

The Structure and Behavior of Pakistan's Imports from Selected Asian Countries: An Application of Gravity Model

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Abstract

This paper critically analyzes Pakistan's import policy during 1990s and explores the determinants of bilateral import flows between Pakistan and selected Asian countries (SAC) in recent past. Much research on international trade patterns focuses on primitive causes of trade such as differences in national factor endowments, preferences and technologies but we have focused on macroeconomic determinants to overcome the problems of trade deficit. It contains the policy issues which may be helpful for policy makers of other developing countries facing same conditions. A gravity model of international trade is empirically tested with the help of generalized least square (GLS) method of estimation for panel data. Empirical results reveal that income, exchange rate and openness of SAC economies are contributing factor of Pakistan's import flows. There is convincing evidence that current import flows are positively correlated with previous year whereas infrastructural bottlenecks have negative impact on Pakistan's import flows.

Keywords: Behavior of Imports, Pakistan, Gravity Model.

1. Introduction

Pakistan located in Southwest of Asia, is the sixth most populous country in the world and has the second largest Muslim population in the world after Indonesia. Foreign trade is important to the economy of Pakistan because country needs to import a variety of products to fulfill the increasing demands resulting from its economic recovery and development. Pakistan is not a major trading player in the international trade. Pakistan's imports have generally been greater than its exports. Like exports Pakistan's imports are highly concentrated to few items namely, Machinery, Petroleum Products, Chemicals, Transport Equipment, Edible oil, Iron and steel, Fertilizers and Tea which account for more than 70% of total imports¹.

¹ Economic Survey of Pakistan (2007-08).

Pakistan's objectives in negotiating bilateral and regional (preferential and free) trade agreements are primarily to seek better market access by addressing tariff and non-tariff measures, to further facilitate and promote trade, investment and to enhance the comparative value of Pakistan's exports. During mid 90's Pakistan's foreign policies are primarily aimed at strengthening trade relations with Asia².

Pakistan is pursuing a policy of export-led growth for which the issues of market access are important. As a consequence, an orchestrated trade policy has been carefully designed. During 1990's the government placed new importance on developing trade links with nearby nations and realized the need to increase regional blocks in international trade. So, Pakistan has adopted a conscious strategy to gradually increase regional blocks in international trade especially with Asian countries. China, Japan, Malaysia, Saudi Arabia, Singapore and Indonesia are among those Asian countries who showed a much pronounced rise in trade with Pakistan during recent years and almost 35 percent to 40 percent of Pakistan's imports are from these countries. This paper will not only find out some important determinants of Pakistan's imports with above mentioned six SAC countries but will also attempt to synthesize the current international trade problems faced by Pakistan thereby providing a starting point for further studies. Table 1.1 represents the percentage share of SAC in total import volume of Pakistan.

Table 1.1:

Percentage share of selected Asian Countries in total import volume of Pakistan

Countries	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
China	4.89	5.56	6.87	7.40	8.94	9.46	11.57
Japan	5.38	5.01	6.58	6.00	7.04	6.43	5.69
Malaysia	4.00	4.41	4.63	3.86	3.29	2.48	3.09
Saudi Arabia	11.7	11.6	10.7	11.4	12.0	10.47	11.43
Singapore	3.04	3.12	3.49	3.15	1.81	1.62	1.57
Indonesia	1.51	2.34	2.11	2.29	2.79	2.65	2.77

Source: WTO Trade data base, World Development Indicators, Federal Bureau of Statistics, Pakistan Revenue Automation Pvt. Ltd. (PRAL).

Unfortunately, the percentage growth rate of Pakistan imports from Asian countries has generally been greater than its exports. According to Looney (2002), there are several factors responsible for this situation. Poor policy making on both the part of the government and the companies has burdened the Pakistani textile industry with high costs

² Recently, Pakistan along with 26 Asian countries had signed the Inter Governmental Agreement on Asian Highway Network (AHN) in a Ministerial meeting held at Shanghai People's Republic of China in April, 2004. The main Agreement has been deposited with Secretary General, United Nations. The main objectives of the Agreement on AHN are (i)- To promote and develop international road transport in Asia and with neighboring regions. (ii)- To strengthen relations and promote trade and tourism among members.

and a limited line of products. In addition the country's relatively slow pace of globalization especially in the 1990s has resulted in little innovation and productive investment. If Pakistan had been a country with years of good governance, experiencing strong and stable investment patterns with increased openness and globalization possessing a highly literate workforce, the situation would have been much better. Table (1.2) represents the major items of Pakistan's imports from SAC.

Table 1.2:
Major items of imports of Pakistan with selected Asian Countries

Countries	Items
China	Boiler machinery and mech. appl, Electrical/appl./parts, Organic Chemicals, Petroleum products and oil, Misc chemical products
Japan	Road vehicles, Boilers, Machinery and Mach. App, Iron and Steel, Telecommunication app/equipt., Organic Chemicals
Malaysia	Animal or vegetable fats and oil, Organic chemicals, Boilers, Machinery and mechanical appliances, Plastic and articles there of, Telecommunication equips.
Saudi Arabia	Petroleum products and oil, Organic Chemicals, Plastic and articles there of, Fertilizers, Leather and leather manufactures
Singapore	Boilers, Machinery and mechanical appliances, Telecommunication appl. and equip., Plastic and articles thereof, Organic chemicals, Petroleum products and oil
Indonesia	Animal or vegetable fats and oil, Petroleum products and oil, Manmade fiber and yarns, Paper, paperboard and articles, Organic chemicals

Source: WTO Trade data base, World Development Indicators, Federal Bureau of Statistics, Pakistan Revenue Automation Pvt. Ltd. (PRAL)

To find out determinants of Pakistan's imports flows with SAC gravity model has been formulated. Pattern of import flows are analyzed by employing mathematical and econometric tools. Pool data of Pakistan, China, Japan, Malaysia, Indonesia, Saudi-Arabia, and Singapore is applied with the help of generalized least squares (GLS) estimation technique. Time series data, covering the period 1996-2006 has been selected because the government placed new importance on developing trade links with nearby nations and realized the need to increase regional blocks in international trade. For this study, the data has been taken from International Financial statistics (IFS) (CD ROM, 2006), State Bank of Pakistan's Publications and Economic Survey of Pakistan.

2. Literature Review

To analyze the impact of bilateral trade policies on economic outcomes, researchers have generally used Gravity Models. There are wide ranges of applied research where the gravity model is used to examine the bilateral trade patterns and trade relationships. The gravity model has been applied to a wide variety of goods and factors of production moving across regional and national boundaries under different circumstances since the early 1940s (see Oguledo and Macphee, 1994). Tinbergen (1962) was the first to

conceive the gravity model in its simple form while Poyhonen (1963) was the second. Numerous adjustments, additions and modifications were made in the gravity model since then. It became popular for modeling trade flows (Eichengreen and Irwin, 1998; Feenstra, 1998).

Jayaraman (1978) examines the effects of a hypothetical South Asia custom union in Bangladesh, India, Nepal, Pakistan and Sri Lanka. He concludes that gains from South Asian Preferential Trade Agreements (PTAs) would be insignificant for small nations. A study of Rahman et al. (1981) confirms some of Jayaraman's results and concludes that small countries like Nepal and Sri Lanka would be at loss as a result of the establishment of the custom union. In the 1990s, many studies have been conducted by using gravity model to access the impact of regional integration in Asia. These studies suggest that the unilateral trade liberalization would yield many more gains for the region compared to preferential trade liberalization and small economies in the region would gain much more from preferential trade liberalization than larger economies (Srinivasan, 1994; Srinivasan and Canonero, 1995; Pigato et al., 1997 and Srinivansan, 1998). Wei (1996) examines the home country bias in the goods market among OECD countries. The empirical results show that an OECD member country imports about two and half times as much from itself than other identical foreign country. Dash (1996) reviews that due to the low level of mutual trust, spillover effects of the ethnic and religious conflicts and the magnitude of bilateral disputes in South Asia, it is unrealistic to believe that any substantial growth of regional cooperation is possible without easing political tensions. According to Matyas (1997) one of the most fruitful ways to formalize the modeling and predicting foreign trade flows is through the use of Gravity type models. Hariss and Matyas (1998) have generalized a time series of cross-sectional data set with an application of random effect Gravity model to exports flow in the APEC region. According to results, important explanatory variables to determine the trade flows in APEC region are incomes of trading countries, population, exchange rate and foreign currency reserves. Also there is strong evidence that export flows are highly correlated with those of previous year.

According to Limao and Venables (1999) transport costs depend on many complex details of geography, infrastructure, administrative barriers, and the structure of the shipping industry. Hassan (2001) estimates gravity model using cross section data for 1996 and 1997 and concludes that the seven SAARC economies are not only reducing trade among themselves but also with the rest of the world (ROW).

Chaudhary and Qaisrani (2002) have investigated the role of trade instability on investment and economic growth. The results show that export instability does not directly affect economic growth and investment in Pakistan. According to Zarzoso and Lehman (2003) infrastructure, income differences and exchange rate are important determinant of bilateral trade flows to assess the trade potential between southern common market (MERCOSUR) and European Union trading blocks.

Santros-Paulino and Thirlwall (2004) have used panel data and times series cross section analysis to estimate the effect of trade liberalization on export growth, import growth, balance of trade and balance of payments for a sample of 22 developing countries that have adopted trade liberalization policies since the mid-1970s. Results show that liberalization stimulates export growth but raises import growth by more leading to a worsening of the balance of trade and payments. This has constrained the growth of output and living standards of people of developing countries.

According to Baunsgaard and Keen (2005) developing countries are still heavily dependent on trade tax revenues, further trade liberalization may be hindered unless they are able to develop alternative sources of revenue. According to Noshab (2006) on regional front, Pakistan did not make serious efforts in trade promotions through the establishment of free trade areas with other countries during the 1990s.

Bader (2006) provides empirical evidence in support of the hypothesis that imports of intermediate and capital goods are critical inputs in the export production of the Pakistan. Hussain and Jalil (2006) address the question of whether intervention in foreign exchange market in Pakistan has been successful in either altering the exchange rate level or smoothing the exchange rate fluctuations. According to empirical results there is evidence of effectiveness of official intervention on exchange rate level as well as on the variance.

According to Baysan and Pitigala (2006) South Asian countries are more interested in trade with the industrial economies that is the EU and the US than with the neighboring sub-regional economies and this could be due to differences in factor endowments with the large industrial economies.

3. Theoretical Background of the Model

Gravity models utilize the gravitational force concept as an analogy to explain the volume of trade, capital flows and migration among the countries of the world. The gravity models have significant explanatory power. The effect of policies on trade flows can be assessed by adding the policy variables to the equation and estimating deviations from the baseline flows. The gravity models allow more variables to be taken into account to explain the extent of trade (Hamilton and winters, 1992; Baldwin, 1994; Deardorff, 1998 and Paas, 2000). There are wide ranges of applied research where the gravity model is used to examine the bilateral trade patterns and trade relationships (see Bergstrand, 1985 & 1989; Koo and Karemera, 1991; Oguledo and Macphee, 1994; Zhang and Kristensen, 1995; Frankel, 1997; Rajapakse and Arunatilake, 1997; Karemera et al., 1999; Mathur, 1999; Sharma and Chua, 2000; Paas, 2000; Hassan, 2000 & 2001; Jakab et al., 2001; Kalbasi, 2001; Martinez and Nowak, 2002; Soloaga and Winters, 2001; Christie, 2002; Carrillo and Li, 2002; Egger and Pfaffermayr 2000 and Matyas et al., 2000). So the focus of the present paper is to formulate the gravity type model to examine the trade potential of Pakistan with SAC. Gravity model of international trade states that:

“The trade flow between two countries is proportional to the product of each country’s ‘economic mass’, generally measured by GDP each to the power of quantities to be determined, divided by the distance between the countries’ respective ‘economic centers of gravity’, generally their capitals, raised to the power of another quantity to be determined” (Christie 2002).

This is expressed as:

$$M_{ijt} = \frac{\beta_0 (Y_{it}^{\beta_1} \cdot Y_{jt}^{\beta_2})}{D_{ijt}^{\beta_3}}, i = 1, j = 2, 3, 4, 5, 6, t = 1996, 1997 \dots \dots \dots 2006 \quad (1.1)$$

where M_{ijt} is import flows between two countries in t time. Y_{it} GDP in i country. Y_{jt} is GDP in j country and D_{ijt} is the distance between the countries' respective economic centers of gravity.

In this equation, GDP is directly proportional to the trade between countries and indirectly proportional to the distance between them. Taking equation (1.1) into natural log form:

$$\ln M_{ijt} = \ln \beta_0 + \beta_1 \ln Y_{it} + \beta_2 \ln Y_{jt} - \beta_3 \ln D_{ijt} ,$$

$i = 1, j = 2, 3, 4, 5, 6, t = 1996, 1997 \dots \dots 2006$ (1.2)

Gravity model is estimated in terms of natural logarithms (\ln). Due to its log-log-linear structure, the coefficients of the gravity model are in terms of elasticity or ratio of percentage changes. These dimensionless measures are comparable across countries and goods and give us direct measures of the responsiveness of trade flows to the trade potential variables of Equations. So, the equation (1.2) becomes:

$$\ln M_{ijt} = \ln \beta_0 + \beta_1 \ln Y_{it} + \beta_2 \ln Y_{jt} + \beta_3 \ln D_{ijt} ,$$

$i = 1, j = 2, 3, 4, 5, 6, t = 1996, 1997 \dots \dots 2006$ (1.3)

Most estimates of gravity models add a certain number of variables to test specific effects. According to objectives of study, if we want to examine the impact of $\sum_{n=4}^{11} \beta_n F_{ijn}$ distinct factors then the model becomes:

$$\ln M_{ijt} = \beta_0 + \beta_1 \ln Y_{it} + \beta_2 \ln Y_{jt} + \beta_3 \ln D_{ijt} + \sum_{n=4}^{11} \beta_n F_{ijn} + \varepsilon_{ijt} ,$$

$i = 1, j = 2, 3, 4, 5, 6, t = 1996, 1997 \dots \dots 2006$ (1.4)

where, $\sum_{n=4}^{11} \beta_n F_{ijn}$ is a sum of specific independent variables either facilitating or restricting import flows.

There are a huge number of empirical applications in the literature of international trade which have contributed to improvement of performance of the gravity equation. Some of them are closely related to our work. In recent papers, Matyas (1997); Matyas (1998); Chen and Wall, (1999); Breuss and Egger, (1999) and Egger, (2000) improved the econometric specification of the gravity equation. Berstrand (1985); Helpman (1987); Wei (1996); Limao and Venables (1999) and Bougeas et al. (1999) are among others who contributed to the refinement of the explanatory variables considered in analysis and addition to new variables. In modeling of gravity type model present study will take those specific independent variables in $\sum_{n=4}^{11} \beta_n F_{ijn}$ which either facilitate or restrict trade of Pakistan with SAC.

$$\sum_{n=4}^{11} \beta_n F_{ijn} = \beta_4 \ln N_{it} + \beta_5 \ln N_{jt} + \beta_6 \ln OP_{it} + \beta_7 \ln OP_{jt} + \beta_8 ER_{ijt} + \beta_9 \ln IN_{it} + \beta_{10} \ln IN_{jt} + \beta_{11} M_{ijt(M-1)} + \varepsilon_{ijt}, i = 1, j = 2, 3, 4, 5, 6, t = 1996, 1997 \dots \dots 2006$$

(1.5)

where, N_{it} is the population of i^{th} country at time t . N_{jt} is the population of j^{th} countries at time t . Data on exchange rates ER_{ijt} are available in national currency per US dollar for all countries. So these rates are converted into the j^{th} countries' currencies in terms of Pakistan's currency (i^{th} country's currency). OP_{it} is openness of economy in i^{th} country at time t . OP_{jt} is openness of economies in j^{th} countries at time t . IN_{it} is the inflation rate in i^{th} country at time t . IN_{jt} is the inflation rate in j^{th} countries at time t . $M_{ijt(N-1)}$ is lag value of bilateral import flows of i^{th} country to j^{th} countries at time t in million U.S. dollars. ε_{ijt} is the error term.

So, by adding specific independent variables, the generalized equation of our import model is as follows:

$$\ln IMP_{ijt} = \ln \beta_0 + \beta_1 \ln V_{it} + \beta_2 \ln V_{jt} + \beta_3 \ln D_{ijt} + \sum_{n=4}^{11} \beta_n F_{ijn} + \varepsilon_{ijt} \quad (1.6)$$

$i = 1, j = 2,3,4,5,6, t = 1996,1997 \dots \dots 2006$

where, \ln is the natural log of variables, j is used for selected Asian countries, i for Pakistan and t for time. The explanatory variables are defined as follows:

IMP_{ijt} is bilateral import flow of i^{th} country to j^{th} countries at time t in million U.S. dollars. V_{it} is the GNP of i^{th} country at time t in million U.S. dollars. V_{jt} is the GNP of j^{th} countries at time t in million U.S. dollars. $\sum_{n=4}^{11} \beta_n F_{ijn}$ have been discussed in detail in equation (1.5).

The coefficients ($\beta_1, \beta_2, \beta_3, \dots, \beta_{11}$) show that how Pakistan's import flows respond to the changes in the size of economies, Population, exchange rate, infrastructural bottlenecks, openness of economies and inflation.

4. Estimation Technique and Methodology

Classical gravity models generally use cross-section data to estimate trade effects and trade relationships for a particular time period for example, one year. In reality however, cross-section data observed over several time periods (panel data methodology) result in more useful information than cross-section data alone. Therefore, the gravity model developed in this study has used balanced panel data with the generalized least squares (GLS) estimation technique³. In this technique, we assume that the intercept (β_0) represents the mean value of all cross-sectional intercepts and the error component (ε_{ijt}) represents the random deviation of individual intercept from the mean value. In GLS method, it is assumed that error component (ε_{ijt}) and independent variables are uncorrelated. As discussed earlier that we want to examine the impact of $\sum_{n=4}^{11} \beta_n F_{ijn}$ specific independent variables which either facilitate or restrict Pakistan's import flows with SAC. With this assumption one is able to separately identify those factors which

³ If each cross-sectional unit has the same number of time series observations, then such a panel is called a balanced panel.

affect bilateral imports flows⁴. It is also proved from a priori point of view that the GLS estimation technique is appropriate for panel data when we estimate trade flows between sample of trading partners from large population⁵ [Harris (1998); Egger (2000) and Gujarati (2003)]. Our sample includes only six major importing partners of Pakistan from a large population of Asia containing 37 countries. So, present paper has used GLS estimation technique. There is a problem with the technique. We cannot directly estimate variables that do not change over time because inherent transformation wipes out such variables. Distance variable in our model is one among such variables. However, this problem can be easily solved by estimating these variables in a second step, running another regression with the individual effects as the dependent variable and distance as independent variable.

$$M_{ijt} = \beta_0 + \beta_1 D_{ijt} + \varepsilon_{ijt} , \quad (1.7)$$

where, M_{ijt} is the individual effects. D_{ijt} is the distance between country i and j countries.

5. Empirical Results and General Discussion

The model has $R^2 = 0.89$ and F-Statistics test shows that import model is significant at 1% level of significance. Also there is no multicollinearity problem among the variables. The auto correlated error structure also support the analysis. So, after performing different diagnostic tests the equation (1.6) is estimated through GLS estimation technique and results are given in the table (1.3).

TABLE 1.3:

Dependent Variable: import flows

Model	Import Model
β_0	-0.053 (0.7294)
Y	0.064***(0.0134)
N	0.078***(0.0031)
ER	-0.055***(0.0073)
OP	-0.117***(0.0000)
IN	0.001 (0.5446)
$M_{ijt (t-1)}$	0.877***(0.0000)
D	-0.0613*(0.0635)
R-Square	0.89
F Statistic	94.79***
Prob (F-stat)	0.000

Note: (***) for 1% level of significance.

(*) for 10% level of significance.

P-values are given in parentheses.

All values are calculated by author.

⁴ For comprehensive discussion on assumptions of GLS method see Gujarati (2003) Fourth Edition and Harris (1998).

⁵ There are many researchers who have empirically tested this view.

In our import model (Table 1.3), the income of trading countries (Y) is positive and significant factor. The empirical results show that Pakistan's import flows with SAC increase by 0.064% with 1% increase in Y . It is true that Y indicates the level of development. If a country develops, consumers demand more exotic foreign varieties that are considered superior goods. Moreover, large domestic markets are able to absorb more imports. So an increase in the incomes of trading countries increases bilateral imports. There are many empirical studies in the literature who have confirmed a positive relation between import flows and income growth (for example Akhtar and Malik, 2000; Rahman, 2003 and Chaudhary et al., 2007).

Population size of trading countries (N) is statistically significant factor and has positive relation with Pakistan's import flows. As we know that Asia is the world's largest and most populous continent with over 4 billion people. It contains more than 60% of the world's current human population⁶ which means a big absorption effect. The big absorption effect of Asian domestic markets is causing more reliance on international trade transactions. Many studies have found it to be trade-enhancing and statistically significant (Linnemann, 1966; Sapir, 1981; Bikker, 1987; Matyas, 1997 and Hassan, 2001).

The impact of exchange rate (ER) has a negative and statistically significant relation with Pakistan's trade with SAC. Depreciation of Pakistani currency has many adverse effects along with increase in prices and foreign debt. Unfortunately Pakistan's Imports have generally been greater than its exports and it has to face the problem in balance of trade. According to empirical results Pakistan's import flows with SAC decrease by only 0.05% with 1% increase in ER . The impact is very small because Pakistan's imports are highly concentrated to few items that account for more than 70% of total imports. The empirical studies of Matyas (1997); Harris and Matyas (1998) and Akhtar & Malik, (2000) support the view that import flows are negatively correlated with ER .

Openness of SAC economies (OP) is statistically significant factor and has a negative sign. The empirical results show that Pakistan's import flows with SAC decrease by 0.12% with 1% increase in the OP . According to Social Policy and Development Centre (SPDC) annual report (2005-06) present efforts to liberalize the economies of Asia are insufficient. Asian countries are relying too much on negotiations while neglecting sensible trade policy reforms at home. Most of the trade liberalization policies have self imposed restrictions on trade through both tariff and non tariff barriers (NTBs)⁷. The average tariffs on manufacturing and primary goods are still high in South Asian economies as compared to East Asian economies⁸. There are many studies which suggest that present efforts to liberalize the economies of Asia are insufficient (for example Bhagwati, 1993 and Bandara, 1998). Inflation (IN) has statistically insignificant and negative relation with Pakistan's import flows. The studies of Rahman (2003) and Akhtar and Malik (2000) have also found the negative relation between imports and inflation.

⁶Asian Development Outlook (2007).

⁷ For further details see annual review of Social Policy and Development Centre (2005-06).

⁸ For further details see Bhagwati (1993), pp. 69.

Lag value of bilateral import flows ($M_{ijt}(t-1)$) show a statistically significant and positive sign⁹. There is convincing evidence that current import flows are highly correlated with previous year¹⁰. The percentage share of Pakistan's import flows with SAC in total import volume is increasing with the passage of time. It is supported by the empirical results that current import flows are positively correlated with previous year. Distance (D) is used as proxy variable for transport cost. Distance between a pair of countries naturally determines the volume of trade between them. The distance variable is significant and has negative sign with Pakistan's import flows to SAC economies. According to empirical results Pakistan's import flows with SAC decrease by only 0.06% with 1% increase in the distance between them. It also supports the theory that transportation cost is an important factor in determining the international prices of a country.

6. Conclusion and Policy Implications

Pakistan is a country which highly depends on trade because country needs to import variety of goods to fulfill the increasing demands resulting from its economic recovery and development. Pakistan is not a major trading player in the international trade. Total exports are more sensitive to agricultural production which have low prices in international market whereas total imports consist of Machinery, Petroleum Products, Chemicals, Transport Equipment, Edible oil, Iron and steel, Fertilizers and Tea which account for more than 70% of total imports. As a result, Pakistan has to face the problem of deficit in balance of payments. This situation is not only faced by Pakistan but many Asian economies with exception of few successful East Asian countries are facing this problem especially south Asian economies.

From the empirical evidences of the gravity model, we can conclude that openness of the SAC economies is the crucial factor for increasing Pakistan's import volume. This variable is found significant at 1% level of significance. The income of trading countries and exchange rate are found as a determining factor of Pakistan's imports flows. There is compelling evidence that current import flows are highly correlated with previous year. From the results we can say that trade relations once established then last for long time. With regard to the distance effect model supports that transportation costs are statistically significant and inversely related to the Pakistan's bilateral imports.

Six pronounced factors simultaneously constrain the growth of trade among SAC. These include non-availability of export surpluses in accordance, inefficient production process, lack of communication, lack of resources, restrictive trade practice and inadequate transits facilities in order to promote intra-regional trade. Joint ventures may be encouraged in area where Asian countries have accumulated sufficient experiences. These include among others agro-based industries, textile, engineering, paper and chemicals. In order to promote technological collaboration SAC may also devise a common policy towards technology transfer. Government should make a plan for

⁹ Many studies have used lag values of dependent variable as independent variable in Gravity type models for example, Matyas (1997; 1998) and Matyas et al. (1997).

¹⁰ According to Harris and Matyas (1998) lag value of bilateral import flows is used as instrument variable, which allows for a correlation between contemporaneous trade flows and those of the previous years, yielding a dynamic model of import flows. This habit persistence in import flows is likely due to (among other factors) political ties.

productivity and efficiency improvement in each area so that the domestic firms can effectively compete with foreign firms. This would require restructuring of Pakistan's ailing innovation system, provision of efficient infrastructure and development of skills.

Hence, there is need to address all of these issues for sustainable growth in bilateral as well as regional trade within SAC.

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