143-53.

Bergstrand, J.H 1985, "The Gravity Equation in International Trade: Some Microeconomic Foundations and Empirical Evidence", *The Review of Economics and Statistic*s, Vol. 67: 474-81. Harvard University Press.

Boisso, Dale and Ferrantino.M. (1997). "Economic Distance, Cultural Distance, and Openness in International Trade: Empirical Puzzles." *Journal of Economic Integration,* 12(4), pp.456-84.
Brad, C.(1994); World Trade in Apparel: An Analysis Of Trade Flows using the Gravity Model, *International Regional Science Review* Vol.17. pp. 151-166.

Breuss F., Egger P.(1999). "The Use and Misuse of Gravity Equation in European integration Research." WIFO Working Paper.

Christos,P. Pentecost E.J, Marques,H (2006); "A Gravity Forecast of The Potential Trade Effects of EU

Enlargement: Lessons from 2004 and Path_dependency in Integration" , The World Economy 29(8), pp;1077-1089.

Deardorff, A. (1998), "Determinants of Bilateral Trade: Does Gravity Work in a Classical World?", In *The Regionalization of the World Economy*, ed. by Jeffrey Frankel. Chicago: University of Chicago Press.

Deardorff, Alan V,1995, "Determinants of Bilateral trade", Does Gravity works in a Neoclassical World?, Presented at a conference by NBER.

Direction of Trade Statistics Yearbook of IMF (Various Issues).

Eaton,J. and S.Kortum (1997), "Technology, Geography, and trade," *Econometrica,* 70,1741-1779.

Evenett, S.J. and Keller, W (1998), "On the Theories Explaining the Success of the Gravity Equation", in NBER *Working Paper*, No. 6529, Cambridge, MA: National Bureau of Economic Research.

Feenstra, Robert C., James A. Markusen, and Andrew K. Rose (2001). "Using the Gravity Equation to Differentiate among Alternative Theories of Trade," *Canadian Journal Of Economics* 34(2): 430-447.

Frankel, J. and Wei, S.J (1993), "Emerging Currency Blocs", Mimeo, University of California- Berkeley.

Frankel, J.A. (1997), "*Regional Trading Blocs in the World Economic System*", Institute for International Economics, Washington, D.C.

Frankel J. (1993), "Regional Trading Blocs in the World Economic System, Institute for International Economics," Washington D.C.

Frankel, J., Stein,E. and Wei, S.(1995). "Trading Blocs and the Americas: The Natural, the unnatural, and the Super-Natural." *Journal of Development Economics*, Vol.47.pp.61-95

Gould, David M (1994), "Immigrant Links to the Home Country: Empirical Implications for U.S. Bilateral Trade Flows", *Review of Economics and Statistics* 76, 302-316.

Gros D. and Gonciarz A. (1996), "A note on the trade potential of central and eastern Europe", *European Journal of Political Economy*, No. 12, pp. 709-721.

Halvorsen, R. and Raymond Palmquist (1980), "The Interpretation of Dummy Variables in Semi logarithmic Equations", The American Economic Review, Vol. 70, No. 3, pp 474-475.

Hassan, M.K.(2000)."Trade Relations with SAARC Countries and Trade Policies of Bangladesh' , Journal of Economic Cooperation Among Islamic Countries, Vol.21, No.3,(July): 99-151.

Hamilton C.B. and Winters A.L. (1992), "Opening Up International Trade with Eastern Europe", *Economic Policy*, No.14, pp.77-116.

Helpman, E and Krugman, P. (1985), "*Market Structure and Foreign Trad*e", Cambridge, MA: MIT Press.

Helpman, E. (1987), "Imperfect Competition and International Trade: Evidence from fourteen Industrial Countries*", Journal of Japanese and International Economics,* Vol. 1:62-81.

Helpman, E. (1989), "Monopolistic Competition in Trade Theory", *Frank Graham Memorial Lectur*e, 1989 special paper 16, International Finance Section, Princeton University, Princeton, N.J.

Helpman, E. and Krugman P.R(1989), "*Market Structure and Foreign Trade: Increasing Return, Imperfect Competition, and International Economy*", Cambridge,USA.

Hummels, D. (1995), "Product Differentiation as a Source of Comparative Advantage", *American Economic Review, Papers and Proceedings*, LXXXIII: 445-49.

Hummels, D (1999), "*Have international transport costs declined*?" working paper.

International Financial Statistics (IFS) CD-ROM, International Monetary Fund (IMF).

Kalbasi, H. (2001), "The Gravity Model and Global Trade Flows", Paper presented at *the 75th International Conference on Policy Modeling for European and Global Issue*s, Brussels. July 5-7.

Linder, S. B. (1961), " *An Essay on Trade and Transformatio*n", New York: John Wiley and Sons.

Linneman, H. (1966), " *An Econometric Study of International Trade Flow*s", North Holland, Amsterdam.

Mátyás, L. (1997), "Proper Econometric Specification of the Gravity Model", *The World Economy*, Vol. 20, No3.

Marks. N and Lázlo Mátyás (1998) " *The Econometrics of Gravity Models*", Working Paper No. 5/98, Melbourne Institute of Applied Economic and Social Research.

Oguledo, V.I. and Macphee, C.R. (1994), "Gravity Models: A Reformulation and an Application to Discriminatory Trade Arrangements", *Applied Economic*s, 26: 107-120.

Poyhonen, P. (1963), "Toward A General Theory of International Trade",*Ekonomiska Samfundets Tidskrif*t, Tredje serien, Argang 16: 69-77.

Rahman, M. M. (2003), " *A Panel Data Analysis of Bangladesh's Trade: The Gravity Model Approach*". University of Sydney.

Sohn C.H. (2005); "Does the Gravity Model Explain South Korea's Trade Flows",The Japanese Economic Review, Vol. 56, No.4,(December).

Tinbergen, J. (1962)," *Shaping the World Economy: Suggestions for an International Economic Policy*". The Twentieth Century Fund, New York.

Wang Z.K., Winters A.(1991), "The Trading Potential of Eastern Europe." CEPR Discussion Paper,610.

Wall,H. J(1999). "*Gravity Model Specification and the Effect of the Canada- U.S. Border*." Working Paper No. 2000-024 A, Federal Reserve Bank of St. Louis.

*World Development Indicator*s, (Various Issues) World Bank.

World Factbook (*2006*). http://www.cia.gov/cia/publications/factbook/