PROMOTION OF FREE TRADE BETWEEN INDIA, BANGLADESH AND THE EUROPEAN UNION

Chandrima Sikdar
Faculty
Institute of Chartered and Financial Analyst of India
National College
161/A Second Cross, J.P.Nagar
BANGALORE- 500078, INDIA
sikdarc@rediffmail.com

&

Debesh Chakraborty
Professor
Department of Economics
Jadavpur University
Calcutta-700032, India
Tel: 91-33 24146328
Fax: 91-33 24146008
debesh_chakraborty@hotmail.com

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Promotion of Free Trade between India, Bangladesh and the European Union -- A Theoretical and Empirical Analysis

Chandrima Sikdar and Debesh Chakraborty

Abstract

European Union is the world's leading trade power today. The European Union is specially committed to supporting developing countries' efforts to integrate into the trading system and to help them reap the benefits of market opening, giving them a hand where needed.

EU is a major trading partner of both India and Bangladesh. The present paper attempts to explore the potentials of enhancing trade between India, Bangladesh and the EU and aims at identifying the possible gains that would accrue to each of the economies when trade takes place between them. The paper presents a theoretical framework, which helps to identify the pattern of trade flows between the three economies in a perfectly competitive world characterized by free trade. The paper extends the framework of Raa and Mohnen (2000) for the three economies. It assumes that each economy has fixed domestic endowments, with tradable and non-tradable commodities that are used for intermediate as well as final consumption. It uses Leontief functions to represent technologies and preferences of three economies: India, Bangladesh and Europe. The model maximizes the level of domestic final demand (including consumption and investment) in one economy, subject to a given proportion of final consumption in the rest of the two economies. The latter has been put forward in a way such that the outcomes preserve the actual bilateral balance of payments. This will lead to efficient allocation of resources.

Thus, the model locates the comparative advantages of the economies linked by international trade based only on the fundamentals of the economies: endowments, preferences and technologies. This theoretical framework provides a general equilibrium determination of the commodity pattern of trade. The empirical implementation of the model considers trade in fourteen sectors consistent with Input-output tables of the three economies. The result shows that India exports six goods, namely, Agriculture, Fishing & Forestry, Chemicals, Textile, Non-metallic minerals, Metal products and Other Services- all of which it produces. Bangladesh exports Mining and miscellaneous manufacturing, Construction and Trade and transport services. Though it produces Other Services, but given the scope for free trade with India and EU, it chooses to import it from its neighbour India. EU, on other hand, exports Food, beverages and tobacco, Fuel and power products, Paper and paper products, Machinery, Trade and transport services. Though it produces some of Chemicals and Other services, yet the trade figures show that these goods feature in the import list of the union. It imports it from India. The study also isolates the gains from free trade accruing to the three economies. For this three more linear programmes are solved. The extent of gain in this trading arrangement is the highest for the least developed economy Bangladesh (66.8%), while it is the smallest for the most developed EU (1.8%). The extent of gains for India is in between that of Bangladesh and the EU (26.1%).

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***Chandrima Sikdar**

and

****Debesh Chankraborty**

*Department of Economics, Institute of Chartered and Financial Analyst of India (ICFAI) National College, Bangalore, India
** Department of Economics, Jadavpur University, India

Correspondence Address: Department of Economics, Institute of Chartered and Financial Analyst of India (ICFAI) National College, Bangalore, India.
Email: sikdarc@rediffmail.com

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PROMOTION OF FREE TRADE BETWEEN INDIA, BANGLADESH AND THE EUROPEAN UNION -- A THEORETICAL AND EMPIRICAL ANALYSIS

Chandrima Sikdar and Debesh Chakraborty

1. INTRODUCTION

The European Union, which was formally established on November 1, 1993 comprises at present 15 member countries, namely, Austria, Belgium, Denmark, France, Finland, Germany, Greece, Ireland, Italy, Luxembourg, The Netherlands, Portugal, Spain, Sweden and the United Kingdom. It represents just 6 % of the world's population. But it accounts for more than 20% of global imports and exports (European Commission, 2002). This has made the EU emerge as the leading trade power of the world today. As such, it exhibits a strong interest in creating conditions in which trade can prosper. The European Union is specially committed to supporting developing countries' efforts to integrate into the trading system and to help them reap the benefits of market opening, giving them a hand where needed (Europa, 2004). This applies particularly to the poorest countries, for which the benefits of globalization remain elusive.

Trade was one of the first areas in which EU countries agreed to pool their sovereignty, transferring to the European Commission the responsibility for handling trade matters, including negotiating international trade agreements on their behalf. This implies that the EU's 15 Member States negotiate as one, both with their trading partners and at the World Trade Organization (WTO), thereby maximising their influence on the international scene (Urwin, 2004).

The European Union aims at free but fair world trade. This refers to a system where all countries are given opportunities to trade freely with one another on equal terms and without protectionist barriers. Thus, the EU is in favour of a 'level playing field' for all countries and clear 'rules of the game' for everyone to follow. To achieve this, the EU's strategy is to open up its own market while others do likewise. It seeks to remove obstacles to trade gradually and at a pace, which the EU and others can sustain, to settle disputes peacefully and to build up a body of internationally agreed rules.

Opening up of markets means removal of trade barriers between countries. This was a basic goal of the union right from the days of its inception. In the 1960s, it created a 'customs

union' between its member countries. A 'single external tariff' was also introduced. Thus, any non-EU country exporting products to the EU was charged the same tariff regardless of which EU country was importing the goods. But although most of the tariff barriers were removed, many 'non-tariff' barriers to trade still remained. For example, different EU countries had different administrative requirements and different rules on things like packaging and labelling — all of which hindered trade between them. That is why, in 1992, the EU launched its 'single market' by removing its non-tariff barriers to trade in goods, and also by opening up trade in services within the union. Such opening up of trade serves to stimulate the economy as a whole. It boosts the revenues of exporting countries and offers consumers in the importing countries a wider choice of goods and services at lower prices because of increased competition. Ultimately it allows all countries to produce and export the goods and services with which they are best placed to compete.

Hence, globalization can boost economic growth. But it can also have effects otherwise. Larger and more open markets bring forth the possibility of increased competition between different countries. By pitting unequally developed economies against one another, globalization may, if unharnessed, widen the gap between rich and poor countries and thereby further sideline the poorest economies of the world. Individual nation States cannot deal with a grave problem like this. Only international agreement can successfully harness globalization and make it work for the good of all.

Thus, EU's trade policy now covers a broader canvas, beyond trade liberalization. It is about updating and improving international rules, and giving them a wider coverage to ensure fair trade and harnessed globalisation. It is about promoting an international agenda that benefits the developing world, and addressing issues of general public concern. One of the key challenges today is to ensure that world trade rules take account of non-market concerns, particularly the environment, public services, food safety, agriculture and culture (European Commission, 2002).

2. INDIA-EU TRADE RELATIONS

Traditionally, India had a multi-dimensional relationship with the EU, which is our largest trading partner, the biggest source of our foreign direct investment, a major supplier of our developmental aid, an important source of technology and also a home to a large and influential Indian diasporas (India-EU relations, 2002).

India attained the status of the EU's largest trading partner right in the first year (1993) of the latter's establishment and since then has maintained a steady growth not only in volume of its

trade with the EU but also in diversity, with a third of Indian exports reaching the EU destinations. India is the EU's seventeenth largest supplier and twentieth largest destination of exports. India's strength lies in traditional exports like textiles, agriculture and marine products, gems and jewellery, leather and engineering and electronic products. Sectors like chemicals, carpets, granites and electronics have exhibited the fastest growth in the last five years. Indian exports from Europe, on the other hand, comprises mainly gems and jewellery, engineering goods, chemicals and minerals.

EU has been enjoying a favourable balance of trade with India since 1990. However, from 1997 this gap started reducing and stood at US $ 957 million. In 1998, India-EU trade for the first time was in favour of India. The balance in India's favour was US $ 316 million. This was partly due to the South East Asian financial crisis favouring a shift in EU's focus on countries such as India. Again in 1999 as the EU's economy picked up, its overall trade improved. India-EU bilateral trade touched US $ 23.01bn. India's exports registered US $ 11.34 billion and imports US $ 11.7 billion, and the balance of US $ 0.36 billion remained in EU's favour (table 1).

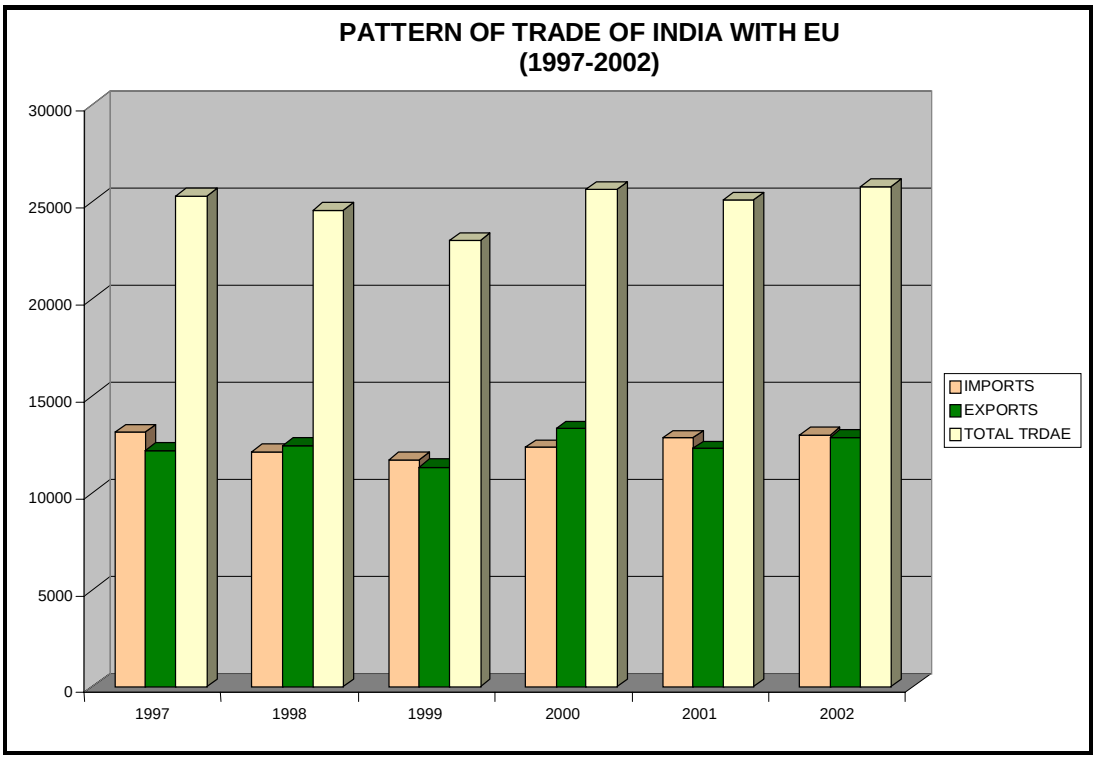
During the year 2002-03, EU accounts for as much as 21.73% of India's exports and 20.42% of total India's imports. According to the latest available figures for the year 2002, total trade between EU and India rose marginally from US $ 25.0 billion in 2001 to US $ 25.8 billion in 2002, thereby registering a growth of 2.81%. The Indian exports to the EU registered a positive growth rate of 4.54% in 2002 against a negative growth rate of –7.68% in 2001. Exports increased from US $ 12.3 billion in 2001 to US $ 12.8 billion in 2002. On the other hand, EU's exports to India during the same period increased from US $ 12.8 billion to US $ 12.9 billion, recording a very meager growth rate of just 1.15% (table 1).

TABLE 1
INDIA-EU TRADE
(MILLION US DOLLARS)

YEAR	IMPORTS	% CHANGE	EXPORTS	% CHANGE	TOTAL TRDAE	% CHANGE
1997	13128	-	12171	-	25299	-
1998	12128	-7.62	12446	2.26	24574	-2.87
1999	11674	-3.74	11342	-8.87	23016	-6.76
2000	12341	23.16	13303	28.60	25644	25.92
2001	12816	3.84	12281	-7.68	25097	-2.13
2002	12964	1.15	12839	4.54	25803	2.81

Source: India_EU annual report 1999.

FIGURE 1



During the year 2002, EU's major items of exports to India consisted of engineering goods, gems and jewellery, chemical and allied products. These items accounted for approximately 77.5% share in EU's total exports to India. Other items, which have notable shares, are metal and metal goods (6.3%) and transport equipment (5.18%). During the same period, India's exports to EU comprised of textiles and clothing (30.87%), gems and jewellery (12.01%), leather and leather goods (11.67%), engineering goods (10.93%), chemical and allied products (8.74%) and agricultural and allied products (7.38%). It is interesting to note that textiles and clothing, leather and leather goods and gems and jewellery constitute around 55% of EU's total imports from India.

At the EU-India Business Summit held in Copenhagen in 2002, a target was set to increase the bilateral trade between the two countries to US $ 31.28 billion by 2005 and to US $ 44.68 billion by 2008. Moreover, the EC-India Country Strategy Paper (2002-2006) mentions that the EU being India's one of the largest trading partner as well as an important source of Foreign Direct Investment will assume a special responsibility of assisting India in its task of tackling its second generation of economic reforms. Accordingly, the EC will bring on

stream a special Trade and Investment Development Programme. This programme builds on the industry driven "EU India investment and trade enhancement initiative" and offers to

- assist India with mainstreaming its tariff, tax and regulatory infrastructure with international practice, including standardization, conformity assessment, safety inspection as well as sanitary and phyto-sanitary systems
- facilitate training for officials and industry on multilateral trade and WTO
- promote industry driven studies on improving the trade and investment environment in key industrial and service sectors.
- encourage the involvement as much as possible of the main stakeholders through dialogue stimulated by relevant think-tanks, civil society groups and private sector.

It is further stated in this Strategy Paper that the EC will be open to support a future sector-specific economic co-operation programme with our country, which will include co-operation in the area of statistics, provided it is driven by the private sector and addresses the underlying policy environment.

3. BANGLADESH- EU TRADE RELATIONS

The European Community's assistance to Bangladesh began as early as 1976. However, this initial assistance was predominantly in the form of food aid. During the 1980's the assistance was expanded to cover irrigation, rural settlements and development projects. The advent of the nineties marked considerable changes in the EU strategy in Bangladesh in terms of specific objectives, size and emphasis.

As a result of 1994 EC strategy towards Asia, Bangladesh became a potential beneficiary of a number of regional ASIA programmes. The general objective of these programmes was essentially promotion of an enhanced economic presence of EU in Asia. However, the programmes failed to gain foothold in Bangladesh since they were not geared to meet the typical deficiencies of a least developed country.

Fortunately at the trade front of economic cooperation between EU and Bangladesh there has been a positive balance throughout (table 2). EU has always included Bangladesh in its Generalized System of Preferences. As such Bangladesh always enjoyed the advantage of duty and generally quota-free access to the EU market. The largest industry of Bangladesh, namely, the Readymade Garment industry has virtually thriven in the competitive advantage of a quota free access to the EU market, while, the country's shrimp industry complying with the EC sanitary standards has secured its EU market share by enjoying duty free access to the

EU market. Moreover, the EC's autonomous decision to grant duty and quota free access to all products produced in the less developed countries (with the exception of arms) comes up with new perspectives for Bangladesh.

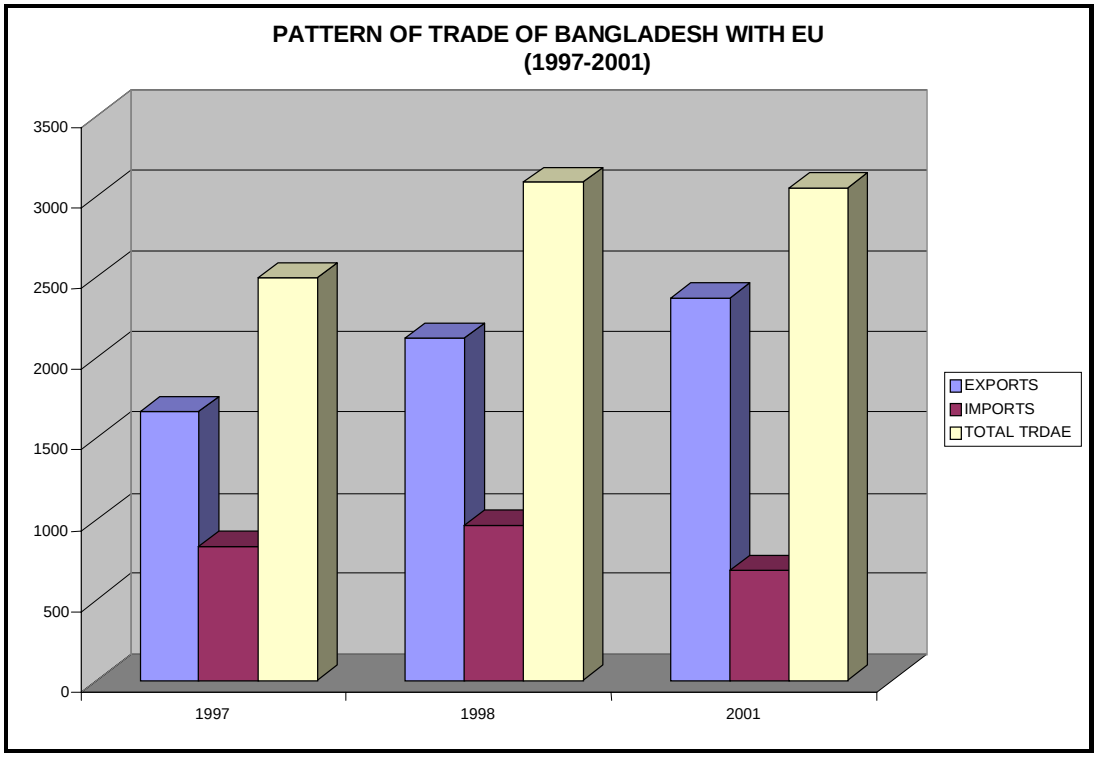
Growth as well as sustainable economic and social development of the economy of Bangladesh requires a full and lasting integration of the economy into the world economy. In this context, EU's trade policy may be important in contributing towards the sustainable development of the country. However, just an enhanced market access and an improved trading environment in itself are not sufficient. The country must also be equipped with a capable government, proper and adequate infrastructure and human resource to be able to reap the benefits from the opportunities that it is offered. Therefore, the EU in its trade and economic cooperation with Bangladesh is all set to address the country's supply-side constraints and competitiveness, trade-related areas, trade development measures, capacity building of public authorities, technology transfers, access to information and global networks and strategies to promote investment and private sector development.

TABLE 2
BANGLADESH-EU TRADE
(MILLION US DOLLARS)

YEAR	IMPORTS	% CHANGE	EXPORTS	% CHANGE	TOTAL TRDAE	% CHANGE
1997	832	-	1669		2501	-
1998	964	15.9	2126	27.4	3090	23.6
2001	685	-28.9	2373	11.6	3058	-1.04

Source: UN Statistics division, 2003.

FIGURE 2



In the past years the EU implemented certain interventions in the area of trade promotion in Bangladesh. However, in recent years the focus of EU cooperation has been on several regional programmes.

A major feature of the export structure of Bangladesh is the dominance of the Readymade Garment (70% of total exports), which is primarily dependent on imported raw materials available through a preferential trade regime in EU quota-free and duty free access. However, exports from Bangladesh are likely to face a massive challenge after 2004, since by that time its competitors might successfully reduce Bangladesh's share of present market in the EU and the USA- its two very important export destinations (about 90%) of its exports of ready-made garments. The effect of this will be detrimental to the economy as a whole, unless otherwise, Bangladesh adopts appropriate measures to meet this challenge. These measures may include diversifying its exports as also improving its existing capacity in terms of better marketing products. As mentioned earlier, EU's latest facility- Everything But Arms comes with an excellent opportunity for Bangladesh for diversifying its exports, particularly, in areas of agricultural products and agro-based industries.

EU has resolved to cooperate with Bangladesh in these areas and hence enable it to diversify exports as also to promote its existing export items through improved market facilities. The

EU interventions may include activities like training and other related technology transfer activities, especially in fields of economic-labelling, packaging, quality control, standards, market studies and other actions, which aim at exposing the local entrepreneurs to the severe challenge of accessing the EU market.

The discussion in the preceding two sections clearly discloses the importance of the EU as a major trading partner of both the economies of India and Bangladesh. Against this backdrop, the present paper attempts to explore the potentials of enhancing trade between India, Bangladesh and the EU and aims at identifying the possible gains that would accrue to each of the economies when free trade takes place between them.

In recent times contemporary researchers have shown considerable interest in free trade arrangements throughout the world as also between the SAARC region and its members. This concern has seen the development of a substantial volume of literature on this topic in recent years. There has been some work on bilateral trade relations between the two SAARC members, namely, India and Bangladesh. The European Union happens to be one of the largest trading partners of both these countries as has been pointed out in the last two sections. Thus, a free trade arrangement comprising of India, Bangladesh and the EU seems quite relevant in the current context. However, very little work has been done in this direction. In this context a mention may be made of a very preliminary work by Nori and Patnaik (2003). This work studies the trade synchronization of the SAARC region as a whole with another regional bloc, namely, the European Union (EU) in the framework of globalization. In particular it analyses India's trade with the SAARC as a trade bloc and with the EU bloc, in addition to the trade synchronization and direction between the two blocs. Though this work is relevant in the current context, yet it is only an empirical analysis and is not based on any theoretical model building that helps to analyze the prospects and possibilities of trade between economies. Moreover, this analysis is only on trade between India and the EU. Though Nori et al have made some humble attempts to study trade between the EU and one of the SAARC members- India but there is no such work, particularly any theoretical model building exercise which analyses the possibilities of free trade between India, Bangladesh and the EU. The present paper aims at filling this gap by contributing to this area.

This paper is organized as follows. Section 1 discusses EU's trade policy and its role in promoting trade worldwide. Section 2 and Section 3 discuss the India-EU and the

Bangladesh-EU trade relations. Section 4 presents the model that describes the pattern of trade between the three economies in a perfectly competitive world characterized by free bilateral trade. Section 5 mentions the data required for the model. The results of the model are discussed in section 6. The gains from free trade accruing to either country are discussed in section 7. The paper finally concludes with a summary of the theoretical model that it proposes along with the policy implications. The data required for the model are discussed in detail in Appendix A.

4. THE MODEL

The paper presents a theoretical framework, which helps to identify the pattern of trade flows between the three economies in a perfectly competitive world characterized by free trade. The paper extends the framework of Raa and Mohnen (2000) for the three economies. It assumes that each economy has fixed domestic endowments, with tradable and non-tradable commodities that are used for intermediate as well as final consumption. It uses Leontief functions to represent technologies and preferences of three economies: India, Bangladesh and Europe. The model maximizes the level of domestic final demand (including consumption and investment) in one economy, subject to a given proportion of final consumption in the rest of the two economies. The latter has been put forward in a way such that the outcomes preserve the actual bilateral balance of payments in the three economies. This will lead to efficient allocation of resources.

The model may be formally stated as follows:

Let the level of final consumption in India be denoted by 'c_1', that of Bangladesh be 'c_2' and the same for the EU be 'c_3' such that,

$$\mathbf{c_1 = \gamma_1 c_3 \quad and \quad c_2 = \gamma_2 c_3}$$

where 'γ_1' is the India-EU final consumption ratio and 'γ_2' is the Bangladesh-EU final consumption ratio.

We now maximize c_3 subject to the structural constraints of the economies as specified below. The two other national consumption levels get maximized in the process, while their proportions remain 'γ_1' and 'γ_2', relative to that of the European Union. If for any economy the weight, 'γ', is large, then that economy has a high level of national consumption, thereby requiring large volumes of imports. Hence the economy experiences a deficit in the balance

of payments. That is, to sum up one can say that for every vector of weights, (γ_1, γ_2), the maximum consumption level 'c_3' and hence 'c_1' and 'c_2' are obtained. If an economy is characterized by a negative balance of payments (BOP) then for it 'γ' is lowered while for an economy with a surplus in its BOP, the 'γ' is raised. The 'γ' is selected such that the BOP is ensured.

The linear programme may be formally stated as

Max $\mathbf{e^T y_1 c_1 + e^T y_2 c_2 + e^T y_3 c_3}$

Subject to

For tradable goods

$$\mathbf{(I-A_1)x_1 + (I-A_2)x_2 + (I-A_3)x_3 \geq y_1c_1 + y_2 c_2 + y_3 c_3 + z_1 + z_2 + z_3} \quad \text{.....(1)}$$

For non-tradable goods

$$\mathbf{(I-A_1)x_1 \geq y_1 c_1\,;\ (I-A_2)x_2 \geq y_2 c_2\,;\ (I-A_3)x_3 \geq y_3 c_3} \quad \text{.....(2)}$$

$$\mathbf{k_1x_1 \leq K_1;\ k_2x_2 \leq K_2;\ k_3x_3 \leq K_3} \quad \text{.....(3)}$$

$$\mathbf{l_1x_1 \leq L_1;\ l_2x_2 \leq L_2;\ l_3x_3 \leq L_3} \quad \text{.....(4)}$$

where,

y_1, y_2, y_3 = domestic final demand vector (including consumption and investment, excluding trade) in India, Bangladesh & EU respectively.

A_1, A_2, A_3 = input-output coefficients matrix in India, Bangladesh & EU respectively.

K_1, K_2, K_3= capital stock in India, Bangladesh and EU respectively.

L_1, L_2, L_3 = labour force in India, Bangladesh and EU respectively.

k_1, k_2, k_3 = capital input coefficients row vector in India, Bangladesh & EU respectively.

l_1, l_2, l_3 = labour input coefficients row vector in India, Bangladesh and EU respectively.

The maximization problem stated above can be rewritten including γ_1 & γ_2 and then solved and for every value of $\gamma = (\gamma_1\, \gamma_2)$ the optimal x's and c_3 and hence c_1 and c_2 are obtained. Let the optimal solutions be denoted by $x_1(\gamma)$, $x_2(\gamma)$, $x_3(\gamma)$, $c_3(\gamma)$.

For tradable commodities the shadow prices of the linear programme gives the competitive prices. Let it be denoted by $p(\gamma)$. And let the net exports of country 'i' to the other two partners be denoted by $(I-A_i)x_i(\gamma) - y_i c_i(\gamma) - z_i$. The inner product of these two- $p(\gamma)$ and

$\{(I-A_i)x_i(\gamma) - y_i c_i(\gamma) - z_i\}$ gives the trade surplus of country 'i' and is denoted by $S_i(\gamma)$. For low 'γ_i', $S_i(\gamma)$ is positive, while for 'γ_i' high, $S_i(\gamma)$ is negative. For some intermediate value, $S_i(\gamma)$ matches the observed surplus of country 'i' with the other two trading partners i.e. for this particular value of 'γ' , $S_i(\gamma) = Si^0$, where

$\mathbf{Si^0 = e^T (x_i^0 - A_i x_i^0 - y_i - z_i)}$ is the observed surplus for country 'i',

and x_i^0 is the observed value of gross output vector x_i

The intermediate value of 'γ' is found by the Newton-Raphson algorithm,

$$\gamma_i^{n+1} = \{[S_i(\gamma_i^n) - S_i^0] \gamma_i^{n-1} - [S_i(\gamma_i^{n-1}) - S_i^0] \gamma_i^n\} / \{ S_i(\gamma_i^n) - S_i(\gamma_i^{n-1})\}$$

with arbitrary initial values, say, $\gamma^0 = 0$; $\gamma^1 = 1$

γ^n converges to 'γ' and the solution of $S_i(\gamma) = Si^0$. The EU balance of payments, $S_3(\gamma) = S_3^0$, holds by the material balance of the tradable commodities or the Walras' Law. For this value of 'γ', the linear programme determines the levels $c_i(\gamma)$, the allocations, $x_i(\gamma)$, and the net exports from country 'i' to other two countries,

$(I-A_i)x_i(\gamma) - y_i c_i(\gamma)$, where $c_i(\gamma) = \gamma_i c_3(\gamma)$ for i= 1,2. The positive elements of this vector locate the comparative advantages of trading partner 'i'.

Thus, the linear programme above locates the comparative advantages of the respective economies only on the basis of the fundamentals of the economies- endowments, preferences and technology. These are all but parameters of the model- y_i representing preferences, A_i, k_i , l_i representing the technologies and K_i and L_i representing the endowments of the economies.

5. DATA

The application of the theoretical model developed in section 4 requires data on the following:

- Input-output coefficient matrices for India, Bangladesh and the EU (A_1, A_2, A_3);
  Sectoral capital and labour coefficients of India, Bangladesh and the EU (k_1, l_1, k_2, l_2, k_3, l_3);
- Sectoral consumption coefficients of India, Bangladesh and the EU (y_1, y_2, y_3);
- Stocks of capital and labour for the three economies (K_1, L_1, K_2, L_2, K_3, L_3).

The basis of the data of this study are the three Input-Output Tables of the Indian Economy for the year 1991-92 (Planning Commission, Government of India, 1995), of the economy of Bangladesh for the year 1992-93 (Centre on Integrated Rural Development for Asia and Pacific (CIRDAP), Bangladesh, 1996) and of the EU for the year 1995 (Eurostat data, Brussels, 2003).

The input-output table for the Indian economy consists of 60 sectors, that of the economy of Bangladesh consists of 53 sectors while the same for the EU consists of 25 sectors. These three input-output tables have been aggregated into 14 sectors only in a way such that all the sectors are present in the available input-output tables of the three economies.

From this aggregated input-output table of each of the country, the input-output coefficient matrices (A_1 for India, A_2 for Bangladesh and A_3 for the EU) have been computed. The sectoral labour coefficients (l_1 for India, l_2 for Bangladesh and l_3 for the EU) for each sector of each of the three economies have been computed from the sectoral employment and sectoral output data of the respective economies. Given the employment data, wage rate and the value added for each sector the sectoral capital coefficients (k_1 for India and k_2 for Bangladesh) are worked out. The sectoral capital coefficient (k_3) for each sector of the EU is obtained from the capital employed and the output produced in each sector of the union. Finally, we have obtained data on the total labour force (L_1 for India, L_2 for Bangladesh and L_3 for the EU) and the capital stock (K_1 for India, K_2 for Bangladesh and K_3 for the EU) of each economy. The detailed description of the data underlying the model developed in section 4 and their necessary adjustments are presented in Appendix A.

6. RESULTS AND DISCUSSION

The results of the theoretical exercise of section 4 are shown in the tables 3 and 4.

TABLE 3

ACTUAL AND FREE TRADE GROSS OUTPUT FIGURES FOR INDIA, BANGLADESH & EU
(MILLION US DOLLARS)

Sl. No.	SECTORS	GROSS OUTPUT					
		INDIA		BANGLADESH		EU	
		ACTUAL	FREE TRADE	ACTUAL	FREE TRADE	ACTUAL	FREE TRADE
1.	Agriculture, fishing & forestry	86471.13	224366.9	12141.73	0	480315	0
2.	Food, beverage & tobacco	20939.63	0	1952.18	0	1043419	80992.79
3.	Fuel & power products	21835.59	0	1851.444	0	910577.5	25697.19
4.	Chemicals	16177.23	56657	2484.454	0	639095.2	108644.1
5.	Textile	30816.76	106557.7	3497.518	0	396461.3	0
6.	Paper & paper products	3491.223	0	134.9211	0	484800.8	47728.67
7.	Non-metallic minerals	4905.765	31383.12	20.84567	0	284259.9	0
8.	Metal products	14996.15	114488	523.8924	0	424092.5	0
9.	Machinery	16734.02	0	150.6417	0	1168005	316706
10	Transport & communication equipment	20284.18	0	1009.788	0	900410.2	138097.8
11.	Mining & miscellaneous manufacturing	13765.07	0	1147.674	178772.9	701552.5	0
12.	Construction	28847.34	0	3394.681	80428.28	1245680	0
13.	Trade & transport services	64629.62	0	4245.02	48870.35	1124602	179616.8
14.	Other Services	63523.72	141093.8	9016.524	3011.838	10100355	482321.5

TABLE 4

FIGURES OF FREE TRADE BETWEEN INDIA, BANGLADESH AND EU CONTRASTED WITH THE ACTUAL FIGURES
(MILLION US DOLLARS)

Sl. No.	SECTORS	ACTUAL NET EXPORTS OF INDIA TO BANGLADESH & EU	FREE NET EXPORTS OF INDIA TO BANGLADESH & EU	ACTUAL NET EXPORTS OF BANGLADESH TO INDIA & EU	FREE NET EXPORTS OF BANGLADESH TO INDIA & EU	ACTUAL NET EXPORTS OF EU TO INDIA & BANGLADESH	FREE NET EXPORTS OF EU TO INDIA & BANGLADESH
1.	Agriculture fishing & forestry	-35.24	66773.99	-108.87	-48005.1	2759.34	-27615.1
2.	Food, beverage & tobacco	-74.31	-14.1464	7.34	-3450.8	162.01	43089.69
3.	Fuel & power products	6.26	-18710.5	0.18	-2620.12	8444.04	88771.06
4.	Chemicals	32.96	42805.55	-13.15	-5224.73	12399.33	-16166.5
5.	Textile	-1178.52	36055.03	-898.27	-4353.35	2676.32	-32919.5
6.	Paper & paper products	75.37	-4876.51	1.89	-87.8152	1187.76	52242.16
7.	Non-metallic minerals	-220.33	21663.63	-6.63	-3579.41	841.51	-22310.4
8.	Metal products	87.16	65370.02	-10.99	-19965	-7649.85	-50213.2
9.	Machinery	30.03	-18705.2	-36.63	-2991.53	-12429.9	43066.76
10.	Transport & commu-nication equipment	5508.01	-1054.29	599.35	-14663.9	75971.02	-85030.3
11.	Mining & miscellaneous manufacturing	-6416.06	-32751.5	-124.06	13577.4	-90862.7	-4645.58
12.	Construction	-4.8E-12	-50857.7	0	70929.07	377.65	-12964.7
13.	Trade & transport services	0	-116868	0	36323.37	4752.73	63100.07
14.	Other Services	0	8985.274	0	-16477.9	-2122	-41897.2

The figures in table 3 show the gross output of the commodities that the three countries produce in a perfectly competitive world characterized by free trade. These figures are noted along with the actual/observed output figures of the economies as is obtained from their respective input-output tables. This is done so that the two situations- actual trade and free trade may be compared and thereby the changes occurring with free trade may be pointed out. The actual trade figures of the table show that all the three economies produce all the fourteen commodities mentioned. However, under conditions of perfect competition with free

trade, none of the countries produce all the fourteen goods. While India produces six and Bangladesh produces four, the bigger trading partner EU produces eight out of the fourteen commodities. India has positive outputs of Agriculture, fishing & forestry, Chemicals, Textile, Non-metallic minerals, Metal products and Other Services. Bangladesh, on the other hand produces Mining and miscellaneous manufacturing, Construction and Trade and transport services and Other services. EU produces eight out of the fourteen goods mentioned in table 3, namely, Food, beverages and tobacco, Fuel and power products, Chemicals, Paper and paper products, Machinery, Transport and communication equipment, Trade and transport services and Other services. From this list of goods that each economy is producing, it can be seen that though the economies are barely producing half the total number of commodities mentioned in the tables above, yet the three economies taken together produces all the fourteen commodities, with a few goods being produced in more than one economy. For example, Chemicals are being produced in both India and EU. This may be explained by the fact that both these countries have high domestic as well as export demand for Chemicals. So given the fact that both the countries have proven expertise in the production of this commodity (as revealed by the observed gross output figures in table 3), they end up in producing it even under conditions of free trade, where each can easily obtain the good from any one of the trading partners who produce it. Similar arguments may explain the production of Trade and transport services in the EU and Bangladesh as well as the production of Other Services in all the three economies. However, barring these Other Services, India and Bangladesh produce mutually exclusive set of goods. Together these two economies are producing nine out of fourteen commodities. Thus, the situation defines a perfect condition for trade between the three economies and shows that they can be complementary to each other as far as their respective demands for the goods are concerned.

Table 4 presents the list of goods that each economy is exporting to and importing from the other two economies under conditions of perfect competition and free trade. India exports all the six goods that it produces, while Bangladesh exports three out of the four goods that it produces. Though it produces Other Services, but given the scope for free trade with India and EU, it chooses to import it from its neighbour India. EU, on other hand, exports Food, beverages and tobacco, Fuel and power products, Paper and paper products, Machinery, Trade and transport services. Though it produces some of Chemicals and Other services, yet the trade figures show that these goods feature in the import list of the union. It imports it from India (as is revealed by the sign pattern of trade in table 4). Thus, though both India and

the EU produce Chemicals and Other Services as has been mentioned earlier, yet the EU shows positive net imports of both these goods (table 4). The reason for this may be the level of commodity aggregation. Chemicals in this model comprise a host of chemical products like, organic, inorganic chemicals, fertilizers etc (table A1 to A3 in Appendix A). India enjoys greater comparative advantage in the production and export of Dyes/Intermediaries and Coal tar chemicals, the export share of which has been to the tune of 1.6% in the year 2000-2001 (indiachemicalexporters.com, 2003). The EU, on the other hand, may be endowed with greater comparative advantage in the production and exports of the other items included under the heading Chemicals. However, India' s comparative advantage in the former set of chemical products may outweigh that of the union's competitiveness in the latter set of chemicals so that the ultimate advantage in production of Chemicals rests with India and not with the EU. A similar factor may prompt the import of Other Services by EU from India, in spite of the fact that it itself produces this good.

As far as India's pattern of exports to the EU is concerned, the pattern suggested by free trade is similar to the observed pattern of trade, with some variations. Indian exports to the EU according to the free trade data (obtained by comparison of the free trade figures in table 4) consist of goods like Agricultural products, Chemicals, Textiles, Non-metallic minerals, Metal products and Other services. Of these, Chemicals and Metal products are also export items of the country in the observed trade list. The change in the direction of export between these two countries for the other products may also be ascribed to commodity aggregation or may be explained by EU's policy of freeing imports from LDC's of import restrictions (Europa- Trade Issues, 2004). For instance, the EU and India initialled on 31 December 1994 a Memorandum of Understanding (Mou) on market access for textile products, whereby the EU granted additional (exceptional) flexibilities to India (Europa – Trade Issues, 2004). On the import list of India from the EU the most important goods with free trade prevailing are Food and beverages, Fuel and power products, Paper and paper products, Machinery and Trade and transport services. This is more or less in line with the pattern of observed trade (mentioned in section 4 above) between the two countries, excepting for Machinery and Trade and transport services. The granting of non-reciprocal tariff reductions to developing countries under the arrangement of the EU's Generalised System of Preferences (Europa – Trade Issues, 2004) explains the Machinery imports of the union from India. On the other hand, the EU's initiative to bring forth various trade and investment development programmes for India may explain the flow of Trade and transport services to India from EU (section 2).

Bangladesh, on the other hand, exports Mining and Miscellaneous manufacturing, Construction and Trade and transport services whereas it imports goods like, Food and beverages, Fuel and power products, Paper and paper products and Machineries. Bangladesh's export of Mining and miscellaneous manufacturing to the EU is very much supported by the fact that its largest industry, namely, the Ready made garment industry enjoys the advantage of duty free access to the EU market. The other export items in the free trade situation more or less tally well with the observed trade list excepting Transport and communication Equipment and Services of all kind. Services as a whole are non tradable for the economy of Bangladesh as suggested by the observed trade pattern. But the free trade figure suggests that Bangladesh exports the Trade and transport services to the EU. This may be the consequence of the EC's decision to grant duty free as well as quota free access to all products of LDC origin as has been mentioned earlier.

7. GAINS FROM TRADE

Having obtained the pattern of trade flows between the economies in a perfectly competitive world characterized by free trade (section 4), we now turn to assess the gains from free trade accruing to the three economies.

One can think of the gains from trade as consisting of two parts:

- One depending on specialization in production. This part of the gain is obtained by eliminating the domestic waste of resources due to misallocation and less than full utilization.
- The other depending on the possibility of exchange. This part of the gain is attributed to free trade only.

To isolate the gains from free trade only we have to solve yet another set of three linear programmes, which will enable us to determine the domestic efficiency gains (gains by eliminating the domestic waste of resources due to misallocation and less than full utilization of resources) that the three economies can achieve without having departed from the bilateral trade pattern, which was obtained by solving the previous linear programme.

The linear programme, which we have to solve to find India's domestic expansion factor is

Max $\mathbf{e\ y_1\ d_1}$

Subject to

$$\mathbf{(I - A_1)x_1 \geq\ y_1\ d_1 + z_1}$$

$$\mathbf{k_1x_1 \leq K_1,\ l_1x_1 \leq L_1}$$

where d_1 is the level of final consumption in India and z_1 is the full net exports vector of India.

The solution to this linear programme yields

$$\mathbf{d_1 = 1.633}$$

We likewise solve a linear programme to obtain the domestic expansion factor for Bangladesh. The linear programme is,

Max $\mathbf{e\ y_2\ d_2}$

Subject to

$$\mathbf{(I - A_2)x_2 \geq\ y_2\ d_2 + z_2}$$

$$\mathbf{K_2x_2 \leq K_2,\ l_2x_2 \leq L_2}$$

where d_2 is the level of final consumption in Bangladesh and z_2 is the full net exports vector of Bangladesh.

From the solution to this linear programme we obtain

$$\mathbf{d_2 = 1.372}$$

A similar linear programme for locating the domestic efficiency gains accruing to EU by taking part in free trade with the two South Asian economies of India and Bangladesh is as follows:

Max $\mathbf{e\ y_3\ d_3}$

Subject to

$$\mathbf{(I - A_3)x_3 \geq\ y_3\ d_3 + z_3}$$

$$\mathbf{k_3x_3 \leq K_3,\ l_3x_3 \leq L_3}$$

where d_3 is the level of final consumption in the EU and z_3 is the full net exports vector of the EU.

The solutions to these three linear programmes in this section yield the value of d_1 (=1.633), d_2 (=1.372) & d_3,(= 0.163). The values of these d_i's thus obtained are subtracted from the

respective c_i's obtained from the linear programme worked out in section 4 of this paper. The answers yield the extent of gains accruing from free trade only to the three economies.

Table 5 shows the gains to total trade as also the two component parts of gains that accrue to the economies from the kind of free trade arrangement that the model in section 4 of the present paper proposes. It is seen that while the extent of gain is the highest for the least developed economy Bangladesh (66.8%), it is the smallest for the most developed economy Europe (1.84%). This result is more or less close to the expectation. Among the three economies, the EU happens to be the biggest trading partner and the union comes up with various schemes and policies (discussed in section 2 and 3) to enable the relatively smaller partners- India and Bangladesh to gain from this free trade arrangement among them.

TABLE 5

GAINS FROM FREE TRADE ACCRUING TO INDIA, BANGLADESH AND THE EU

Sl. No	COUNTRIES	INDIA	BANGLADESH	EU
1.	Total Gains from trade	89.4% (c_1)	104.0% (c_2)	3.47% (c_3)
2.	Gains by eliminating domestic waste of resources	63.3% (d_1)	37.2% (d_2)	1.63% (d_3)
3.	Gains from free trade only	26.1%	66.8%	1.84%

Particularly, given their developing country status, the exports of both India and Bangladesh to the EU benefit from reduced tariffs under the EU's Generalised System of Preferences (Europa- Trade Issues, 2004).

8. SUMMARY AND CONCLUSION

EU is a major trading partner of both India and Bangladesh. The present paper attempts to explore the potentials of enhancing trade between India, Bangladesh and the EU and aims at identifying the possible gains that would accrue to each of the economies when trade takes place between them. The paper presents a theoretical framework, which helps to identify the pattern of trade flows between the three economies in a perfectly competitive world characterized by free trade. The paper extends the framework of Raa and Mohnen (2000) for the three economies. It assumes that each economy has fixed

domestic endowments, with tradable and non-tradable commodities that are used for intermediate as well as final consumption. It uses Leontief functions to represent technologies and preferences of three economies: India, Bangladesh and Europe. The model maximizes the level of domestic final demand (including consumption and investment) in one economy, subject to a given proportion of final consumption in the rest of the two economies. The latter has been put forward in a way such that the outcomes preserve the actual bilateral balance of payments.

The empirical implementation of the model considers trade in fourteen sectors consistent with Input-output tables of the three economies. The result shows that India exports six goods, namely, Agriculture, Fishing & Forestry, Chemicals, Textile, Non-metallic minerals, Metal products and Other Services- all of which it produces. Bangladesh exports Mining and miscellaneous manufacturing, Construction and Trade and transport services. Though it produces Other Services, but given the scope for free trade with India and EU, it chooses to import it from its neighbour India. EU, on other hand, exports Food, beverages and tobacco, Fuel and power products, Paper and paper products, Machinery, Trade and transport services. Though it produces some of Chemicals and Other services, yet the trade figures show that these goods feature in the import list of the union. It imports it from India. The study also isolates the gains from free trade accruing to the three economies. For this three more linear programmes are solved. The extent of gain in this trading arrangement is the highest for the least developed economy Bangladesh (66.8%), while it is the smallest for the most developed EU (1.8%). The extent of gains for India is in between that of Bangladesh and the EU (26.1%).

In recent times, when the forces of globalization are making waves throughout the world the orientation of governments across the world has shifted from being focused predominantly on domestic markets to being focused on global markets. Thus, given the fact that EU, the largest trade power in the world today, also happens to be major trading partner for both the South Asian developing economies of India and Bangladesh (the two economies which are making efforts to strengthen their trade ties) the present paper attempts to explore the potentials of enhancing trade between India, Bangladesh and the EU and aims at identifying the possible gains that would accrue to each of the economies when free trade takes place between them. It has been observed that both the economies gain substantially from such a trading arrangement. Such a free trade arrangement is

likely to go a long way towards deeper integration of the two South Asian countries with the world economy. In particular, it will fetch substantial gains for the two developing economies of India and Bangladesh by improving their over-all competitiveness through access to the marketing network, skill and technology of the EU. Similar suggestion has not only come up from various policy making levels in the two developing countries, but has also been put forward by various contemporary researchers in their writings. However, any work, which is based on theoretical model building that helps to analyze the viability of free trade between these three economies, has not been attempted to the best of the knowledge of the present researcher. The present study thus makes a modest contribution to this area.

A. APPENDIX

A1 Input- Output Coefficient Matrices

The basis of the data of this study are the three Input-Output Tables of the Indian Economy for the year 1991-92 (Planning Commission, Government of India, 1995), of the economy of Bangladesh for the year 1992-93 (Centre on Integrated Rural Development for Asia and Pacific (CIRDAP), Bangladesh, 1996) and of the EU for the year 1995 (Eurostat data, Brussels, 2004). The Input-Output Table for the Indian economy consists of 60 sectors, that of the economy of Bangladesh consists of 53 sectors while the same for the EU consists of 25 sectors. These three input-output tables have been aggregated into 14 sectors only in a way such that all the sectors are there in the available input-output tables of the three economies. The sectors are:

(1)Agriculture, fishing and forestry, (2) Food, beverages and tobacco, (3) Fuel and power products, (4) Chemicals, (5) Textile, (6) Paper and paper products, (7) Non-metallic minerals, (8) Metal products, (9) Machinery, (10) Transport and communication equipment, (11) Mining and miscellaneous manufacturing, (12) Construction, (13) Trade and transport services and (14) Other services.

From the aggregated input-output table of each of the country, the input-output coefficient matrices have been computed (A_1 for India, A_2 for Bangladesh and A_3 for the EU) using the standard input-output rule:

$$\mathbf{A_1 = z_1\, x_1^{-1}} \quad \text{..... (1)}$$

$\mathbf{A_2 = z_2\ x_2^{-1}}$ …….. (2)

$\mathbf{A_3 = z_3\ x_3^{-1}}$ …….. (3)

Where z_i s (i= 1, 2 & 3) are the inter-industry transaction matrices (14 x 14) of India, Bangladesh and the EU respectively and x_i s (i=1,2 & 3) are the diagonal matrices representing the sectoral outputs of the respective economies.

A2 Labour Coefficients

The sectoral labour coefficients for each sector required for each of the three economies for the empirical implementation of the model have been computed from the sectoral employment and sectoral output data of the respective economies. In other words,

$\mathbf{l_1 = L_1\ x_1^{-1}}$ …….. (4)

for India,

$\mathbf{l_2 = L_2\ x_2^{-1}}$ ……... (5)

for Bangladesh and

$\mathbf{l_3 = L_3\ x_3^{-1}}$ ……... (6)

for the EU

where l_i s (i= 1,2 & 3) are the row vectors of labour coefficients of India, Bangladesh and the EU respectively

L_i s (i= 1,2 & 3) are the row vectors of labour employed in each sector in the economies of India, Bangladesh and the EU respectively

The employment figures for all the required sectors for the economy of Bangladesh are available for the year 1992-93 (CIRDAP, Bangladesh, June 1996). On the other hand, the employment figures for majority of the sectors of the economy of India are available for the year 1991-92 from the economic tables (Census, 1991). For some agricultural sectors like Rice, Wheat, Jute, Sugarcane, Cotton the employment figures are obtained from website indiaagristat.com. Employment figure for Tea is available from the website www.teauction.com. The employment figures for all the sectors of the economy of the EU for the year 1995 are available from the economy's input-output table (Eurostat data, Brussels, 2004).

A3 Capital Coefficients

An indirect method has been used to derive the sectoral capital coefficients from the available information for the two economies of India and Bangladesh. The following formula is used:

$$\mathbf{k_1 = (v_1 - w_1 L_1) x_1^{-1}} \quad \ldots\ldots\ldots\ldots\ldots\ldots (7)$$

$$\mathbf{k_2 = (v_2 - w_2 L_2) x_2^{-1}} \quad \ldots\ldots\ldots\ldots\ldots\ldots (8)$$

for India and Bangladesh respectively,

where k_i s (i= 1,2) are the row vectors of capital coefficients of the economy of India & Bangladesh

v_i s (i= 1,2) denote the row vectors of value added at factor cost by sectors of the economy of India & Bangladesh

w_i s (i= 1,2) are the wage rates of the sectors of the two economies

L_i s (i= 1,2) are the row vectors of labour employed in the different sectors of India and Bangladesh

For both the economies of India and Bangladesh the figures for sectoral value added at factor cost (v_1 and v_2) are available from the input-output tables of the respective economies. For the Indian economy the wage rate is available from the Indian Labour Year Book 1995. For the economy of Bangladesh we have the data on wage rates for all the sectors (CIRDAP, June 1996).

However, for the EU as a whole capital employed in each sector is available from the input-output table (Eurostat data, Brussels, 1995). These capital stock figures along with the output figures for each of the sectors are used to obtain the sectotal capital coefficients for the EU according to the following formula:

$$\mathbf{k_3 = K_3 x_3^{-1}} \quad \ldots\ldots\ldots\ldots\ldots\ldots (9)$$

where k_3 is the row vector of capital coefficients of the EU

and K_3 is the row vectors of labour employed in the different sectors of the EU

The sectoral capital and labour coefficients, thus computed for all the three economies are presented in table A1.

TABLE A1

SECTORAL LABOUR, AND CAPITAL COEFFICIENTS OF INDIA, BANGLADESH & THE EU

Sl. No.	Sectors	India		Bangladesh		European union	
		Labour Coeffici–ents (l_1)	Capital Coeffici – ents (k_1)	Labour Coeffici –ents (l_2)	Capital Coeffi–cients (k_2)	Labour Coeffici ents (l_3)	Capital Coefficients (k_3)
1.	Agriculture, fishing & forestry	32.50	0.42	28.26	0.44	27.76	3.55
2.	Food, Beverages & Tobacco	10.40	0.05	7.70	0.17	5.49	0.84
3.	Fuel & Power Products	1.11	0.25	1.25	0.38	2.75	2.96
4.	Chemicals	1.15	0.27	1.008	0.18	4.82	1.13
5.	Textile	7.41	0.21	16.98	0.06	14.69	1.08
6.	Paper & Paper products	8.29	0.22	2.17	0.11	8.56	1.19
7.	Non-metallic minerals	17.91	0.29	1.46	0.15	8.87	1.44
8.	Metal products	1.64	0.21	1.34	0.15	12.3	1.08
9.	Machinery	3.35	0.26	2.79	0.26	9.2	0.87
10.	Transport & communication equipment	1.30	0.48	0.13	0.26	8.46	1.66
11	Mining & miscellaneous manufacturing	26.65	0.09	11.24	0.02	6.61	1.01
12.	Construction	7.97	0.29	6.03	0.04	12.7	0.61
13.	Trade & transport services	18.44	0.46	19.13	0.27	11.31	2.95
14.	Other Services	18.62	0.52	11.68	0.44	14.52	3.12

A4 Capital Stock and Labour Force

The total capital stock of both the economies of India and Bangladesh, are obtained by using the formula

$$K = kx / \sigma$$

where σ is the degree of capacity utilization in an economy. It is assumed to be 60% in both the economies of India and Bangladesh.

The data on total capital stock for the EU is directly available from the Eurostat data, Copenhagen (2003).

The figures for the total labour force for the economies are the total economically active population, which includes persons employed, as well as those who are willing to supply labour. For India this figure is available from Planning Commission, Government of India, 1995, for Bangladesh it is available from the World Development Report (1995) and for the EU this is available from the World Development Report (1997).

The figures for the capital and labour stocks for the three economies are shown in table A2.

TABLE A2
CAPITAL STOCK AND LABOUR FORCE OF INDIA, BANGLADESH AND THE EU

COUNTRY	CAPITAL STOCK (RS MILLION)	LABOUR (MILLION)
India	5,876,701	521.33
Bangladesh	521,360	54.86
EU	1379,471655	350.17

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