Macro-Economic and Trade Link Models of SAARC Countries: An Investigation for Regional Trade Expansion

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ABSTRACT: *The paper examines the macroeconomic structure of SAARC countries- Bangladesh, India, Nepal, Pakistan and Sri Lanka. It also explores the possibility of trade expansion among these countries by examining the macro-economic and regional trade link models based on time series data of 28 years. The study finds that there are inter-country differences in production and consumption patterns, investment behaviour, tax and non-tax structures in the SAARC countries. Hence there is a considerable scope for trade expansion among the SAARC countries. The study also confirms that aggregate regional consumption and regional GNP increase significantly with the increase of aggregate regional trade, and the consumption and income elasticities are 1.70 and 1.61 respectively. The study also exhibits that the GNP of Bangladesh, Nepal, Pakistan and Sri Lanka, with limited exceptions, are significantly increased with the increase of their exports to the region. So these countries would definitely be benefited from the regional trade expansion. The same may be true for India if the smuggled trade is prevented or reduced, and true economic factors, keeping aside political conflicts, dominate for regional trade policy.*

KEY WORDS: *Trade Expansion, SAARC Countries, Macroeconomic and Trade Link Models, Time Series Data.*

JEL Codes: E20, F10, C13, C22.

1. INTRODUCTION

The current intra-SAARC[1] trade, 4.09% of the total trade of the region in 2002 (IMF, 2003), is not convincing though the attempts of economic cooperation among these countries are being observed since 1985. Apart from country specific and regional politics, one of the main reasons for slow progress in economic cooperation in this region is the mutual ignorance about the structure of these economies. The lacking of sufficient quantitative assessment about the implications of further economic integration especially on the volume and direction of trade, income and employment situation, GDP and inflation, etc. may also be the reason for this slow economic cooperation (Guru-Gharana, 2000).

Against this backdrop, the aims of this paper are: (a) to examine the macroeconomic structure of 5 SAARC countries-Bangladesh, India, Nepal, Pakistan and Sri Lanka-individually with a view that this would help the policy makers and planners of these countries to analyze the impacts of different policy options and costs and benefits of increased economic integration in the SAARC regions; (b) to explore the possibility of trade expansion among these countries by examining the regional trade link models. To understand the commonalities and differences in the structure of the respective countries a common macro econometric framework has been used.

The organisation of this paper is as follows: section 2 provides a brief literature review; section 3 analyses the methodology and framework of the study; section 4 and 5 present the estimation results of country specific models and trade link models respectively, and section 6 summarizes and concludes.

2. A BRIEF LITERATURE REVIEW

The proponents (Varshney, 1987; Batliwalla, 1987; Hussain, 1987; Panchamukhi et al, 1990 for example) of regional integration opine that regional economic cooperation among the South Asian Countries would help reduce the economic dependence of these countries on the developed countries in the future. Intra regional trade could facilitate growth and development of the South Asian countries on the basis of regional self-reliance.

Taking empirical observations Waqif (1987) mentions that almost all countries have possibilities to increase their respective trade with the partner countries of the SAARC region. He points out that regional collective self-reliance can be obtained by exploiting horizontal and vertical economic linkages among these countries to help induce autonomous and self-generating growth among the cooperating countries.

Govindan (1996) argues that there are many strong trade linkages between SAARC countries. Based on a partial equilibrium model, the ex-ante trade creation and trade diversion effects show that SAFTA would increase trade considerably in the region and would be welfare improving for all SAARC countries.

Using a link model for Pakistan, India, Bangladesh and Sri Lanka Naqvi et al (1988) attempts to analyze the possibilities of regional trade expansion. Their findings show that India's outlook, both for export and import, is biased for extra-regional than to intra-regional. The least oriented country toward regional trade is Bangladesh. It imports more from extra-regional sources rather than intra-regional sources with the increase in GNP. However, the study has many limitations that have to be improved.

For example, Naqvi *et al.* (1988) worked with the time series data of 1959-60 to 1978-79 when, till 1971, Bangladesh was the part of Pakistan. So before 1971, trade between Bangladesh and Pakistan was in fact intra-country trade, rather than international trade. Moreover, the authors could not include foreign aid as an explanatory variable of the public consumption for data problems, but aid may be the vital component for the government consumption of SAARC countries. Also this study did not show any test for autocorrelation, test for stationarity of variables or cointegration. If the variables are non-stationary, which is the usual case when dealing with time series data, the regression results are spurious.

Guru-Gharana (2000) also analyzed the possibilities of trade expansion in the SAARC region with the help of macroeconomic modeling for south Asian economies. The estimation is based on time series data of 22 years from 1975-1996. Using Three Stages Least Squares (3SLS) estimation technique he found that all SAARC countries would be dramatically benefited from regional trade expansion. Though this study is much improved in terms of content and coverage compared to the study of Naqvi et al (1988), it is also not free from limitations. For example, the author mentioned that he had to collect data from different sources for the same variable and time period; these data are widely different and the time series are not comparable. This study also did not perform any test for autocorrelation, test for stationarity of variables or cointegration.

Quoting from Srinivasan and Canonero (1993) Ahmed (1999) notes that principal gains would come from preferential arrangements with bigger block like NAFTA and EU for the larger economies like India and Pakistan. On the other hand, smaller

economies like Bangladesh and Nepal would be more benefited from regional integration. Referring to Hossain and Vousden (1996), the author also mentions that small partners – Bangladesh and Sri Lanka- suffer and the bigger partners- India and Pakistan- gain if a custom union is formed among these four countries.

Supporting the findings of Yusufzai (1998), Hassan (2000) states that the benefits of Bangladesh are small from regionalism compared to investment of time and other resources that have to be made by Bangladesh. The author's statement however is not supported by his empirical research. Opposite estimates of gain from regionalism, Rahman (1998) and Dubey (1995) for example, are also available.

3. METHODOLOGY AND FRAMEWORK

Single equation methods- for example, Two Stage Least Square (2SLS)- are both robust and computationally simple estimation algorithm, as they require no information about other equations in the model. 2SLS estimates are not asymptotically efficient, but they are consistent.

The benefit of using simultaneous equations estimation methods (Full Information Maximum Likelihood or Three Stage Least Squares) has to do with their large sample properties. However, when the available sample size is small, the trade-off between superior specification and computational simplicity is not so important. 2SLS provides the more reasonable estimating technique in a small sample size of up to 100 observations. Moreover, when the sample size is small, empirical evidence shows that there is, if any, little difference between parameters estimated using OLS and other simultaneous equations methods. Therefore, it is quite appropriate to use OLS in

estimating equations of econometric models in case of small samples (Rahman and Shilpi, 1996). Accordingly, OLS is used as the method of estimating the equations of the macroeconometric model in this research where sample size is only 28.

The study follows the works of Naqvi et al (1988) and Guru-Gharana (2000) with different estimation method, and tries to mitigate some drawbacks of these two studies. In order to overcome the non-stationarity problem of variables we have run the Unit Root Test (Dickey-Fuller Test) for individual time series and Cointegration Test for linear combination[2]. We found that time series are cointegrated. If time series are cointegrated, a long run or equilibrium relationship between the variables exists and the regression is real and not spurious. Under such circumstances, OLS estimation technique is consistent (Thomas, 1997, p. 432).

The study period here has been extended to 28 years, from 1972- 1999. Also single data source has been used for the same variables of all countries for all 28 years in order to make the time series comparable. This study also incorporates some additional variables for some equations based on economic theory.

Though the SAARC consists of 7 countries, we employ macro econometric modeling technique with individual country models and the trade link models for five countries -Bangladesh, India, Nepal, Pakistan and Sri Lanka- for which relevant data are available. Maldives and Bhutan are excluded from the analysis due to unavailability of data. The linkage among the SAARC countries has been established mainly through trade.

Data

The sources of data are the World Development Indicator, World Bank (2001), International Financial Statistics, *IMF* (*2002*) and different issues of *Direction of Trade Statistics Yearbook*. The data set consists of time series data of many aggregate expenditure, financial, trade, and monetary variables of five countries of South Asia. All observations are annual.

It is important to mention some notes / limitations of the available data. There are no direct data on some variables; so indirect method has been used to obtain these data. Data on the exchange rates have been used either per US$ (between dollar and other currencies) or per currency of importing country (between *Taka* and other currencies of the SAARC countries when Bangladesh imports). There are some missing observations for certain variables for all countries. The data gaps were filled up by interpolation technique. In interpolation our objective is to estimate intermediate values for a given series (Maddala, 1977, p.201-207)

The Country Specific Models

We use stylized national models for the five countries of SAARC. These models are developed based on economic theories and econometric considerations. For each of the five countries, the economy has been divided into several sectors or sub-sectors. These country models are then linked to each other through foreign trade equations.

A. ***Production Sector***

Using Cobb-Douglas type production function one aggregate production function for each country has been estimated. Labor and capital are used as inputs, and total labor force and total investment are proxied for labor employed and capital stock as data on employment and capital stock are not available for all years of all countries. To shape the linear form of this production function we converted all variables into natural log form. Thus production sector is represented by:

$$ln\ GNP = \alpha + \beta_1\ ln\ LF + \beta_2\ ln\ TI + U \qquad (1)$$

where, GNP = Gross National Product, LF = Total Labor Force, TI = Total Investment, ln = natural log. α, β_1, β_2 are parameters, and U is the error term. β_1, and β_2 measure output elasticity of labor force and investment respectively. We expect positive signs for both β_1 and β_2.

B***. Expenditure Sector***

The expenditure sector is usually divided into Consumption and Investment sub-sectors.

(a) Consumption sub-sector

Consumption (C) is further decomposed into Private Consumption (PC) and Government Consumption (GC). We have estimated a linear type consumption function including lagged endogenous variable as a regressor. This reflects partial adjustment assumption with a target level of consumption. Hence consumption function is considered smoothed, and any short-run fluctuations in income do not have much effect on consumption but have major effect on savings. Because of data problem we have used GNP rather than disposable income as main determining factor

of consumption. To capture the wealth effect on consumption, we have also included the real interest rate as explanatory variable. So our consumption equation is

$$lnPC = \alpha + \beta_1 lnGNP + \beta_2 lnLAPC + \beta_3 RR + U \qquad (2)$$

Where, PC = Private consumption, GNP= Gross National Product, LAPC= Lagged private consumption, RR= Real interest rate= Nominal interest rate- Rate of inflation. α and β's are parameters; U is the error term. We expect positive signs for β_1 and β_2 and β_3.

Public (government) consumption expenditure is positively related to the government revenue and foreign aid. Hence our model for public consumption would be

$$lnGC = \alpha + \beta_1 lnGR + \beta_2 lnAid + U \qquad (3)$$

where GC = Public consumption, GR= Government revenue.

b) *Investment Sub-sector*

Total investment is also divided into private investment (PI) and government investment (GI). Generally investment decision is based on two basic relationships: (1) accelerator relation between output and capital stock, and (2) negative relation between demand and the cost of capital. By using lag value of income or output the simplest version of accelerator principle can be realized. In fact, investment decision itself is inherently associated with different types of lags.

The private investment decision is also affected by domestic credit to private sector. The government investment is also included as explanatory variable to capture

crowding out or crowding in effects. Foreign direct investment (FDI) also plays an important role to determine PI as countries are always encouraging the inflow of FDI. Therefore, our private investment equation is:

$$lnPI = \alpha + \beta_1 lnLAGNP + \beta_2 lnLAPI + \beta_3 RR + \beta_4 ln\,DCP + \beta_5 lnGI + \beta_6 lnFDI + U \quad (4)$$

where LAGNP= Lagged GNP, LAPI = Lagged private investment, RR= Real interest rate, DCP = Domestic credit to private sector, GI = government investment, FDI = Foreign direct investment. We expect a positive sign for the coefficients of LAGNP, LAPI, DCP and a negative sign for the RR coefficient. The coefficients for GI and FDI could be either positive or negative.

Government investment is mainly determined by the lagged government revenue, and foreign aid (especially true for developing countries). It also depends on GNP and previous year's government investment. The latter indicates influences of on-going projects for which the long-term commitments are made by governments. Hence government investment equation is

$$lnGI = \alpha + \beta_1 lnLAGR + \beta_2 lnAID + \beta_3 ln\,GNP + \beta_4 lnLAGI + U \quad (5)$$

where, LAGR = Lagged government revenue, AID = Foreign aid, LAGI = lagged government investment. We expect that GI is positively related to LAGR, AID, GNP and LAGI.

We could not estimate PI and GI separately for Nepal and Sri Lanka because of data problem. So total investment has been estimated for these two countries. Hence the equation is

$$lnTI = \alpha + \beta_1 lnLAGNP + \beta_2 lnLATI + \beta_3 RR + \beta_4 ln DCP + \beta_5 lnAID + \beta_6 lnFDI + \beta_7 lnLAGR+U \quad (6)$$

C***. Fiscal Sector***

Total government revenue is divided into two: (i) non-tax revenue (GNTR) and tax revenue (GTR). Government non-tax revenues are usually fees and different charges. GNTR generally depends on aggregate economic activities. To capture the time trend in the variable we would also include the lagged endogenous variable as explanatory variable. Thus the equation for GNTR is

$$lnGNTR = \alpha + \beta_1 lnGNP + \beta_2 lnLAGNTR + U \quad (7)$$

where GNP represents for aggregate economic activities. We expect positive signs for both β_1 and β_2.

The GTR depends on many factors such as legal tax rates, the degree of compliances, levels of economic activity, the expectations concerning inflation, foreign exchange movements, transactions in the foreign trade sector, etc. But many factors do not work properly in developing countries. Here projections of tax collection often changed by variations in economic activities and movements in foreign trade sector. So we consider the following simple model for the GTR.

$$lnGTR = \alpha + \beta_1 lnGNP + \beta_2 lnIMP + U \qquad (8)$$

where IMP= Total imports. We expect positive signs for both β_1 and β_2.

D. ***Monetary Sector***

a) Inflation

Inflation is caused by both demand-pull and cost-push factors. These are: money supply growth, excess aggregate demand, increased wages and prices, rising cost of raw materials, foreign exchange movements, foreign inflation (especially important for a country importing huge consumption goods), expectation about future prices, etc. However, considering the availability of data we would consider the following simple model of inflation for the SAARC countries where both demand and supply side variables are present.

$$INFL = \alpha + \beta_1 lnM_2 + \beta_2 LAINFL + \beta_3 lnGNP + \beta_4 MGNPR + U \qquad (9)$$

where, INFL = Inflation rate, M_2 = Money supply, LAINFL = Lagged inflation rate, MGNPR = Import GNP ratio.

Import price indices generally reflect foreign shock to domestic inflation more accurately; but because of data limitations for some countries of the SAARC we have used MGNPR to cover this shock. The lagged endogenous variable is included to cover expectations and dynamism of the inflationary process. We expect a positive sign for β_1 and β_2. β_3 and β_4 could be either positive or negative.

b*) Demand for Money*

There are three motives for demand for money: transaction motive, precautionary motive and speculative motive. For the first 2 motives, demand for money is determined by GNP, and for the last motive demand for money is determined by rate of interest. Thus money demand equation would be

$$lnM_2 = \alpha + \beta_1 lnGNP + \beta_2 IR + U \qquad (10)$$

where, M_2 is the demand for money (= money supply) and IR is interest rate. We expect a positive sign for β_1 and a negative sign for β_2.

E. ***Foreign Trade Sector***

This sector contains five import equations for each country- four equations from member states of the SAARC and the fifth from the rest of the world (RW). For intra-SAARC bilateral import functions the explanatory variables are: (i) exchange rate ratio between the currencies of the countries (country i and j) with respect to US$, (ii) the GNP of the importing country (country i) and (iii) export of the importing country to the other SAARC country (country j) from which import is being used as endogenous variable. The explanatory variables from the rest of the world are: (i) exchange rate between the currency of importing country and US$, (ii) GNP of the importing country and (iii) total exports of the importing country to the rest of the world. Therefore, the import equations for each country are as follows:

$$lnIMP_{ij} = \alpha + \beta_1 lnEXR_{ij} + \beta_2 lnGNP_i + \beta_3 lnX_{ij} + U \quad [j=4] \qquad (11)$$

$$lnIMP_{iRW} = \alpha + \beta_1 lnEXR1_{iRW} + \beta_2 lnGNP_i + \beta_3 lnX_{iRW} + U \qquad (12)$$

where, IMP_{ij} = import of country i from country j, EXR_{ij}= exchange rate ratio between country i and j (expressed as j's currency per i's currency), $EXR1_{iRW}$ = exchange rate between country i and RW (expressed as country i's currency per US$), X_{ij} = export of country i to country j; X_{iRW} = exports of country i to the RW. We expect a positive sign for coefficients of all right hand side variables. However, with regard to the imports from the RW, we expect a negative sign for the coefficient of exchange rate.

4. ESTIMATION RESULTS OF COUNTRY MODELS[3]

Appendix 1 (not included, but can be obtained on request) presents the estimated OLS (or GLS[4]– corrected for autocorrelation) results for the five countries systematically. Within the severe data limitations, the models, with few exceptions, provide a satisfactory 'fit'.

The estimated results of production functions exhibit that the production elasticity with respect to labor force and total investment is different for different countries. For private consumption, GNP is found highly significant explanatory variable in all five countries with the correct positive sign. The consumption elasticity with respect to income is different for different countries suggesting inter-country differences in consumption patterns. The lagged value of private consumption is also found significant positive contributor. The elasticity of government consumption with respect to the government revenue ranges from 0.97 (in Pakistan) to 1.28 (in Nepal). So there are inter- country differences in public expenditure pattern.

With regard to private investment, the lagged GNP variable has highly significant positive impact on PI in India and Pakistan. The domestic credit to private sector is found significant for Pakistan and Bangladesh with expected positive sign, and moderate significant for India with a surprising negative sign. For India, PI may be determined by other factors which are not possible to include such as political stability, government policy, etc. The government investment is also found highly significant negative (crowding-out effect) contributor to PI in Bangladesh only. The FDI has highly significant negative effect on the PI in Pakistan and significant negative effect on the PI of Bangladesh. This implies FDI substitutes PI in these two countries. The government investments of Bangladesh and India significantly depend on the government revenue. The $LAGR^5$ is found insignificant for Pakistan. The GNP variable is found highly significant for Bangladesh but with surprising negative sign. Perhaps the increased income is diverted to government consumption rather than government investment. The lagged TI has moderate significant carry over effect (positive) for Sri Lanka's TI. The domestic credit to private sector variable is significant positive contributor to TI for Nepal and Sri Lanka.

The elasticity of GNTR to GNP is the highest for Bangladesh, 1.64, followed by Sri Lanka, 0.76, India, 0.55 and Pakistan, 0.20. The lagged GNTR is also found significant determinant for all countries. For all countries, its effect is positive as expected, and the extent of effect, the elasticity, is different for different countries ranging from 0.14 for Bangladesh to 0.87 for Pakistan. The elasticity of GTR to GNP varies across countries ranging from 0.24 in Pakistan to 0.57 in India. The import variable has significant positive effect on GTR for all countries. The elasticity of GTR

to import variable is the highest for Pakistan, 0.82, followed by Nepal, 0.73, Sri Lanka, 0.47, Bangladesh 0.32, and India, 0.31.

It is observed that the model for inflation in India and Nepal is disappointing though it is a bit better in Bangladesh, Pakistan and Sri Lanka. The model passes F-test only for Bangladesh, Sri Lanka (5% probability level) and Pakistan (1% probability level). The reason for this poor performance of the model may be that we could not include the essential variables, for data limitations, that truly affect the inflation in these countries. The example of these variables are: prices of indigenous raw materials and machineries, trade union activities, consumers' demand, dishonesty of businessmen, growth of wage rate, etc The GNP variable is found highly significant determining factor of demand for money in all five countries. Its influences on M2 differ considerably across countries and are uniformly high. The elasticity is 1.35 for Bangladesh, 2.73 for India, 3.70 for Nepal, 1.56 for Pakistan and 0.94 for Sri Lanka. Such high values imply that there is considerable scope for non-inflationary monetary expansion in these countries.

5. ESTIMATION RESULTS OF TRADE LINK MODELS

The Appendix 2 (not included, but can be obtained on request) shows the estimated foreign trade equations, which link the five economies of the SAARC regions. It is observed that some of the trade equations do not exhibit good fit. The main reasons may be that trade in SAARC region is largely determined by non-economic bilateral relations rather than economic logic of comparative advantages. The economic explanatory variables (such as exchange rate, income of the importing countries, etc.)

that are generally used to model bilateral trade are unable to sufficiently capture the fluctuations of trade data of these countries.

In case of imports from India the exchange rate ratio and GNP variables are found highly significant positive contributors for explaining the Bangladesh's imports. The elasticities for these two variables are almost the same, 2.10 and 2.11 respectively. Bangladesh's imports do not depend on Bangladesh's exports to India. GNP is also found significant variable for Bangladesh's imports from Sri Lanka and the rest of the world with the correct sign, but it is moderate significant with negative sign for Pakistan. The elasticity of imports to GNP is 1.22 for Sri Lanka. Bangladesh's exports to Pakistan and Sri Lanka are found highly significant and moderate significant respectively for explaining Bangladesh's imports from these two countries. Also Bangladesh's exports to the rest of the world are found highly significant positive contributor for Bangladesh's imports from the RW as expected.

The models for India's imports from Pakistan shows unsatisfactory fit indicating non-economic (political) considerations are dominating factors for bilateral trade. Data deficiency may also attribute to this poor performance of the models. Exports of India to Bangladesh and Nepal are found significant factor for India's imports from these two countries. India's income has significant positive effects on its imports from Bangladesh and Sri Lanka. As expected, no variable is found significant for imports from Pakistan. However, in case of Sri Lanka, the exchange rate ratio has highly significant positive effect.

The GNP variable is found significant factor, with correct positive sign, in determining Nepal's import from all sources except from Bangladesh. The impact of GNP, the elasticity, is the highest in case of import from the rest of the world, 3.69. For Pakistan it is 3.02 followed by Sri Lanka (2.97) and India (0.26). The exports of Nepal are found highly significant for India and the RW with correct positive sign. The import elasticities to this variable for India and the rest of the world are 0.63 and 0.76 respectively.

We see that the import model of Pakistan is only satisfactory for Bangladesh and the rest of the world. The exchange rate ratio and Pakistan's exports to Bangladesh are highly significant positive contributors for Pakistan's imports from Bangladesh. All variables are found significant for Pakistan's imports from the rest of the world with correct signs except the exchange rate. The elasticity is the higher for the Pakistan's exports to the RW (0.42) compared to the elasticity to GNP (0.30).

For the import model of Sri Lanka, 'the exports of Sri Lanka to Bangladesh' variable is found moderate significant for Sri Lanka's imports from Bangladesh. With regard to imports from India, Sri Lanka's export to India is only significant determining factor. In case of imports from Nepal the exchange rate ratio and GNP are the positive contributors. The country's import from Pakistan is determined by its income. The import elasticity is 0.40.

Regional Imports, Regional consumption and Regional GNP

The effects of country specific GNP on individual country's imports from the SAARC region as a whole are noted in Appendix 3 (not included, but can be obtained on

request). We observe that Bangladesh, followed by Nepal and Sri Lanka, is the most open country for the regional imports. On the other hand, India, followed by Pakistan, is the most conservative country for the same. The elasticities of regional imports to GNP of these countries are 0.51, 0.43, 0.30, 0.24 and 0.27 respectively.

Appendix 4 (not included, but can be obtained on request) shows the effects of aggregate regional trade on aggregate regional consumption and aggregate regional GNP. Regional trade has positive and highly significant impacts on both regional consumption and regional GNP, and the elasticities are 1.70 and 1.61 respectively.

6. SUMMARY AND CONCLUSIONS

The estimated results of country specific models for production and consumption exhibit that there are inter-country differences in production and consumption patterns in the SAARC countries. The investment behaviour is also not the same in all countries. There are differences in the tax and non-tax structures of these countries. The elasticities of tax and non-tax revenues, with respect to income, are different for different countries. So there is a considerable scope for trade expansion among the SAARC countries based on comparative advantages. The estimated results of money demand equations show the possibility of non-inflationary monetary expansion in these countries.

Bangladesh, followed by Nepal and Sri Lanka, is the most open country for the regional imports based on the import elasticity with respect to GNP. On the other hand, India, followed by Pakistan, is the most conservative country for the same. The study also confirms that aggregate regional consumption and regional GNP increase

significantly with the increase of aggregate regional trade, and the trade elasticities are 1.70 and 1.61 respectively for these two variables.

It is also evident from the trade link models that bilateral trade in the SAARC countries are heavily influenced by reciprocal effects. Almost all countries have reciprocal effects of their exports on their bilateral imports from each other.

Although some countries appear to discriminate somewhat against the regional trade, there is still a great possibility of regional trade expansion in order to obtain mutual benefits. An expansion of regional trade would certainly increase the government revenues in these countries if trade policies are formulated and executed based on pure economic considerations of comparative advantages, which in turn would increase the national income in each country.

Our study confirms that the GNP of Bangladesh, Nepal, Pakistan and Sri Lanka, with limited exceptions, are significantly increased with the increase of their exports to the region. So these countries would definitely be benefited from the regional trade expansion. The same may be true for India if smuggled trade is prevented or reduced, and true economic factors, keeping aside political conflicts, dominate for regional trade policy. Therefore one should not be pessimistic regarding the possibility of regional trade expansion and mutual gains from it if correct and genuine expansionary regional policies are pursued with broad mind.

Based on the above analysis, the policy prescription may be that all countries must be ‘positive’ in their actions with regard to the policy formulation and execution for

regional trade expansion. Economic considerations rather than non-economic factors should always get priority for regional trade in order to obtain maximum possible gains. Efforts must be made to diversify export-import basket and increase regional investment within the shortest possible time. If harmonious developmental strategies, uniform outward-looking and region-oriented policies are pursued, all countries of the SAARC region would be benefited in terms of both a faster growth rate of GNP and greater intra-SAARC trade as regional trade expansion is not a zero-sum game (Naqvi, et al., 1988). A cordial and concerted regional effort must be made as soon as possible for intra-SAARC trade expansion.

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Notes:

1. SAARC stands for South Asian Association for Regional Cooperation. Member countries are Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka.

2. Results are not shown because of space consideration.

3. Some equations may have endogeneity problem (though it is not a big issue if equations are free from autocorrelation, multicollinearity, etc.). The suggested solution is to estimate equations by Instrumental Variable (IV) method. However, to find out appropriate instrument is another big problem. Researchers generally use lagged regressor as an instrument. Since many regressors of the study are already in lagged form, IV method is not used taking further lag values.

4. See Gujarati (1999, p. 391-393).

5. Multicollinearity was found between LAGR and LAGI for India and Pakistan. However, as these two variables are theoretically important for determining GI, and also to maintain a common modeling structure for all countries, both variables are still included. Moreover, if the goal is to use the model to predict the future mean value of the dependent variable, collinearity per se may not be bad (Gujarati, 1999, p.327).

REFERENCES

Ahmed, N. (1999) Trade Liberalization in Bangladesh: An Empirical Investigation. *A Ph.D. Thesis*, University of Sydney, Australia.

Batliwalla, C.J. (1987) Financial Cooperation in South Asia, *ADB/EWC Symposium on Regional Cooperation in South Asia*, Asian Development Bank, Manila, Philippines.

Dubey, M. (1995) Indo-Bangladesh Economic Relations, in Indo-Bangladesh Dialogue: *Economic and Trade Cooperation*, Center for Policy Research, New Delhi, India.

Govindan, K. (1996) A South Asian Preferential Trading Arrangement: Implications for Regional Trade in Food Commodities, *Journal of Economic Integration*, 11(4) (December): 478-91.

Gujarati, D. (1999) *Essentials of Econometrics*, Second Edition, McGraw-Hill International Editions.

Guru-Gharana, K.K. (2000) Macro-Economic Modeling of South Asian Economies with Intra-SAARC Trade Link. *Final Report*- submitted to South Asian Network of Economic Institutes, IIDS, Nepal.

Hassan, M.K. (2000). Trade Relations with SAARC Countries and Trade Policies of Bangladesh, *Journal of Economic Cooperation,* 21(3), (July), 99-151.

Hossain, M. M. and Vousden, N. (1996) Welfare Effects of a Discriminatory Trading Area in South Asia, *Economic Division Working Paper # 96/9,* Canberra, Research School of Pacific and Asian Studies, Australian National University.

Hussain, A. (1987) Trade Expansion Among South Asian Countries: Problems and Prospects, *South Asia Journal*, 1(.2), Sage Publications, New Delhi/Newbury Park/London.

IMF. (2002) *International Financial Statistics.* International Monetary Fund.

IMF. (2003). *Direction of Trade Statistics Yearbook*, International Monetary Fund.

IMF (Various Years), *Direction of Trade Statistics Yearbook*, International Monetary Fund.

Maddala, G.S. (1977) *Econometrics*, McGraw-Hill Book Company, New York.

Naqvi, S.N.H. et al (1988) Possibilities of Regional Trade Expansion: A Link Model for Pakistan, India, Bangladesh and Sri Lanka, in Singer, H.W. et al (ed.) *Challenges of South -South Cooperation,* (part II) Asia Publishing House, New Delhi.

Panchamukhi, V.R. et al, (1990) *Economic Cooperation in the SAARC Region-Potential, Constraints and Policies*, Interest Publications, New Delhi.

Rahman, M. (1998) Bangladesh-India Bilateral Trade: Current Trends, New Perspectives, New Challenges**,** *BIISS Journal*, 19(1).

Rahman, S.H. and Shilpi, F.J. (1996) A Macroeconometric Model of the Bangladesh Economy: Model, Estimation, Validation and Policy Simulation, *Research Monograph*, No. 17, BIDS, Dhaka, Bangladesh.

Srinivasan, T.N. and Canonero, G. (1993) Liberalization of Trade Among Neighbours: Two illustrative models and Simulations, *South Asia Region Discussion Paper Series*, Supplement II to IDP # 142.

Thomas, R.L. (1997) *Modern Econometrics-An Introduction*, Addison Wesley Longman, England.

Varshney, R.L. (1987) Promotion of Trade and Economic Relations: Obstacles and Possibilities, (Ed.) Waqif, A.A. *South Asian Cooperation in Industry, Energy and Technology***.** Sage Publications, New Delhi.

Waqif, A.A. (1987) Regional Cooperation for Industrial Development in South Asia, (Ed.) Waqif, A.A. *South Asian Cooperation in Industry, Energy and Technology*. Sage Publications India Private Ltd., New Delhi/Newbury Park/ London.

Wayne A. F. (1996) *Introduction to Statistical Time Series*, 2nd ed. John Wiley and Sons Inc.

World Bank. (2001) *World Development Indicators*, Washington D.C.

Yusufzai, Z. (1998***)*** *Liberalization in the Shadow of a Large Neighbor: A Monograph on Bangladesh India Economic Relations,* Center for Policy Dialogue, Dhaka, Bangladesh.

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