The Economic Impacts of Improved Foreign Investor Confidence in Bangladesh: A CGE Analysis

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by

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Abstract

This paper uses a large-scale computable general equilibrium model of Bangladesh to simulate the economic effects of attracting foreign investment by improved business confidence. The simulation results indicate that if all revenue of newly arrived capital accrues to foreign investors and the government maintains budget neutrality, in the long-run this would expand GDP slightly. In general, capital-intensive sectors experience robust expansion and labour-intensive sectors suffer a contraction in output and employment. Urban households experience increases in consumption because they are relatively heavily concentrated in manufacturing sectors that are favourably affected. In contrast, rural households experience decreases in consumption because they are relatively concentrated in the agriculture sector which is adversely affected.

Keywords: Business confidence; foreign direct investment; computable general equilibrium model; Bangladesh.

JEL Classification: C68, E22, F21

Abbreviations

BOI	Board of Investment
BOT	Balance of Trade
BOTE	Back-of-the-envelope
CES	Constant Elasticity of Substitution
CGE	Computable General Equilibrium
CPI	Consumer Price Index
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GEMPACK	General Equilibrium Modelling PACKage
GOB	Government of Bangladesh
GOS	Gross Operating Surplus
IACC	Independent Anti-Corruption Commission
IIFC	Infrastructure Investment Facilitation Center
IO	Input Output
IP-2005	Industrial Policy of 2005
JETRO	Japan External Trade Organisation
LES	Linear Expenditure System
RMG	Readymade Garments
SAM	Social Accounting Matrix
SAP	Structural Adjustment Programme
SEZ	Special Economic Zone
SOE	State Owned Enterprise
TCF	Textile, Footwear and Clothing
UNCTAD	United Nations Conference on Trade and Development
UNPAN	United Nations Online Network in Public Administration and Finance

Notes

(i)	BAORANI refers to CGE model of Bangladesh
(ii)	ORANI refers to Australian CGE model

Table of Contents

1. Introduction

There has been much recent debate among economists about the effects of economic reforms in developing countries. Bangladesh, one of the world's most densely populated poverty-stricken countries, has undertaken reforms towards a free-market economy at a pace deemed to be faster than many of its neighbours, making it one of the most open economies in the South Asian region. While economic reforms significantly change the policy environment in a country, a proper assessment of the impact of these reforms requires a comprehensive framework capable of analysing the interactions between various economic agents in the markets. Computable general equilibrium (CGE) models, because of their computational rigour and extensive analytical capability, have become a popular policy-analysis technique in the examination of the economy-wide effects of policy changes. Over the last two decades, CGE models have been applied increasingly to the problems of trade and investment policy, tax policy, structural adjustment and agricultural policy in both developed and developing countries[1]. The objective of the present paper is to examine the impact of improved business confidence in Bangladesh making it more attractive to foreign investors, using CGE modelling approach.

This paper uses a large-scale comparative-static CGE model to undertake a set of counterfactual policy simulations to examine the long-run effects of improved foreign investor confidence in Bangladesh on its on macroeconomic indicators and sectoral output as well as the effects on consumption at household level. This is done by conducting and analysing two simulation experiments in which the required rate of return[2] on investment in different industries in Bangladesh are lowered. The remainder of this paper is organised as follows. The next section presents an overview of investment climate in Bangladesh, followed by a brief description of local private sector investment. Section 4 presents the recent trend of inflows of FDI in the South Asia countries particularly Bangladesh. The subsequent section discusses the scope for a better investment climate in Bangladesh. Then the theoretical structure of the

[1] Major review articles of CGE models and applications include Shoven and Whalley (1984), Pereira and Shoven (1988) and Powell and Lawson (1990). For major reviews of CGE models used in development policy analysis, see Decaluwe and Martens (1988), de Melo (1988) and Bandara (1991).
[2] Required rate of return is the ratio of the rental price of capital to the cost of unit of capital. We assume improved investors' confidence implies reduction in the required rate of return on investment.

Bangladesh CGE model and the database are briefly described in Section 6. Section 7 provides a description of the simulations that are carried out to investigate the economic effects of improved foreign investor confidence in Bangladesh. The simulation results are presented in Section 8. Finally, Section 9 provides concluding comments.

2. Investment Climate in Bangladesh

Bangladesh boasts a business friendly investment regime. Since the early 1980s the Government has moved towards a market economy and recently more flexible rules and policies have been implemented to attract both local and foreign investment. For instance, the New Industrial Policy was launched in 1982 with the primary objective to encourage greater participation of the private sector in the industrialisation of the country. Moreover, the policy of privatising the state owned enterprises (SOEs) was adopted to develop an efficient private sector in the country. To manage the privatisation programs more efficiently, the 'Privatisation Commission' was set up in 1993 and there has been modest success with the privatisation of SOEs[3]. The Board of Investment (BOI)[4] was established by the Investment Board Act of 1989 to promote and facilitate investment in the private sector both from domestic and overseas sources with a view to contributing to the socio-economic development of Bangladesh. Furthermore, in a major development towards fostering an investment-friendly atmosphere in the country, the Government of Bangladesh instituted a National Taskforce for Facilitating of Investment Climate on 08 October 2003 (BOI, 2004, p.34). In recent years, industrial and investment policies in Bangladesh have been further liberalised by reducing bureaucratic control over private investment and opening up many areas. A substantial incentive program has also been implemented in Bangladesh. The details of this program are presented in Table 1. None of these incentives have been effective and they might be the factors behind the existence of some distortions. Most of the incentives targeted big foreign investors whereas local small investors are being offered very little.

[3] Since the inception of the Privatisation Commission in 1993, a total of 42 SOEs have been privatised so far (GOB, 2003c, p.179). The Privatisation Commission's web site <http://www.bangladeshonline.com/pb/> provides details of its activities.
[4] Details about BOI are available from its web site <http://www.boibd.org/>.

Table 1: Summary of Incentives Provided to the Investors

1. Tax exemptions :	Generally 5 to 7 years. However, for power generation exemption is allowed for 15 years.
2. Duty :	No import duty for export oriented industry. For other industry it is @ 5 percent ad valorem.
3. Tax law :	i. Double taxation can be avoided in case of foreign investors on the basis of bilateral agreements. ii. Exemption of income tax up to 3 years for the expatriate employees in industries specified in the relevant schedule of income tax ordinance.
4. Remittance :	Facilities for full repatriation of invested capital, profit and divided.
5. Exit :	An investor can wind up on investment either through a decision of their annual general meeting or extra-ordinary general meeting. Once a foreign investor completes the formalities to exit the country, he or she can repatriate the sales proceeds after securing proper authorization from the central bank.
6. Ownership :	Foreign investors can set up ventures either wholly owned or in joint collaboration with local partners.

Source: BOI (2005a).

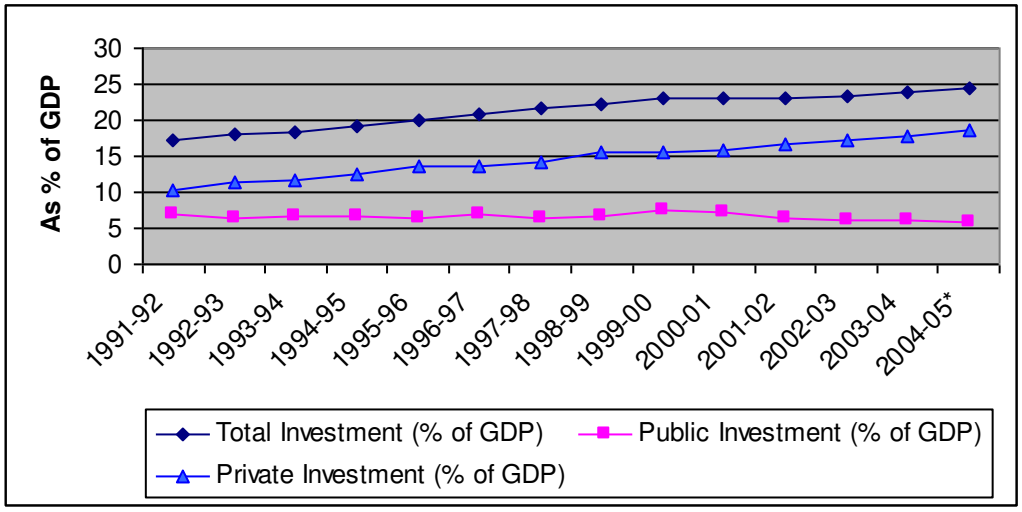

Figure 1: Investment Rate as a Percentage of GDP[5]

Figure 1 shows investment as a percentage of Gross Domestic Product (GDP) during the fiscal years 1991-92 to 2004-05 in Bangladesh. The rate of national investment has gradually picked-up since 1991-92 (about 17 percent of GDP), rising to 24 percent of GDP in 2004-05. If we consider investment in public and private sectors separately, it can be seen that while the share of private sector investment increased to

[5] *July 2003-March 2004: Provisional data. Source: *Bangladesh Economic Review 2003 & 2005* (GOB, 2003c & 2005a).

about 19 percent of GDP in 2004-05 from 10 percent in 1991-92 the share of public sector investment in GDP declined to almost 6 percent in 2004-05 from 7 percent during the same period of time. Due to private sector-oriented reforms in Bangladesh, domestic and foreign direct investment has been rising and this resulted in a gradual increase in private sector investment. Although the investment in the public sector reduced slightly as a percentage of GDP, the value of total public expenditure has increased[6].

3. Local Private Sector Investment

The general local private sector investment trend in Bangladesh indicates that the level of investment has risen gradually since 1991-92 except for 1992-93 and 1996-97 when it has fallen slightly (Table 2). For instance, the overall level of local private investment rose to US$ 2,027 million in 2002-03 from only US$ 91 million in 1991-92 (i.e. an average increase of US$ 176 million per annum). It may be noted that 1991-92 to 2002-03, in fact, coincided with the Structural Adjustment Programme (SAP) which was being implemented in Bangladesh over the same period of time. The SAP brought about important and profound reforms in the trade, investment, fiscal, financial and institutional policies in Bangladesh for the greater openness of the economy (Hoque, 2005).

The highest growth rate in local private investment was observed in 1993-94 (almost 408 percent) followed by 1994-95 (85 percent), 1995-96 (38 percent) and 2002-03 (32). In 1991-92 and 1996-97, Bangladesh experienced a negative growth in local private investment, about -1 percent and -5 percent respectively (Table 2).

Table 3 shows the sectoral distribution of local private investment registered with the Board of Investment (BOI) during 2003-04. Local investment proposals are dominated by manufacturing sectors namely textile (almost 29 percent), agro-based and food & allied (18 percent), chemical (12 percent), glass & ceramic (10 percent) and engineering (8 percent). The service sector's share is 17 percent of local investment proposals which also includes telecommunications, energy & power and financial institutions.

[6] The public expenditure/GDP ratio was about 12 percent in 1991-92 (GOB, 2002, p.26) and 16 percent in 2004-05 (GOB, 2005a, p.33).

Table 2: Local Private Investment during 1991-92 to 2003-04

Fiscal year	Amount in million US$	Growth (percent)
1991-92	91	-
1992-93	90	-1.10
1993-94	457	407.78
1994-95	846	85.12
1995-96	1,171	38.42
1996-97	1,108	-5.38
1997-98	1,137	2.62
1998-99	1,183	4.05
1999-00	1,324	11.92
2000 -01	1,420	7.25
2001-02	1,531	7.82
2002-03	2,027	32.40
2003-04*	1,522	0.12

Note: *July 2003-March 2004: Provisional data.

Source: BOI (2004), p.18.

Table 3: Local Private Investment Registration during 2003-04: Distribution by Sectors[7]

Sector	Investment proposal		Sector share
	Projects	Amount in million US$	(percent)
Textile	777	667.48	28.86
Service	103	396.11	17.13
Agro-based	73	297.80	12.88
Chemical	130	272.51	11.78
Glass & ceramics	14	223.71	9.67
Engineering	219	185.51	8.02
Food & allied	87	116.86	5.05
Printing & packaging	95	53.91	2.33
Tannery & rubber	21	10.00	0.43
Miscellaneous	92	88.75	3.84
Total	1,611	2,312.63	100.00

Source: BOI (2005b).

4. Inflows of FDI[8] in Bangladesh

[7] Note: Investment data are local investment proposals registered with BOI, not actual investment statistics. Sample surveys of the BOI registered local investment projects found that about 85 percent of the registered local projects are either implemented or at different stages of implementation (BOI, 2004, p.21).

[8] FDI is defined as an investment involving a long-term relationship and reflecting a lasting interest and control by a resident entity in one economy in an enterprise resident in an economy other than that of the investor (BOI 2005c, p.5).

Bangladesh has adopted a number of policies and provided generous incentives to attract FDI into the country and the country seems to offer perhaps the most liberal and well-protected FDI regime in South Asia[9]. A World Bank (1999) report judges the Bangladeshi FDI regime to be the most liberal among South Asia, with no prior approval requirements or limits on equity participation or on the repatriation of profits and income. Leaving aside the political confrontations in the country, a recent survey, conducted by the Japan External Trade Organisation (JETRO) (2005), has found Bangladesh as the cheapest destination for investment among 21 major cities and countries in Asia. Despite the generous incentives and liberalised regimes FDI flow into Bangladesh has not been very encouraging. Political unrest and the deteriorated law and order situation have slowed down the rate of new foreign investment. Table 4 presents time-series data of FDI projects registered with BOI since 1991-92.

Table 4: Inflows of FDI in Bangladesh during 1991-92 to 2003-04[10]

Fiscal year	Amount in million US$	Growth (percent)
1991-92	25	-
1992-93	53	112.00
1993-94	804	1416.98
1994-95	730	-9.20
1995-96	1,516	107.67
1996-97	1,054	-30.47
1997-98	3,440	226.38
1998-99	1,926	-44.01
1999-00	2,119	10.02
2000 -01	1,271	-40.02
2001-02	302	-76.24
2002-03	368	21.85
2003-04*	390	41.30

Note: *July 2003-March 2004: Provisional data.
Source: BOI (2004), p.18.

It can be seen from Table 4 that the trend in foreign investment projects registered with BOI reveals a sharp increase in FDI inflows from 1991-91 to 1995-96. For example, in 1991-92, foreign investment projects registered with BOI amounted to only US$ 25 million which grew to US$ 1,516 million in 1995-96. In 1997-98,

[9] A summary of incentives provided to foreign investors is presented in Table 6.1 in Section 6.1. Foreign investment in Bangladesh is well protected by law and by practice. The Foreign Private Investment (Promotion and Protection) Act 1980 includes a guarantee of fair and equitable treatment to foreign private investment (BOI 2004, p.26).
[10] FDI data are based on foreign investment projects registered with BOI.

Bangladesh attracted its highest amount of FDI (US$ 3,440 million) followed by 1999-00 (US$ 2,119 million). During 2001-02, registration of foreign investment projects drastically decreased to US$ 302 million, a fall of US$ 669 million from the previous fiscal year[11].Since 2001-02 foreign investment projects registered with BOI has started to rise slowly.

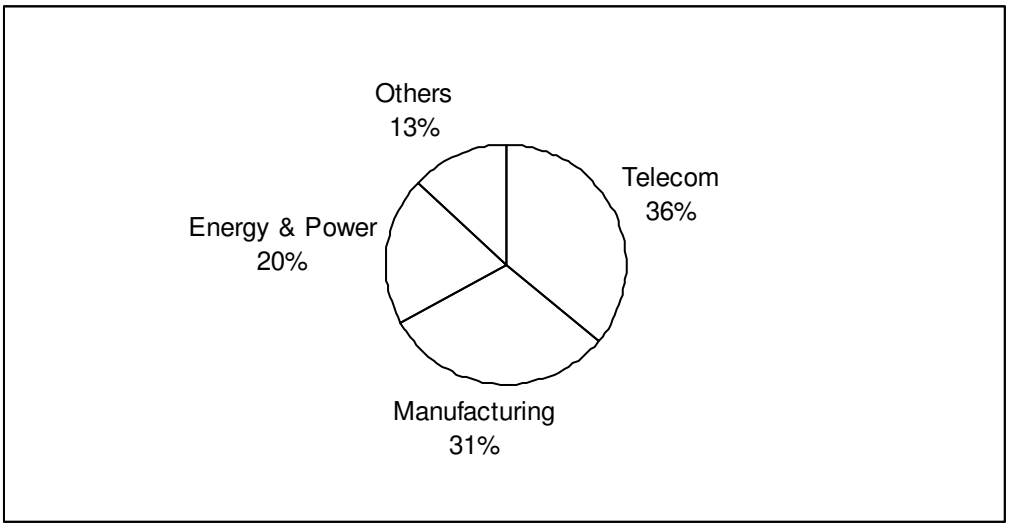

Figure 2: Sectoral Distribution of FDI in 2004[12]

Table 5: Extended Sectoral Distribution of FDI during 2004

Sector	FDI in million US$	Sectoral share	Sectoral ranking
Service	441.124	66.76	-
Telecommunications	237.410	35.93	1
Energy & power	133.045	20.13	2
Other services	70.669	10.69	4
Manufacturing	206.822	31.30	-
Textile	116.888	17.69	3
Chemical	47.323	7.16	5
Leather & rubber	18.692	2.83	6
Agro-based	9.036	1.37	9
Food & allied	3.212	0.49	10
Glass & ceramics	1.280	0.19	11
Printing & publications	0.558	0.08	12
Miscellaneous	9.883	1.49	8
Engineering	12.860	1.95	7

[11] Bangladesh witnessed considerable political turmoil during fiscal year 2001-2002 in the run-up to the general election that was held in October 2001. The political conflicts adversely affected the economy, particularly FDI inflows.
[12] Source: BOI (2004), p.8.

Total	660.806	100.00

Source: BOI (2004).

If we consider a broader sectoral distribution of FDI in 2004, it can be seen from Figure 2 that the service sector (56 percent of investment proposals) emerged as the leading sector which includes telecommunications (36 percent) and energy & power (20 percent). The manufacturing sector represents 31 percent of total FDI and other sectors account for 13 percent. The principal constituents of the manufacturing sector are textile, chemical and leather & rubber sub-sectors that represent about 88 percent of this sector. Textile is the highest FDI recipient in the manufacturing sector, followed by chemical and leather & rubber. Other manufacturing areas such as agro-based, food & allied and glass & ceramics have also been attracting FDI to a certain extent. Table 5 presents the sectoral distribution of FDI in more detail.

Table 6 shows the trend of inflows of FDI in Bangladesh, India, Nepal, Pakistan and Sri Lanka during 1991-98. It can be seen that Bangladesh is the only country in South Asia where FDI has been growing in each year since 1991, although from a very low base. It may further be noted that in Bangladesh, FDI took place at a considerably faster rate during 1991-98 than its neighbours. Table 6 also shows that in Bangladesh, FDI inflows per US$ 1,000 has increased sharply from 0.2 in 1991-95 to 7.2 in 1998, whereas in South Asia on average, it has increased to 6.7 in 1998 from 3.3 during the same period of time. In 1991-95, Bangladesh was the least attractive destination for FDI according to both measurements namely actual FDI inflows and FDI inflows per US$ 1,000 GDP whereas in 1998 it became the 3rd most attractive destination in the South Asia after India and Sri Lanka.

Table 6: FDI Inflows to South Asia[13]

Country	1991-95 FDI inflows		1996 FDI inflows		1997 FDI inflows		1998 FDI inflows	
	$ millions	Per $ 1,000 GDP	$ millions	Per $ 1,000 GDP	$ millions	Per $ 1,000 GDP	$ millions	Per $ 1,000 GDP
Bangladesh	6	0.2	14	0.3	141	3.4	308	7.2
India	803	2.6	2,426	6.7	3,577	8.6	2,635	6.3
Nepal	5	1.4	19	4.2	23	4.7	12	2.7
Pakistan	417	7.8	918	14.2	713	11.6	507	7.9

[13] Note there is a large deviation in FDI figures for Bangladesh between Table 4 and Table 6. This is probably because of the fact that Table 6 includes only the FDI which have been implemented whereas Table 4 includes FDI all FDI projects registered with BOI regardless of their implementation stages.

Sri Lanka	123	11.6	133	9.6	435	28.8	206	13.1
South Asia*	1,363	3.3	3,520	7.3	4,901	9.1	3,679	6.7

Note: *For South Asia, both the averages and totals are based on the inclusion of Afghanistan and Maldives in addition to the five countries in the table.

Source: UNCTAD (2000), p.16.

But presumably the notable performance of Bangladesh compared to its South Asian neighbours in terms of attracting FDI is a temporary phenomenon. In Table 6 we have FDI figures available only to 1998. It can been seen from Table 4 the trend in foreign investment projects register with BOI in Bangladesh reveals a sharp decrease in FDI inflows from 1997-98 to 2001-02 with an exception in 1999-2000 where it rises slightly[14].

According to the World Investment Report 2005[15] published by UNCTAD (2005), Bangladesh has attracted only US$ 460 million of FDI in 2004 accounting for 6.57 percent of all FDI inflows in the South Asian region. According to the UNCTAD index for attracted foreign investments, Bangladesh ranks 122nd out of 132 investment destination countries. Moreover, the Business Competitiveness Index 2005-06[16] published by the World Economic Forum (2005) ranks Bangladesh as 110 out of 117 countries due to persistent corruption, poor infrastructure and indecisiveness on the part of the government.

Table 7: Bangladesh and Neighbours' Risk Rating

Country	Political security rating	Economic security rating	Business environment rating	Composite rating
Bangladesh	46.0	42.0	38.1	44.0
India	64.0	72.0	61.8	67.9
Pakistan	49.0	57.0	49.3	53.3
Sri Lanka	49.0	46.0	51.5	47.5

Source: Business Monitor International (2005): various issues.

The Business Monitor International[17], a London-based leading organisation in news analysis, forecasts and data on global emerging markets, provides short-term country rating in terms of political and economic risk and business environment. Table 7

[14] A sharp fall in FDI inflows to Bangladesh in 1998-99 (FDI falls by 44 percent, see Table 3) might be partly due to the Asian financial crisis that started in July 1997.
[15] The report is available online at <http://www.unctad.org/en/docs/wir2005_en.pdf>.
[16] Full results of the Business Competitiveness Index rankings are available at <www.weforum.org/gcr>.
[17] Business Monitor International web address is <http://www.businessmonitor.com/>.

shows the short-term country risk rating of Bangladesh, India, Pakistan and Sri Lanka. All ratings are expressed as a number between 1 and 100. Lower the number higher the risk. Bangladesh's low rating in all four indicators makes it the highest risk country in the South Asian region which is consistent with the Transparency International (2005)'s findings that found Bangladesh the most corrupt country in the world as per its Corruption Perceptions Index 2005[18].

5. Scope for a Better Investment Climate

An UNCTAD (2000) report on the results of consultations with the private sector in Bangladesh (both foreign and domestic) found three key items namely good governance (including law and order), upgrading infrastructure, and reducing red tape that need to be addressed on a priority basis to make the country's investment climate better.

An Independent Anti-Corruption Commission (IACC) was established by the Anti-Corruption Commission Act 2004[19] to promote good governance and ensure transparency in public administration in Bangladesh. The establishment of IACC is expected to reduce the cost of doing business in the country by curbing corruption and illegal payments, although realistically, it will take some time to become effective. Moreover, the Infrastructure Investment Facilitation Center (IIFC)[20] was established in March 1999 to promote and facilitate private sector participation in the infrastructure sector of Bangladesh as well as to improve efficiency and reduce demand for scare public resources. IIFC provides assistance with policy development work toward creating an enabling environment for greater level of private sector investment in infrastructure sectors.

In order to further strengthen the country's industrialisation process the government of Bangladesh has recently formulated an industrial policy known as Industrial Policy

[18] Transparency International's report is available from its web site <http://www.transparency.org/cpi/2005/dnld/media_pack_en.pdf>.
[19] Source: UNPAN (2005), Anti-Corruption Commission Act 2004 available at <http://unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN019089.pdf>.
[20] IIFC, a government owned company, provides professional services to line ministries and agencies of the Government of Bangladesh to develop infrastructure projects for private sector participation (IIFC, 2005) web address <http://www.iifc.net/>.

2005 (IP-2005)[21]. One of the foremost objectives of IP-2005 is to accept private initiatives as the main driving force of economic development and uphold the government's facilitating role in creating a favourable atmosphere in order to augment private investments in the country's industrialization, given the background of a free market economy and globalization (GOB, 2005b). The recognition by the Government of Bangladesh that the private sector is the engine of growth is encouraging and offers much hope for the future. The IP-2005 also recognises the establishment of Special Economic Zone (SEZ) following some of the Asian and Pacific countries such as Taiwan, China, Singapore and Malaysia. Because this concept to a great extent is cost-effective and economically profitable, the government will establish SEZs across Bangladesh on a priority basis considering the nature and types of industries and comparative costs across regions.

According to IP-2005, BOI, formed under the leadership of the Prime Minister, with Ministers and Secretaries representing relevant ministries, will take the necessary decisions in order to help establish new industries and provide assistance to already established industries. The BOI will provide a one-stop service in the following fields so that investors get infrastructure facilities quickly when setting up industries:

- electric and gas connections;
- water and sewerage connections;
- telecommunications facilities;
- customs clearance of imported machineries, spare parts and raw materials;
- clearance from environmental agencies; and
- other necessary facilities and services for speedy setting up and running of industries.

The above initiatives provide our motivation for simulating improved business confidence in Bangladesh making it more attractive to foreign investors.

6. Theoretical Structure of the Bangladesh CGE Model

[21] This can be downloaded from <http://www.epb.gov.bd/indust_policy/industrial_%20policy_05.doc> (GOB, 2005b).

The theoretical structure of the core CGE model of the Bangladesh economy (called BAORANI[22]) used in this paper is based closely on ORANI, a CGE model of Australian economy (Dixon *et al*., 1982). The main extension of ORANI's theoretical structure for BAORANI is the incorporation of multiple households in the same manner as employed by Horridge *et al.* (1995) for their CGE model of South Africa. A complete description including the theoretical structure of the BAORANI model is provided in Hoque (2006). BAORANI, like ORANI, is a single country comparative-static CGE model. It consists of 86 industries, 94 commodities and three primary factors of production: labour, capital and land. Its main characteristics are listed below:

Assumptions about production structure

Producers are assumed to be price takers who choose their inputs to minimise the cost of producing any given level of output subject to a constant return to scale nested Leontief/constant elasticity of substitution (CES) production functions. CES functions allow substitution between: imported and domestic inputs; labour, capital and land; and occupations. Production functions are assumed to be weakly separable. No substitution is allowed between primary factors and intermediate inputs or between intermediate inputs of different classes. Substitution between imported and domestic inputs is modelled using Armington elasticities i.e. the Armington (1969) assumption that imports are imperfect substitutes for domestic supplies is adopted. Labour is disaggregated into eight groups according to gender and level of education (for type of labour see Table 12). Figure A.1 located in the Appendix illustrates the structure of production.

Assumptions about investment demands

Investors are assumed to be price takers who minimise the cost of creating units of physical capital subject to nested CES production functions. Aggregate investment is normally exogenous, but its industrial composition depends on the relative rates of return across industries.

[22] The name of the model is inclusive of the Australian model 'ORANI' to which is added 'BA' for Bangladesh. It is a coincidence that the title of the new model also is the name of the researcher's home village.

Assumptions about household demands

The representative household is assumed to maximise a nested Klein-Rubin/CES utility function (Klein and Rubin, 1947-1948) subject to its aggregate budget constraints. Substitution is allowed between commodities and between sources of commodities using a nested Linear Expenditure System (LES)-CES demand system. Household sector is disaggregated into nine groups in accordance with the following criteria: (i) regional differences, i.e. urban and rural households; (ii) educational level of the head of the household; and (iii) access to productive forms of material wealth particularly, agricultural land (for type of household see Table 13).

Export demands

Export demands are modelled by dividing all commodities into two groups: traditional and non-traditional. For an individual traditional export commodity, foreign demand is inversely related to that commodity's price and for the remaining collective non-traditional export commodities; foreign demand is inversely related to the average price of all collective export commodities.

Government demands

The level and composition of government consumption is exogenously determined.

Prices

Zero-pure-profit conditions and constant returns to scale imply that basic values of outputs are functions only of input prices. Basic prices of imports are the landed-duty-paid domestic currency prices. Purchasers' prices are the sum of basic prices, sales taxes, and trade and transport margins.

Market clearing

Commodity markets are assumed to be cleared. A common short-run assumption that real wage rates are fixed with labour in excess supply is adopted.

Identities defining macro variables

The model includes a number of identities defining macroeconomic variables (e.g. GDP, the trade balance, price indexes) as explicit aggregates of their microeconomic components.

The model is solved using the GEMPACK (General Equilibrium Modelling PACKage) software, developed by the Centre of Policy Studies and the Impact Project, Monash University (Harrison and Pearson, 1996). A CGE database for the model is constructed using information from the 2000 input output (IO) tables and from the 1993-94 and 2000 Social Accounting Matrix (SAM) for Bangladesh[23]. The elasticity estimates used in the model are assigned on the basis of literature reviews.

Interpretation of Comparative-static Results

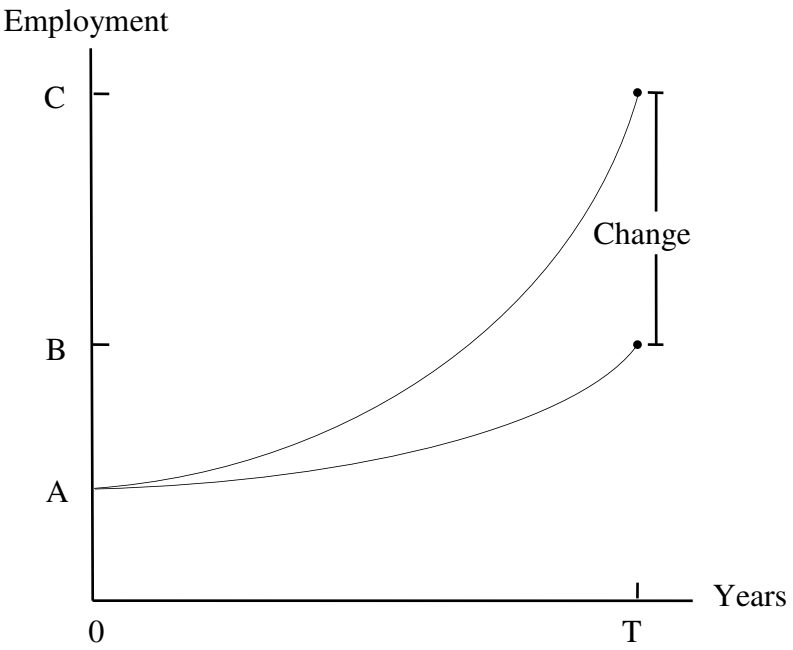

Figure 3: Comparative-static Interpretation of Results

We explained that the BAORANI model is designed for comparative-static simulations. Here we provide a brief description of what we mean by comparative-static results. The "comparative-static" nature of the model implies that it provides projections at only one point in time, which is the solution year. The model refers implicitly to the economy at some future time period to ensure that the economy adjusts after the initial shock(s). This concept is illustrated by Figure 3, which plots the values of some variable, say employment, against time. *A* is referred to as the

[23] Both 2000 IO tables and 2000 SAM for Bangladesh are supplied by the Sustainable Human Development Unit, Planning Commission, Ministry of Planning, Government of Bangladesh, Dhaka (GOB, 2003a and 2003b) and the 1993-94 SAM is from Fontana and Wobst (2001).

level of employment in the base period (period 0). Suppose that in period 0 an external shock is applied, say all tariffs are completely removed. As a result of this shock C is the level of employment that will be attained in T years time, all other things being equal. In the event of no shock B will be level of employment. In a comparative-static simulation, BAORANI generates the percentage change in employment $100(C-B)/B$, showing how employment in period T would be affected by the removal of tariffs alone.

7. Description of Simulations

Two sets of policy simulations are conducted to explore the long-run impact of improved investors' confidence in Bangladesh on its macroeconomic indicators and sectoral output and employment, as well as the impact on consumption at the household level. The simulations are:

- **Scenario A**: a 10 percent reduction in the rate of return on investment in selected sectors[24] which attract the majority of FDI in Bangladesh; and
- **Scenario B**: a 1.15 percent reduction in the rate of return on investment in all sectors in Bangladesh[25].

The key assumptions underlying the abovementioned simulations are:

- the simulations relate to the long run - aggregate employment is exogenous while the real wage is endogenous;
- rates of return on capital in each industry are exogenous, with capital stocks adjusting endogenously (in each industry) and all revenue of newly arrived capital accrues to foreign investors[26];
- both the balance of trade[27] and domestic absorption are endogenous - real household consumption for each household class moves with its real

[24] As we can see from Table 4, telecommunications, energy & power, textile, chemical, and leather & rubber sectors have accounted for 83.74 percent of the total FDI in Bangladesh. In the first simulation, the rate of return on investment in these sectors is reduced by 10 percent.

[25] The amount of uniform shock (1.15 percent) is the aggregated investment share of the selected industries times the size of the shock in the first simulation (i.e. 10 percent).

[26] The implementation process of the assumption that the new capital is foreign owned is discussed in the last paragraph of this section. The aim of this assumption is to avoid overestimation of the impact on household consumption. However, with this assumption, we are underestimating the effects on household consumption. It would have been better if we could precisely allocate the revenues of newly arrived capital between local and foreign investors. Due to lack of reliable data we could not do that.

disposable income (average propensity to consume is held fixed), aggregate investment follows the aggregate capital stock, and real government demand follows aggregate total household demand;

- government maintains revenue neutrality via adjusting general tax rate across all users;
- the policy has no effect on technology and consumer preferences; and
- finally, the nominal exchange rate is the numeraire.

Figure 4 presents a schematic representation of the long-run macroeconomic environment. In this figure, exogenous variables are depicted in rectangles and endogenous variables are depicted in ovals. The arrows indicate direction of causation between variables. On the supply-side of the macro economy, we have exogenised the employment, rate of return on capital and technology. On the demand-side, both the balance of trade and domestic absorption are endogenous. Real household consumption moves with real disposable income (average propensity to consume is held fixed), aggregate investment follows the aggregate capital stock, and real government demand follows total household demand.

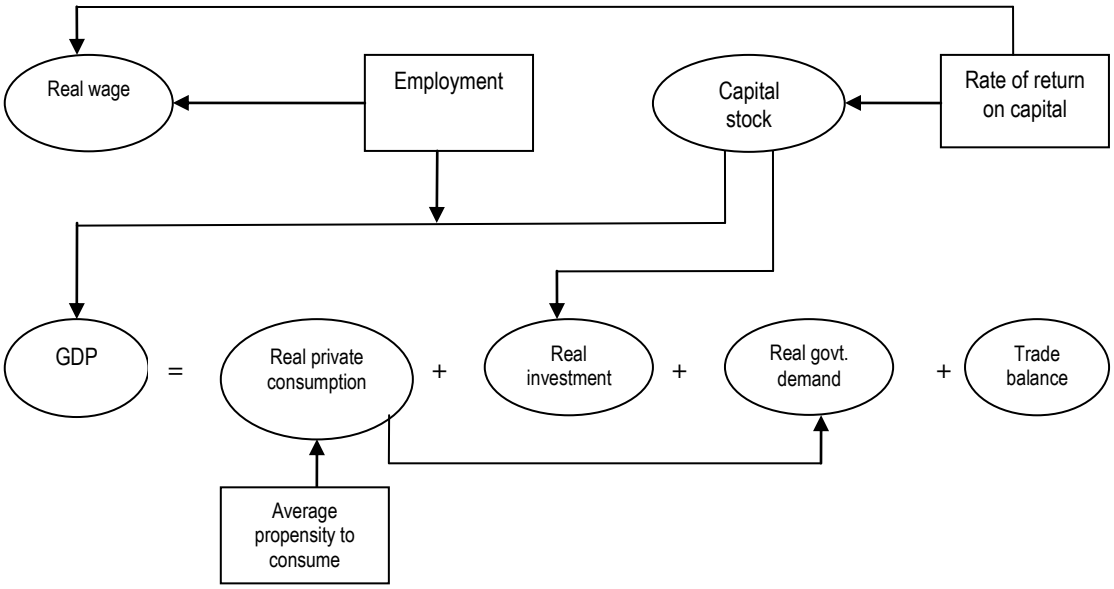

Figure 4: Schematic Representation of the Long-run Macroeconomic Environment

[27] The long-run refers to a period which is long enough for both labour and capital markets to adjust but not long enough to adjust the balance of trade (BoT). In the very long run we would expect to adjust BoT.

Figure 5 illustrates the interaction between rate of return and rate of capital growth in a specific sector, say telecommunications. The initial equilibrium is at point E. The shock, the reduction in the rate of return on investment in the telecommunications sector, moves the capital supply curve down from S to S'. As a result, the equilibrium moves from point E to E', which has a lower rate of return on investment and a higher rate of capital growth[28].

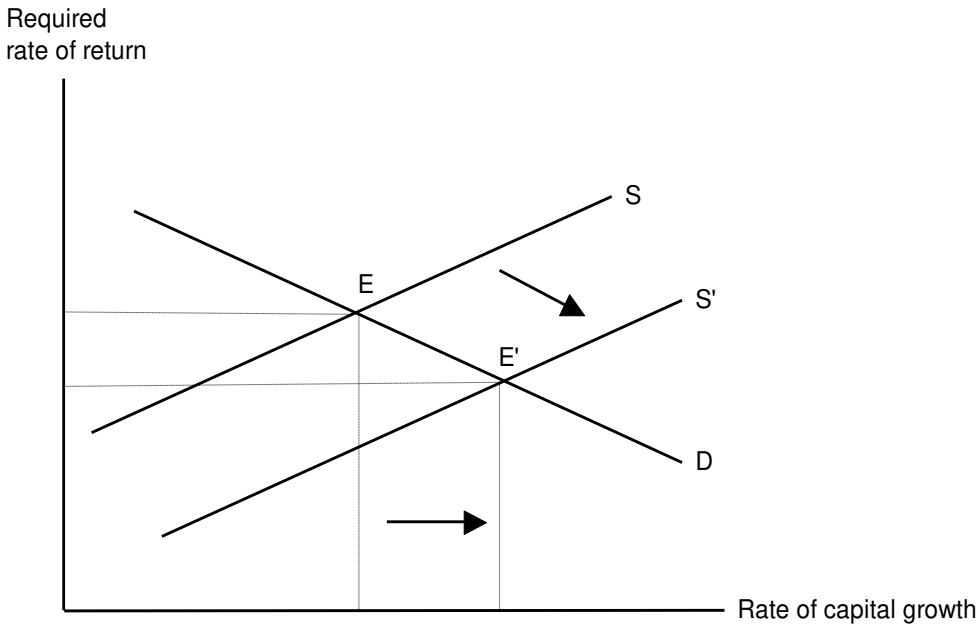

Figure 5: Capital Supply Schedule

Before we begin to analyse the simulation results, we provide a brief description of how we have handled the assumption that the new capital is foreign owned[29]. One of the main sources of household income is income from gross operating surplus (GOS) and the GOS comes from five different sources including the rent from capital. Generally, in the BAORANI model, the percentage change in the aggregate rent from capital is a weighted average of the percentage changes in current capital stock and rental price of capital in each industry. This indicates that the revenue of newly arrived capital accrues to both local and foreign investors. To implement the assumption that all revenue of newly arrived capital accrues to foreign investors, we

[28] An informative analysis of the improvement of investors' confidence is provided by Dixon (1998).
[29] For a complete description of the implementation process of the assumption that the new capital is foreign owned see Appendix B in Hoque (2006).

presume that the percentage change in the aggregate rent from capital is a weighted average of the percentage change in rental price of capital in each industry. In this way we are not allowing household to receive any revenue from newly arrived capital and hence the new capital is entirely foreign owned.

8. Simulation Results

The results of the two simulations are shown in Tables 8 - 14. To make the discussion straightforward, first we discuss scenario A then scenario B. For each scenario we discuss macro variables, sectoral outputs and employment, and household consumption.

8.1 Scenario A: Macroeconomic Results

Table 8 shows the macroeconomic effects resulting from a 10 percent reduction in the rate of return on investment in selected sectors which attract the majority of FDI in Bangladesh[30]. The selected sectors are jute fabrication, yarn industry, cloth milling, dyeing and bleaching, ready made garments (RMG), knitting, leather industry, shrimp farming, food process, fishing, clay industry, toiletries manufacturing, medicines, basic chemical, chemical industry, cement manufacturing, electricity and water generation, gas extraction and distribution, mining and quarrying, telecommunication, information technology and e-commerce. In scenario A, we actually examine the economic impact of FDI inflows in Bangladesh due to a reduction in the rate of return on investment where all revenue of newly arrived capital accrues to foreign investors.

To understand the macroeconomic results (GDP, aggregate employment, aggregate capital stock etc.) we develop a small back-of-the-envelope (bote) model. From the supply-side of the macro-economy the GDP identity is

$$GDP = A * F(K, L) \tag{1}$$

where A is technological-change variable (a 10 percent increase in A means that a given level of output can be produced with 10 percent less capital and labour). We assume that labour and capital earn the value of their marginal products so that

$$W = A * \frac{\partial F}{\partial L}\left(\frac{K}{L}\right) * P_g \text{ and} \tag{2}$$

[30] See footnote 21.

$$Q = A * \frac{\partial F}{\partial K}\left(\frac{K}{L}\right) * P_g \tag{3}$$

where W is the wage rate, Q is the rental rate on capital and P_g is the GDP price deflator. Dividing equation (2) by the consumer price index (P_c) and equation (3) by the investment price index (P_i) we obtain:

$$\mathrm{W_r} = \frac{W}{P_c} = \frac{P_g}{P_c} * A * \frac{\partial F}{\partial L}\left(\frac{K}{L}\right) \quad \text{and} \tag{4}$$

$$\mathrm{ROR} = \frac{Q}{P_i} = \frac{P_g}{P_i} * A * \frac{\partial F}{\partial K}\left(\frac{K}{L}\right) \tag{5}$$

where W_r is the real wage rate and ROR is the required rate of return on investment. Note that P_g includes the price of exports but not the price of imports, and P_c and P_i include the price of imports but not the price of exports. Therefore, the price ratios on the right-hand-sides of equations (4) and (5) can be regarded as increasing functions of the terms of trade.

Now our simulations involve a reduction in ROR. Let us assume for the moment that there is no change in the terms of trade. With no change in the terms of trade and the technological variable (A), it follows from the equation (5) that a lowering of ROR implies a fall in $\partial F/\partial K$. Since $\partial F/\partial K$ is a decreasing function of K/L, with L fixed, a fall in $\partial F/\partial K$ requires an increase in K. Since $\partial F/\partial L$ is an increasing function of K/L it then follows from equation (4) that real wages must increase.

However, in our simulations there is a change in the terms of trade. It deteriorates but not enough to overturn the above result[31]. Indeed, the results for the price deflators shown in column 1 of Table 8 indicate that while P_g/P_c declines slightly (thus restraining the increase in capital), the ratio P_g/P_c actually increases slightly causing the real wage increase. However, these movements are small (-0.2 percent and 0.1 percent respectively), compared with a rate of return fall of about 1.15 percent economy-wide. Hence, from our bote model combined with our assumptions of no

[31] The reason we get a small change in the terms of trade because of a very high export demand elasticity (-20.0).

changes in technology and aggregate employment we would expect an increase in the aggregate level of capital stock (K) and consequently an increase in GDP. Our simulation results show that the aggregate level of capital stock increased by almost 1.12 percent. On the basis of the capital stock result, we would expect an increase in GDP of about 0.58 percent (the capital share of GDP times the percentage increase in capital stock, 0.52*1.12), which is very close to the BAORANI result (about 0.60 percent).

Table 8: Macroeconomic Impact of Improved Foreign Investor Confidence

Main macro variables	Scenario A (Column 1)	Scenario B (Column 2)
Real investment expenditure	0.742	0.932
Real household consumption	0.126	-0.006
Real government demand	0.126	-0.006
Export volume index	4.058	3.193
Import volume index	1.376	0.454
Real GDP	0.598	0.562
Aggregate capital stock	1.115	1.095
GDP price index	0.776	-0.329
GDP at factor cost deflator	0.797	-0.332
Aggregate employment	0.000	0.000
Investment price index	1.008	-0.312
Consumer price index	0.679	-0.325
Exports price index, local currency	-0.157	-0.155
Real devaluation	-0.776	0.329
Average capital rental	-0.215	-1.463
Average nominal wage	1.987	0.939
Average real wage	1.308	1.264
Terms of trade	-0.157	-0.155
Household disposable income	0.803	-0.325
(Nominal BOT)/(nominal GDP)*	0.003	0.003
Contribution of BOT to real GDP*	0.331	0.358

Note: Variables with (*) asterisk are in ordinary changes and all other macro results are percentage changes.

From the demand side of the macro economy, we assume real household consumption moves with real disposable income and average propensity to consume is fixed. Real household consumption increases (about 0.13 percent) since household disposable income increases (0.80 percent). Moreover, the price of consumption (CPI) goes down compared to the GDP price index. We also assume real government demand follows total household demand hence government consumption increases by 0.13 percent. Aggregate real private investment grows by 0.74 percent to follow a 1.12

percent growth in aggregate capital stock. The investment result is lower than the capital result because of a lower weight on the selected sectors[32] in the investment aggregate than in the capital stock aggregate (i.e. selected sectors have a lower investment-capital (I/K) ratio on average than non-selected sectors).

Because private and public consumption is 79.67 percent of GDP and private investment is 22.46 percent, the contribution of the increase in domestic absorption to real GDP is (0.7967*0.126 + 0.2246*0.742) or 0.27. Consequently, with 0.60 percent change in real GDP, there must be a surplus in the trade balance. Our first guess is that the contribution provided by the rise in net exports to GDP would be (0.60 - 0.27) or 0.33. The simulation results show that the percentage increase in exports is 4.06 percent and the percentage increase in imports is 1.38 percent. Because exports is 13.42 percent of GDP and imports is 15.52 percent, the contribution of the rise in net exports to real GDP is (0.1342*4.06 – 0.1552*1.38) or 0.33, which is identical to our first guess.

Moreover, we know movements in the components of the international trade balance occur due to activity effects and relative price effects. Changes in domestic demand (with given prices) will tend to change the demand for imports – an activity effect. Hence with real GDP up, so too is the demand for imports. The movement in the overall balance of trade towards surplus requires a change in international competitiveness (a change in domestic costs relative to foreign prices/costs in common currency terms) to induce an expansion in exports and to dampen the increase in imports. In our simulation the nominal exchange rate is the numeraire. Hence we would expect the real devaluation of Bangladeshi currency necessary to achieve the improvement in international competitiveness to be generated via a reduction in the Bangladeshi price level. However, the simulation result shown in column 1 of Table 8 indicates an appreciation in the real exchange rate (brought about by a 0.776 percent increase in the GDP deflator). Like Australian ORANI model, the definition for the real exchange rate in BAORANI model is the ratio of the domestic currency of the GDP deflator to the domestic currency value of the foreign GDP deflator. Giesecke (2000) points out, while this is a useful index of the real exchange

[32] Selected sectors are those in which the rate of return on investment is reduced by 10 percent in scenario A.

rate for the majority of simulations, in some simulations it fails to provide the proper sign to explain movements in the real balance of trade. For example, some shocks to the model that are directed at industries producing goods that primarily are either exported or compete with imports, can be associated with an apparent appreciation of the real exchange rate index, and an increase in the real balance of trade surplus. This result arises because the price impact of the shock is expressed as a significant change in the prices of traded goods relative to the GDP deflator.

8.2 Scenario A: Sectoral Results

The sectoral effects (output, employment and real investment results for 20-aggregated sectors[33]) of the reduction in rate of return on investment in selected sectors (scenario A) are reported in Table 9. The results for all 86 sectors are presented in Table A.2 located in the Appendix. Most sectors grow, especially the targeted sectors. The sectors that are affected most favourably are textile clothing and footwear hereafter TCF (with an expansion in output of 6.49 percent), non-metal product (2.71 percent), utilities (1.42 percent), chemicals (1.12 percent), fishing (1.00 percent), mining and quarrying (0.93 percent), and transport (0.91 percent). With the exception of transport, the aforementioned aggregate sectors include the sectors for which the rate of return on investment is lowered in this particular simulation (scenario A). The expansion in transport output can be explained by the fact that this industry is a supplier to the sectors that exhibit robust expansion in our simulation.

While most aggregated sectors expand when the rate of return on investment is lowered, there are some that contract. For instance, output in the other manufacturing and public service sectors contract by 11.24 percent and 2.29 percent respectively[34]. Wood & paper, agriculture, and processed food sectors also experience a slight contraction in output results (-0.15 percent, -0.05 percent and -0.05 percent

[33] The mappings between 86 sectors and 20 sectors and between 94 commodities and 20 commodities are presented in Table A.1located in the Appendix.
[34] Note that public service sector has a very high elasticity of exports (-20.00) and the export share of public administration and defence goods, a key component of aggregated public service goods, accounted for about 25 percent in the database.

respectively). The abovementioned sectors, which use more labour, get hurt because of the real wage increase, and they are not listed as selected sectors[35].

Table 9: Effects of Improved Foreign Investor Confidence on Output, Employment and Real Investment: 20 Aggregated Sectors

	Scenario A			Scenario B		
20 Aggregated sectors	Output	Employment	Real investment	Output	Employment	Real investment
Agriculture	-0.052	-0.361	0.402	0.231	-0.289	1.178
Fishing	1.003	-1.214	4.128	0.159	-0.308	0.802
Forestry	0.297	0.216	0.494	0.604	0.110	1.252
Processed food	-0.045	-0.657	0.387	0.041	-0.522	0.447
TCF	6.491	6.313	11.571	1.927	1.809	3.135
Tobacco product	0.151	-0.328	0.251	0.021	-0.901	0.224
Wood and paper	-0.154	-0.410	0.116	0.282	-0.380	0.735
Chemicals	1.116	-0.340	0.954	1.387	1.118	2.560
Non-metal product	2.705	-0.177	4.003	0.817	0.019	1.212
Metals	0.108	-0.104	0.485	0.569	-0.108	1.056
Machinery and equipment	0.122	-0.425	0.794	0.905	0.229	1.602
Other manufacturing	-11.242	-11.517	-11.070	4.899	4.156	5.364
Construction	0.566	0.223	0.754	0.728	-0.065	1.141
Utilities	1.417	-2.882	2.705	0.324	-0.570	0.595
Mining and quarrying	0.926	-1.503	4.068	0.416	-0.041	1.119
Trade	0.596	0.234	0.822	0.452	-0.220	0.943
Transport	0.906	0.388	1.329	0.700	-0.001	1.185
Housing service	0.294	0.000	0.294	0.529	0.000	0.529
Public service	-2.286	-2.551	-1.093	-0.078	-0.433	0.854
Private service	0.570	0.197	0.990	0.484	-0.064	1.190

Note: All figures are percentage changes.

In examining the reasons for effects on the output of individual commodities, it is helpful to decompose these effects into those resulting from changes in domestic demand for a commodity (regardless of source of supply), substitution effects between the locally-supplied commodity and imports, and changes in export demand for that commodity. This is provided for all 94 commodities in Table A.3 located in the Appendix. For example the toiletries sector exhibits the biggest expansion in output results i.e. output increases by 15.17 percent. The 'LocalMarket' column in Table A.3 can be interpreted as saying that given the increase in domestic demand for toiletries (local and imported) we may have anticipated the rise in output to be 2.42

[35] The selected sectors are those for which the rate of return on investment is reduced in this simulation (scenario A).

percent. However, the 'DomShare' column can be interpreted as saying that due to a relative price change favouring locally produced toiletries, the output of this industry increases by an additional 0.20 percentage points (over the growth in local demand). The 'Export' column shows that the increased export demand accounted for 12.55 percentage points of the total expansion in toiletries production. Note the share of exports in toiletries sales in the database is 30 percent (Table A.3). Moreover, the export price for toiletries falls sharply by 2.10 percent compared to only a 0.16 percent fall in the economy-wide export price index.

In contrast the other manufacturing (i.e. 'MisceInd') sector exhibits the biggest contraction (output falls by 11.24 percent as shown in Table A.4 located in the Appendix). The decomposition of this result reveals that the export of other manufacturing products is decreased by 11.07 percent while overall local demand (regardless of source of supply) for the other manufacturing products is increased by only 0.16 percent. Two features of the other manufacturing industry make it a vulnerable industry – relatively high labour intensity and high export share. We can refer to Table 10 which is calculated from the BAORANI database containing the destination share of the other manufacturing products. The majority of the other manufacturing products goes to intermediate demanders (74 percent) followed by export demanders (24 percent). Note that the export price for other manufacturing products rises (by 1.23 percent) while the economy-wide export price index falls. Moreover, the industry has a very high elasticity of exports (-20.00).

Table 10: Sales Matrix for the Other Manufacturing Industry[36]

Sales Matrix	Intermediate	Investment	Household	Government	Exports	Total
Other manufacturing	0.741	0	0.016	0	0.243	1

Source: BAORANI database

The other manufacturing cost matrix shown in Table 11, which is also calculated from the BAORANI database, contains the cost share of the other manufacturing products. Table 11 reveals that capital cost contributes 46 percent of total other manufacturing cost, labour cost 29 percent and intermediate cost 20 percent, margin 4 percent and taxes 1 percent.

[36] Sales matrix contains basic price values.

Table 11: Cost Matrix for the Other Manufacturing Industry[37]

Cost Matrix	Intermediate	Labour	Capital	Margin	Taxes	Total
Other manufacturing	0.205	0.287	0.459	0.039	0.010	1

Source: BAORANI database

Table 9 shows the results of real investment for 20-aggregated sectors. We can see that TCF becomes the most attractive sector to investors (with an expansion in real investment of 11.57 percent) followed by mining and quarrying (4.07 percent), fishing (4.13 percent), non-metal products (4.00 percent), and utilities (2.71 percent). On the other hand, other manufacturing and public service sectors become the least attractive to investors. The investment results for all 86 sectors are presented in Table A.2.

We assume in the long-run, the supply of labour is exogenous but the real wage is endogenous. We also allow substitution between different types of labour. Table 12 shows the effects on employment of each labour type. In general, female workers experience a relatively higher increase in employment than male workers. The type of labour which experiences the largest increase in employment is the low-educated female workers (4.20 percent), followed by the medium-educated female workers (3.64 percent). The majority of the low and medium educated female workers are employed in TCF sector (43 percent of low-educated and 40 percent of medium-educated) which experience robust expansion in employment (6.31 percent). As a result, both low and medium educated female workers experience the largest increase in employment.

Table 12: Effects of Improved Foreign Investor Confidence on Employment by Labour Type

Type of labour	Scenario A	Scenario B
Male	-0.379	-0.103
Male labour with no education (no formal schooling)	0.004	-0.132
Male labour with low education (class I to class V)	-0.051	-0.056
Male labour with medium education (class VI to class X)	-0.403	-0.107
Male labour with high education (class XI and above)	-0.882	-0.110
Female	2.465	0.669
Female labour with no education (no formal schooling)	1.951	0.495
Female labour with low education (class I to class V)	4.197	1.148
Female labour with medium education (class VI to class X)	3.635	1.011
Female labour with high education (class XI and above)	0.800	0.256

Note: All figures are percentage changes.

[37] Sales matrix contains basic price values.

On the other hand, both high and medium educated male workers, a majority of whom are employed in public service sector (respectively, about 36 percent and 10 percent) experience a contraction in employment (i.e. falls by 0.88 percent and 0.40 percent respectively). Note that overall employment in public service sector falls by 2.55 percent. A slight increase in employment for the illiterate male workers (0.004 percent) is due to the fact that a considerable number of these workers are employed in those sectors (namely TCF, construction, trade etc) which are projected to experience an expansion in employment.

8.3 Scenario A: Distributional Results

Table 13 shows the percentage changes in real consumption by household group for the simulation of a 10 percent reduction in the rate of return on investment in selected industries i.e. for simulation A. Table 13 also shows the percentage changes in household-specific consumer price indexes i.e. CPI. The results of our simulation indicate that a 10 percent reduction in the rate of return on investment in selected industries has only minor effects on the distribution of real consumption between households.

The first thing to notice is that there is not much inter-household variation in CPI results but there are some differences in disposable income results. We assume household real consumption moves with household real disposable income. As we can see from Table 14, household disposable income mainly comes from two sources - GOS and labour wage. The share of GOS in household disposable income is 55 percent and the corresponding figure for labour wage is almost 45 percent. Note we assume that all revenue of newly arrived capital accrues to foreign investors and hence households' do not get any revenue from additional capital inflows to the economy. Therefore changes in household disposable income largely depend on changes in labour income. Simulation results show that household disposable income increases since labour income increases. Moreover the share of labour income to total household disposable income is different for different household groups. For example, the share is almost 74 percent for highly educated urban household, 69 percent for rural landless and 57 percent for urban illiterate group whereas for rural large and

small farm household groups it is only about 10 percent and 22 percent respectively (Table 14).

It can be seen from Table 13 that the household group which gains most is rural landless (almost 0.88 percent increase in their real consumption) followed by urban illiterates (0.53 percent), urban high educated households (0.24 percent), rural marginal farmers (0.22 percent) and urban low educated households (0.22 percent). Rural landless and urban illiterates exhibit greater expansion in real consumption because of their higher shares of labour income to disposable income. On the other hand real consumption for large and small farmers shrinks (by 0.61 percent and 0.30 percent respectively) since the percentage increase in their CPI (0.67 and 0.67 respectively) outweighs the increase in their disposable income (0.06 and 0.37 respectively). A slight increase in large and small farmers' disposable income compared to other household groups is mainly because of their low shares of labour income to disposable income discussed in the previous paragraph.

Table 13: Effects of Improved Foreign Investor Confidence on Real Consumption and CPI by Household Type

	Scenario A		Scenario B	
Type of household	Real consumption	CPI	Real consumption	CPI
Rural	0.023	0.673	-0.173	-0.295
Landless	0.875	0.668	0.513	-0.297
Marginal farmers	0.216	0.674	-0.081	-0.301
Small farmers	-0.300	0.672	-0.534	-0.292
Large farmers	-0.614	0.673	-0.834	-0.281
Non-farm	0.057	0.674	-0.066	-0.298
Urban	0.256	0.686	0.205	-0.364
Illiterates	0.525	0.680	0.299	-0.347
Low education	0.215	0.682	0.077	-0.356
Medium education	0.092	0.691	0.144	-0.382
High education	0.238	0.694	0.667	-0.373

Note: All figures are percentage changes.

Table 14: Disposable Income Shares and Source of Income by Household Type

HOU	VGOSHOU	VLABINC_O	VHOUHOU	VGOVHOU	VROWHOU	VHOUGOV
Landless	0.313	0.682	0.005	0	0	0
Marginal	0.579	0.415	0.006	0	0	0
Small	0.774	0.218	0.002	0.002	0.003	0
Large	0.901	0.096	0	0.001	0.002	0
NonFarm	0.569	0.426	0	0.002	0.003	0

Illitera	0.427	0.569	0.003	0	0	0
LowEdu	0.537	0.458	0.004	0	0	-0.001
MedEdu	0.508	0.489	0	0.001	0.001	-0.001
HighEdu	0.259	0.735	0	0.001	0.002	-0.003
Total	0.551	0.445	0.002	0.001	0.002	0

Note: VGOSHOU, VLABINC_O, VHOUHOU, VGOVHOU and VROWHOU refer to household income from GOS, labour wage, other households, government subsidies and foreign remittances and VHOUGOV refers to income taxes and household transfers to government.

Source: BAORANI database

8.4 Scenario B: Macroeconomic Results

In scenario B, we assume that an improved investors' confidence reduces the rate of return on investment in all 86 sectors by 1.15 percent. We show the macro results in Table 8. The pattern of the results for real GDP, aggregate real capital stock and aggregate real private investment in simulation B is similar to that in simulation A. Real GDP increases by 0.57 percent compared to 0.59 percent in simulation A. Aggregate real private investment grows by 0.93 percent to follow a 1.10 percent growth in aggregate capital stock. A slight (about 0.19 percentage points) increase of the aggregate real private investment in simulation B compared to simulation A is due to a fall in investment price index (by 0.33 percent) whereas in simulation A investment price index increases (by 1.01 percent).

Real household consumption declines slightly by 0.006 percent in scenario B (in contrast, real household consumption increases by 0.13 percent in scenario A). This is because in scenario B, the price of consumption goes up slightly compared to GDP price index. Moreover in scenario B household disposable income falls by 0.33 percent. Real government demand falls (by 0.006 percent) to follow the fall in real private demand. Therefore, the stimulation of the economy has generated more or less nothing in terms of private and public consumption. This highlights the idea that the inflow of capital does not bring any advantage to Bangladesh in a situation where it is assumed that all revenue of newly arrived capital accrues to foreign investors.

With an increase in real investment along with a slight decrease in real private and public spending, an increase in the real GDP must result in the trade balance moving toward surplus. Changes in domestic demand (with given prices) will tend to change the demand for imports hence with real GDP up, so too is the demand for imports (imports increase by 0.45 percent). The movement in the overall balance of trade

towards surplus requires a change in international competitiveness (a change in domestic costs relative to foreign prices/costs in common currency terms) to induce an expansion in exports and to dampen the increase in imports. The nominal exchange rate is the numeraire hence the improvement in international competitiveness is achieved by a fall in the domestic price level (the GDP deflator falls by 0.33 percent). This leads to an expansion in the aggregate export volume, estimated at 3.19 percent. Taking exports and imports together, net exports (i.e. trade balance) improves significantly. The expansion in export volume causes the export price, and hence the terms of trade, to fall by 0.16 percent.

8.5 Scenario B: Sectoral Results

The sectoral effects (output, employment and real investment results for 20-aggregated sectors) of scenario B are reported in Table 9. The results for all 86 sectors are presented in Table A.2.

All 20-aggregated sectors exhibit expansion in their output results except the public service sector where output falls by 0.08 percent. The sectors that are affected most favourably are other manufacturing (with an expansion in output of 4.90 percent, employment rises by 4.16 percent and investment rises by 5.36 percent), TCF (1.93 percent, 1.81 percent and 3.14 percent respectively) and chemicals (1.39 percent, 1.12 percent and 2.56 percent respectively). Remember in scenario A, the other manufacturing sector experiences a robust contraction in output results (output falls by 11.24 percent). As we can see from Table 11, other manufacturing sector is very capital intensive (capital cost contributes about 46 percent of total other manufacturing cost compared to the corresponding economy-wide figure of only about 27 percent. This swings the other manufacturing results other way round.

Table A.4 shows the decomposition results for all 94 commodities. For example the increase in other manufacturing output is 4.90 percent. The 'LocalMarket' column can be interpreted as saying that given the increase in domestic demand for other manufacturing (local and imported) we may have anticipated the rise in output to be 0.44 percent. However, the 'DomShare' column can be interpreted as saying that due to a relative price change favouring locally produced other manufacturing products,

the output of this industry increased by an additional 0.13 percentage points (over the growth in local demand). Finally, the 'Export' column shows that the increased export demand accounted for 4.33 percentage points of the total expansion in other manufacturing production. Note that other manufacturing is an export-oriented sector and its export price falls sharply (by 0.48 percent) compared to a 0.16 percent fall in economy-wide export price index.

The public defence and administration is the only sector which exhibits a contraction in output results. The decomposition of this result reveals that the export of public administration and defence products is decreased by 0.81 percent while overall local demand (regardless of source of supply) for the public administration and defence products is increased by 0.13 percent (Table A.4). Note that public administration and defence is an export-oriented sector in Bangladesh: the share of exports in the database account for 25 percent (Table A.4). Also note that the export price for public administration and defence products rise (by 0.17 percent) while the economy-wide export price index falls.

8.6 Scenario B: Distributional Results

Household real consumption results for scenario B are reported in Table 13. The simulation results indicate that a reduction in the rate of return on investment in all 86 sectors has some effect on the distribution of real consumption. Table 13 reports the percentage change in household-specific CPI. We can see that there is little variation across households in the effects of the decrease on consumption price indexes. The variation in consumption across households is explained primarily by the effect of the shock on the employment prospects of the households. For example, rural households, which experience decreases in consumption (by 0.17 percent), are relatively concentrated in the agriculture and fishing sectors that are adversely affected by the reduction of the rate of return on investment. On the other hand, urban households, which experience increases in consumption (by 0.21 percent), are relatively heavily concentrated in manufacturing industries that are favourably affected.

Only the landless in rural household groups experience increases in consumption and the remaining groups experience decreases in consumption. All urban household groups experience increases in consumption. The high-educated urban households

experience the largest increases in consumption (by 0.67 percent), followed by rural landless (by 0.51 percent), and urban illiterates (0.30 percent). As discussed in section 6.6.3, these results are explained by the higher share of labour income to disposable income in case of high-educated urban households, rural landless and urban illiterates, respectively 74 percent, 69 percent and 57 percent (Table 13). On the contrary, both large and small farmers experience the largest decreases in consumption (0.83 percent and 0.53 percent respectively) due to their small share of labour income to disposable income (only 10 percent and 22 percent respectively).

9. Conclusions

A central part of this paper involves an examination of the long-run effects of attracting foreign investment by improved business confidence in Bangladesh. The paper began with an overview of local and foreign investment in Bangladesh which was followed by a discussion about the scope of a better investment climate in the country. The final section of this paper dealt with investigation of the effects of improved business confidence in Bangladesh on its macroeconomic indicators, sectoral output and employment as well as the effects on consumption at household level. We did this by conducting and analysing two simulations in which we lowered the required rate of return on investment in Bangladesh. In the first simulation we lowered the rate of return on investment in selected sectors by 10 percent (scenario A) and in the second simulation it was lowered by 1.15 percent in all 86 sectors (scenario B). In the first part of this paper we have outlined the main attempts that the government of Bangladesh has adopted creating a business friendly investment regime in the country to attract foreign investment. Therefore, the exercise which we have undertaken in this paper is not hypothetical. In fact it is a very important issue for Bangladesh.

The results of our simulations indicate that, with all revenue from newly arrived capital accruing to foreign investors and government maintained budget neutrality, an improvement in investors' confidence in Bangladesh would expand GDP slightly. However the stimulation of the economy generated more or less nothing in terms of private and public consumption. This highlights the idea that the inflow of capital did

not bring any advantage to Bangladesh since we assumed that all revenue of newly arrived capital accrued to foreign investors.

In scenario A, most sectors grew, especially the targeted sectors. In scenario B, the sectors that experienced the greatest positive effects on their output and employment were the export-oriented sectors. Overall capital intensive sectors experienced robust expansion as a result of reduced rate of return on investment and labour intensive sectors suffered a contraction in output and employment as real wage increased.

There were differences in household real consumption results. In both scenarios, urban households experienced increases in consumption because they were relatively heavily concentrated in manufacturing sectors that were favourably affected by the reduction of the rate of return on investment. On the other hand, rural households experienced decreases in consumption in scenario B because they were relatively concentrated in the agriculture and fishing sectors that were adversely affected. However, rural households' consumption remained almost steady in scenario A.

We assumed that all revenue from newly arrived capital accruing to foreign investors. An alternative scenario might have specified that not all existing capital was locally owned and not all incoming capital was foreign owned. This could form the basis for future research.

Appendix

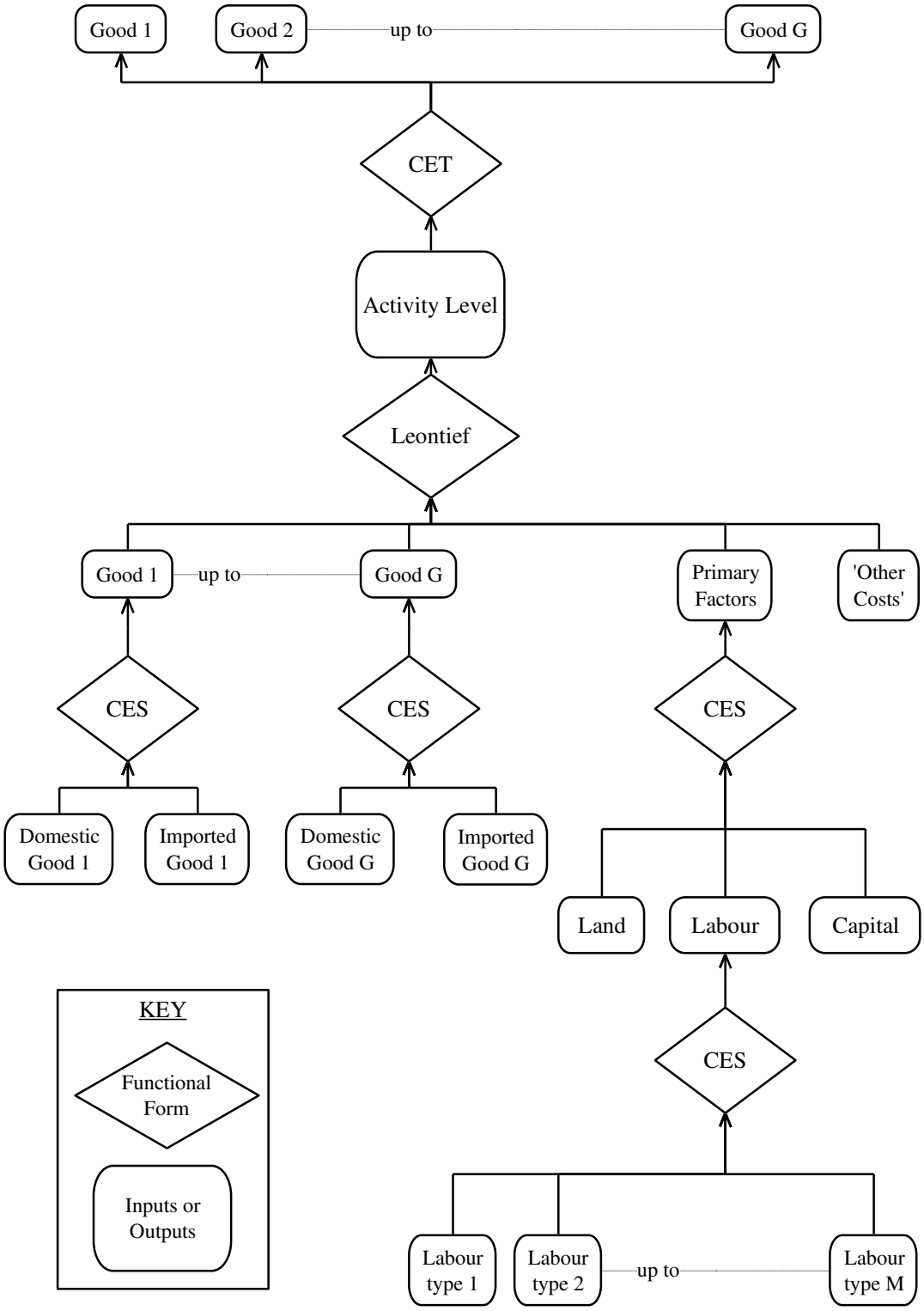

Figure A.1: Structure of Production in BAORANI

Table A.1: Mapping of 86 Industries – 20 Industries and 94 Commodities – 20 Commodities

86 Industries	20 Industries	94 Commodities	20 Commodities
1 Paddy	Agriculture	1 Paddy	Agriculture
2 Wheat	Agriculture	2 Wheat	Agriculture
3 OthGrains	Agriculture	3 OthGrains	Agriculture
4 Jute	Agriculture	4 Jute	Agriculture
5 Sugarcane	Agriculture	5 Sugarcane	Agriculture
6 Potato	Agriculture	6 Potato	Agriculture
7 Vegetables	Agriculture	7 Vegetables	Agriculture
8 Pulses	Agriculture	8 Pulses	Agriculture
9 Oilseeds	Agriculture	9 Oilseeds	Agriculture
10 Fruits	Agriculture	10 Fruits	Agriculture
11 Cotton	Agriculture	11 Cotton	Agriculture
12 Tobacco	Agriculture	12 Tobacco	Agriculture
13 Tea	Agriculture	13 Tea	Agriculture
14 Spices	Agriculture	14 Spices	Agriculture
15 OthCrops	Agriculture	15 OthCrops	Agriculture
16 LivestockR	Agriculture	16 Meat	Agriculture
17 PoultryRear	Agriculture	17 MilkFat	Agriculture
18 Shrimp	Fishing	18 Animldraft	Agriculture
19 Fish	Fishing	19 Manure	Agriculture
20 Forestry	Forestry	20 HidesSkins	Agriculture
21 RiceFlorBran	FoodProcess	21 PoltryMeat	Agriculture
22 FlorBranFed	FoodProcess	22 PoltryEggs	Agriculture
23 FishSeafod	FoodProcess	23 Shrimp	Fishing
24 EdibleNonOil	FoodProcess	24 Fish	Fishing
25 SugrGurMols	FoodProcess	25 Forestry	Forestry
26 TeaProduct	FoodProcess	26 RiceFlorBran	FoodProcess
27 Salt	FoodProcess	27 FlorBranFed	FoodProcess
28 ProcssFood	FoodProcess	28 FishSeafod	FoodProcess
29 TaningLethr	TCF	29 EdibleNonOil	FoodProcess
30 LethrProdt	TCF	30 SugrGurMols	FoodProcess
31 Baling	TCF	31 TeaProduct	FoodProcess
32 JuteProduct	TCF	32 Salt	FoodProcess
33 Yarn	TCF	33 ProcssFood	FoodProcess
34 MillClth	TCF	34 TaningLethr	TCF
35 HandlmClth	TCF	35 LethrProdt	TCF
36 DyeBleaching	TCF	36 Baling	TCF
37 RMG	TCF	37 JuteProduct	TCF
38 KniRMGH	TCF	38 Yarn	TCF
39 Toiletries	Chemicals	39 MillClth	TCF
40 Cigarettes	TobaccoProdt	40 HandlmClth	TCF
41 Bidi	TobaccoProdt	41 DyeBleaching	TCF
42 BasicWProdt	WoodPaper	42 RMG	TCF
43 WodnFur	WoodPaper	43 KniRMGH	TCF
44 PulpPaBord	WoodPaper	44 Toiletries	Chemicals
45 PrintingPub	WoodPaper	45 Cigarettes	TobaccoProdt
46 Medicines	Chemicals	46 Bidi	TobaccoProdt

...Table A.1continues

Table A.1continued

86 Industries	20 Industries	94 Commodities	20 Commodities
47 FertzInsect	Chemicals	47 BasicWProdt	WoodPaper
48 BasicChemica	Chemicals	48 WodnFur	WoodPaper
49 PetrolProdt	Chemicals	49 PulpPaBord	WoodPaper
50 ChnPottry	NonMtlPrd	50 PrintingPub	WoodPaper
51 ChemicalInd	Chemicals	51 Medicines	Chemicals
52 Glass	NonMtlPrd	52 FertzInsect	Chemicals
53 BricTCProdt	NonMtlPrd	53 BasicChemica	Chemicals
54 Cement	NonMtlPrd	54 PetrolProdt	Chemicals
55 IronStBasic	Metals	55 ChnPottry	NonMtlPrd
56 FabMetProdt	Metals	56 ChemProdt	Chemicals
57 Machinery	MachinEqp	57 Glass	NonMtlPrd
58 TransEquipmt	MachinEqp	58 BricTCProdt	NonMtlPrd
59 MisceInd	OthManufac	59 Cement	NonMtlPrd
60 UrbanBldg	Construction	60 IronStBasic	Metals
61 RuralBldg	Construction	61 FabMetProdt	Metals
62 PowPlntBldg	Construction	62 Machinery	MachinEqp
63 RuralRd	Construction	63 TransEquipmt	MachinEqp
64 PortRdRailBg	Construction	64 MisceInd	OthManufac
65 CanlDykOthBg	Construction	65 UrbanBldg	Construction
66 ElecWater	Utilities	66 RuralBldg	Construction
67 GasExtrDist	Utilities	67 BldgMantence	Construction
68 MinigQuaring	MinigQuaring	68 PowPlntBldg	Construction
69 TradWholsale	Trade	69 RuralRd	Construction
70 TradRetail	Trade	70 PortAirRlwy	Construction
71 AirTran	Transport	71 CDOthrBldg	Construction
72 WaterTran	Transport	72 InfrastrMtn	Construction
73 LandTran	Transport	73 ElecWater	Utilities
74 RailTran	Transport	74 GasExtrDist	Utilities
75 Warehousing	Transport	75 MinigQuaring	MinigQuaring
76 HousingServ	HousingServ	76 TradWholsale	Trade
77 HealthServ	PublicSvc	77 TradRetail	Trade
78 EdnServ	PublicSvc	78 AirTran	Transport
79 PubAdmDfen	PublicSvc	79 WaterTran	Transport
80 BnkInsRealSt	PrivateSvc	80 LandTran	Transport
81 ProfServ	PrivateSvc	81 RailTran	Transport
82 HotelRest	PrivateSvc	82 Warehousing	Transport
83 Entertainmnt	PrivateSvc	83 HousingServ	HousingServ
84 Communica	PrivateSvc	84 HealthServ	PublicSvc
85 OtherServ	PrivateSvc	85 EdnServ	PublicSvc
86 InfTechServ	PrivateSvc	86 PubAdmDfen	PublicSvc
		87 BnkInsRealSt	PrivateSvc
		88 ProfServ	PrivateSvc
		89 HotelRest	PrivateSvc
		90 Entertainmnt	PrivateSvc
		91 Communica	PrivateSvc
		92 OtherServ	PrivateSvc
		93 InfTechServ	PrivateSvc
		94 Waste	OthManufac

Table A.2: Effects of Improved Foreign Investor Confidence on Output and Employment of all 86 Industries

	Scenario A			Scenario B		
Industry	Output	Employ	Invest	Output	Employ	Invest
1 Paddy	-0.04	-0.23	0.82	0.03	-0.34	0.34
2 Wheat	-0.29	-0.51	1.05	0.22	-0.11	0.06
3 OthGrains	0.04	-0.21	0.66	0.02	-0.50	0.36
4 Jute	-1.58	-1.87	0.66	-0.22	-0.54	-1.43
5 Sugarcane	-0.12	-0.40	0.58	-0.05	-0.58	0.17
6 Potato	-0.01	-0.29	0.56	-0.02	-0.60	0.28
7 Vegetables	-0.94	-1.40	0.87	0.20	-0.29	-0.82
8 Pulses	0.03	-0.25	0.76	0.14	-0.40	0.33
9 Oilseeds	-0.76	-1.09	1.67	0.80	0.51	-0.52
10 Fruits	-0.14	-0.51	0.53	0.03	-0.63	0.06
11 Cotton	2.96	3.40	1.85	1.06	0.69	3.97
12 Tobacco	-0.95	-1.36	0.94	0.22	-0.22	-0.79
13 Tea	-3.46	-4.39	1.17	0.43	0.01	-3.82
14 Spices	-0.24	-0.49	0.69	0.04	-0.51	-0.05
15 OthCrops	-0.38	-0.73	0.95	0.27	-0.21	-0.16
16 LivestockR	0.28	0.20	1.31	0.67	0.38	0.48
17 PoultryRear	0.05	-0.38	0.33	0.02	-0.84	0.21
18 Shrimp	3.72	1.98	1.56	0.77	0.40	7.55
19 Fish	0.40	-2.46	0.57	0.02	-0.59	3.11
20 Forestry	0.30	0.22	1.25	0.60	0.11	0.49
21 RiceFlorBran	-0.08	-0.55	0.20	-0.04	-0.96	0.04
22 FlorBranFed	0.26	-0.22	0.29	0.07	-0.87	0.37
23 FishSeafod	-0.28	-0.77	0.95	0.75	-0.21	-0.18
24 EdibleNonOil	-0.33	-0.79	0.73	0.49	-0.43	-0.20
25 SugrGurMols	-0.13	-0.23	0.92	-0.05	-0.24	0.36
26 TeaProduct	0.03	-0.20	0.66	-0.04	-0.51	0.39
27 Salt	0.21	0.01	1.04	0.27	-0.12	0.60
28 ProcssFood	0.64	-2.35	0.56	0.02	-0.60	3.24
29 TaningLethr	0.18	-0.22	1.36	0.99	0.19	0.37
30 LethrProdt	0.26	-3.41	1.40	1.00	0.24	2.18
31 Baling	-2.88	-3.25	0.03	-0.41	-1.13	-2.66
32 JuteProduct	-3.33	-3.98	0.51	-0.52	-0.65	1.61
33 Yarn	4.20	2.59	1.84	1.01	0.68	8.18
34 MillClth	12.06	9.40	3.81	3.20	2.64	14.99
35 HandlmClth	0.09	-0.05	0.77	-0.10	-0.39	0.54
36 DyeBleaching	0.17	-1.98	0.62	-0.10	-0.54	3.61
37 RMG	13.34	11.19	4.38	3.66	3.22	16.78
38 KniRMGH	11.60	9.45	3.52	2.81	2.36	15.04
39 Toiletries	15.17	12.00	2.74	2.24	1.58	17.59
40 Cigarettes	0.16	-0.35	0.18	0.02	-0.99	0.24
41 Bidi	0.12	-0.30	0.36	0.02	-0.80	0.29
42 BasicWProdt	0.15	-0.20	0.68	0.19	-0.48	0.39
43 WodnFur	0.05	-0.30	0.68	0.19	-0.49	0.29
44 PulpPaBord	-0.36	-0.78	0.69	0.36	-0.47	-0.19

...Table A.2 continues

Table A.2 continued

	Scenario A			Scenario B		
Industry	Output	Employ	Invest	Output	Employ	Invest
45 PrintingPub	-0.13	-0.36	1.01	0.29	-0.15	0.23
46 Medicines	0.92	-2.25	0.76	0.26	-0.40	3.34
47 FertzInsect	-5.75	-6.21	4.42	4.15	3.26	-5.62
48 BasicChemica	4.47	1.46	2.41	1.87	1.25	7.05
49 PetrolProdt	0.30	-0.17	1.04	0.81	-0.12	0.42
50 ChnPottry	5.20	0.85	1.17	0.91	0.00	6.44
51 ChemicalInd	0.35	-3.49	0.59	0.23	-0.57	2.10
52 Glass	-0.50	-0.79	0.66	0.08	-0.50	-0.20
53 BricTCProdt	0.60	0.27	1.19	0.69	0.03	0.86
54 Cement	2.41	-1.31	1.42	1.03	0.25	4.28
55 IronStBasic	-0.07	-0.36	1.33	0.75	0.17	0.23
56 FabMetProdt	0.36	0.06	0.88	0.31	-0.28	0.65
57 Machinery	-0.46	-0.65	1.30	0.52	0.14	-0.06
58 TransEquipmt	0.85	0.30	1.69	1.39	0.52	1.04
59 MisceInd	-11.24	-11.52	5.36	4.90	4.16	-11.07
60 UrbanBldg	0.47	0.08	1.10	0.64	-0.16	0.69
61 RuralBldg	0.47	0.04	1.05	0.67	-0.21	0.65
62 PowPlntBldg	0.81	0.33	1.43	1.16	0.17	0.94
63 RuralRd	1.31	0.91	1.62	1.19	0.36	1.51
64 PortRdRailBg	1.23	0.98	1.84	1.10	0.58	1.59
65 CanlDykOthBg	1.20	0.94	1.58	0.86	0.32	1.55
66 ElecWater	1.43	-2.89	0.60	0.33	-0.56	2.70
67 GasExtrDist	1.27	-2.71	0.48	0.15	-0.68	2.87
68 MinigQuaring	0.93	-1.50	1.12	0.42	-0.04	4.07
69 TradWholsale	1.23	0.90	1.30	0.79	0.13	1.49
70 TradRetail	0.24	-0.10	0.77	0.26	-0.40	0.49
71 AirTran	1.23	1.03	1.53	0.79	0.39	1.61
72 WaterTran	1.23	0.82	1.11	0.79	-0.03	1.39
73 LandTran	1.23	0.78	1.18	0.79	-0.02	1.45
74 RailTran	1.23	1.13	1.72	0.79	0.59	1.71
75 Warehousing	-0.29	-0.57	0.98	0.37	-0.19	0.02
76 HousingServ	0.29	0.81	0.53	0.53	-0.32	0.29
77 HealthServ	0.31	0.00	1.03	0.47	-0.14	0.59
78 EdnServ	-0.07	-0.16	0.83	-0.14	-0.33	0.43
79 PubAdmDfen	-6.68	-6.78	0.27	-0.68	-0.90	-6.19
80 BnkInsRealSt	0.32	0.10	1.20	0.46	0.04	0.69
81 ProfServ	0.29	0.01	1.28	0.81	0.07	0.46
82 HotelRest	0.21	-0.01	0.68	0.05	-0.52	0.44
83 Entertainmnt	-0.01	-0.29	0.65	0.04	-0.52	0.30
84 Communica	7.84	5.15	1.44	0.84	0.28	10.74
85 OtherServ	0.03	-0.07	1.02	0.06	-0.14	0.52
86 InfTechServ	1.96	-0.72	1.13	0.53	-0.03	4.87

Note: All figures are percentage changes. Employ refers to employment and invest refers to investment.

Table A.3: Summary of Sectoral Outputs and Characteristics (Scenario A)

Commodity	Output	Fan decomposition			Coefficients	
	x0com	LocalMarket	DomShare	Export	EXPSHR	IMPSHR
1 Paddy	-0.04	-0.04	0.00	0.00	0.00	0.00
2 Wheat	-0.29	0.02	-0.31	0.00	0.00	0.34
3 OthGrains	0.04	0.05	-0.01	0.00	0.00	0.01
4 Jute	-1.58	-1.35	0.00	-0.23	0.17	0.00
5 Sugarcane	-0.12	-0.12	0.00	0.00	0.00	0.00
6 Potato	-0.01	-0.01	0.00	0.00	0.00	0.00
7 Vegetables	-0.94	0.02	-0.31	-0.65	0.03	0.28
8 Pulses	0.03	0.03	0.00	0.00	0.00	0.00
9 Oilseeds	-0.76	-0.50	-0.25	0.00	0.00	0.30
10 Fruits	-0.14	-0.03	-0.11	0.00	0.00	0.07
11 Cotton	2.96	3.80	-0.84	0.00	0.00	0.66
12 Tobacco	-0.95	-0.16	-0.30	-0.48	0.02	0.17
13 Tea	-3.46	-0.07	0.00	-3.39	0.27	0.00
14 Spices	-0.24	-0.04	-0.19	0.00	0.00	0.11
15 OthCrops	-0.38	-0.14	-0.16	-0.07	0.00	0.10
16 Meat	0.38	0.44	-0.06	0.00	0.00	0.03
17 MilkFat	-0.07	0.25	-0.32	0.00	0.00	0.51
18 Animldraft	0.18	0.21	-0.03	0.00	0.00	0.02
19 Manure	-0.32	-0.33	0.01	0.00	0.00	0.02
20 HidesSkins	0.17	0.20	-0.04	0.00	0.00	0.02
21 PoltryMeat	0.05	0.06	-0.01	0.00	0.00	0.01
22 PoltryEggs	0.06	0.06	0.00	0.00	0.00	0.00
23 Shrimp	3.72	0.82	0.00	2.90	0.35	0.00
24 Fish	0.40	0.40	0.00	0.00	0.00	0.00
25 Forestry	0.30	0.30	0.00	0.00	0.00	0.00
26 RiceFlorBran	-0.08	-0.05	-0.03	0.00	0.00	0.02
27 FlorBranFed	0.26	0.27	-0.01	0.00	0.00	0.01
28 FishSeafod	-0.26	0.28	-0.02	-0.53	0.06	0.03
29 EdibleNonOil	-0.33	0.15	-0.48	0.00	0.00	0.51
30 SugrGurMols	-0.13	-0.01	-0.12	0.00	0.00	0.06
31 TeaProduct	0.03	0.05	-0.01	0.00	0.00	0.01
32 Salt	0.21	0.23	-0.02	0.00	0.00	0.02
33 ProcssFood	0.62	0.43	0.19	0.00	0.00	0.11
34 TaningLethr	0.18	0.18	0.00	0.00	0.00	0.00
35 LethrProdt	0.26	0.25	0.00	0.00	0.37	0.01
36 Baling	-2.88	-2.88	0.00	0.00	0.00	0.00
37 JuteProduct	-3.33	0.03	0.00	-3.35	0.52	0.00
38 Yarn	4.20	4.22	-0.01	0.00	0.00	0.32
39 MillClth	11.90	11.21	0.70	0.00	0.00	0.29
40 HandlmClth	0.09	0.09	0.00	0.00	0.00	0.00
41 DyeBleaching	0.18	0.11	0.07	0.00	0.00	0.03
42 RMG	13.34	0.02	-0.01	13.32	0.83	0.47
43 KniRMGH	11.60	0.03	0.00	11.57	0.74	0.06
44 Toiletries	15.17	2.42	0.20	12.55	0.30	0.22
45 Cigarettes	0.16	0.16	0.00	0.00	0.00	0.01
46 Bidi	0.12	0.12	0.00	0.00	0.00	0.00
47 BasicWProdt	0.16	0.20	-0.04	0.00	0.00	0.03
48 WodnFur	0.05	0.06	-0.01	0.00	0.00	0.01
49 PulpPaBord	-0.36	-0.05	-0.30	0.00	0.00	0.42
50 PrintingPub	-0.13	0.02	-0.15	0.00	0.00	0.13

...Table A.3 continues

Table A.3 continued

	Output	Fan decomposition			Coefficients	
Commodity	x0com	LocalMarket	DomShare	Export	EXPSHR	IMPSHR
51 Medicines	0.92	0.36	0.56	0.00	0.00	0.26
52 FertzInsect	-5.75	-0.22	-0.32	-5.21	0.33	0.50
53 BasicChemica	2.12	1.44	0.68	0.00	0.00	0.79
54 PetrolProdt	0.30	0.84	-0.32	-0.22	0.02	0.61
55 ChnPottry	5.20	1.64	0.23	3.33	0.07	0.09
56 ChemProdt	0.38	0.27	0.11	0.00	0.00	0.52
57 Glass	-0.50	0.18	-0.67	0.00	0.00	0.65
58 BricTCProdt	0.60	0.61	-0.01	0.00	0.00	0.02
59 Cement	2.41	0.87	1.54	0.00	0.00	0.67
60 IronStBasic	-0.07	0.10	-0.17	0.00	0.00	0.36
61 FabMetProdt	0.35	0.56	-0.22	0.00	0.00	0.29
62 Machinery	-0.45	1.00	-0.94	-0.52	0.02	0.71
63 TransEquipmt	0.85	1.22	-0.37	0.00	0.00	0.48
64 MisceInd	-11.24	0.16	-0.34	-11.07	0.33	0.45
65 UrbanBldg	0.50	0.50	0.00	0.00	0.00	0.00
66 RuralBldg	0.50	0.50	0.00	0.00	0.00	0.00
67 BldgMantence	0.22	0.22	0.00	0.00	0.00	0.00
68 PowPlntBldg	0.83	0.83	0.00	0.00	0.00	0.00
69 RuralRd	1.34	1.34	0.00	0.00	0.00	0.00
70 PortAirRlwy	1.27	1.27	0.00	0.00	0.00	0.00
71 CDOthrBldg	1.22	1.22	0.00	0.00	0.00	0.00
72 InfrastrMtn	0.83	0.83	0.00	0.00	0.00	0.00
73 ElecWater	1.43	1.43	0.00	0.00	0.00	0.00
74 GasExtrDist	1.27	1.27	0.00	0.00	0.00	0.02
75 MinigQuaring	0.93	0.93	0.00	0.00	0.00	0.10
76 TradWholsale	1.23	1.23	0.00	0.00	0.00	0.00
77 TradRetail	0.24	0.24	0.00	0.00	0.00	0.00
78 AirTran	1.23	1.23	0.00	0.00	0.04	0.00
79 WaterTran	1.23	1.23	0.00	0.00	0.12	0.00
80 LandTran	1.23	1.23	0.00	0.00	0.00	0.00
81 RailTran	1.23	1.23	0.00	0.00	0.00	0.00
82 Warehousing	-0.29	-0.29	0.00	0.00	0.00	0.00
83 HousingServ	0.29	0.29	0.00	0.00	0.00	0.00
84 HealthServ	0.31	0.31	0.00	0.00	0.00	0.00
85 EdnServ	-0.07	-0.07	0.00	0.00	0.00	0.00
86 PubAdmDfen	-6.68	0.31	0.00	-6.99	0.25	0.04
87 BnkInsRealSt	0.32	0.73	0.00	-0.41	0.01	0.02
88 ProfServ	0.29	0.83	0.00	-0.54	0.02	0.01
89 HotelRest	0.21	0.21	0.00	0.00	0.00	0.00
90 Entertainmnt	-0.01	0.01	0.00	-0.02	0.00	0.00
91 Communica	7.84	1.30	0.00	6.54	0.13	0.02
92 OtherServ	0.03	0.03	0.00	0.00	0.00	0.00
93 InfTechServ	1.96	0.51	0.00	1.46	0.04	0.02
94 Waste	0.35	0.38	-0.03	0.00	0.00	0.72

Note: Figures for x0com are percentage changes. Figures for LocalMarket, DomShare and Export are percentage point contributions to x0com. EXPSHR refers to export share is the share of output which is exported and IMPSHR refers to import share is the share of imports in the local market. Exports and imports are at basic prices.

Table A.4: Summary of Sectoral Outputs and Characteristics (Scenario B)

Commodity	Output	Fan decomposition			Coefficients	
	x0com	LocalMarket	DomShare	Export	EXPSHR	IMPSHR
1 Paddy	0.03	0.03	0.00	0.00	0.00	0.00
2 Wheat	0.22	0.16	0.06	0.00	0.00	0.34
3 OthGrains	0.02	0.02	0.00	0.00	0.00	0.01
4 Jute	-0.22	-0.20	0.00	-0.01	0.17	0.00
5 Sugarcane	-0.05	-0.05	0.00	0.00	0.00	0.00
6 Potato	-0.02	-0.02	0.00	0.00	0.00	0.00
7 Vegetables	0.20	-0.03	0.07	0.16	0.03	0.28
8 Pulses	0.14	0.14	0.00	0.00	0.00	0.00
9 Oilseeds	0.80	0.60	0.20	0.00	0.00	0.30
10 Fruits	0.03	0.00	0.04	0.00	0.00	0.07
11 Cotton	1.06	1.05	0.01	0.00	0.00	0.66
12 Tobacco	0.22	0.07	0.05	0.09	0.02	0.17
13 Tea	0.43	-0.01	0.00	0.44	0.27	0.00
14 Spices	0.04	0.00	0.04	0.00	0.00	0.11
15 OthCrops	0.27	0.21	0.04	0.03	0.00	0.10
16 Meat	0.87	0.89	-0.02	0.00	0.00	0.03
17 MilkFat	0.48	0.05	0.43	0.00	0.00	0.51
18 Animldraft	0.20	0.16	0.03	0.00	0.00	0.02
19 Manure	0.26	0.23	0.03	0.00	0.00	0.02
20 HidesSkins	0.91	0.93	-0.02	0.00	0.00	0.02
21 PoltryMeat	0.02	0.01	0.01	0.00	0.00	0.01
22 PoltryEggs	0.01	0.01	0.00	0.00	0.00	0.00
23 Shrimp	0.77	0.28	0.00	0.49	0.35	0.00
24 Fish	0.02	0.02	0.00	0.00	0.00	0.00
25 Forestry	0.60	0.60	0.00	0.00	0.00	0.00
26 RiceFlorBran	-0.04	-0.05	0.00	0.00	0.00	0.02
27 FlorBranFed	0.07	0.06	0.01	0.00	0.00	0.01
28 FishSeafod	0.74	0.02	0.02	0.69	0.06	0.03
29 EdibleNonOil	0.49	0.15	0.33	0.00	0.00	0.51
30 SugrGurMols	-0.05	-0.05	0.00	0.00	0.00	0.06
31 TeaProduct	-0.04	-0.04	0.00	0.00	0.00	0.01
32 Salt	0.27	0.27	0.00	0.00	0.00	0.02
33 ProcssFood	0.03	-0.01	0.04	0.00	0.00	0.11
34 TaningLethr	0.99	0.99	0.00	0.00	0.00	0.00
35 LethrProdt	1.00	-0.07	0.00	1.07	0.37	0.01
36 Baling	-0.41	-0.41	0.00	0.00	0.00	0.00
37 JuteProduct	-0.52	-0.06	0.00	-0.46	0.52	0.00
38 Yarn	1.01	1.01	0.00	0.00	0.00	0.32
39 MillClth	3.15	3.08	0.07	0.00	0.00	0.29
40 HandlmClth	-0.10	-0.10	0.00	0.00	0.00	0.00
41 DyeBleaching	-0.09	-0.10	0.01	0.00	0.00	0.03
42 RMG	3.66	0.01	0.00	3.66	0.83	0.47
43 KniRMGH	2.81	0.01	0.00	2.80	0.74	0.06
44 Toiletries	2.24	0.27	0.02	1.95	0.30	0.22
45 Cigarettes	0.02	0.02	0.00	0.00	0.00	0.01
46 Bidi	0.02	0.02	0.00	0.00	0.00	0.00
47 BasicWProdt	0.21	0.20	0.01	0.00	0.00	0.03
48 WodnFur	0.19	0.19	0.00	0.00	0.00	0.01
49 PulpPaBord	0.36	0.17	0.19	0.00	0.00	0.42
50 PrintingPub	0.30	0.28	0.02	0.00	0.00	0.13

...Table A.4 continues

Table A.4 continued

	Output	Fan decomposition			Coefficients	
Commodity	x0com	LocalMarket	DomShare	Export	EXPSHR	IMPSHR
51 Medicines	0.26	0.19	0.07	0.00	0.00	0.26
52 FertzInsect	4.15	0.17	0.25	3.73	0.33	0.50
53 BasicChemica	0.99	0.83	0.16	0.00	0.00	0.79
54 PetrolProdt	0.81	0.56	0.12	0.13	0.02	0.61
55 ChnPottry	0.91	0.23	0.04	0.64	0.07	0.09
56 ChemProdt	0.22	0.17	0.05	0.00	0.00	0.52
57 Glass	0.08	-0.02	0.10	0.00	0.00	0.65
58 BricTCProdt	0.69	0.68	0.01	0.00	0.00	0.02
59 Cement	1.03	0.74	0.28	0.00	0.00	0.67
60 IronStBasic	0.75	0.69	0.07	0.00	0.00	0.36
61 FabMetProdt	0.31	0.28	0.03	0.00	0.00	0.29
62 Machinery	0.52	0.66	-0.17	0.03	0.02	0.71
63 TransEquipmt	1.39	1.15	0.24	0.00	0.00	0.48
64 MisceInd	4.90	0.44	0.13	4.33	0.33	0.45
65 UrbanBldg	0.68	0.68	0.00	0.00	0.00	0.00
66 RuralBldg	0.68	0.68	0.00	0.00	0.00	0.00
67 BldgMantence	0.49	0.49	0.00	0.00	0.00	0.00
68 PowPlntBldg	1.15	1.15	0.00	0.00	0.00	0.00
69 RuralRd	1.18	1.18	0.00	0.00	0.00	0.00
70 PortAirRlwy	1.11	1.11	0.00	0.00	0.00	0.00
71 CDOthrBldg	0.86	0.86	0.00	0.00	0.00	0.00
72 InfrastrMtn	1.15	1.15	0.00	0.00	0.00	0.00
73 ElecWater	0.33	0.33	0.00	0.00	0.00	0.00
74 GasExtrDist	0.15	0.15	0.00	0.00	0.00	0.02
75 MinigQuaring	0.42	0.42	0.00	0.00	0.00	0.10
76 TradWholsale	0.79	0.79	0.00	0.00	0.00	0.00
77 TradRetail	0.26	0.26	0.00	0.00	0.00	0.00
78 AirTran	0.79	0.79	0.00	0.00	0.04	0.00
79 WaterTran	0.79	0.79	0.00	0.00	0.12	0.00
80 LandTran	0.79	0.79	0.00	0.00	0.00	0.00
81 RailTran	0.79	0.79	0.00	0.00	0.00	0.00
82 Warehousing	0.37	0.37	0.00	0.00	0.00	0.00
83 HousingServ	0.53	0.53	0.00	0.00	0.00	0.00
84 HealthServ	0.47	0.47	0.00	0.00	0.00	0.00
85 EdnServ	-0.14	-0.14	0.00	0.00	0.00	0.00
86 PubAdmDfen	-0.68	0.13	0.00	-0.81	0.25	0.04
87 BnkInsRealSt	0.46	0.45	0.00	0.01	0.01	0.02
88 ProfServ	0.81	0.58	0.00	0.23	0.02	0.01
89 HotelRest	0.05	0.05	0.00	0.00	0.00	0.00
90 Entertainmnt	0.04	0.03	0.00	0.01	0.00	0.00
91 Communica	0.84	0.12	0.00	0.72	0.13	0.02
92 OtherServ	0.06	0.06	0.00	0.00	0.00	0.00
93 InfTechServ	0.53	0.33	0.00	0.20	0.04	0.02
94 Waste	0.00	0.04	-0.04	0.00	0.00	0.72

Note: Figures for x0com are percentage changes. Figures for LocalMarket, DomShare and Export are percentage point contributions to x0com. EXPSHR refers to export share is the share of output which is exported and IMPSHR refers to import share is the share of imports in the local market. Exports and imports are at basic prices.

References

Armington, P.S. (1969), "The Geographic Pattern of Trade and the Effects of Price Changes", *IMF Staff Papers*, XVI, July 1969, International Monetary Fund (IMF), New York, pp. 176-199.

Bandara, J.S. (1991), "Computable General Equilibrium Models for Development Policy Analysis in LDCs", *Journal of Economic Surveys*, Vol. 5, No. 1, pp 3-69.

Board of Investment (BOI) (2005a), "Investment Incentives", BOI, Government of Bangladesh (GOB), Dhaka, at <http://www.boibd.org/invest_incentive.htm> accessed on 20 November 2005.

BOI (2005b), "Investment Statistics", BOI, GOB, Dhaka, available at <http://www.boibd.org/invest_stat.htm1#d1> accessed on 22 November 2005.

BOI (2005c), "FDI in Bangladesh during 2004", BOI, GOB, Dhaka, June 2005, available at <http://www.boibd.org/FDI_in_Bangladesh_2004.pdf> accessed on 24 November 2005.

BOI (2004), *Bangladesh Investment Handbook*, BOI, GOB, 2nd Edition, June 2004, Dhaka, available at <http://www.boibd.org/invest_book.html> accessed on 24 November 2005.

Business Monitor International (2005), *Asia Monitor: South Asia Monitor*, December 2005, Vol. 11, Issue 12, pp.2, 4, 6-7, London.

de Melo, J. (1988), "Computable General Equilibrium Models for Trade Policy Analysis in Developing Countries: A Survey", *Journal of Policy Modeling*, Vol. 10, Issue 4, pp. 469-503.

Decaluwe, B. and Martens, A. (1988), "CGE Modeling and Developing Economies: A Concise Empirical Survey of 73 Applications to 26 Countries", *Journal of Policy Modeling*, Vol. 10, Issue 4, pp. 529-568.

Dixon, P.B. (1998), "A Theoretical Analysis of the Thai Economic Crisis", *Chulalongkorn Journal of Economics*, Vol. 10, No. 1, January 1998, pp. 1-13.

Dixon, P.B., Parmenter, B.R., Sutton, J. and Vincent, D.P. (1982), *ORANI: A Multisectoral Model of the Australian Economy*, North-Holland, Amsterdam.

Fontana, M. and Wobst, P. (2001), "A Gendered 1993-94 Social Accounting Matrix for Bangladesh", *TMD Discussion Paper No. 74*, International Food Policy Research Institute, Washington D.C.

Giesecke, J.A.D (2000), *FEDERAL-F: A Multi-Regional Multi-Sectoral Dynamic Model of the Australian Economy*, PhD Thesis, School of Economics, University of Adelaide, Adelaide.

GOB (Government of Bangladesh) (2005a), *Bangladesh Economic Review 2005 (Bengali version)*, Economic Adviser's Wing, Finance Division, Ministry of Finance, GOB, Dhaka, viewed on 20 November 2005 at <http://www.mof.gov.bd/economic/economic_review_bangla.html>.

GOB (2005b), *Industrial Policy 2005*, Ministry of Industries, GOB, Dhaka, available at <http://www.epb.gov.bd/indust_policy/industrial_%20policy_05.doc> accessed on 1 December 2005.

GOB (2003a), "Input Output Table 2000 for Bangladesh", Sustainable Human Development Unit, Planning Commission, Ministry of Planning, GOB, Dhaka.

GOB (2003b), "Social Accounting Matrix 2000 for Bangladesh", Unpublished document, Sustainable Human Development Unit, Planning Commission, Ministry of Planning, GOB, Dhaka.

GOB (2003c), *Bangladesh Economic Review 2003*, Economic Adviser's Wing, Finance Division, Ministry of Finance, GOB, Dhaka, available at <http://www.mof.gov.bd/previous_budget/economic_2003/economic_review_english.html> accessed on 20 November 2005.

GOB (2002), *Bangladesh Economic Review 2002 (Bengali version)*, Economic Adviser's Wing, Finance Division, Ministry of Finance, GOB, Dhaka, June 2002.

Harrison, W.J. and Pearson, K.R. (1996), "Computing Solutions for Large General Equilibrium Models Using GEMPACK", *Computational Economics*, Vol. 9, pp.83-127.

Hoque, S. (2006), *A Computable General Equilibrium Model of Bangladesh for Analysis of Policy Reforms,* PhD Thesis (under examination), Centre of Policy Studies, Faculty of Business and Economics, Monash University, Melbourne.

Hoque, S. (2005), "The Macroeconomic and Industrial Effects of Trade Liberalisation in Bangladesh: a CGE Analysis", presented at the *Fourth International Convention of Asia Scholars*, 20 - 24 August 2005, Shanghai.

Horridge, J.M., Parmenter, B.R., Cameron, M., Joubert, R., Suleman, A. and Jongh, D.de. (1995), "The Macroeconomic, Industrial, Distributional and Regional Effects of Government Spending Programs in South Africa", *General Paper No. G-109*, Centre of Policy Studies, Monash University, Melbourne.

IIFC (Infrastructure Investment Facilitation Center) (2005), "The Infrastructure Investment Facilitation Center", Dhaka, viewed on 1 December 2005, <http://www.iifc.net/>.

JETRO (Japan External Trade Organisation) (2005), "The 15th Survey of Investment-Related Cost Comparison in Major Cities and Regions in Asia", JETRO, Tokyo, at <http://www.jetro.go.jp/thailand/e/data/15thinvestsurveyeng.pdf> accessed on 30 November 2005.

Klein, L.R. and Rubin, H. (1947-1948), "A Constant-Utility Index of the Cost of Living", *Review of Economic Studies*, Vol. 15, No. 2, pp. 84-87.

Pereira, A.M. and Shoven, J.B. (1988), "Survey of Dynamic Computational General Equilibrium Models for Tax Policy Evaluation", *Journal of Policy Modeling*, Vol. 10, Issue 3, pp. 401-436.

Powell, A.A. and Lawson, T. (1990), "A Decade of Applied General Equilibrium Modelling for Policy Work", Chapter 8 in L. Bergman, D.W. Jorgenson and E. Zalai (Eds), *General Equilibrium Modelling and Economic Policy Analysis*, Blackwell, Cambridge, pp. 241-290.

Shoven, J.B. and Whalley, J. (1984), "Applied General-Equilibrium Models of Taxation and International Trade: An Introduction and Survey", *Journal of Economic Literature*, Vol. 22, Issue 3, pp. 1007-1051.

Transparency International (2005), *Transparency International Corruption Perceptions Index 2005*, Transparency International, Berlin, available at <http://www.transparency.org/cpi/2005/dnld/media_pack_en.pdf> accessed on 30 November 2005.

UNCTAD (2005), *World Investment Report 2005*, UNCTAD, Geneva, available online at <http://www.unctad.org/en/docs/wir2005_en.pdf> viewed 1 December 2005.

UNCTAD (2000), *An Investment Guide to Bangladesh: Opportunities and Conditions,* UNCTAD/ITE/IIT/Misc.29, Internet Edition, UNCTAD, Geneva, August 2000, available <http://www.unctad.org/en/docs/poiteiitm29.en.pdf> accessed on 30 November 2005.

UNPAN (United Nations Online Network in Public Administration and Finance) (2005), *Anti-Corruption Commission Act 2004*, UNPAN, New York, at <http://unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN019089.pdf> accessed on 30 November 2005,

World Bank (1999), *Foreign Direct Investment in Bangladesh: Issues of Long-run Sustainability*, World Bank, Washington D.C., available at <http://www-wds.worldbank.org/servlet/WDSContentServer/WDSP/IB/2000/02/03/000094946_00011505355643/Rendered/PDF/multi_page.pdf> accessed on 30 November 2005.

World Economic Forum (2005), *Global Competitiveness Report 2005-2006*, World Economic Forum, Geneva, available at <www.weforum.org/gcr> accessed on 1 December 2005.