REGIONAL DEVELOPMENT IN BANGLADESH: A SPATIAL ANALYSIS THROUGH INPUT-OUTPUT MODEL

by

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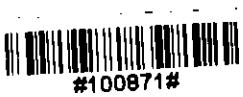
MASTER OF URBAN AND REGIONAL PLANNING



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Thesis Acceptance Form

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It is hereby declared that this thesis or any part of it has not been submitted elsewhere for the award of any degree or diploma.

আফসানা হক

Afsana Haque

Dedicated to

My Parents

and

Little Brother, Md. Nafizul Haque

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ABSTRACT

Bangladesh is experiencing regional imbalance since its birth. Such imbalances affected the regions in many ways including their economic structures. This research work represents an attempt where the economic systems of six regions of the country namely Barisal, Chittagong, Dhaka, Khulna, Rajshahi and Sylhet are evaluated with the help of input-output technique.

The input-output model has enabled to perform several types of analyses of the regional economies, the implications of which for policy can hardly be over emphasized. It is found that in terms of output multiplier, sectoral backward and forward linkages, the economic sectors interact more strongly in developed regions (Dhaka and Chittagong) rather than in the less developed parts.

Another important finding of this study is the economic landscapes of the regions which highlight the stimulating role of industry sector in fostering the growth of developed regions.

Finally, regional impacts are assessed due to an increase in the investment expenditure for the thirteen major economic sectors. The results of this exercise also revealed that the impacts are smaller in the under developed regions compared to more developed regions. Based on these findings an effort is provided to motivate the planners and policy makers to integrate regional and sectoral approach to ensure the ultimate goal of national development.

ABBREVIATION

BBS	Bangladesh Bureau of Statistics
BL	Backward Linkage
FL	Forward Linkage
GDP	Gross Domestic Product
GED	General Economic Division
GoB	Government of Bangladesh
I-O	Input-Output Table
MPM	Multiplier Product Matrix
OM	Output Multiplier
PC	Planning Commission
PyIO	Python Input-Output Module

Backward Linkage:

Backward linkage represents the dependence of some industries on others supplying their inputs in the input-output chain.

Forward Linkage:

Forward linkages identify the amount of output supplied forward by some industries to other in the input-output chain.

Leontief and Ghoshian Inverse Matrices:

The Leontief inverse is practically the most widely derived matrix from an input-output table. While the Leontief inverse is based on the input requirement matrix **A** = [a_{ij}], the Ghoshian inverse is based on the output allocation matrix $\vec{\mathbf{A}} = \left[\vec{a}_{ij}\right]$. The elements of these matrices are computed in the following way,

$$a_{ij} = \frac{z_{ij}}{X_j} \qquad \text{and} \qquad \vec{a}_{ij} = \frac{z_{ij}}{X_i}$$

where z_{ij} is the input from i required in the production of j (or in the Ghoshian structure is the output of i sent to the production to j) and X is the total input or output. In practical terms, the input requirement matrix is obtained by dividing each cell in the transaction matrix with its corresponding input in each column; while the output allocation matrix is obtained by dividing each cell in the transaction matrix with its corresponding output in each row. The Leontief inverse matrix is then computed as $(I - A)^{-1}$, while the Ghoshian inverse is then obtained by $\left(I - \vec{A}\right)^{-1}$.

Open Model and Closed Model:

When household sector is a part of final demand column and acts as an exogenous sector then the economic model is known as open model. Once household sector is moved from the final demand column and placed inside the technically interrelated

table, that means, it serves as an endogenous sector. This is known as closing the model with respect to households.

Output Multiplier:

An output multiplier for sector *j* is defined as the total value of production in all sectors of the economy that is necessary in order to satisfy a dollar's worth of final demand for sector *j*'s output. For the simple output multiplier, this total production is the direct and indirect output effect, obtained from a model in which households are exogenous. The initial output effect on the economy is defined to be simply the initial dollar's worth of sector *j* output needed to satisfy the additional final demand. Then, formally, the output multiplier is the ratio of direct and indirect effect to the initial effect alone.

TABLE OF CONTENTS

Acknowledgement		v
Abstract		vi
Abbreviations		vii
Glossary		viii-ix
Table of Contents		x-xii
List of Tables		xiii
List of Figures		xiv-xv
CHAPTER 1	**INTRODUCTION**	1-4
1.1	Introduction	1
1.2	Rationale of the Study	1
1.3	Objectives of the Study	2
1.4	Scope and Limitations of the Study	3
CHAPTER 2	**METHODOLOGY OF THE STUDY**	5-15
2.1	Input-Output Technique as an Analytical Tool	5
2.2	PyIO: Input-Output Analysis with Python	7
2.2.1	Aggregation of sectors in national input-output table	9
2.2.2	Updating an input-output table	9
2.2.3	Output multiplier analysis	11
2.2.4	Key sector analysis	11
2.2.5	Extraction method analysis	12
2.2.6	MPM (Multiplier Product Matrix) analysis	13
2.2.7	Impact analysis	14
2.3	Sequential Steps Followed	14
2.3.1	Delineation of region	14
2.3.2	Data collection	14
2.3.3	Regional disparity analysis	14

	2.3.4	Aggregation of national input-output table	15
	2.3.5	Regionalization of national input-output table	15
	2.3.6	Policy suggestions	15
CHAPTER 3		**LITERATURE SEARCH AND STATEMENT OF THE PROBLEM**	16-23
3.1		Regional Development Theories	16
3.2		Empirical Studies	17
3.3		Regional Disparity in Bangladesh: An Overview	20
CHAPTER 4		**OUTPUT MULTIPLIER ANALYSIS**	24-27
4.1		Analysis of Output Multipliers	24
	4.1.1	Intra-regional analysis	24
	4.1.2	Inter-regional analysis	27
CHAPTER 5		**SECTORAL LINKAGES AND KEY SECTOR ANALYSIS**	28-39
5.1		Sectoral Linkages in Regional Economy	28
5.2		Key Sector Analysis	37
CHAPTER 6		**REGIONAL ECONOMIC STUCTURE: EMPIRICAL RESULTS OF EXTRACTION METHOD**	40-52
6.1		Backward Effects	40
	6.1.1	An intra-regional analysis	40
	6.1.2	An inter-regional analysis	46
6.2		Forward Effects	46
	6.2.1	An intra-regional analysis	46
	6.2.2	An inter-regional analysis	52

CHAPTER 7	**VISUALIZATION OF ECONOMIC STRUCTURE: A REGIONAL PERSPECTIVE**	53-57
CHAPTER 8	**IMPACT ANALYSIS**	58-67
CHAPTER 9	**IMPLICATIONS OF THE STUDY RESULTS FOR POLICY MAKING**	68-73
9.1	Key Findings and Level of Regional Disparity	69
9.2	Recommendation	70
References		74
Appendices		
	Appendix A: Data	80
	Appendix B: Input-Output Tables of Regions	101
	Appendix C: Backward and Forward Linkages for Regions	114
	Appendix D: Results of MPM Analysis	127
	Appendix E: Results of Impact Analysis	134

LIST OF TABLES

Table No.	Title	Page No.
2.01	A Simple Input-Output Table for Three Sector Economy	5
3.01	Distribution of Population by Division, 1974-2001	21
3.02	Per Capita Gross Regional Product at Current Market Price (in million Tk)	22
3.03	Regional Distribution of Population, 2001	23
4.01	Sectoral Output Multipliers and their Rankings within the Regions, 1999-2000	25
5.01	Regional Backward Linkage Hierarchies, 1999-2000	30
5.02	Regional Forward Linkage Hierarchies, 1999-2000	31
5.03	Highest and Lowest Coefficient Values of Both the Linkages for Six Regions of Bangladesh, 1999-2000	32
5.04	Sector Classifications for Six Regions of Bangladesh, 1999-2000	38
8.01	Impact on Total Output in Regions due to Some Selected Scenarios	62

LIST OF FIGURES

Figure No.	Title	Page No.
3.01	Comparison between National and Regional GDP per capita, 1999-2000	22
4.01	Sectoral Output Multipliers for the Regions, 1999-2000	26
5.01	Sectoral Backward Linkage Coefficients for Regions, 1999-2000	35
5.02	Sectoral Forward Linkage Coefficients for Regions, 1999-2000	36
6.01	Sectoral Backward Linkages for Barisal, 1999-2000	41
6.02	Sectoral Backward Linkages for Chittagong, 1999-2000	41
6.03	Sectoral Backward Linkages for Dhaka, 1999-2000	42
6.04	Sectoral Backward Linkages for Khulna, 1999-2000	43
6.05	Sectoral Backward Linkages for Rajshahi, 1999-2000	43
6.06	Sectoral Backward Linkages for Sylhet, 1999-2000	44
6.07	Sectoral Backward Effects for Regions, 1999-2000	45
6.08	Sectoral Forward Linkages for Barisal, 1999-2000	47
6.09	Sectoral Forward Linkages for Chittagong, 1999-2000	47
6.10	Sectoral Forward Linkages for Dhaka, 1999-2000	48
6.11	Sectoral Forward Linkages for Khulna, 1999-2000	49
6.12	Sectoral Forward Linkages for Rajshahi, 1999-2000	49
6.13	Sectoral Forward Linkages for Sylhet, 1999-2000	50
6.14	Sectoral Forward Effects for Regions, 1999-2000	51
7.01	Economic Landscape for Barisal, 1999-2000	54
7.02	Economic Landscape for Chittagong, 1999-2000	54
7.03	Economic Landscape for Dhaka, 1999-2000	55
7.04	Economic Landscape for Khulna, 1999-2000	55
7.05	Economic Landscape for Rajshahi, 1999-2000	56
7.06	Economic Landscape for Sylhet, 1999-2000	56

Figure No.	Title	
8.01	Output Change in Barisal Region due to Different Scenarios	59
8.02	Output Change in Chittagong Region due to Different Scenarios	59
8.03	Output Change in Dhaka Region due to Different Scenarios	60
8.04	Output Change in Khulna Region due to Different Scenarios	60
8.05	Output Change in Rajshahi Region due to Different Scenarios	61
8.06	Output Change in Sylhet Region due to Different Scenarios	61
8.07	Impacts on Sectoral Outputs in Different Regions due to Scenario 1	63
8.08	Impacts on Sectoral Outputs in Different Regions due to Scenario 2	64
8.09	Impacts on Sectoral Outputs in Different Regions due to Scenario 3	65
8.10	Impacts on Sectoral Outputs in Different Regions due to Scenario 13	66

CHAPTER 01 INTRODUCTION

1.1 Introduction

National Development Planning in Bangladesh is sectoral rather than regional. In this type of planning sectoral priorities and targets are fixed and funds are allocated accordingly. It is true that national development is, in one sense, simply the composite of economic activities and these activities combined in certain ways yield growth in national accounts. In another sense, it is also evident that disregard of regional aspects especially regional distribution of resources and activities can diminish an economy's capacity of growth (Friedmann, 1966). Therefore, regional concern is receiving increased attention of the policy makers and planners. Even India, our neighboring country, is also gradually shifting from a macro-economic sectoral approach to a regional approach (Misra *et al.*, 1978; Sundaram, 1979).

Whereas, in Bangladesh the policy makers are still dependent on sectoral approach even when regional imbalance is growing in such a state which needs immediate attention. Significant variation in the service provisions, economic activities, land use distributions etc. in urban centres of Bangladesh are evidence of the fact that some regions have received maximum services while others lack even the minimum subsistence facilities. The resulting effect is reduced regional productivity (Friedmann, 1966) slow internal factor flows and consequently retarded and/or skewed national development (Williamson, 1975). In the view of such an understanding the present research was planned to highlight existing economic scenario of regions and prove the urgency of inclusion of regional planning in the development planning approach.

1.2 Rationale of the Study

Regional balance in development of Bangladesh has never received due attention in the planning exercise. During the second and third Five Year Plans of the then Pakistan, economic activity and infrastructure focused mainly upon three major

urban areas of Dhaka, Chittagong and Khulna creating disparities among regions of Bangladesh (Islam, 1978). After liberation the condition did not change. The development planning process still does not incorporate a systematic regional dimension. Annual distribution of public resources is made according to priorities of different economic and social sectors. Political decisions and public administration play a vital role in determining the actual resource allocation.

Nevertheless, a question that must be addressed is whether there is at all any necessity to be concerned with regional issues in the context of a relatively small geographical territory. The answer to this question lies essentially in the extent to which regional disparities exist and whether these threaten political, social and economic stability. Hence, a first and foremost step is to investigate the status of regional development in the country. In addition, it is important to examine the impact of investment decisions on basic economic sectors of different regions to identify potentials for a more regionally balanced development. These concerns then can adequately be reflected in the forthcoming plan document.

In the light of the above explanations, the present study tries to explore the strength and weakness of the regional economies through multiplier and linkage coefficients. The effort is also provided to strengthen the motivation for efficient regional policy formulation describing the necessity of policy shifting from their chartered path.

1.3 Objectives of the Study

The objectives of this research can be outlined as follows –

i. To assess inter-regional variation in terms of per capita GDP in the country.

ii. To examine regional economic structures, their interactions in terms of output multiplier and sectoral linkage coefficients and to assess the impact of investment decisions on basic economic sectors of different regions using input-output method.

iii. To draw some policy implications ensuring integration of sectoral and regional approach in the development planning process to facilitate a more balanced development of different regions of the country.

1.4 Scope and Limitations of the Study

It is very unlikely that a social research is carried out and it is completely free of any assumption or constraint. Like any other study, the present study also involves a number of limitations, which are described in the following paragraphs.

1.4.1 Limitations regarding data

The whole study is carried out based on secondary data. The major sources of its data are-

i. Various census reports published by Bangladesh Bureau of Statistics (BBS)

ii. The input-output table for Bangladesh economy, 1999-2000 which is prepared for Sustainable Human Development Project, General Economic Division (GED), Planning Commission and BBS, Government of Bangladesh (GoB).

The preparation of the input-output table used secondary data, specifically saying, input-output table for Bangladesh Economy, 1985-1986 and various census reports of BBS instead of primary data. Therefore, any error in the used data may prevail or even propagate while further manipulation is done using PyIO software to have an idea about regional economic structures.

1.4.2 Study limitations in regional variation analysis

This research work considers six divisions of Bangladesh as six regions and assesses their regional variations in terms of a single criterion i.e. GDP per capita. Inclusion of more criteria may enrich the study, which is however beyond the scope of the present work basically due to time constraints.

Again, regional imbalances even in terms of selected criterion may be carried out more comprehensively resulting more regions. For instance, the per capita GDP of Dhaka, Gazipur and Mymensingh districts of Dhaka divisions were respectively 354240, 69670 and 73117 million taka in 1999-2000 (BBS, 2002). The similar detail for other districts of the same division is somewhat less than half, sometimes one third or even one fourth. The contribution of Dhaka district to national GDP is 14.94 per cent whereas the other sixteen districts of Dhaka Division jointly contribute to only 22.8 per cent of national GDP (BBS, 2002). Therefore, it would be better to segregate Dhaka into two or three regions rather keeping it a single one. But in such case, number of regions will be greater and huge data will be generated. To avoid the handling of such awesome data, the largest administrative unit of the country that is six divisions are considered as six regions to facilitate the study. Such initiative hence limited the scope of data analysis.

1.4.3 Limitations considering regional structure analysis

The scope of the study is also limited to analyzing the causes behind regional inequalities and poor performance of regional economic structure. Social aspects and their influence on regional economic system are also ignored. It could only incorporate an open model and could not calculate income and employment multipliers because of unavailability of data as required by the software used.

Finally, the study results could be made more informative and comprehensive, if the national table were presented in the form of a multi-regional table (consisting of six identified regions) displaying regional relations through economic sectors, which could not be done due to data unavailability and resource constraints.

CHAPTER 02

METHODOLOGY OF THE STUDY

This section describes the analytical tool, used software and the sequential process adopted in the study in order to fulfill the stated objectives.

2.1 Input-Output Technique as an Analytical Tool

Input-output technique is useful for analyzing the production structure of the economies. It can be useful to detect and describe sectoral dependences (or linkages), the effects of changes in one sector upon the others. Hence, in order to unveil regional economic structure, the study used Leontief open, static input-output model.

An input-output table is constructed for a particular economic area – a nation, a region (however defined), a state etc. for a certain time period (usually a year). As the economic activity of an area is divisable to a number of economic sectors or industries, the input-output model is ultimately concerned with the inputs and outputs of these sectors and their inter-relationships.

Table 2.01: A Simple Input-Output Table for Three Sector Economy

		Purchaser Sector			Final Demand	Total Output
		Agriculture	Industry	Service		
Seller Sector	Agriculture	Z_{11}	Z_{12}	Z_{13}	Y_1	X_1
	Industry	Z_{21}	Z_{22}	Z_{23}	Y_2	X_2
	Service	Z_{31}	Z_{32}	Z_{33}	Y_3	X_3
Primary Input		W_1	W_2	W_3	-	W
Total Input		X_1	X_2	X_3	Y	X

Each industry produces some output that is distributed among other sectors and for final consumption. The final demand includes consumer (household) purchase, purchases for private investment purposes, government purchases and exports. At the same time some exogenous inputs are used by industries which include the primary factors of production like labor, capital, imports from outside the system, governmental subsidies and so on. In an input-output model these inter-industry flows are arranged in matrix format and is measured in monetary terms.

Thus, if an economy is divided into three sectors and X_i represents the total output (production) of sector i, Y_i and W_i, the total final demand and total primary input for sector i respectively and the observed monetary value of the flow from sector i to sector j is denoted by Z_{ij}, then the input-output table will look like as Table 2.01.

Using the table, the equation reflecting the sales of output of each sector takes the following forms-

$$X_1 = Z_{11} + Z_{12} + Z_{13} + Y_1 \quad \ldots \quad \ldots \quad \ldots \quad (1)$$
$$X_2 = Z_{21} + Z_{22} + Z_{23} + Y_2 \quad \ldots \quad \ldots \quad \ldots \quad (2)$$
$$X_3 = Z_{31} + Z_{32} + Z_{33} + Y_3 \quad \ldots \quad \ldots \quad \ldots \quad (3)$$

In the equations, the Z_{ij} can be replaced by technical co-efficient, a_{ij} which can be defined as the ratio of flow of input from i to j (Z_{ij}) to total output of j (X_j). Once the notation of a set of fixed technical coefiicient is accepted, the equation can be rewritten, replacing each Z_{ij}.

$$X_1 = a_{11} X_1 + a_{12}X_2 + a_{13}X_3 + Y_1$$
$$X_2 = a_{21} X_1 + a_{22}X_2 + a_{23}X_3 + Y_2$$
$$X_3 = a_{31} X_1 + a_{32}X_2 + a_{33}X_3 + Y_3$$

If the equations are arranged in matrix format, then the unique solution is given by,

$$\mathbf{X} = (I - A)^{-1} Y \qquad \text{if } |I - A| \neq 0$$

where,

$$A = \begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{bmatrix}, \qquad X = \begin{bmatrix} X_1 \\ X_2 \\ X_3 \end{bmatrix}, \qquad Y = \begin{bmatrix} Y_1 \\ Y_2 \\ Y_3 \end{bmatrix}$$

I is the 3*3 identity matrix and $(I - A)^{-1}$ is the "Leontief Inverse".

The main importance of input-output analysis lies in the fact that it helps to estimate the multipliers, linkage coefficients and at the same time it is concerned with the effect that a change in final demand as a whole (i.e. sales to export, consumption and investment sectors) would have on the other industrial sectors of the economy. These advantages of input-output model are rightly captured in the current research through subsequent analysis as presented in Chapter Four, Five, Six, Seven and Eight.

Apart from these advantages this system faces some problems too. It ignores the economies of scale in production. Which implies production in a Leontief system operates under constant returns to scale (Miller and Blair, 1985; Wilson, 1974).

2.2 PyIO: Input-Output Analysis with Python

The PyIO module is functions to perform basic operations and analysis with input-output model. The applications in this module are derived from input-output analysis conducted by colleagues at the Regional Economics Applications Laboratory (REAL), University of Illinois at Urbana-Champaign. They choose Python as the basis for this module mainly because Pyhton is easy to learn and has great computational capability. However, the module does not provide the facility for assembling or generating an input-output table. The program assumes that the user has an input-output table available for manipulation (Nazara *et al.*, 2003).

The inputting input-output data is a very important part in this module. The current version of PyIO allows only input from an ASCII text file. The general structure is

that users need to input the information about input-output as a text file. When the computation results are ready to be presented, then users are asked whether they want those written in Microsoft Excel. If so, Excel needs to be properly installed and results are shown in a worksheet that is automatically opened. If users do not want the output in Excel format, then the results are automatically written in a pre-named text file (Nazara *et al.*, 2003).

Once the data have been inputted several functions related to input-output analysis can be performed, which are categorized in three parts below-

i. Table operations
   - Aggregation of input-output tables
     - Aggregating sectors in one region (national) or inter-regional input-output tables
     - Aggregating regions in an inter-regional input-output tables
   - Updating matrix: regional supply percentage, simple location quotient
   - Updating matrix: RAS method

ii. Basic I-O analysis
   - Leontief and Ghoshian inverse
   - Impact analysis
   - Multiplier analysis: output, income, employment and input

iii. Advanced I-O analysis
   - Key sector analysis
   - Output decomposition analysis
   - Multiplier Product Matrix (MPM) analysis
   - Extraction method analysis
   - Push and pull analysis
   - Field of Influence

Among them the functions used in the present study are briefly described in the following paragraphs –

2.2.1 Aggregation of sectors in national input-output table

The aggregation of input-output tables is a common procedure in input-output analysis. In the case of a national table, aggregation of input-output table can be conducted between sectors and PyIO does this task following the rules of aggregation.

Suppose it is required to aggregate an *n*-sector input-output table into a *k*-sector specification, where *n* is greater than *k*. A crucial element in the aggregation procedure is the construction of an aggregation matrix **S** that is of *k*n* dimension. For example, to aggregate sector 2 and sector 3 in a 4-sector input-output table, the aggregation matrix will be:

$$S = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

The new transaction matrix, total output, final demand for the aggregated table can be accomplished by multiplying the aggregation matrix **S** with the original transaction matrix. Let **NT** and **T** be the new transaction matrix and old transaction matrix respectively, **NX** and **X** be the new and old output, **NF** and **F** be the new and old final demand (Nazara *et al.*, 2003).

$$\mathbf{NT} = \mathbf{ST}$$
$$\mathbf{NX} = \mathbf{SX}$$
$$\mathbf{NF} = \mathbf{SF}$$

2.2.2 Updating the national input-output table

Updating techniques are widely used in input-output analysis to overcome the expensive cost of producing new tables from surveys. The PyIO program includes two functions to update an input-output table using non-survey methods:

- The location quotient method
- The regional supply percentage method

Both these methods are commonly used to regionalize a national input-output table. This technique is frequently used when the only available input-output data is the national table supplemented by regional data, such as gross output or employment by sector.

The regional supply percentage in region R in each sector i (p_i^R) can be computed as the following:

$$p_i^R = \frac{X_i^R - E_i^R}{X_i^R - E_i^R + M_i^R}$$

where X, E and M respectively denote output, export and import. The magnitude of the regional supply percentage lies between 0 and 1, with the higher end corresponding to regional self sufficiency in sector i. To adjust the national table, each row of the national **A** matrix is multiplied by the appropriate percentage. In matrix notation this is written as $\mathbf{A^{RR}} = \mathbf{PA}$, where $\mathbf{A^{RR}}$ is the regional input coefficient matrix, **P** is the n-element vector of regional supply percentage and **A** is the national input coefficient matrix.

The location quotient also measures some degree of self-sufficiency at the regional level. The simple location quotient, which for region R and sector i is defined as

$$SLQ_i^R = \frac{\frac{X_i^R}{\sum_i X_i^R}}{\frac{X_i^N}{\sum_i X_i^N}}$$

where the superscript R and N, respectively denote regional and national data (Nazara *et al.*, 2003). The updating criteria are given as the following:

$$a_{ij}^{RR} = a_{ij}^N \left(SLQ_i^R\right) \quad \text{if} \quad SLQ_i^R < 1$$

$$a_{ij}^{RR} = a_{ij}^N \quad \text{if} \quad SLQ_i^R \geq 1$$

2.2.3 Output multiplier analysis

Following Miller and Blair (1985), the software calculates output multiplier as the column sum of the Leontief inverse. Let, assume, $\mathbf{B} = [b_{ij}]$ is the Leontief inverse matrix, then the output multiplier for sector j, denoted by O_j is

$$O_j = \sum_{i=1}^{n} b_{ij}$$

where n is the number of sectors (Nazara *et al.*, 2003).

2.2.4 Key sector analysis

PyIO identifies key sectors by calculating backward and forward linkage proposed by Rasmussen (1956) drawing on entries in the Leontief inverse. If $\mathbf{B} = (\mathbf{I} - \mathbf{A})^{-1} = [b_{ij}]$ is the Leontief inverse matrix and B_j and B_i are the column and row multipliers of this Leontief inverse then sector j's backward linkage (BL_j) and forward linkage (FL_j) are defined as:

$$BL_j = \frac{\frac{1}{n}\sum_{i=1}^{n} b_{ij}}{\frac{1}{n^2}\sum_{i,j=1}^{n} b_{ij}} = \frac{\frac{1}{n}B_j}{\frac{1}{n^2}V} = \frac{B_j}{\frac{1}{n}V} \quad \text{and} \quad FL_j = \frac{\frac{1}{n}\sum_{j=1}^{n} b_{ij}}{\frac{1}{n^2}\sum_{i,j=1}^{n} b_{ij}} = \frac{\frac{1}{n}B_i}{\frac{1}{n^2}V} = \frac{B_i}{\frac{1}{n}V}$$

where $B_j = \sum_{i=1}^{n} b_{ij}$, $B_i = \sum_{j=1}^{n} b_{ij}$ and $V = \sum_{i=1}^{n}\sum_{j=1}^{n} b_{ij}$

The usual interpretation is to propose that if $BL_j>1$, a unit change in final demand in sector j will generate an above-average increase in activity in the economy. Similarly, for $FL_i>1$, it is asserted that a unit change in all sectors' final demand would create an above average increase in sector i. Thus, a key sector is identified as one having both indices greater than 1 (Nazara *et al.*, 2003).

2.2.5 Extraction method analysis

The extraction method analyzes the importance of a sector by hypothetically extracting that particular sector from the concerned input-output system. The output differences between the with and without that sector are then analyzed, and are generally considered as the importance of the extracted elements.

The code presented in the Python Input-Output module computes the backward and forward linkage of the extraction method as outlined in Dietzenbacher *et al.* (1993). The importance of a sector is presented in terms of the backward and forward linkages between a system with and without the isolated element. Further the backward linkage is computed according to Leontief inverse while the forward linkage is obtained using the Ghoshian system.

The output difference between the full and extracted system can be estimated from the following equation:

$$x - \bar{x} = \begin{pmatrix} x^1 - \bar{x}^1 \\ x^R - \bar{x}^R \end{pmatrix} = \left\{ \begin{bmatrix} L^{11} & L^{1R} \\ L^{R1} & L^{RR} \end{bmatrix} - \begin{bmatrix} \left(I - A^{11}\right)^{-1} & 0 \\ 0 & \left(I - A^{RR}\right)^{-1} \end{bmatrix} \right\} \begin{pmatrix} f^1 \\ f^R \end{pmatrix}$$

where **x** denotes output, **L** is the Leontief inverse matrix, **A** is the input requirement matrix, **f** is the final demand vector, superscript '1' and 'R' denotes extracted sector and the rest of the system respectively.

The above measure pertains to the backward linkage of the impact. In terms of the forward linkage, the difference is as follows

$$\left(x - \bar{x}\right)' = \begin{pmatrix} v^{1'} & v^{R'} \end{pmatrix} \left\{ \begin{bmatrix} G^{11} & G^{1R} \\ G^{R1} & G^{RR} \end{bmatrix} - \begin{bmatrix} \left(I - B^{11}\right)^{-1} & 0 \\ 0 & \left(I - B^{RR}\right)^{-1} \end{bmatrix} \right\}$$

where **v** denotes the primary input vector, **G** is the Ghoshian inverse, **B** is the output allocation matrix and the rest is as previously defined (Nazara *et al.*, 2003).

2.2.6 MPM analysis

The input-output multiplier product matrix (MPM) is a visualization technique, to compare the structure of two economies at the same point of time, derived from Leontief inverse matrix. The MPM matrix, **M**, is defined as (Sonis *et al.* 1997):

$$\mathbf{M} = [m_{ij}] = \frac{1}{V}[B_i B_j] = \frac{1}{V}\begin{pmatrix} B_1 \\ B_2 \\ \cdot \\ \cdot \\ \cdot \\ B_n \end{pmatrix}(B_1 \quad B_2 \quad \ldots \quad B_n)$$

where $\mathbf{B} = [b_{ij}]$ is the Leontief inverse, V is the grand sum of rows and columns of **B**

or $V = \sum_{i=1}^{n}\sum_{j=1}^{n} b_{ij}$, $B_j = \sum_{i=1}^{n} b_{ij}$ and $B_i = \sum_{j=1}^{n} b_{ij}$

The point to be noted is that the column and row multipliers from MPM are the same as those from the Leontief inverse matrix:

$$\sum_{j=1}^{n} m_{ij} = \frac{1}{V}\sum_{j=1}^{n} B_i B_j = B_i \quad \text{and} \quad \sum_{i=1}^{n} m_{ij} = \frac{1}{V}\sum_{i=1}^{n} B_i B_j = B_j$$

Thus, the MPM structure is essentially connected with the properties of sector's backward and forward linkages. The rows and columns of matrix M can be rearranged along the magnitude of the values of backward and forward from the largest to the smallest to provide the hierarchy of backward (for columns) and forward (for rows) linkages. Using the MPM matrix, it is possible to construct economic landscapes to provide a summary view of the economic structure (Nazara *et al.*, 2003).

2.2.7 Impact analysis

This analysis computes a new set of output if the economy is given new hypothetical values of final demand. In particular, the usual formula is

$$\mathbf{X} = (I - A)^{-1}\mathbf{F}$$

where **X** is output, $(\mathbf{I-A})^{-1}$ is the Leontief inverse and **F** is final demand (Nazara *et al.*, 2003).

2.3 Sequential Steps Followed

2.3.1 Delineation of region:

At the early stage of the study the whole country is delineated into six regions which coincide with the six Divisions of Bangladesh. With the progress of the study, all data are analyzed with respect to these regions. It would be better if the number of regions could be made larger. But in such case, huge data would be generated. To avoid the handling of such huge data, the largest administrative unit of the country i.e. six Divisions of the country are considered as six regions in the present study.

2.3.2 Data collection:

This research is fully based on secondary data. The major sources of these data are Statistical Yearbooks, government publications, research papers and relevant books. The different types of data include –

- Data on GDP
- Data on Population
- Input-Output table for Bangladesh economy 1999-2000

2.3.3 Regional disparity analysis:

After collection of data, regional inequality is analyzed in response to the selected criterion i.e. GDP per capita.

2.3.4 Aggregation of national input-output table:

In this stage, following the rules of aggregation, 45 sectors of national input-output table of 1999-2000 is aggregated into 13 sectors using Python Input-Output Module (see article 2.2) in order to construct the regional tables. The aggregation is necessary since the regional gross output data, which is required to regionalize the national table, are only available in terms of these 13 sectors. Calculation of regional sectoral output is shown in Appendix A, Table A.3.

2.3.5 Regionalization of national input-output table:

After aggregation of the sectors, the regionalization of national table is performed to have six regional input-output tables using the same software. Here, simple location quotient method (see article 2.2.2) is applied using regional and national GDP data. The basic assumption is, the sub-regions (six divisions) have similar technology and demand/consumption patterns as the parent region (Bangladesh). They also over-estimate regional interdependencies and minimize cross-hauling.

The six regional tables (see Appendix B) are then used to calculate output multiplier (article 2.2.3), analysis of sectoral linkages (article 2.2.4 and 2.2.5) and for generation of economic landscape (article 2.2.6) and impact analysis (article 2.2.7).

2.3.6 After completion of all the analytical tasks, finally, some *policy* options are drawn based on the results of this research.

CHAPTER 03

LITERATURE SEARCH AND STATEMENT OF THE PROBLEM

With an interest to know regional development approaches, spatial organization procedure, development process and regional policy problems relevant literature like books, research reports, documents, government publications, thesis reports etc. are viewed at the very early stage of the formulation of this research. Such consultation facilitated a comprehensive understanding of pertinent regional development theories, research works and finally to conceptualize the problem.

3.1 Regional Development Theories

Regional organization has always received a critical concern in the planning of developing countries. They face regional imbalance, more often termed as 'north-south' problem, in the transition period by moving from agrarian to industrial economy. Because industrialization typically leads to concentration of investments upon one or two regions, leaving much of the remaining national territory locationally obsolete.

This phenomenon has been addressed by a number of carefully elaborated theories. They described that industrial growth tends to be concentrated upon few metropolitan regions, which Francois Perroux (1955) termed as 'growth poles' of an economy. These growth poles may generate impacts on the surrounding regions which may be favorable or adverse. Under the favorable condition the growing regions may stimulate the economic growth of the less developed areas through creating demand for the latter's principal production factors like labor, capital, raw materials etc. If the under developed regions are capable to fulfill their (i.e. of the growing areas) necessities, it ultimately will stimulate production, employment and income hence increasing the saving capacity and investment potential of the lagged regions. That means, the backward regions have entered into the process of development. Such impact has been called the 'spread effect' by Gunner Myrdal (1957) and 'trickling down effect' by Albert Hirschman (1958).

In contrast, both Myrdal and Hirschman have described respectively through 'backwash effect' and 'polarization effect' how the cumulative greater disparity may occur resulting to a stagnant economy while adverse impacts take place. In such case, whatever capital is available in the backward region will tend to move towards the more developed region in the hope of better returns. This will denude the backward region of its talents and other resources and make the starting of development process more difficult.

Again, regional disparity is a common phenomenon for every society. No regions within nations do typically posses equal capacity for growth as they have differences in resource endowments, population characteristics, natural or acquired, impact of past political events and policies or near historical accidents. Apart from these factors, income disparities inevitably result from the process of economic growth (Islam, 1978). To some extent these inequalities are necessary to facilitate internal factor flows with sufficient speed and quality but the differences should not exceed the limit where it hinders the regional growth, gives rise of social conflicts and political unrests. Therefore, "Albert Hirschman chiefly concerned with development strategy, emphasizes the need to phase the investment process carefully over a sequence of regions, concentrating initially upon the points of rapid urban-industrial expansion and moving outward into the periphery when the need for further public investment declines in relative importance at the centre" (Friedmann, 1966). He argues for a policy of 'controlled disequilibrium under which regional convergence acts as stimulus to national growth.

3.2 Empirical Studies

In the light of the stated theories, a number of studies have been carried out to have an idea about regional disparities. For example, Balisacan and Fuwa (2003) tried to find out whether spatial inequality is increasing in the Philippines. Their research related national level income inequality to spatial inequality. Tadjeoddin, Suharyo and Mishra (2003) explored regional disparity and centre-regional conflicts in Indonesia. Spatial disparities in the availability and the range of available qualities

of goods and services in developing countries received attention in the work of Banerji and Jain (2003). In their paper, they argued that, if there are economies of scale in the production of a particular quality of good, then *market thickness* might play a role in determining the range of available qualities of the good.

There is another stream of studies which used useful analytical tools to critically examine regional economic structure, inter-industry factor flows etc. For instance, in their study, conducted under a NASA grant to the Bureau of Economic Research, University of Colorado, Miernyk, Bonner, Chapman and Shellhammer (1967) tried to identify and to measure as precisely as possible, the inter-relationships that existed in a single local economy of Boulder, Colorado. They used income and employment multipliers to find out direct, indirect and induced effects of a change in final demand in appropriate perspective. They also claimed that the methods developed for measuring local income and employment impacts in Boulder economy can be applied anywhere.

Schaffer (1976) with the assistance of Laurent, Floyd, Sutter, Hamby and Herbert interpreted the empirical relations identified for Georgia in a 28-industry transactions table. They discussed the numerous possible multipliers and showed how these multipliers might be used by the planners. They also provided a starting point for impact analysis and in connection analysed the impact of public projects.

In order to seek answers of some posed questions like: how does model specification affect the size of multipliers? How stable are multipliers over time? What are the differences between short-run and long-run multipliers? Conway Jr. (1991) compared multipliers from three models of the Washington State economy: an economic base model, an input-output model and an inter-industry econometric model. The central conclusion of such an investigation suggested that regional input-output model have an advantage over economic base models because of their ability to distinguish multipliers among industries. It is also identified that in case of static models, input-output multipliers are unable to depict the time paths of impacts.

Krugman (1991) and Venables (1996) observed, "with the process of trade liberalization the importance of the factors that determine the economies of agglomeration (scale economies, market size and transport costs) became less important. On the other hand, the distribution among the regions of factors as natural resources, infrastructure and human capital became more important in the production process and in the definition of the level of income." (Perobelli and Haddad, 2003).

Consequently, the issues related to regional economic structures, inter-industry linkages, spatial inequality etc. have came into the attention of the many researchers. In their study, Guo and Hewings (2001) tried to identify the changes of economic structure of China influenced by economic growth from input-output perspective. The methodology was rooted in key sector analysis and complemented by presentation of multiplier product matrix (MPM), which presented an interpretation of structure based on the products of the row and column of Leotief inverse and provided a macro-economic visualization (economic landscape) of economic structure to attain a better understanding of the structural change of an economy in different times.

The key backward and forward linkage industries in the People's Republic of China (PRC) economy were identified by Zhang and Felmingham (2002) applying two extraction modeling techniques to the PRC's 1997 input-output model. Perobelli and Haddad (2003) aimed to evaluate the inter-regional linkages based on the many region input-output table for Brazilian regions for the year 1996. They examined the effects of hypothetical extraction of a region from a many region model and calculated the forward and backward linkages to have an overview of the economic structure.

Impacts of various European Union (EU) policies have been analyzed applying input-output technique by Grčić, Mrnjavac and Petković (n.d.). They analyzed regional sectoral linkages to have useful insights into the differing effects on national and regional employment and other important variables stemming from the

diversity of the country's regions in terms of their economic development and structural characteristics.

But, there have rarely been a study in Bangladesh related to these types of issues. An attempt was made by Islam (1978), where the author addressed inter- and intra-regional disparities and tried to regionalize depressed and developed regions. In a separate study, Bahauddin (1989) examined the spatial distribution of physical facilities in Bangladesh within the context of issues that affect its balanced regional development. He used various standard methods and found that certain regions appeared to have distinguished themselves as developed while others lag far behind the national average level of development. In a recent study Basher (1997) investigated sectoral linkages and leakages in the context of decades old regime of liberalized trade of Bangladesh economy under which both export and import are virtually unrestricted.

Under such circumstances, this research aims to provide an assessment about the regional inequality (based on selected criteria) in Bangladesh and critical examination of corresponding economic structures through an input-output model.

3.3 Regional Disparity in Bangladesh: An Overview

Bangladesh has suffered from extreme regional disparity since its birth. The history of such differences dates back to pre-liberation period. As mentioned earlier, during the second and third Five Year Plans of the then Pakistan, economic activity and infrastructure development was focused mainly upon three major urban areas of Dhaka, Chittagong and Khulna creating inequalities among the regions of Bangladesh (Islam, 1978). Afterwards several Five Year Plans came into existence for the development of a newly liberated country. Their main target was poverty alleviation rather than minimizing regional disparity.

Since the 1980s the development approach received a new dimension. Establishment of 'growth centres' started with the resemblance of Francois Perroux's 'growth poles' to support rapid growth of farm and non-farm sector production and marketing

activities. The development of rural infrastructure- including roads, bridges and culverts, market places, drainage and irrigation channels- was underlined as the major element of the new development strategy. Employment impact of such type of development was huge. In addition, public spending was increased too (Toufique and Turton, 2002). But regional inequalities started to take a wider shape. Bahauddin (1989) proved (using GINI index) that inter-regional disparities in terms of certain physical facilities, which have close association with socio-economic variables, still exist in Bangladesh. The study found certain regions namely Dhaka, Comilla, Bogra, Chittagong, Dinajpur and Rangpur, who had distinguished themselves as developed while others lag far behind the national average level of development.

Table 3.01: Distribution of Population by Division, 1974-2001

Division	1974	1981	1991	2001	Percentage Change*
Barisal	7.60	7.47	7.02	6.59	-1.01
Chittagong	19.40	19.45	19.30	19.47	+0.07
Dhaka	29.80	30.13	30.70	31.48	+1.68
Khulna	12.30	12.21	11.90	11.79	-0.51
Rajshahi	24.30	24.25	24.70	24.29	-0.01
Sylhet	6.66	6.49	6.36	6.38	-0.28
Bangladesh	**100.00**	**100.00**	**100.00**	**100.00**	

Source: BBS, 2003.

* Difference between 2001 and 1974 data

Meanwhile agriculture-based economy of Bangladesh began to get oriented to a new dimension namely industrial sector. Agro-based industries, garment industries and other large and small manufacturing industries flourished. The share of agriculture sector to national GDP, which was 41.77 per cent in 1984-85, turned to 22.83 per cent by 2003-2004, whereas the similar details for industrial sector had risen almost three times (27.80 per cent from 9.86 per cent) during this period (PC, 1998 and BBS, 2002). But the problem is, this industrial growth is concentrated upon few urban areas, initiating and encouraging Hirschman's 'polarization effect' and consequent imbalanced regional development. Over the years the population distribution of Bangladesh (Table 3.01) can be a testimony of the mentioned fact.

While assessing inter-regional disparity, as evident in Bangladesh in terms of GDP per capita, it is found that during 1995-2000 the per capita GDP of Dhaka has never

been below the national average rather exceeded it by a large amount. On the other hand, except Chittagong and Khulna, the others are lagged far behind the national GDP per capita (Figure 3.01 and Table 3.02).

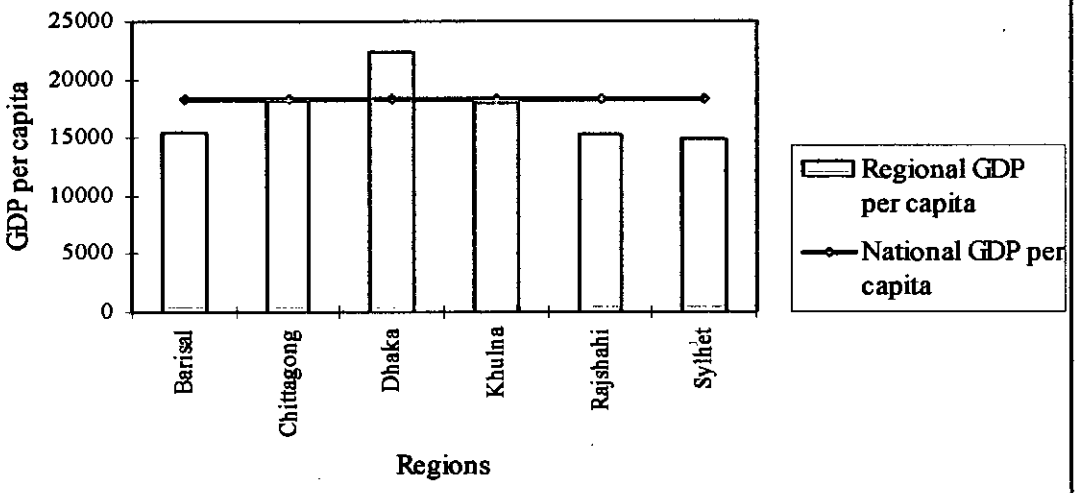

Figure 3.01: Comparison between National and Regional GDP per capita, 1999-2000

Source: BBS, 2002.

Table 3.02: Per Capita Gross Regional Product at Current Market Price (in million Tk.)

Regions	1995-1996		1996-1997		1997-1998		1998-1999		1999-2000	
	GDP Per capita	Rank	GDP per capita	Rank	GDP per capita	Rank	GDP per capita	Rank	GDP per capita	Rank
Barisal	11520	4	12374	4	13122	4	14444	4	15383	4
Chittagong	13712	2	14523	2	15770	2	17050	2	18128	2
Dhaka	16734	1	17790	1	19506	1	20928	1	22303	1
Khulna	13276	3	14257	3	15415	3	16828	3	17875	3
Rajshahi	11074	5	11899	5	12971	5	14234	5	15174	5
Sylhet	11017	6	11833	6	12778	6	13856	6	14886	6
Bangladesh	**13621**		**14537**		**15824**		**17150**		**18269**	

Source: BBS, 2002.

The effects of such inter-regional imbalances are reflected in-

i. Excessive concentration of population (Table 3.03) and economic activities in Dhaka region, limiting the economic potentials of other regions and restricting the expansion possibilities of the economy as a whole.
ii. Growth of the Dhaka City area to a size where the diseconomies exceed the external economies.
iii. Marked inter-regional differences in living standard, job opportunities, social welfare facilities and development prospects (Kwon, n.d.).

If such imbalanced spatial development continues, serious decline in the regional productivity will be observed that will ultimately be detrimental to overall national development.

Table 3.03: Regional Distribution of Population, 2001

Regions	Total Population	Share of Total Population to the National Total Population	Urban Population	Share of Urban Population to the Regional Total Population
Barisal	8153960	6.58	1160300	14.23
Chittagong	24119660	19.47	5724140	23.73
Dhaka	38987140	31.48	13386060	34.33
Khulna	14604900	11.79	2920580	20.00
Rajshahi	30088740	24.29	4437740	14.75
Sylhet	7896720	6.38	976380	12.36
Bangladesh	123851120	100.00	28605200	23.10

Source: BBS, 2003.

Hence it is high time to integrate the regional development approach with the national sectoral approach in order to achieve 'controlled disequilibrium'. To facilitate such an integrated and comprehensive formulation of regional policy and their efficient implementation, it is crucial that the policy makers know as much as they can about the regions. Keeping this in mind, the present research aims to provide some highlighting points about the economic structure of the study regions, which are elaborated in the succeeding chapters.

4.1 Analysis of Output Multipliers

The output multipliers for industry sectors are always of interest to planners and policy makers. This is particularly because; it helps to trace out those sectors of the economy where additional spending will have the greatest impact in terms of monetary value of output generated throughout the economy (Miller and Blair, 1985). Thus, the sectoral output multipliers for study regions are identified and analyzed both from intra- and inter-regional perspectives.

4.1.1 Intra-regional Analysis

Table 4.01 presents output multipliers for industries of six divisions of Bangladesh. These simple multipliers should be interpreted as lower limits and might not be reasonably close to the actual effects of changes in final demand since they exclude any of the effects induced by incomes circulating through households.

Surprisingly, in every region the output multiplier is the highest for hotel and restaurant sector which is generally thought to have little influence on the economy. Other than this sector, the multiplier values for the rest of the service sectors are less than the average. The lowest magnitude of output multiplier is observed for one of the service sectors namely trade service. This may because the service sectors are supporting sectors in Bangladesh and do not export extensively. Almost in every region, the multiplier index is larger than the average for agriculture, fishing, industry and construction sectors, which have larger impact on the economy.

Though the output multipliers for hotel and restaurant are the largest in regional economies, there are variations in their values according to regions. In Sylhet region, the value of output multiplier for hotel and restaurant is 2.230, whereas, the value of

Table no. 4.01: Sectoral Output Multipliers and their Rankings within the Regions, 1999-2000

Sectors	Barisal		Chittagong		Dhaka		Khulna		Rajshahi		Sylhet	
	OM	Rank	OM	Rank	OM	Rank	OM	Rank	OM	Rank	OM	Rank
Agriculture	1.623	3	1.904	5	1.809	5	1.805	4	1.683	3	1.834	4
Fishing	1.570	4	2.108	2	1.986	1	1.835	3	1.630	4	1.909	2
Industry	1.670	2	2.006	3	1.907	4	1.874	2	1.732	2	1.907	3
Construction	1.379	7	1.853	6	1.802	6	1.619	6	1.487	6	1.732	6
Utility (E. G.W.)	1.530	5	1.962	4	1.938	3	1.739	5	1.615	5	1.802	5
Trade services	1.185	12	1.354	13	1.339	13	1.270	13	1.221	13	1.290	13
Transport & Communication	1.356	8	1.676	8	1.641	8	1.517	8	1.427	8	1.568	8
Housing	1.339	9	1.617	9	1.586	9	1.476	9	1.404	9	1.520	9
Health	1.153	13	1.529	10	1.503	10	1.336	11	1.232	12	1.417	10
Education	1.238	11	1.416	12	1.382	12	1.322	12	1.277	11	1.357	11
Public Administration	1.248	10	1.420	11	1.391	11	1.337	10	1.280	10	1.349	12
Other services	1.418	6	1.705	7	1.647	7	1.557	7	1.482	7	1.606	7
Hotel and Restaurant	1.946	1	2.205	1	1.969	2	2.162	1	1.998	1	2.230	1

Source: Based on multiplier analysis technique.

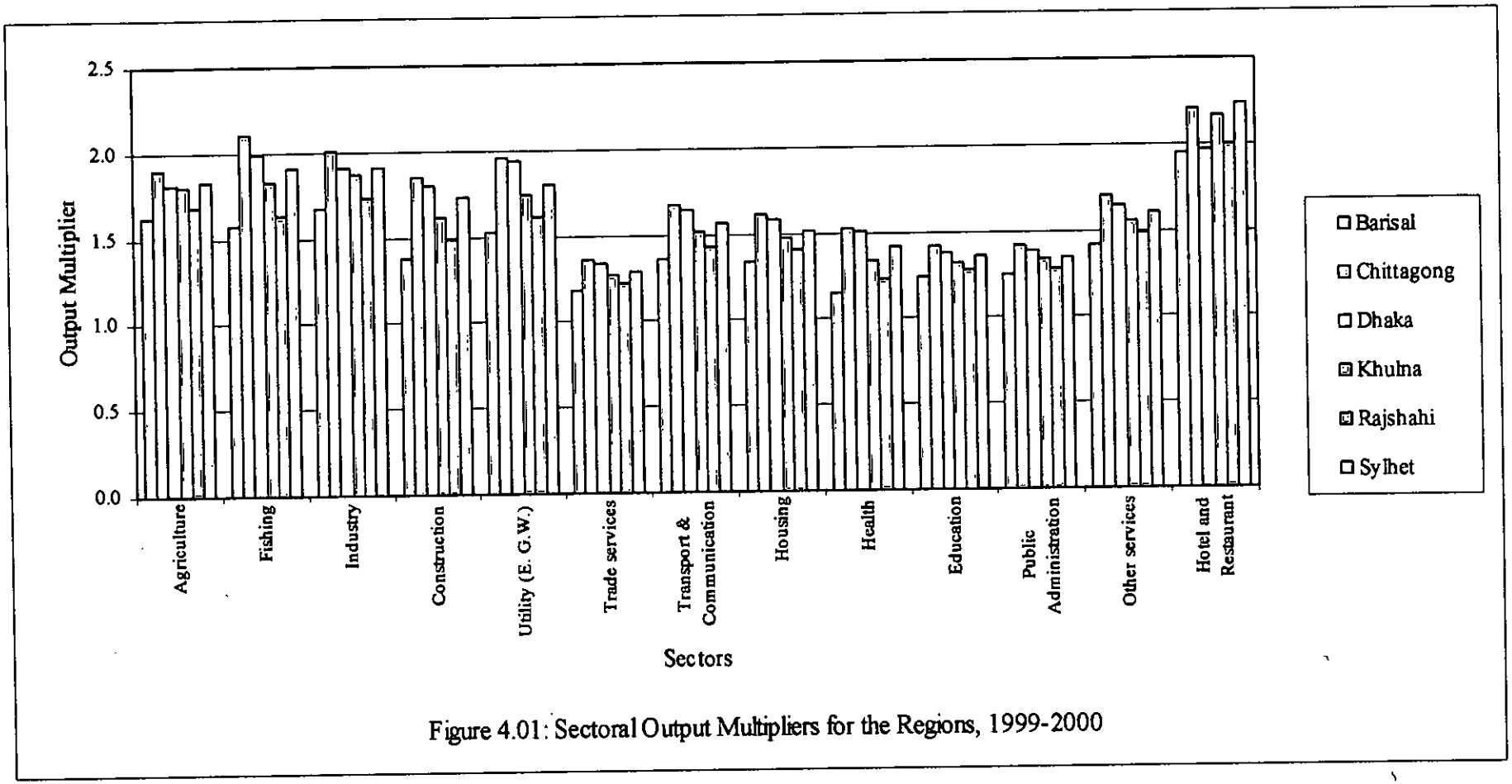

Figure 4.01: Sectoral Output Multipliers for the Regions, 1999-2000

Source: Based on multiplier analysis technique

the same is 1.946 for Barisal region (Table 4.01). Such variations occur due to amount of local inputs available for the production process. Variation of similar scale in the multiplier values are viewed for every sectors of the economy.

A perusal of Table 4.01 also reveals the relative ranking of output multipliers for industries of six divisions. Surprisingly, the output multiplier for fishing industry ranked first within Dhaka region. Though the sector accounts only about 4 per cent of regional GDP, this may be the result of broad classification of regions. The same is placed second for Chittagong and Sylhet, third for Khulna and fourth for Barisal and Rajshahi. The rapidly growing transportation and communication sector is ranked eighth in the same list; probably because it is still acting as a supporting service sector in the economic system.

4.1.2 Inter-regional Analysis

The most interesting finding is portrayed in Figure 4.01. It shows the relative ranking of regions according to sectoral output multipliers. The multipliers of Chittagong exceed those of other regions. This may reflect a scenario where the locational advantages and harmonious relationships among the economic sectors of Chittagong encourage the investors to have the highest possible returns. Almost for every industry the order of regions by magnitude of output multiplier is, Chittagong, Dhaka, Sylhet, Khulna, Rajshahi and Barisal. Slight variations are observed for agriculture, industry and hotel and restaurant sectors. In the agriculture sector the second position is replaced by Sylhet region while the third place is jointly occupied by Dhaka and Khulna divisions. Dhaka and Sylhet share the second position for the industrial sector and in terms of multiplier of hotel and restaurant related activities, Sylhet supercedes all other regions.

CHAPTER 05

SECTORAL LINKAGES AND KEY SECTOR ANALYSIS

Following Rasmussen's method (see article 2.2.4), the sectoral linkage structure of regional economies are explored and the results are summarized in the following paragraphs.

5.1 Sectoral Linkages in Regional Economy

Prior to the analysis of linkage coefficients as derived by the technique, four important theoretical considerations need to be emphasized –

i. "The production technology within input-output model is assumed to be linear (Leontief type). This in turn implies that all economic sectors exploit completely the factors of production that they have in their disposal (full capacity). Consequently, if for some sectors the factors of production are under utilized the respective linkage coefficients would be overestimated.

ii. If the intermediate supply is not perfectly elastic, then the sectoral linkages would be overestimated.

iii. The opportunity cost of inputs is zero; differently an increase in the production of any given sector would lead to a reduction of supply of some other sector.

iv. The size of the sectoral linkages depends on the aggregation scheme of the national or regional model. In general, high degree of aggregation leads to high linkage coefficients" (Grčić *et al.*, n.d.)

Apart from these, it should be kept in mind that both backward and forward linkages provide no guarantee about their potential translation to actual growth and in the selection of key sectors with reference to linkage indices, efficiency and comparative costs are not at all considered (Thomas, 1982).

The regional backward and forward linkages are, however, arranged in three tables – Tables 5.01, 5.02 and 5.03 for each of the thirteen major economic sectors of

Bangladesh. These tables exhibit some interesting features of regional economies.

Agriculture as well as industry sectors are above average contributors to both the forward and backward linkage structure of the respective regional economies. Between these sectors, both the linkage indices for industry are larger than that of agriculture sector. The cause behind it may include that in the present study, the industry sector consists of twenty one large and small diversified manufacturing and processing industries who have large variations in their input and output materials. Therefore, these industries maintain a good linkage with the rest of the sectors giving rise to a high index value in both the directions. However, there are significant variations among the linkage multiplier values. The magnitudes of forward and backward linkage multipliers for agriculture of Dhaka are 1.3099 and 1.0739 respectively which are the lowest in the regional context. Barisal has the highest backward linkage value and Sylhet has the highest forward linkage multiplier for agricultural activity.

In this connection, the point needs to be highlighted is that the variations in linkage values are subject to certain conditions which include the existence of a minimum market size consistent with capacity expansion, availability of complementary inputs (credits, skilled labor etc.) and government policies consistent with the ranking of sectors. The last point is most important since the government may encourage or discourage a firm to respond under an operating structure (Thomas, 1982). For instance, in the regions of Bangladesh industrialization is encouraged in such a way that industry could become an export oriented sector by large. As such the forward linkage value is larger than that of backward linkage. Again, there are variations among the regions in forward linkage values of industry. The magnitude of forward linkage for industry sector is the highest in Dhaka (2.6878). One of the reasons may be, garment industry is highly encouraged in the Capital City and its surrounding areas which is one of the leading export base industries in the country.

Table 5.01: Regional Backward Linkage Hierarchies, 1999-2000

Sectors	Barisal		Chittagong		Dhaka		Khulna		Rajshahi		Sylhet	
	Value	Rank	Value	Rank	Value	Rank	Value	Rank	Value	Rank	Value	Rank
Agriculture	1.1309	3	1.0878	5	1.0739	5	1.1253	4	1.1236	3	1.1076	4
Fishing	1.0943	4	1.2045	2	1.1790	1	1.1444	3	1.0882	4	1.1530	2
Industry	1.1635	2	1.1461	3	1.1321	4	1.1687	2	1.1567	2	1.1522	3
Construction	0.9609	7	1.0584	6	1.0696	6	1.0093	6	0.9930	6	1.0464	6
Utility	1.0662	5	1.1211	4	1.1504	3	1.0844	5	1.0787	5	1.0883	5
Trade services	0.8260	12	0.7736	13	0.7947	13	0.7919	13	0.8152	13	0.7792	13
Trans. & Comm.	0.9451	8	0.9576	8	0.9742	8	0.9459	8	0.9528	8	0.9469	8
Housing	0.9334	9	0.9237	9	0.9414	9	0.9201	9	0.9373	9	0.9182	9
Health	0.8034	13	0.8734	10	0.8920	10	0.8330	11	0.8230	12	0.8559	10
Education	0.8626	11	0.8088	12	0.8205	12	0.8245	12	0.8528	11	0.8200	11
Public Administration	0.8697	10	0.8115	11	0.8256	11	0.8335	10	0.8547	10	0.8151	12
Other services	0.9879	6	0.9739	7	0.9776	7	0.9711	7	0.9898	7	0.9703	7
Hotel and Restaurant	1.3560	1	1.2597	1	1.1691	2	1.3478	1	1.3343	1	1.3470	1

Source: Based on Rasmussen's method of sectoral linkage identification

Table 5.02: Regional Forward Linkage Hierarchies, 1999-2000

Sectors	Barisal		Chittagong		Dhaka		Khulna		Rajshahi		Sylhet	
	Value	Rank	Value	Rank	Value	Rank	Value	Rank	Value	Rank	Value	Rank
Agriculture	1.6347	1	1.4533	2	1.3099	2	1.6425	2	1.6501	2	1.6715	2
Fishing	0.8516	7	0.7297	7	0.6871	9	0.7784	7	0.7829	9	0.7610	7
Industry	1.3327	3	2.6673	1	2.6878	1	2.0021	1	1.6588	1	2.3257	1
Construction	0.8148	8	0.6756	9	0.6937	8	0.7403	8	0.7844	8	0.7168	9
Utility	0.7997	9	0.6930	8	0.7402	7	0.7266	9	0.7927	7	0.7473	8
Trade services	1.2140	4	1.2443	4	1.2512	4	1.2328	4	1.1838	4	1.1524	4
Trans. & Comm.	0.9795	5	0.9722	5	0.9965	5	0.9837	5	0.9507	5	0.9082	5
Housing	0.9574	6	0.8220	6	0.8656	6	0.8855	6	0.9395	6	0.8210	6
Health	0.7303	11	0.6004	11	0.6183	11	0.6558	11	0.7009	11	0.6362	11
Education	0.7159	12	0.5862	13	0.6059	13	0.6408	13	0.6861	13	0.6207	12
Public Administration	0.7530	10	0.6348	10	0.6675	10	0.6826	10	0.7218	10	0.6526	10
Other services	1.5016	2	1.3287	3	1.2615	3	1.3842	3	1.4619	3	1.3688	3
Hotel and Restaurant	0.7148	13	0.5925	12	0.6147	12	0.6447	12	0.6865	12	0.6177	13

Source: Based on Rasmussen's method of sectoral linkage identification

Table 5.03 : Highest and Lowest Coefficient Values of Both the Linkages for Six Regions of Bangladesh, 1999-2000

Sectors	Barisal		Chittagong		Dhaka		Khulna		Rajshahi		Sylhet	
	FL	BL	FL	BL	FL	BL	FL	BL	FL	BL	FL	BL
Agriculture	1.6347	1.1309	1.4533	1.0878	1.3099	1.0739	1.6425	1.1253	1.6501	1.1236	1.6715	1.1076
Fishing	0.8516	1.0943	0.7297	1.2045	0.6871	1.1790	0.7784	1.1444	0.7829	1.0882	0.7610	1.1530
Industry	1.3327	1.1635	2.6673	1.1461	2.6878	1.1321	2.0021	1.1687	1.6588	1.1567	2.3257	1.1522
Construction	0.8148	0.9609	0.6756	1.0584	0.6937	1.0696	0.7403	1.0093	0.7844	0.9930	0.7168	1.0464
Utility	0.7997	1.0662	0.6930	1.1211	0.7402	1.1504	0.7266	1.0844	0.7927	1.0787	0.7473	1.0883
Trade services	1.2140	0.8260	1.2443	0.7736	1.2512	0.7947	1.2328	0.7919	1.1838	0.8152	1.1524	0.7792
Trans. & Comm.	0.9795	0.9451	0.9722	0.9576	0.9965	0.9742	0.9837	0.9459	0.9507	0.9528	0.9082	0.9469
Housing	0.9574	0.9334	0.8220	0.9237	0.8656	0.9414	0.8855	0.9201	0.9395	0.9373	0.8210	0.9182
Health	0.7303	0.8034	0.6004	0.8734	0.6183	0.8920	0.6558	0.8330	0.7009	0.8230	0.6362	0.8559
Education	0.7159	0.8626	0.5862	0.8088	0.6059	0.8205	0.6408	0.8245	0.6861	0.8528	0.6207	0.8200
Public Administration	0.7530	0.8697	0.6348	0.8115	0.6675	0.8256	0.6826	0.8335	0.7218	0.8547	0.6526	0.8151
Other services	1.5016	0.9879	1.3287	0.9739	1.2615	0.9776	1.3842	0.9711	1.4619	0.9898	1.3688	0.9703
Hotel and Restaurant	0.7148	1.3560	0.5925	1.2597	0.6147	1.1691	0.6447	1.3478	0.6865	1.3343	0.6177	1.3470

Highest value

Lowest value

Source: Based on Rasmussen's method of sectoral linkage identification

While considering transport and communication and housing sectors, the tables depict that both are non-key sectors (forward as well as backward linkage multiplier values are less than 1) in every region of Bangladesh but have tremendous potentialities to turn into key sectors (as their value approach 1). A similar conclusion can be drawn for the other services sector. During 1999-2000, it was serving as a forward linkage oriented activity and its backward linkage value in every region is a little less than 1. This service type includes IT sectors, whose performance over the last five years suggest that it will become an important sector of Bangladesh very shortly.

Table 5.01 and Figure 5.01 depict the relative position of each sector based on backward linkage multiplier both in the intra- and inter-regional context respectively during the period of 1999-2000. A striking fact that can be noticed is that hotel and restaurant related activities are at the top of the list in every region. Because by their very nature this type of activity has to maintain good relations, especially for their inputs (like agricultural products, industrial output, efficient service facilities) to the other sectors. There are several other industry sectors which are above average contributors to the backward linkage structure for the regions. These sectors are agriculture, fishing, industry and utility services.

The weaker contributors to regional backward linkage structure include trade services, health sector, education and public administration sectors. The transport and communication and housing sectors are ranked eighth and ninth respectively in terms of their backward linkage values. The middle rung of the list is occupied by construction and other services sectors.

Though hotel and restaurant related activities are at the top of the list in almost every region, it accounts for less than 1 per cent of the regional GDP. Whereas, the contribution of trade to regional GDP is more than 11 percent, though it holds the lowest position (12^{th} in Barisal and 13^{th} in the rest five regions) in the regional context when the backward linkage multipliers are considered. The scenario may be different if the relative importance of each sector in terms of their proportional

contribution to regional GDP can be accommodated in the identification process of backward and forward linkage hierarchies.

"Backward linkages reveal the extent of backward dependence and industries with comparatively large backward linkages are key industries in the sense that they will purchase a significant proportion of the outputs of other industries. Several of the sectors identified as having weak backward linkages may still be important in a different context, namely their contribution to forward sales. By their very nature, some industries will sell their output forward in preference to buying inputs. There is no final picture of the significance of individual industries in an input-output structure until the forward linkages are analyzed" (Zhang and Felmingham, 2002).

This is particularly true for the trade service which is clearly one of the key forward linkage industries of regional economies ranking at number four (Table 5.02). The Table 5.02 and Figure 5.02 also reveal that hotel and restaurant related activities, which is at the top of the chart when ranked in terms of backward linkage multiplier value, is now at the bottom rung, just only because the output of this sector is basically targeted for final consumption rather than sectoral purchase. Education, health and public administration have secured the lowest four positions. As mentioned earlier, these sectors are among the weaker contributors of regional backward structure. Because, being the service sectors, their input ratio is smaller in comparison to other sectors. However, their position in both the linkage systems suggests that the investment in these sectors is not at all beneficial. The scenario may be completely opposite if social accounting could be incorporated.

Industry, agriculture and other services are the highest contributors to the forward linkage structure. The fast growing transport and communication and housing sectors are also two important forwarding industry in every regional economy ranking at fifth and sixth respectively according to the magnitude of forward linkage multiplier. The industrialization is closely related to banking, finance, IT, transportation and communication etc. As such the important contribution of other services and transport sectors are evident in the regional forward linkage system.

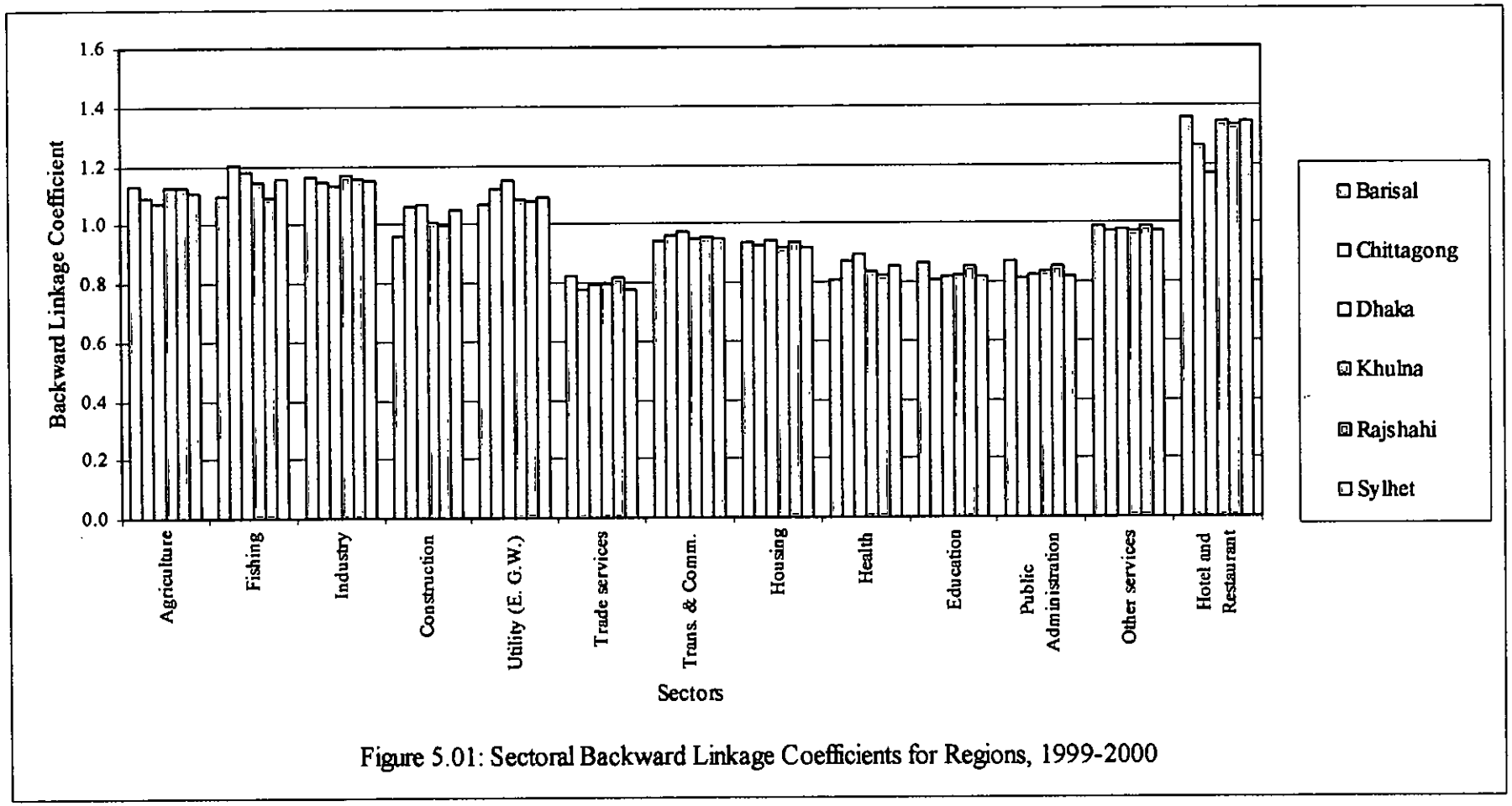

Figure 5.01: Sectoral Backward Linkage Coefficients for Regions, 1999-2000

Source: Based on Rasmussen's method of sectoral linkage identification

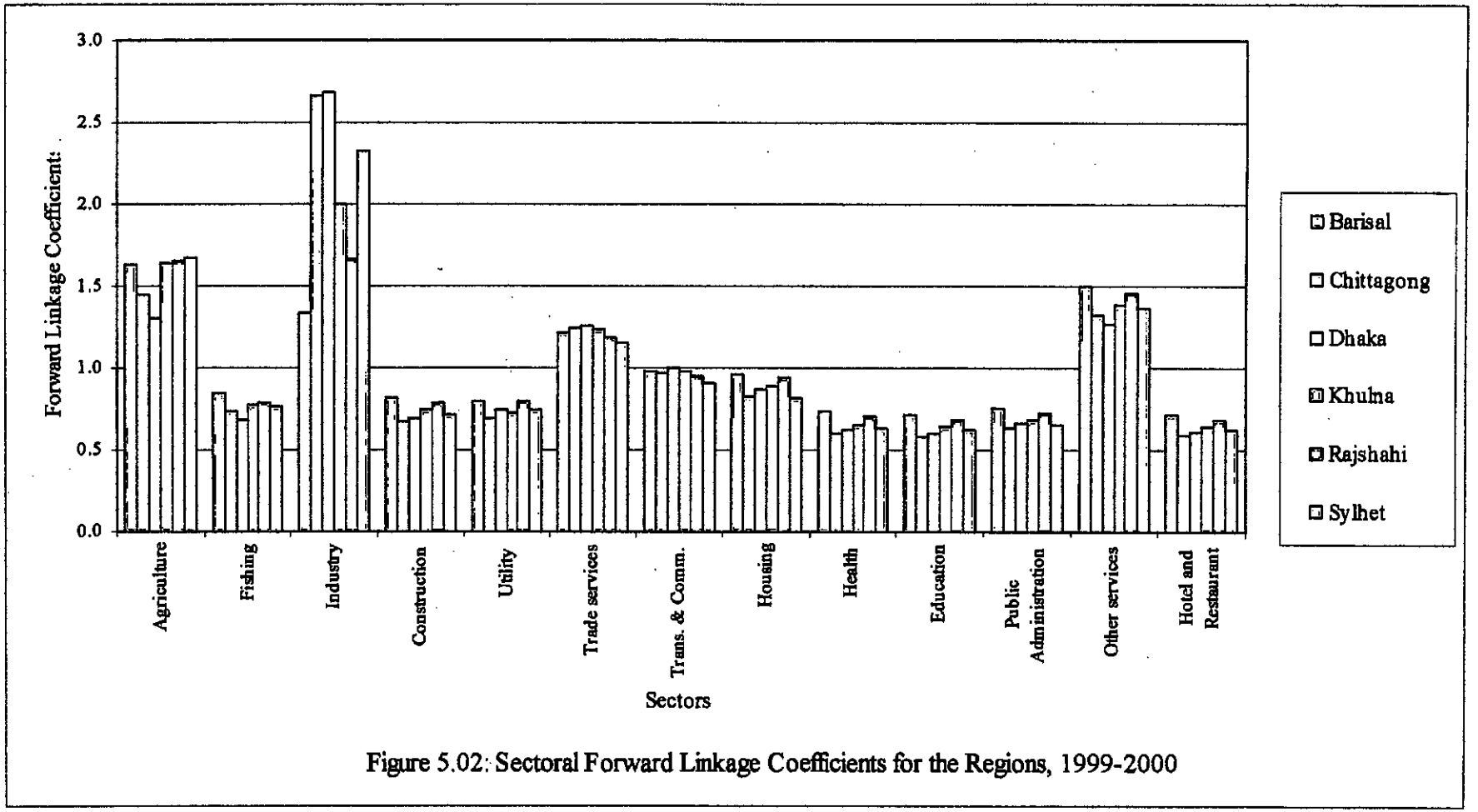

Figure 5.02: Sectoral Forward Linkage Coefficients for the Regions, 1999-2000

Source: Based on Rasmussen's technique of sectoral linkage identification

Another important inference can be drawn from regional backward and forward linkage analysis. Region having high backward linkage oriented sectors may have a high dependence on intermediate goods of other regions which are typically capital-intensive and may ultimately pursue a region to be in backward position. In the light of such an understanding, Table 5.03 provides some interesting findings. It shows that the highest magnitude of both forward (12 out of 13 sectors) and backward (10 out of 13 sectors) linkage multipliers are shared by Barisal and Dhaka region. On the other hand, Chittagong receives the lowest value of both the linkages for several sectors. In fact, the lowest value of backward and forward linkage multiplier of education and public administration sectors are found in Chittagong Division. By and large, the similar case is evident for Sylhet too. Whereas in Khulna and Rajshahi regions the multiplier indices for different sectors lie somewhat between the highest and lowest values.

For developing economies like ours, those industries are of particular interests which are ranked as both strong backward and forward linkage sectors. The growth of these will stimulate the development of the linked industries in both backward and forward direction. Therefore, regional economic industries are again viewed to identify the key sectors.

5.2 Key Sector Analysis

According to Rasmussen's method, key sectors are those, for which both the backward and forward linkage multipliers are greater than 1. Applying this criterion, sector classification for six divisions of Bangladesh for the period of 1999-2000 is carried out and is presented in Table 5.04.

A quick perusal of Table 5.04) reveals that even though the forward and backward linkage multiplier values are different among regions in the study period, the key sectors are the same for all regions. Among thirteen major sectors of the country, key sectors interact only between two sectors namely agriculture and industry. Though Bangladesh has long been well-known as an agriculture-based country but

the table reflects that along with agriculture sector, industrial sector has also turned into a dominant component of its national economy as also evident from the sectoral share to regional gross output. But the point that needs to be mentioned here is that in the present study agriculture and industry are the aggregation of several other smaller sectors. Agriculture and industry sector include nine and twenty one large and small economic sectors respectively (see Appendix A for detailing). Therefore, their strong backward and forward linkage may be the result of a very broad classification of the mentioned sectors and as a consequence they appeared with a high linkage multiplier values strengthening their claim to be the key sectors both for the regional and national economy.

Table 5.04: Sector Classifications for Six Regions of Bangladesh, 1999-2000

Code	Sectors	Regions					
		Barisal	Chittagong	Dhaka	Khulna	Rajshahi	Sylhet
1	Agriculture	K	K	K	K	K	K
2	Fishing	B	B	B	B	B	B
3	Industry	K	K	K	K	K	K
4	Construction	O	B	B	B	O	B
5	Utility (E. G.W.)	B	B	B	B	B	B
6	Trade services	F	F	F	F	F	F
7	Transport & Communication	O	O	O	O	O	O
8	Housing	O	O	O	O	O	O
9	Health	O	O	O	O	O	O
10	Education	O	O	O	O	O	O
11	Public Administration	O	O	O	O	O	O
12	Other services	F	F	F	F	F	F
13	Hotel and Restaurant	B	B	B	B	B	B

K = Key sectors
B = Backward linkage oriented sectors
O = Other sectors
F = Forward linkage oriented sectors

Source: Based on Rasmussen's technique of key sector analysis

Of the other sectors five out of thirteen are neither forward nor backward linkage oriented sectors. Their (Transport and Communication, Housing, Health, Education and Public Administration) states are same in all the six divisions of Bangladesh. An interesting feature is, though construction sector serves as a backward linkage oriented sector for Chittagong, Dhaka, Khulna and Sylhet; it is not yet been the same for Barisal (0.9609) and Rajshahi (0.9930) region but has the potentialities (as the value approaches 1) to be turn to a backward linkage oriented sector.

Among the rest, fishing, utility and hotel and restaurant activities are of importance for their greater backward linkages whereas trade and other services are important for their higher magnitude of forward linkage multipliers.

CHAPTER 06

REGIONAL ECONOMIC STRUCTURE: EMPIRICAL RESULTS OF EXTRACTION METHOD

6.1 Backward Effects

Tables C.1a, C.1b, C.1c, C.1d, C.1e and C.1f in the Appendix C indicate in each column the production/output effects after the extraction of the sectors from the concerned regional economies. Those tables present the results as a percentage change of the actual production.

6.1.1 An intra-regional analysis

Barisal Region:

Figure 6.01 shows that when agriculture and industry sectors are isolated there is a big effect in the region's economy. Besides these two, fisheries sector also generates a larger effect when it is extracted. The importance of fishing sector in the economy of Barisal can easily be understood if its contribution to regional GDP is seen. This sector contributes to 10.69 per cent of Barisal's economy which is the highest among its contribution to the GDP of the rest five regions.

The impacts of isolation can also be verified from the Table C.1a. The analysis of the table depicts that at the exclusion of the mentioned three sectors, the relevant backward linkage values are mainly constituted by trade, other service and transport and communication sectors. The isolation of another important sector namely transport and communication sector greatly affects the industry, construction and housing sectors. In general, it is apparent from the table that the two key sectors have significant influence over Barisal's backward linkage structure which is evident even when the rest of the economic sectors are isolated one after another. These results represent the bias of Barisal's economy towards the two identified sectors.

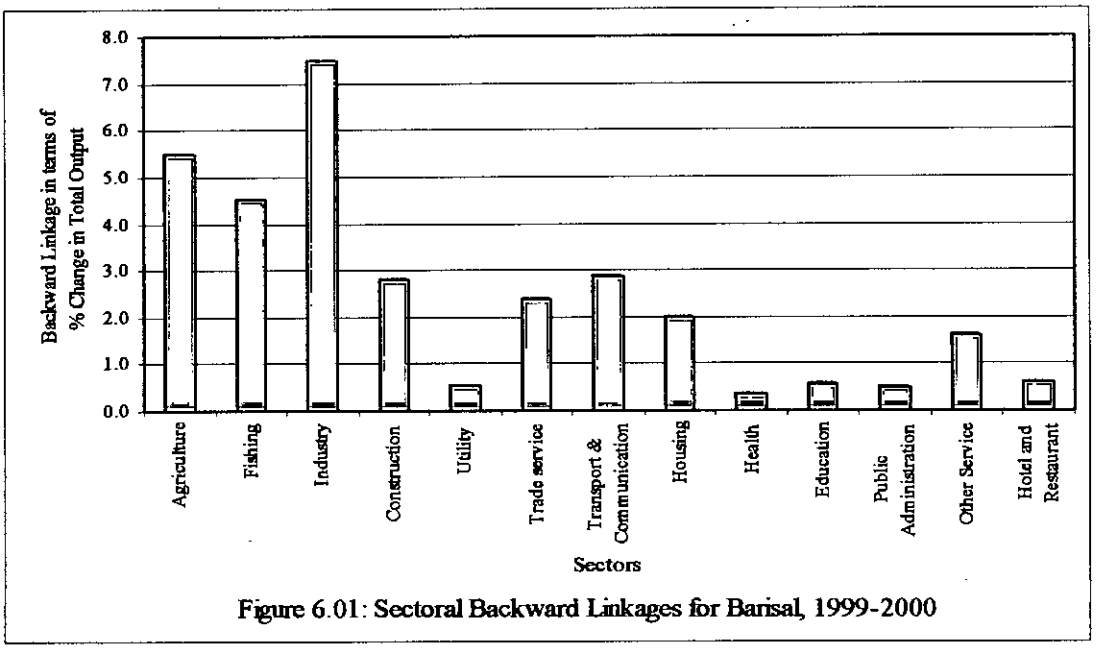

Figure 6.01: Sectoral Backward Linkages for Barisal, 1999-2000

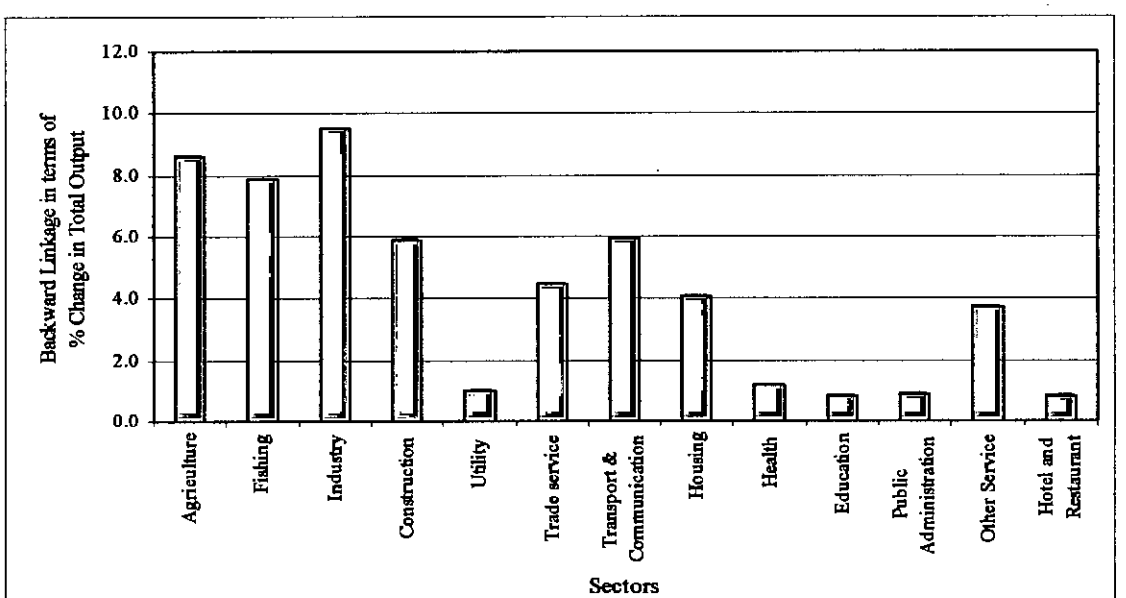

Figure 6.02: Sectoral Backward Linkages for Chittagong, 1999-2000

Chittagong Region:

The results as summarized in Figure 6.02 and Table C.1b enable to affirm that Chittagong's economic structure face better interaction among agriculture, fishing, industry, construction, trade and transportation and communication sectors. Based on the backward linkage effects, it can be concluded that the backward dependence of Chittagong upon the mentioned sectors is bigger than that of the rest of the

sectors. Such an interaction reflects the strength of economic structure of Chittagong region.

Dhaka Region:

Figure 6.03 and Table C.1c reflect the impacts of the isolation of the thirteen sectors from Dhaka's economy. Using the results it is possible to say that in terms of backward linkage, industry is the significantly important economic sector of Dhaka. Its exclusion reduces the total regional output by 11.368 per cent and agriculture and trade sectors' output by 3.331 and 3.213 per cent respectively. As expected, it is also found that there are several other sectors namely agriculture, construction, transport and communication, trade and housing which interact nicely within the system.

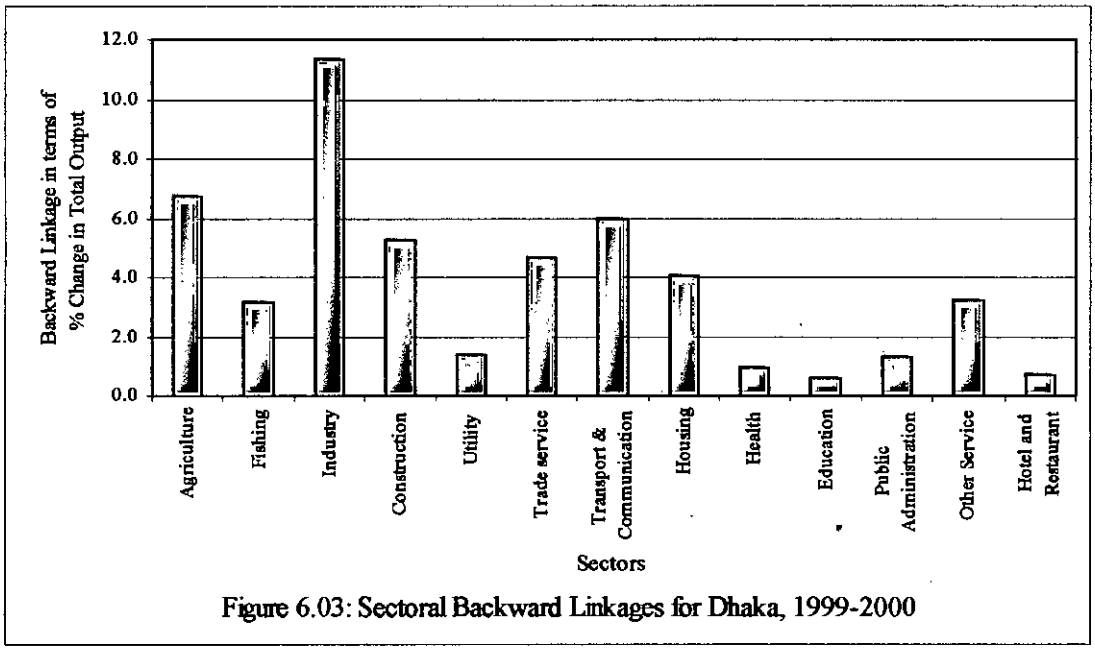

Figure 6.03: Sectoral Backward Linkages for Dhaka, 1999-2000

Khulna Region:

When agriculture sector is isolated from the regional economy the results as depicted in Figure 6.04 show that there is a large effect on the Khulna's backward linkage structure. It reduces the total regional output by almost ten per cent. The impacts of extraction of other sectors can be viewed in Table C.1d. Like other regions, it is also true for Khulna that the effect generated by the successive isolation of economic sectors are mainly concentrated among agriculture, industry, trade, transport and communication and other service sectors.

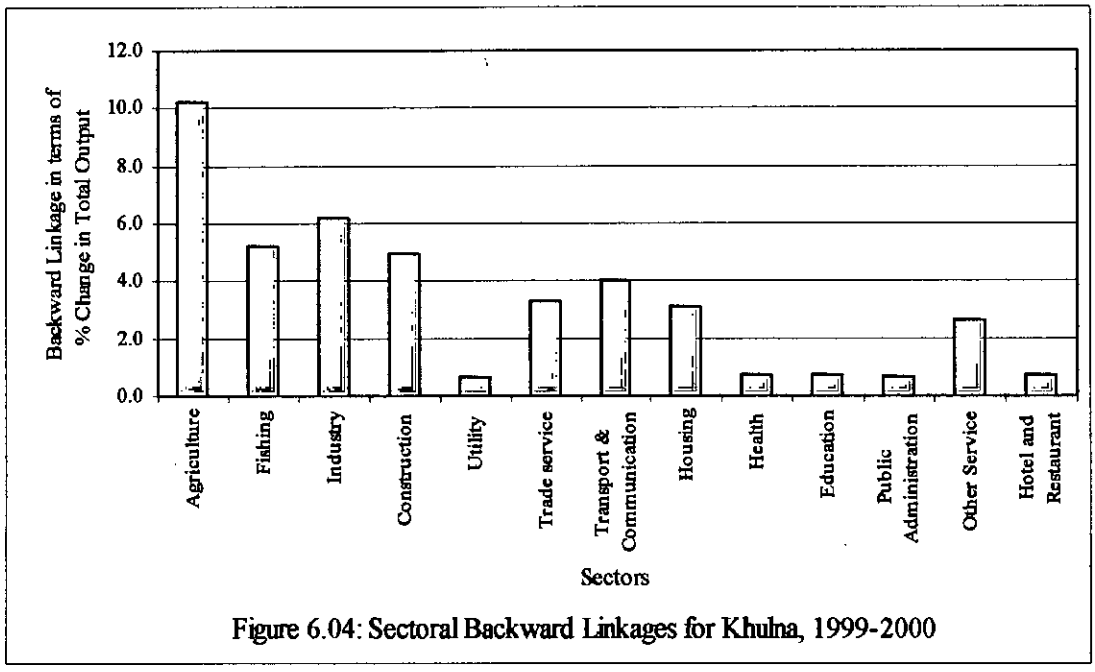

Figure 6.04: Sectoral Backward Linkages for Khulna, 1999-2000

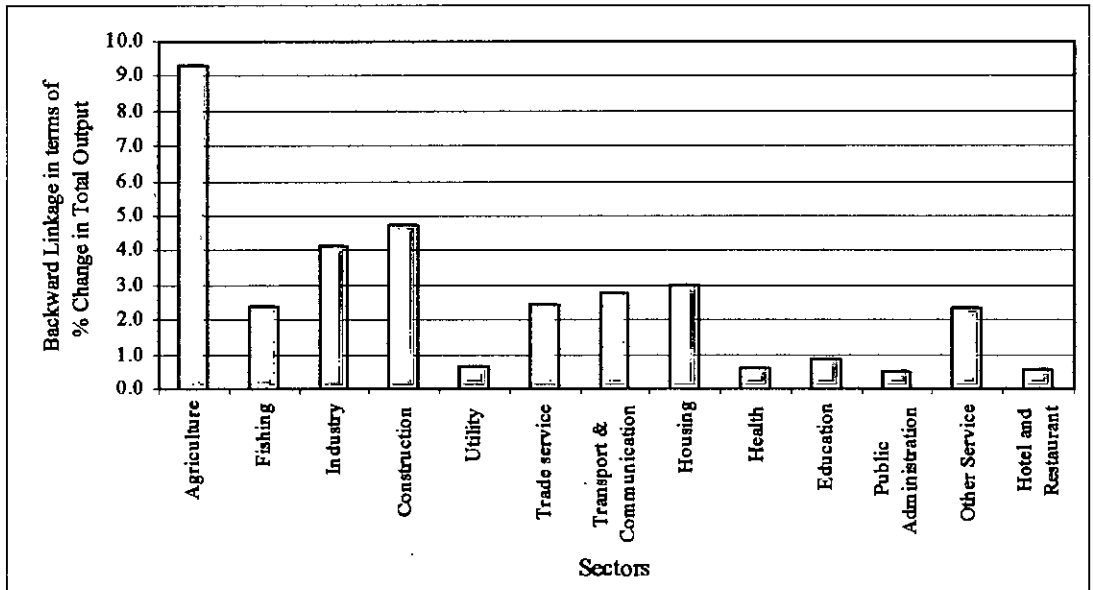

Figure 6.05: Sectoral Backward Linkages for Rajshahi, 1999-2000

Rajshahi Region:

The analysis of Figure 6.05 and Table C.1e reveals that based on the backward linkage effects, the backward dependence of Rajshahi upon agriculture sector is bigger than on any other sector. Other than this, Rajshahi's economy faces substantial interaction between industry and construction sectors. Their isolation

generates considerable impacts upon agriculture, trade and other service industries. The hypothetical extraction of construction sector hinders the production of agriculture, industry and other services respectively by almost 1.2, 1.7 and 0.6 per cent.

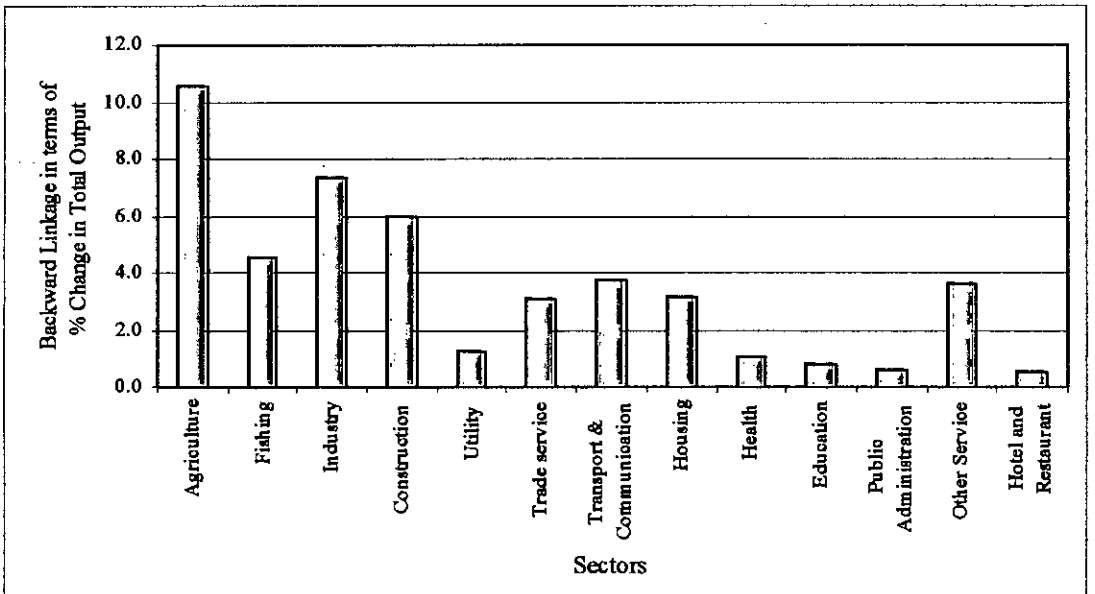

Figure 6.06: Sectoral Backward Linkages for Sylhet, 1999-2000

Sylhet Region:

It is viewed from Figure 6.06 and Table C.1f, when agriculture and industry sectors are isolated there is a large effect in Sylhet region's economy. Using the results of Table C.1f, it can be said that in terms of backward linkage, construction and fishing industries have an important contribution to its economic structure.

While analyzing the regional backward linkage structure an important inference can be drawn. At the time of regional policy formulation construction, trade, transport and communication and other service industries should receive proper attention to optimize their output flows. Besides key sectors, generally for every region, these sectors are important contributors to their economic structures. They maintain a noticeable linkage coefficient value with agriculture and industry sectors and thereby are able to affect the production of the key sectors to a great extent.

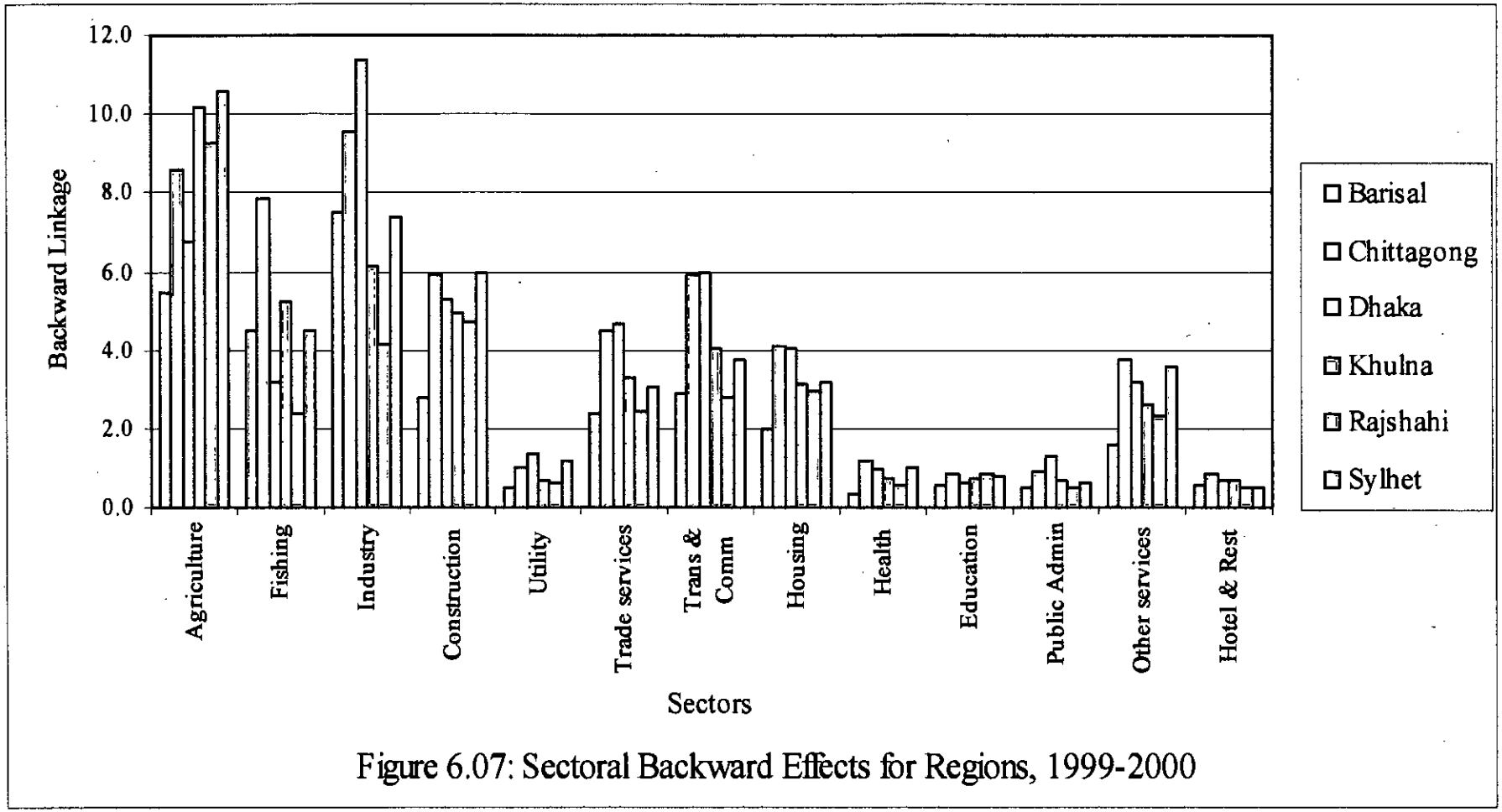

Figure 6.07: Sectoral Backward Effects for Regions, 1999-2000

Source: Based on extraction method

6.1.2 An inter-regional analysis

Sectoral backward effects for regions are portrayed in Figure 6.07. It reveals that in the regional context maximum backward effects are generated by agriculture, fishing, industry and construction sectors. Among the other sectors particularly utility, health, education, public administration and hotel and restaurant services have small effects in every regional economy as because their requirements of inputs from other sectors is very limited.

It is typically noticed that the industry sector has a huge effect on the economic condition of Dhaka and slightly less on that of Chittagong. Khulna, Rajshahi and Sylhet are tremendously affected when agriculture sector is isolated from the economy. Such a scenario shows that in terms of backward linkage, comparatively developed regions, more specifically saying Dhaka and Chittagong, are dependant over industry sectors while the weaker regions are agriculturally biased.

6.2 Forward Effects

Tables C.2a, C.2b, C.2c, C.2d, C.2e and C.2f in the Appendix C present the main results for forward linkages. The results are calculated to find out the percentage change of total output. The value of forward linkage is obtained by summing all off-diagonal elements in each column.

6.2.1 An intra-regional analysis

Barisal Region:

The results presented in Figure 6.08 and Table C.2a show that there is a large impact within the region when trade service and industry sectors are isolated. This implies, for Barisal division, the forward dependence of the isolated sectors upon the rest of the economy is bigger than the forward dependence of the rest. It is found that their exclusion affects fishing industries to a considerable amount. As the mentioned

sectors are isolated the fishing industry faces a reduction in its output by 2.209 and 1.087 per cent respectively.

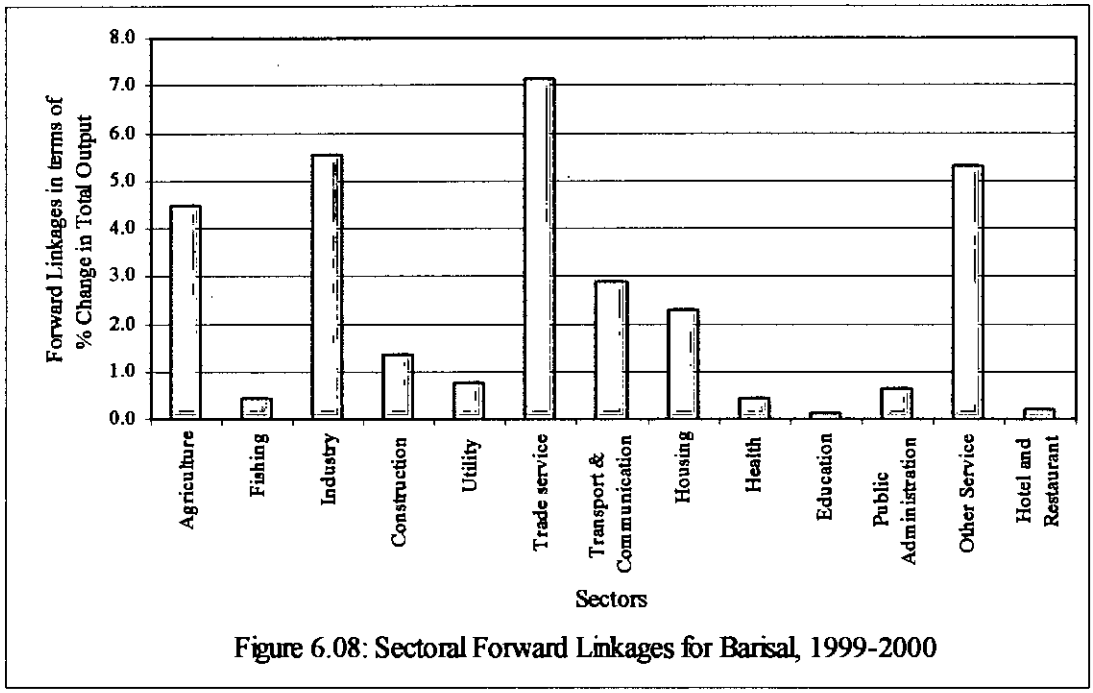

Figure 6.08: Sectoral Forward Linkages for Barisal, 1999-2000

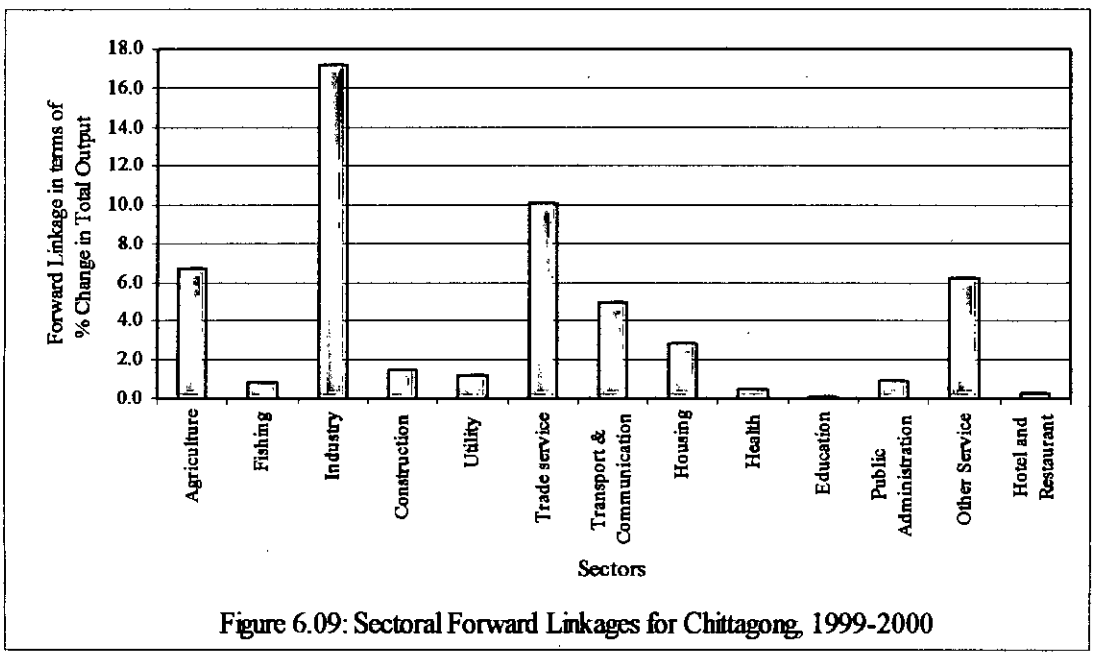

Figure 6.09: Sectoral Forward Linkages for Chittagong, 1999-2000

Chittagong Region:

The analysis of the results depicted in Table C.2b confirms that Chittagong's economic structure has a very strong forward linkage through industry and trade

service. Their isolation curtails almost 17 and 10 per cent of regional total production respectively (Figure 6.09). Agriculture and other service also maintain good forward linkage here. A perusal of the table shows that the isolation of each and every sector ultimately affects the industry and agriculture sector markedly. This implies the relative importance of the identified sectors in Chittagong's forward linkage structure.

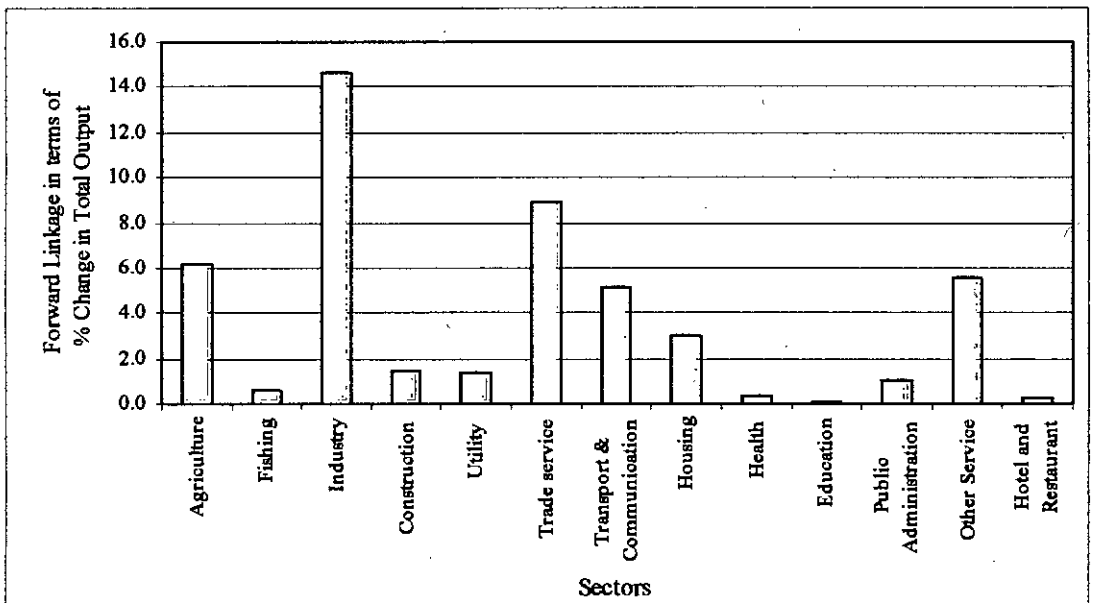

Figure 6.10: Sectoral Forward Linkages for Dhaka, 1999-2000

Dhaka Region:

While considering forward linkages, Table C.2c and Figure 6.10 depict a set of results for Dhaka that is similar to that of the Chittagong region. When industry and trade service are hypothetically extracted from the regional economy, the total output goes down by 14.654 and 8.913 per cent respectively. Transport and communication sector is included in the same system as one of the chief contributors along with agriculture and other services. But the isolation of industry sector generates the highest effect. At its isolation particularly the agriculture, construction, transport and communication, trade, housing and other services face a reduction in their output by almost 1.6 to 3 per cent. These results highlight marked significance

of industry sector showing its interactions with the other activity sectors in Dhaka's forward linkage structure.

Khulna Region:

Based on forward linkage effects (Figure 6.11 and Table C.2d), it can be affirmed that forward dependence of Khulna upon industry, trade service, other services and agriculture are bigger than on the rest of the economy.

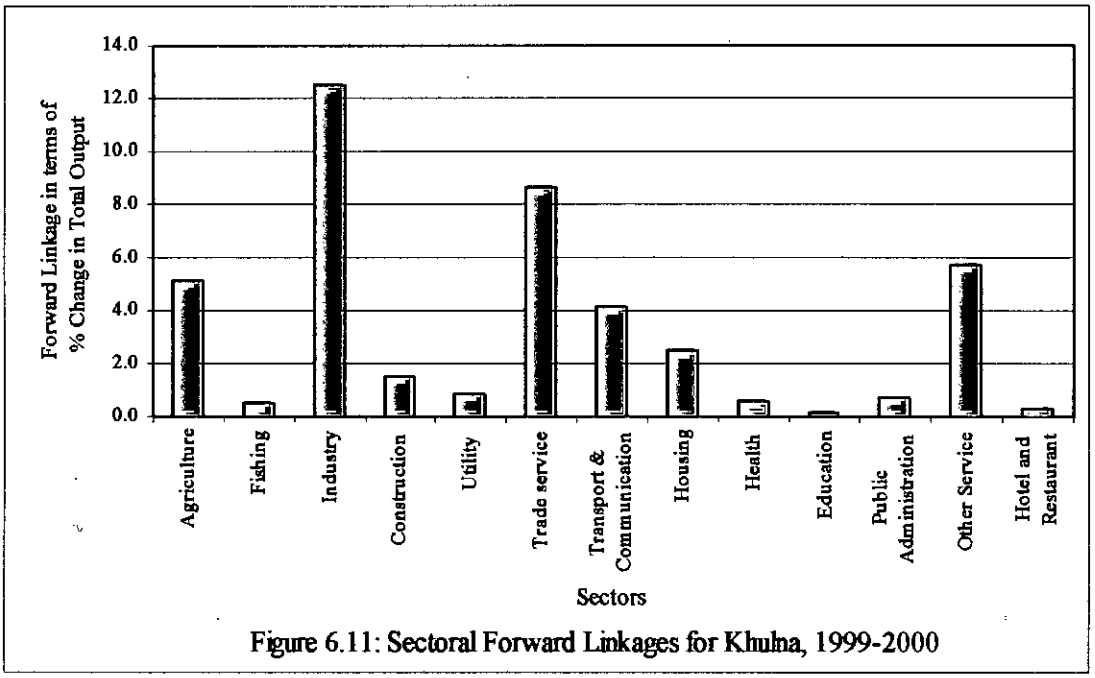

Figure 6.11: Sectoral Forward Linkages for Khulna, 1999-2000

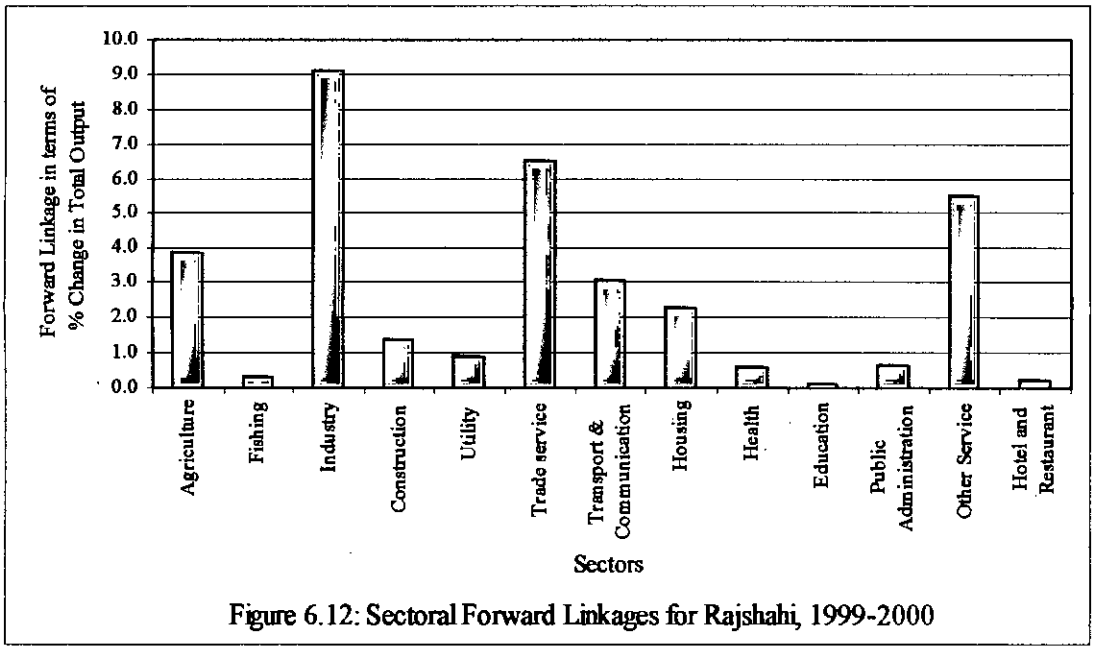

Figure 6.12: Sectoral Forward Linkages for Rajshahi, 1999-2000

Rajshahi Region:

The isolation of industry and trade service sectors curtails the total output of Rajshahi region almost by 9 and 7 per cent respectively (Figure 6.12 and Table C.2e). No other sectors individually can show such impacts over Rajshahi's forward linkage. These imply the dependence over the isolated sectors for the region's strong forward linkage structure.

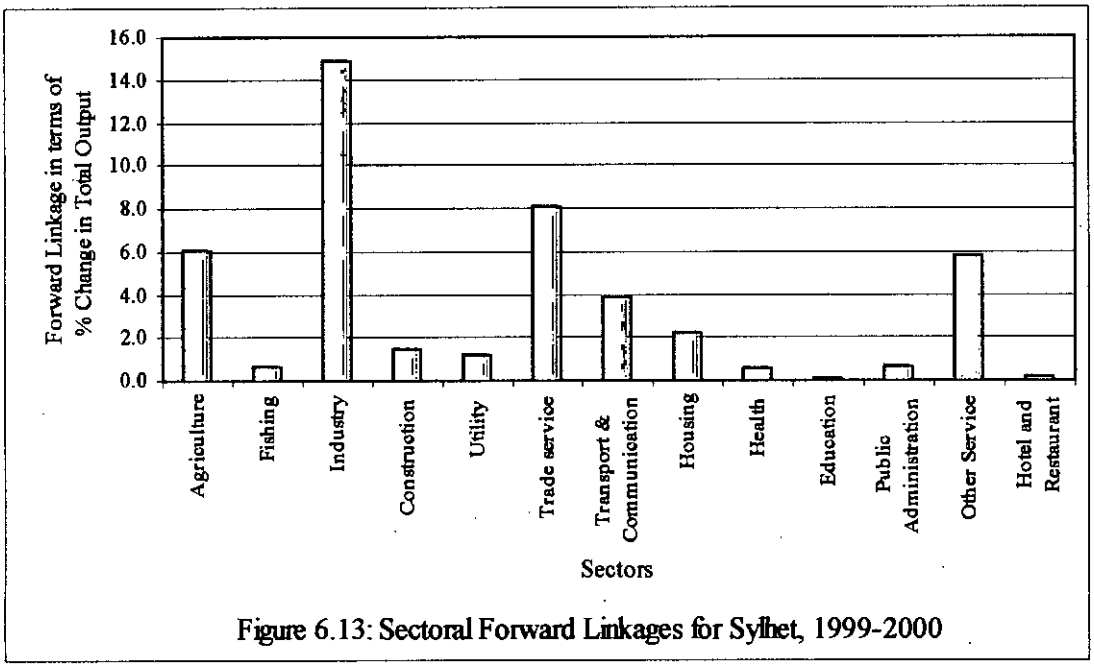

Figure 6.13: Sectoral Forward Linkages for Sylhet, 1999-2000

Sylhet Region:

Like Barisal, Chittagong, Khulna and Rajshahi, Sylhet region's forward linkage structure is basically industry and trade service biased. The other important contributors to the linkage structure are agriculture and other services (Figure 6.13 and Table C.2f).

To this end, it can be summarized that trading, transport and communication and other service industries work in harmony with the two key sectors in regional forward linkage system. Therefore, apart from key sectors, further systematic investment in these sectors may ultimately be useful to increase regional gross production. In addition, attention should be paid to those sectors which are important but exert minimum impacts in the economic system.

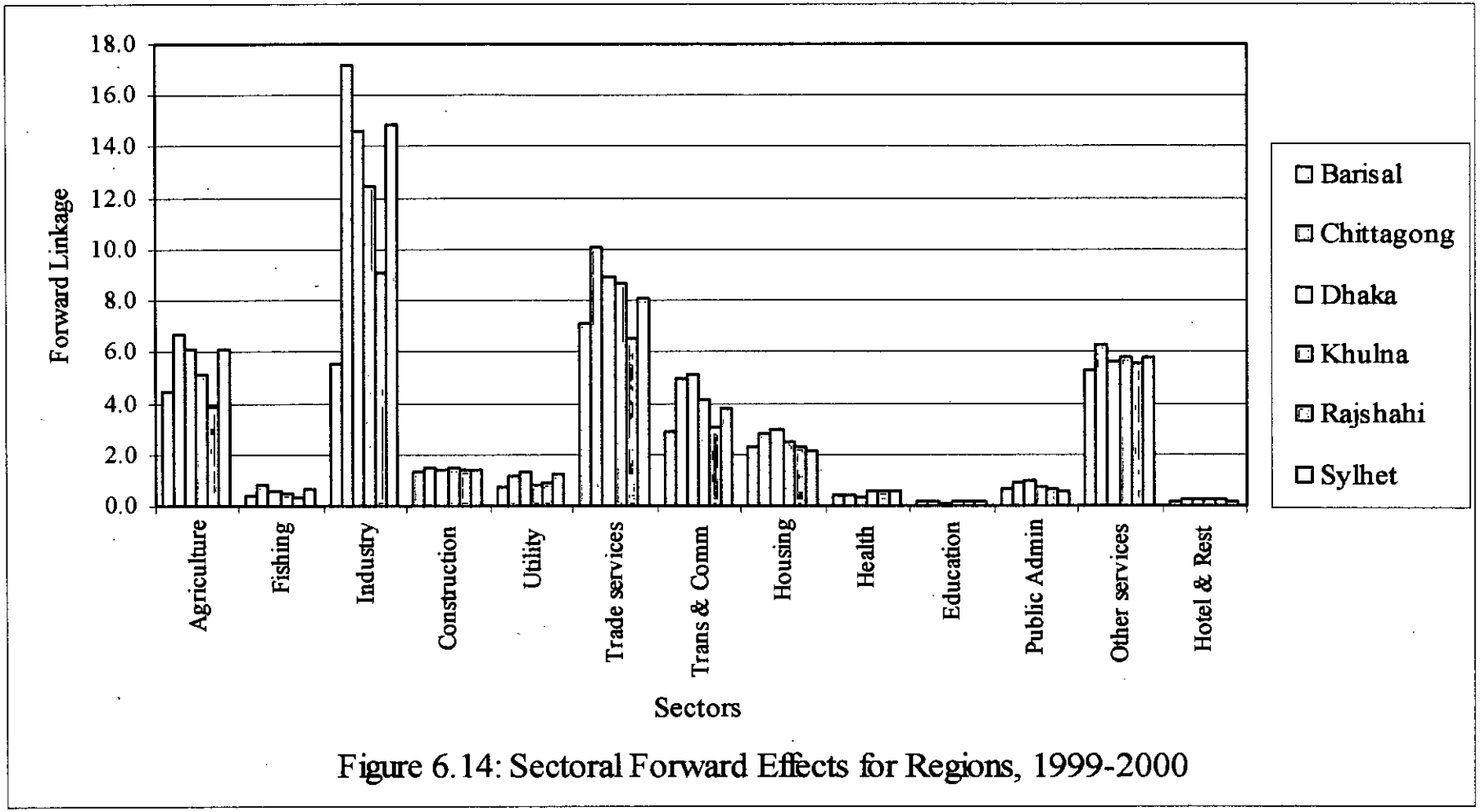

Figure 6.14: Sectoral Forward Effects for Regions, 1999-2000

Source: Based on extraction method

6.2.2 An inter-regional analysis

Figure 6.14 shows the variation of sectoral forward linkages in the regional context and highlights an important point. Though it is evident that irrespective of any region (either developed or under developed), their forward linkage structures are primarily industry, trade, other service and agriculture biased, but the system is the strongest for Chittagong region. Isolation of the mentioned sector exhibits largest effect in Chittagong. Next comes Dhaka.

But while considering the forward effects of transport and communication, housing, public administration and utility service, Dhaka secures the highest position. This implies that these services render better opportunity or harmonious linkages in Dhaka than the rest of the regions. This is very natural since being at the focus of every government interventions, these two regions enjoy consistent market size with extended capacity, availability of necessary inputs, comparative advantages arising from location etc.

Sectoral linkages for Khulna and Sylhet show that the sectors of these regions have greater than average impact upon national economy. The figure also reflects relatively poor forward linkage structure of Barisal and Rajshahi which needs immediate attention of policy makers.

CHAPTER 07

VISUALIZATION OF ECONOMIC STRUCTURE: A REGIONAL PERSPECTIVE

This section provides a comparative picture of economic landscape of six regions namely Barisal, Chittagong, Dhaka, Khulna, Rajshahi and Sylhet. The economic structures of these regions are portrayed in Figures 7.01, 7.02, 7.03, 7.04, 7.05 and 7.06. Using MPM technique the thirteen sectors of each region are rearranged in matrix format (see Appendix D) where rows represent the hierarchy of forward linkages while the column provides that of the backward linkages. The nature of hierarchies is such that the north-east quadrant provides the highest elevation and the landscape slopes gradually towards the west and south. The point to be noted is that ranking of row hierarchy of forward linkages and column hierarchy of backward linkages is the same as the hierarchy of forward and backward linkages in key sector analysis.

According to forward linkages, sector 3 (industry) maintains strong linkages in every regional economies as shown by the height of the intersection columns of the sector with all other sectors and such an understanding is complementary with the earlier findings. Among the other sectors, sector 1 (agriculture), 12 (other services) and 6 (trade service) enjoy comparative advantages in Barisal, Khulna and Rajshahi. Whereas, their situation is poor in Dhaka, Chittagong and Sylhet.

In terms of backward linkages, in each and every region sector 13 (hotel and restaurant) holds better linkages. From the rests of the industries, sector 2 (fishing) and sector 5 (utility) show their stronger position.

It is also viewed that the peak of the hierarchy is maintained by the intersection of sector 13 and sector 3 in Chittagong, Dhaka, Khulna and Sylhet region. In Barisal the similar attribute is maintained by the intersection of sector 13 and sector 1. Interestingly, in Rajshahi Division, the apex of the hierarchy is shared by the intersections of sector 13 and 1 and sector 13 and 3.

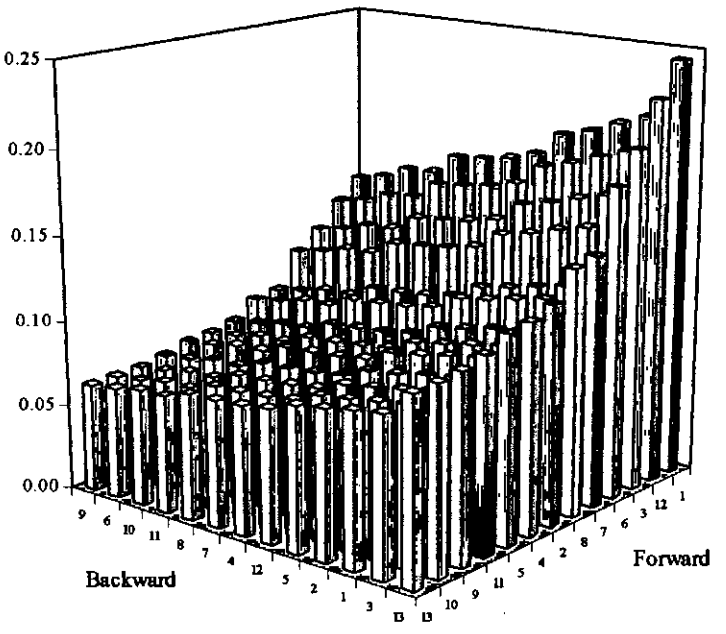

Figure 7.01: Economic Landscape for Barisal, 1999-2000

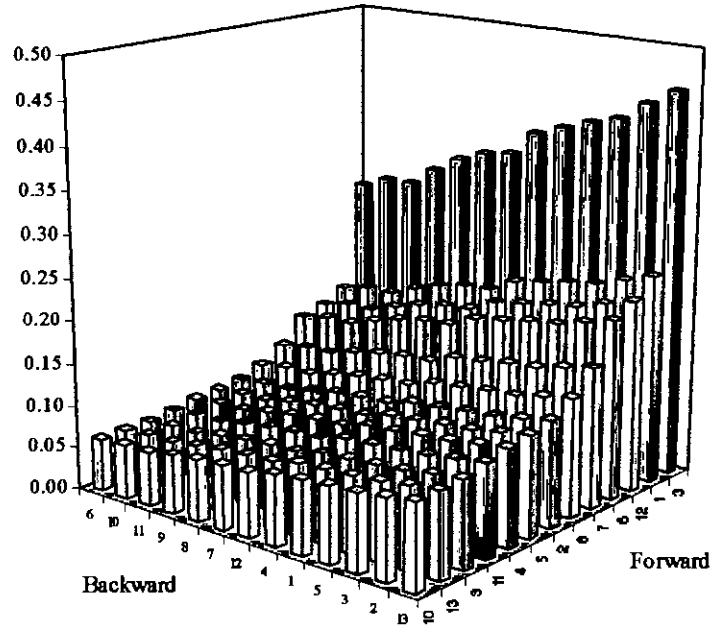

Figure 7.02: Economic Landscape for Chittagong, 1999-2000

Legend:
1 = Agriculture 2 = Fishing 3 = Industry 4 = Construction 5 = Utility
6 = Trade service 7 = Trans. & Comm. 8 = Housing 9 = Health 10 = Education
11 = Public Admin. 12 = Other service 13 = Hotel & Restaurant

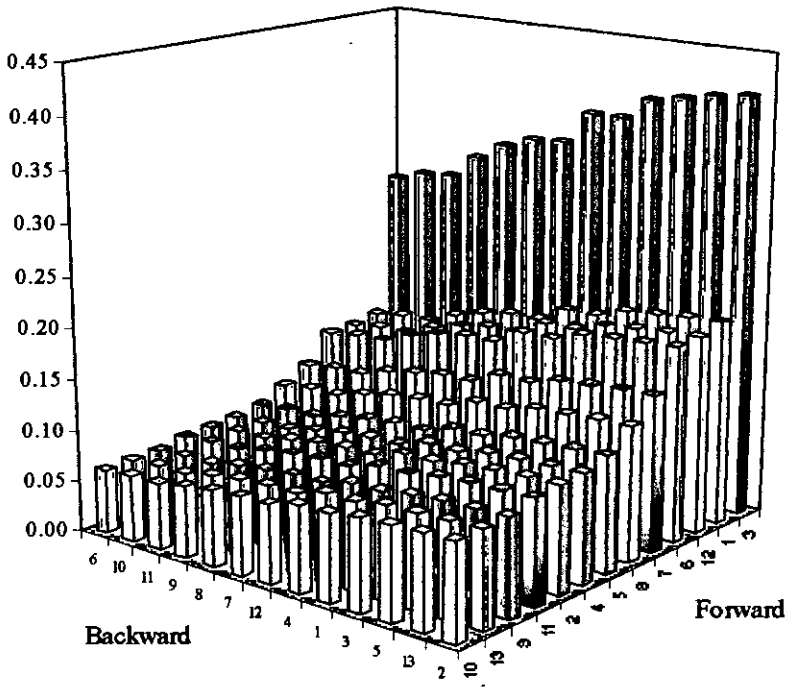

Figure 7.03: Economic Landscape for Dhaka, 1999-2000

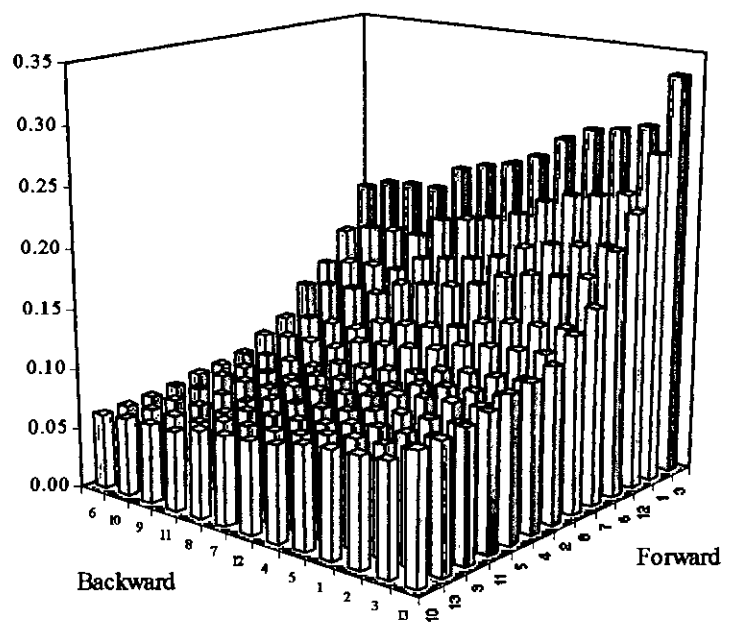

Figure 7.04: Economic Landscape for Khulna, 1999-2000

Legend:
1 = Agriculture 2 = Fishing 3 = Industry 4 = Construction 5 = Utility
6 = Trade service 7 = Trans. & Comm. 8 = Housing 9 = Health 10 = Education
11 = Public Admin. 12 = Other service 13 = Hotel & Restaurant

The overall view depicts that the slopes of the landscapes for Barisal, Khulna and Rajshahi are pretty gentle while the same details for Chittagong, Dhaka and Sylhet are quite skewed. These findings ultimately implies the following facts-

i. On an average, every sector performs with relatively poor linkages or interactions with each other in the considered economy of Barisal, Khulna and Rajshahi region. Here, the whole system lacks presence of at least one influential sector that can power regional growth.

ii. Contrastingly, industry as an economic sector shows greater significance in Chittagong, Dhaka and Sylhet to guide their development. In comparison, some other sectors like construction, trade, transport and communication and other services have failed to draw attention of the investors. Therefore, high elevation of intersection columns of industry with all other sectors become evident resulting an abrupt change in economic landscapes of the relevant regions.

iii. Again, in Barisal, Khulna and Rajshahi, the sectoral linkage coefficients being poorer than the developed regions, the interactions among the sectors themselves have not been proved a stimulating one to encourage the regional growth. For instance, the highest elevation of the landscape, as contributed by hotel and restaurant (as backward linkage sector) and industry (as forward linkage sector) is 0.452 and 0.411 for Chittagong and Dhaka respectively, where the same detail for Barisal and Rajshahi are 0.245 and 0.255.

These kinds of results, however, are stimulus to motivate the policy makers and planners to formulate and implement efficient regional policies, so that the investors change their investment decisions from their chartered path and participate in minimizing the regional imbalance.

IMPACT ANALYSIS

Though impact analysis is primarily used to assess the size of structural interdependence of regional economies as well as the degree in which the growth of a sector can contribute directly or indirectly in the enlargement of other sectors in the input-output model (Grčić *et al.*, n.d.), here the main aim of the exercise is to analyze the impact of investment decisions on basic economic sectors of different regions.

In order to facilitate the exercise with the use of regional input-output table, the differential effects of an increase in investment expenditures in different regions are considered. Here an increase is assumed in investment expenditures in every sector of a region. First, it is assumed that within a region the increase in investment expenditure takes place in agriculture sector (scenario 1), then in fishing industries (scenario 2) and so on (scenario 3 to 13). It should be noted that the extent of change in every region is the same. The following equations are used in this case:

$$\Delta X = (I - A)^{-1} \Delta Y_B^i$$

$$\Delta X = (I - A)^{-1} \Delta Y_C^i$$

$$\Delta X = (I - A)^{-1} \Delta Y_D^i$$

$$\Delta X = (I - A)^{-1} \Delta Y_K^i$$

$$\Delta X = (I - A)^{-1} \Delta Y_R^i$$

$$\Delta X = (I - A)^{-1} \Delta Y_S^i$$

where, $\Delta Y_B^i, \Delta Y_C^i, \Delta Y_D^i, \Delta Y_K^i, \Delta Y_R^i$ and ΔY_S^i represent changes in sectoral (economic sectors, i = 1, 2, 3, ...13) final demand in Barisal, Chittagong, Dhaka, Khulna, Rajshahi and Sylhet.

The results of impact analysis are arranged here in two ways. In the first case, impacts on sectoral outputs are viewed intra-regionally, which are presented in six figures (Figure 8.01, 8.02, 8.03, 8.04, 8.05 and 8.06). Sectoral breakdown of output

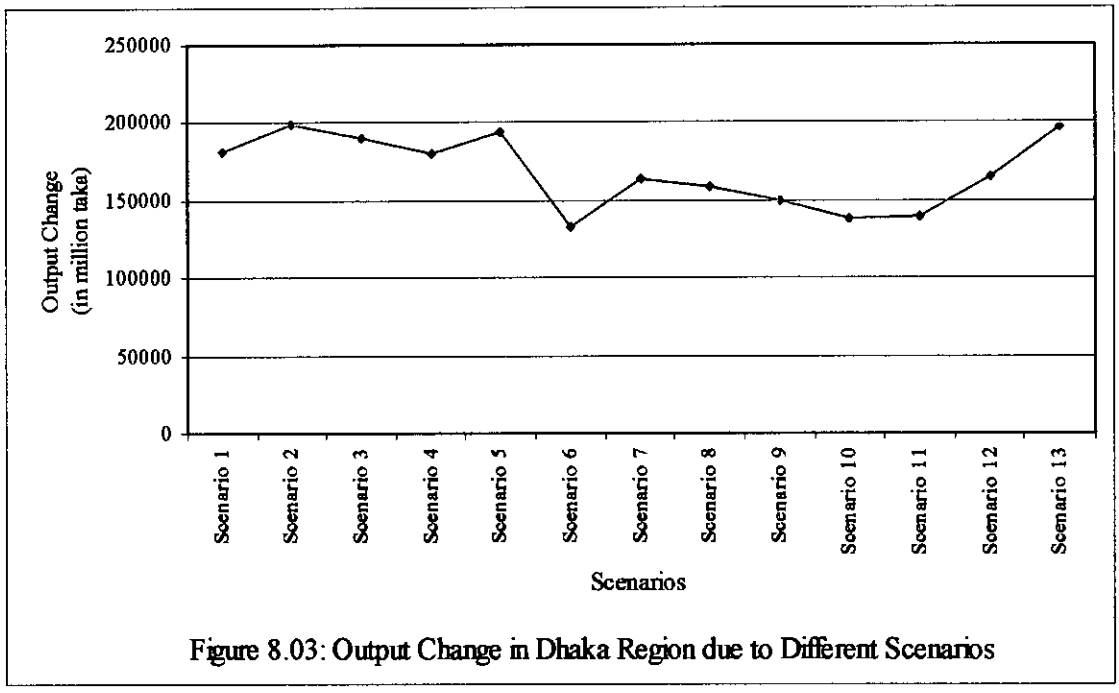

Figure 8.03: Output Change in Dhaka Region due to Different Scenarios

Source: Based on impact analysis

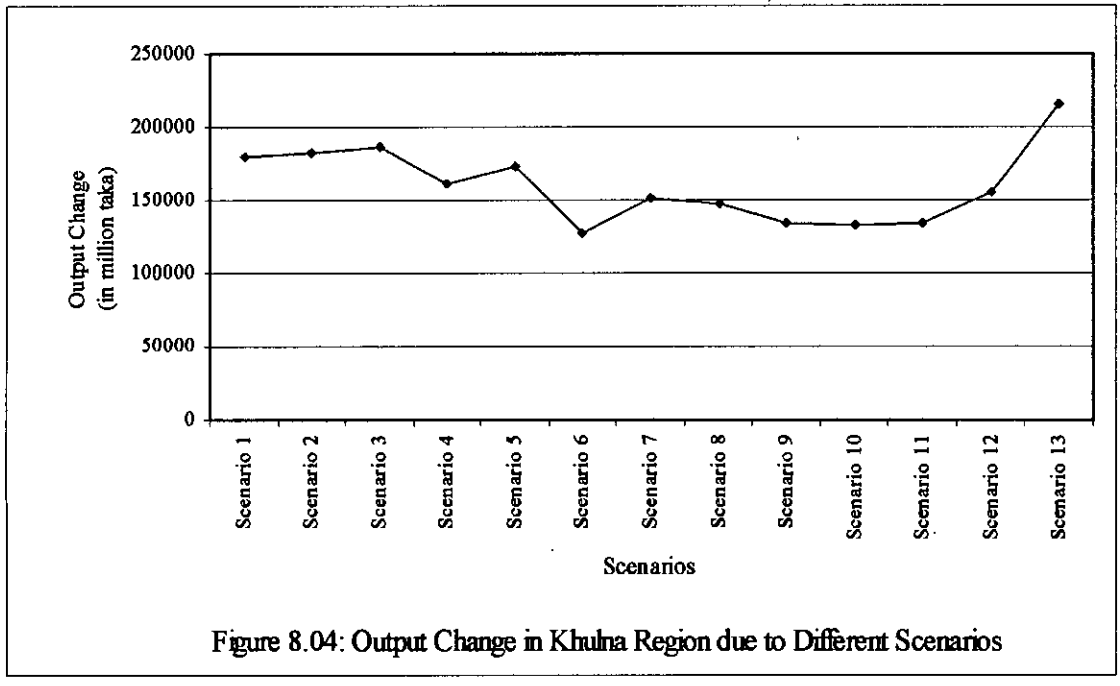

Figure 8.04: Output Change in Khulna Region due to Different Scenarios

Source: Based on impact analysis

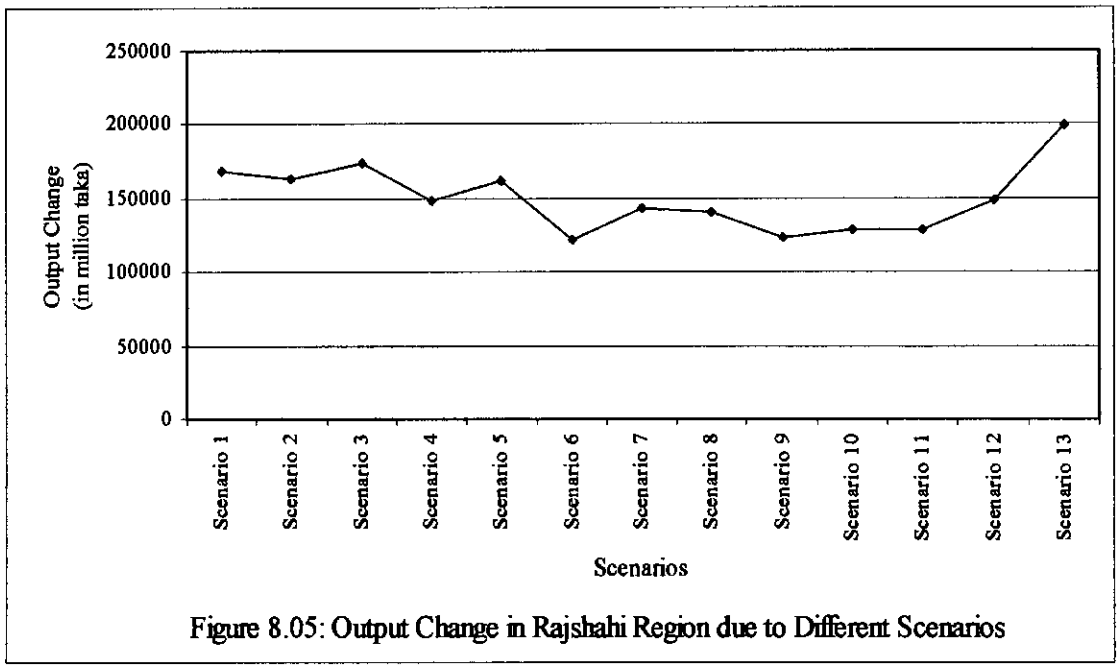

Figure 8.05: Output Change in Rajshahi Region due to Different Scenarios

Source: Based on impact analysis

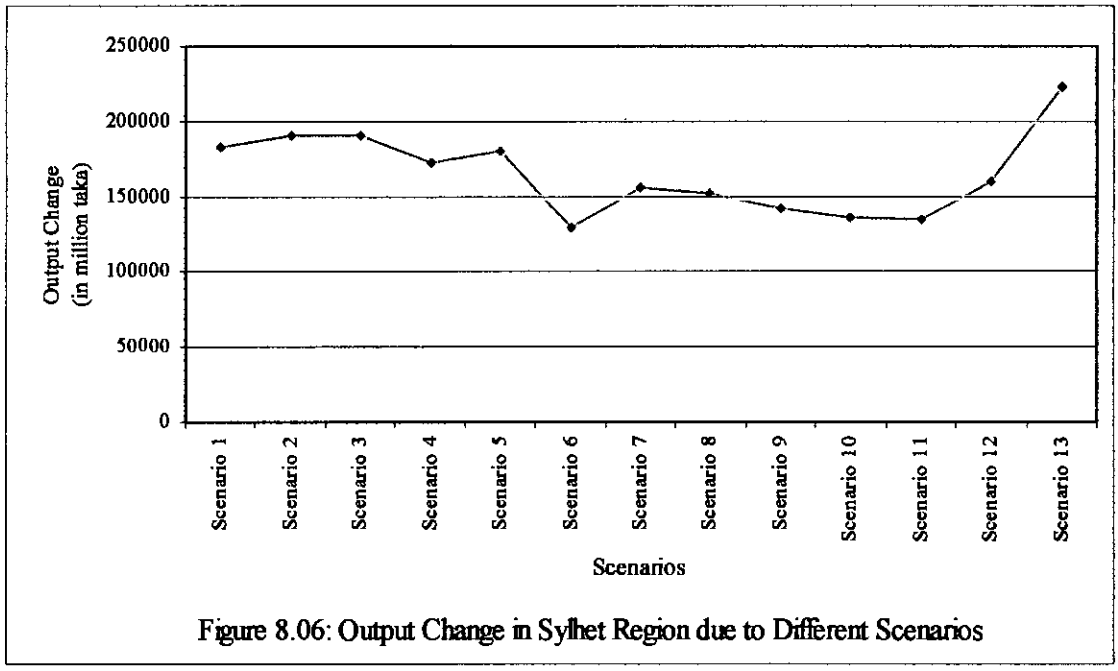

Figure 8.06: Output Change in Sylhet Region due to Different Scenarios

Source: Based on impact analysis

changes are available in Appendix E. The figures highlight that though there are variations among the impact on output due to various scenarios but the pattern is almost similar across the sectors in different regions. It is interesting to note that maximum output change occurs in every region due to an increase in exogenous final consumption in hotel and restaurant sector. The other sectors which generate larger impacts on regional outputs due to an increase in their final demand, include agriculture, fishing, industry and utility services. This is a reflection of the fact that the sectors of regions typically responded according to their output multipliers while the same amount of changes in the final consumption is made. But the point which requires careful attention is that whether such an increase is possible in the particular regional context.

Considering the importance and prospect of some particular sectors namely agriculture, fishing, industry and hotel and restaurant sector, the impacts generated by the increase in investment expenditure of these sectors are evaluated inter-regionally. Here also only one sector is disturbed at a time.

The results of such analysis are presented in Table 8.01 and Figures 8.07, 8.08, 8.09 and 8.10.

Table 8.01: Impact on Total Output in Regions due to Some Selected Scenarios

Scenarios	Barisal	Chittagong	Dhaka	Khulna	Rajshahi	Sylhet
Scenario 1	162270	190405	180899	180477	168254	183372
Scenario 2	157026	210844	198604	183539	162953	190888
Scenario 3	166950	200613	190693	187444	173210	190742
Scenario 13	194568	220500	196938	216170	199801	222990

Source: Based on impact analysis

The table reveals that noticeable output changes occur through increases in final consumption in agriculture (scenario 1), fishing (scenario 2), industry (scenario 3) and hotel and restaurant (scenario 13) sectors in different regions. It is also found

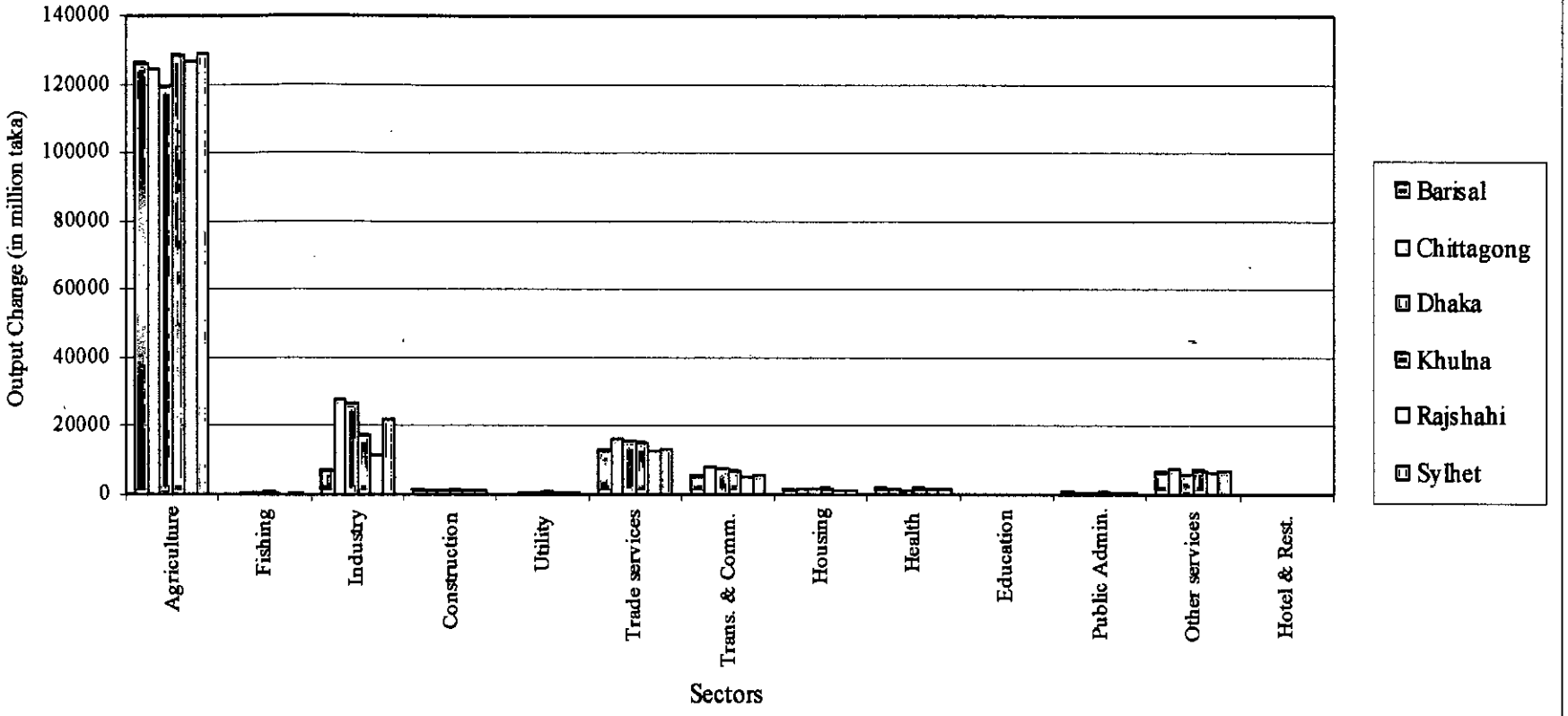

Figure 8.07: Impacts on Sectoral Outputs in Different Regions due to Scenario 1

Source: Based on impact analysis

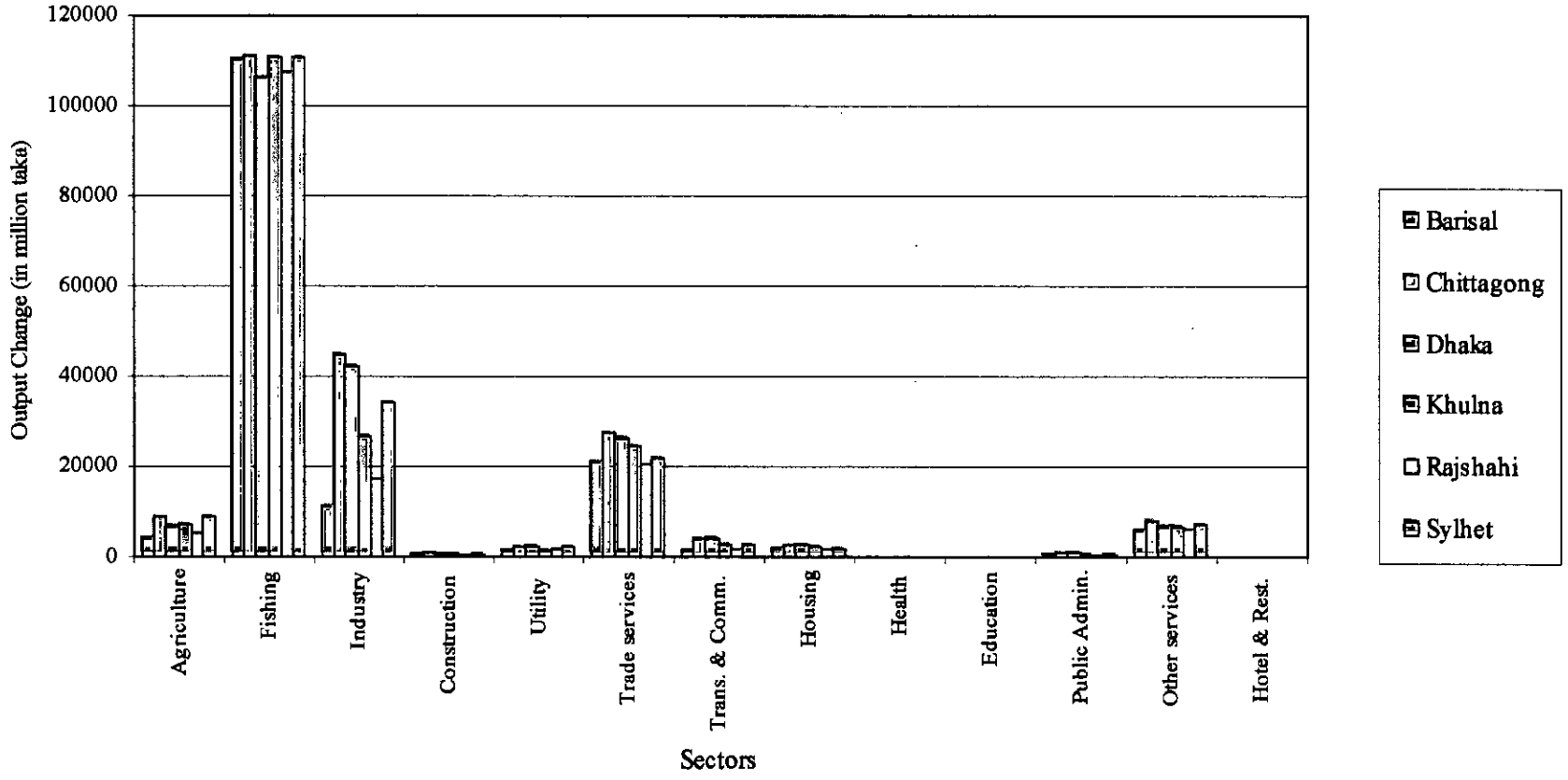

Figure 8.08: Impacts on Sectoral Outputs in Different Region due to Scenario 2

Source: Based on impact analysis

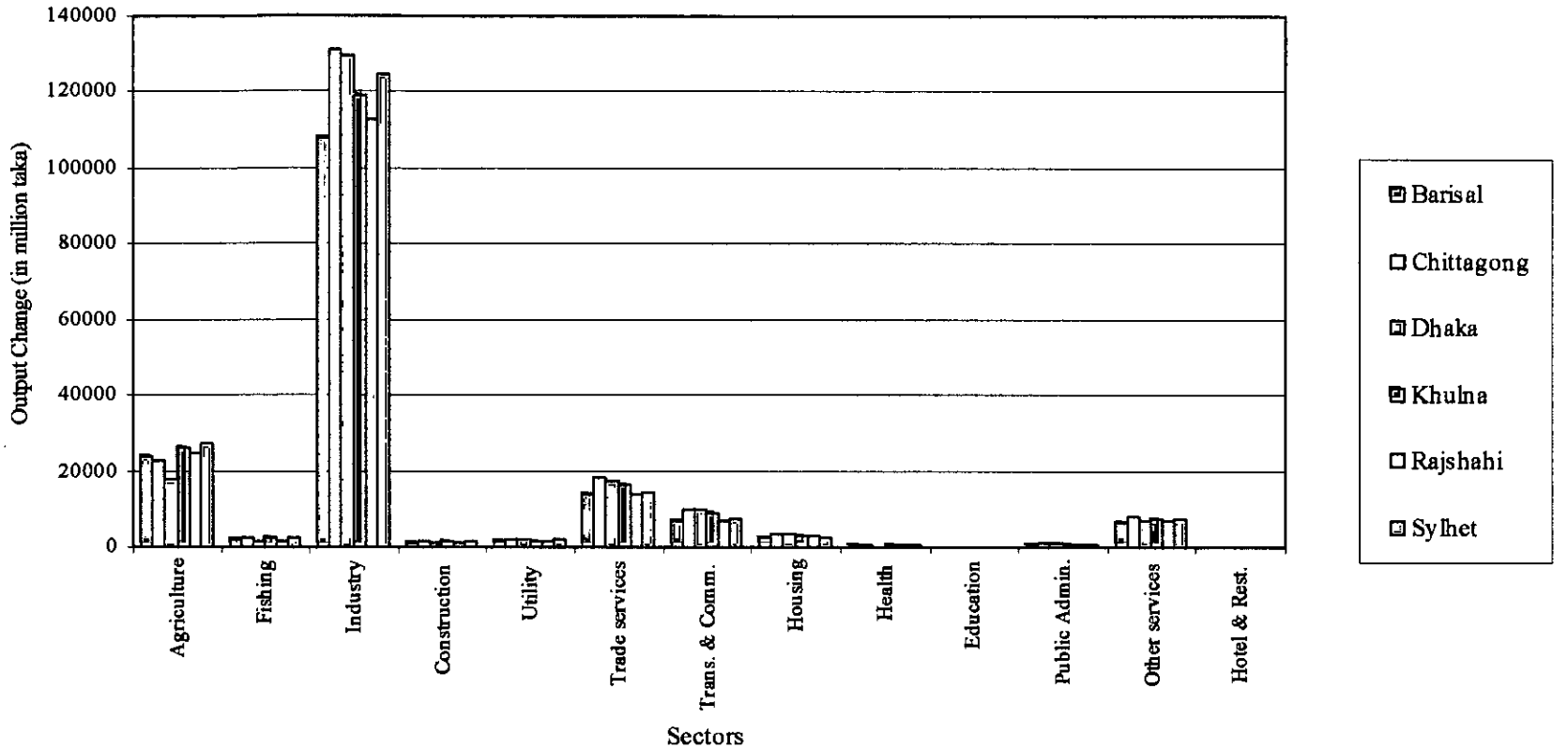

Figure 8.09: Impacts on Sectoral Outputs in Different Regions due to Scenario 3

Source: Based on impact analysis

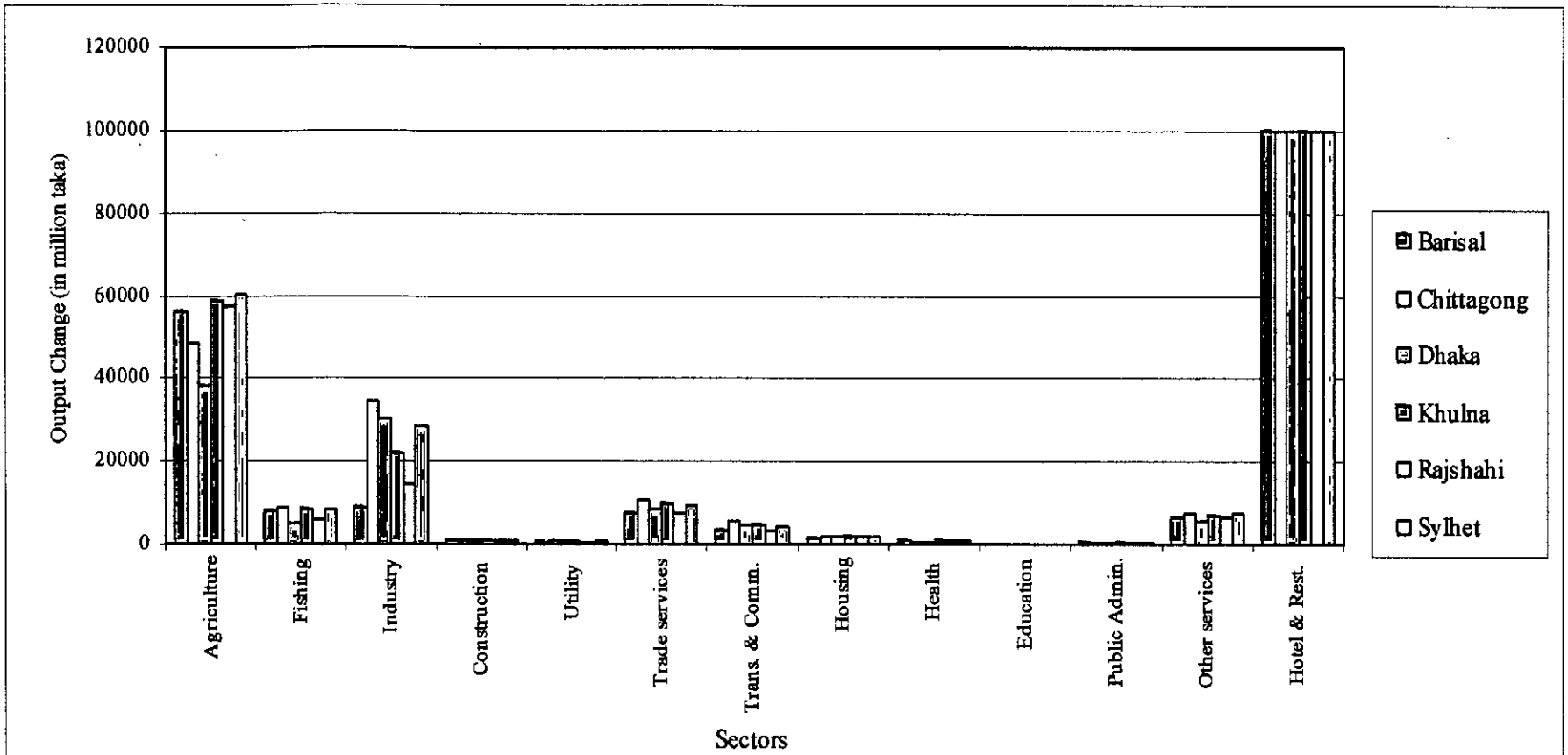

Figure 8.10: Impacts on Sectoral Outputs in Different Regions due to Scenario 13

Source: Based on impact analysis

that such impacts vary significantly between two sets of regions. The impacts of increases in the mentioned sectors' final consumption in Chittagong, Dhaka and Sylhet on total outputs are larger than the impacts of increases in the sectors' final consumption in Barisal, Khulna and Rajshahi. But there are variations on sectoral outputs when these scenarios come into affect. As for example, in case of scenario 1 (see Figure 8.07), maximum change in agriculture output is noticed for Sylhet while the minimum is observed for Dhaka. It implies that the contribution of agriculture is the minimum in the growth of Dhaka than the rest of the regions. This finding is also supported by the share of agriculture sector in the regional GDP (Appendix A, Table A.3). Since the same scenario affects industry sector, larger impact is noticed for developed regions. The same approach as depicted in the remaining figures (Figures 8.08, 8.09 and 8.10) provide the same scenario of regional imbalance.

CHAPTER 09

IMPLICATIONS OF THE STUDY RESULTS FOR POLICY MAKING

Development of a country largely depends on efficient policy formulation and their implementation. These policies ideally incorporate a sectoral as well as a spatial dimension. Unfortunately, in Bangladesh, national development planning approach is very much concerned with its economic sectors almost excluding their space relations. A general idea is that the economic activities combined in certain ways, as suggested by the policy makers, will yield growth in national accounts. Regional distribution of resources and activities and their capacity to enhance a balanced growth is almost ignored in every step of planning.

Variation in regional production is a common and expected phenomenon. Such differences stem from differences in natural endowments, sectoral linkages and other market forces that exist among the regions. But policy intervention becomes essential when such differences hinder regional as well as national growth.

"Regional economies are very open and interact quite strongly with each other. Variations in the levels of development across regions, therefore, are the major determinants of growth over space. Although regions are dependent on each other for the provision of goods and services, economically advanced regions gain in balance because of their capacity to meet the diverse needs arising not only from within their own economies but also from the economies of the less developed regions. Consequently, economic gaps among regions may continue to widen unless measures are taken to strengthen the economic base of the less developed regions" (Jahan, 1987).

Under such a predicament, the present study follows a comprehensive approach to explore the extent of variations in regional economies with the help of input-output table. Though input-output method is unable to estimate the substantial effects on economic development of the region that may be caused due to the changes in economic structures, it provides useful information about the sectoral multipliers,

backward and forward linkages and economic landscape. It also facilitates the impact assessment of investment decisions over the basic economic sectors. The Python I-O module has performed all these tasks for the six regions of Bangladesh and unveiled the present scenario of regional imbalance in the face of the respective economic systems of the regions.

9.1 Key Findings and Level of Regional Disparity

Regional disparity originates from and can be viewed through a number of crucial factors. One of such factors may be the sectoral linkages that determine the pattern and the type of an economic system. These linkages can be of two types- backward linkage and forward linkage. "Backward linkages measure the degree of dependence of industrial sectors on the supply of inputs from the other sectors while forward linkages relate to interdependence secured through the sale of one industry's output to others as inputs. The policy significance of identifying the key or most important backward and forward linkages is that policy makers can determine the impact flowing from the stimulation of a key sector on other sectors of the economy" (Zhang and Felmingham, 2002).

These linkage patterns determine the impact exerted over an economy. The higher the linkage factors, the greater are the impacts. Therefore, developed regions are able to take advantage of stronger inter-relationships among their economic sectors with higher linkage coefficient value.

In the present study agriculture and industry have been identified as key sectors in every region. But there are variations in their linkage values. In terms of multiplier effects, industry as key sector has a greater potential than the agriculture sector. Again impact of industries varies with flow direction (forward and backward) and regions. In case of backward linkage, industry sector shows strong interactive relation in Khulna (1.1687). However, the relation is comparatively weak in Dhaka (1.1321). Whereas in forward direction the same sector maintains better linkage in Dhaka with highest linkage coefficient value - 2.6878 (see Table 5.03) and poor

interaction with the remaining sectors in Barisal (1.3327). Agricultural industries as well as the other sectors show such kinds of regional variations. However, the study shows, in terms of backward linkage effect, the developed region (i.e. Dhaka and Chittagong) is basically industry dependant while the weaker regions are agriculture based. This finding is also supported by the empirical results of extraction method.

Sectoral linkages are again more clearly viewed through economic landscapes of the regions. Figures 7.01, 7.02, 7.03, 7.04, 7.05 and 7.06 depict a very crude truth. They clearly portray that in less developed regions, there is no such activities which can motivate regional growth. On the other hand, stimulating presence of industry sector indicates its role to foster development in developed regions.

The similar disparity is also revealed through identification of output multipliers. The importance of output multiplier determination lies in the fact that when the increase of national output is the major concern, then investment should be concentrated on that regional sector which has the highest magnitude of multipliers. The study identifies that Dhaka and Chittagong (have the highest GDP per capita) enjoy the largest value of output multipliers almost for every basic economic sector including industry, utility, construction, transportation and communication etc. Whereas the other regions, particularly Barisal and Khulna are in quite backward position. This indicates towards a fact that investment will always be directed towards Dhaka and Chittagong with the highest possible return, giving rise to an extreme polarization effect.

9.2 Recommendation

To restrict such aggravation, it is high time to formulate an efficient regional policy ensuring its effective implementation. To this end, the present study can act as a source of baseline information with some policy suggestions. For instance, the study not only identifies key sectors but also explores the highly potential backward and forward linkage industries which can generate larger impact to the concerned

regional economy. In the light of such findings, some broad policies are recommended for the six regions of Bangladesh.

Barisal Region

The two key industries namely agriculture and industry sectors contribute around 33 per cent to Barisal's GDP. Apart from these two sectors, it can be rightly said that another important sector namely fishing may truly capture the locational advantages of the region. Because this sector is serving as a key backward linkage industry and already contributes around 11 per cent to regional GDP. It has the highest forward linkage value in the regional context with higher value of output multiplier. Therefore, any intervention to increase the production of fishing sector may have significant impact upon the economic growth of the region.

A significant advantage of Barisal region is that in the regional context it has the highest value of forward linkage multiplier with reasonable dependence in backward direction for several sectors namely construction, utility, housing, health, education, public administration, other services and hotel and restaurant sector. Hence, efficient investment to improve the output quality and quantity of these sectors, marketing facilities may foster the development of the region.

Chittagong and Dhaka Region

Chittagong region comprises those parts of the country which include the one and only seaport of the country, the largest river port, important tourist spots etc. whereas Dhaka Division is situated at the centre of the country, includes the Capital City and eventually is at the focus of all government decision. These two regions enjoy locational advantages as well as better economic opportunities. The influence of industry sector in the regional development is marked here. Other economic sectors have good forward and backward dependence on the rest of the sectors of the regions.

Since these two regions are quite developed in the national context, further investment to improve their forward linkage system may denude the remaining parts

of the country. Rather efforts should be made to intervene in the backward linkage structures of these regions in such a way that can help to expand the production of the economic sectors of the four other regions namely Barisal, Khulna, Rajshahi and Sylhet.

Hotel and restaurant sector of Dhaka and Chittagong should get priority as a supporting facility encouraging tourism in these regions especially in Chittagong.

Khulna Region

Though per capita GDP of Khulna is close to that of Chittagong, but the basic difference between these two regions lies in the fact that the economic structure of Khulna is agriculture based (agriculture sector contributes about one-fourth of the regional GDP) whereas industrialization is predominant in Chittagong. In this regard, agro-based industry should be encouraged to capture the high potentials of Khulna's agriculture sector. Such an effort may also be helpful to improve its industrial structure in forward direction.

At the same time interventions should be made to improve the production structure of transport and communication, trade and other service sectors.

Rajshahi Region

Some interesting features of Rajshahi region draw attention while the sectoral shares to its GDP are observed. The figures reveal that the share of agriculture sector to the regional GDP is larger than any other sector which is, in fact, the highest in comparison to the contribution of the same sector in the remaining economies. The contribution of trade and other services, construction and even housing sector exceeds the same of the industry sector, which highlights the uniqueness of Rajshahi region.

But as the output multiplier and both backward and forward linkage co-efficient of industry sector suggest about its high potentials, then it would be better to encourage establishment of agro-based industries, fruit-processing factories (as Rajshahi is

well-known for various fruits) in the region. Such initiative along with careful attention will directly and indirectly influence the growth of construction, utility, trade, transport and communication and other services sectors both in backward and forward direction.

Sylhet Region

Considering the sectoral contribution to regional GDP, output multiplier, backward and forward linkage, the future investment should consider the following list and set the priority accordingly-

- Agriculture
- Industry
- Other services
- Trade services
- Transport and communication
- Construction
- Fishing
- Utility
- Hotel and restaurant
- Housing
- Health
- Education
- Public administration

In conclusion, it should be mentioned that the recommendations are provided based on the analysis of secondary data which may contradict with the practical solution. To avoid such ambiguity it is suggested that prior to the implementation of the stated recommendation, systematic surveys, rational diagnosis of regional potentials with the consideration of comparative advantages should be efficiently carried out.

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Appendices

APPENDIX A

DATA

The data used for this study came mainly from two sources. These are-

a. The census reports published by Bangladesh Bureau of Statistics (BBS)
b. The input-output table for Bangladesh economy, 1999-2000, prepared for Sustainable Human Development Project, General Economic Division (GED), Planning Commission (PC) and BBS, Government of Bangladesh (GoB).

The Input-Output Table for Bangladesh

The input-output table for Bangladesh economy (see Table A.1) contains 45 sectors. To facilitate the study these sectors are aggregated into 13 major sectors (Table A.2). The aggregated sectors are listed below-

Code of Aggregated Sectors	Sectors used in the Study	Sectors used in the National Input-Output Table		
1	Agriculture	a. Paddy	b. Grains	c. Jute
		d. Commercials	e. Tea	f. Other crops
		g. Livestock	h. Poultry	i. Forestry
2	Fishing	a. Other fish		
3	Industry	a. Rice milling	b. Ata and flour mill	c. Other food
		d. Tea product	e. Leather products	f. Jute textile
		g. Yarn	h. Mill cloth	i. Clothing
		j. Ready Made Garments	k. Tobacco products	l.Wood products

		m. Printing and publishing	n. Chemical	o. Fertilizer
		p. Petroleum products	q. Clay products	r. Cement
		s. Iron and steel basic	t. Machinery	u. Miscellaneous industry
4	Construction	a. Urban building	b. Rural building	c. Construction
5	Utility	a. Utility		
6	Trade Services	a. Trade services		
7	Transport and Communication	a. Transport services b. Communications		
8	Housing	a. Housing		
9	Health	a. Health		
10	Education	a. Education		
11	Public Administration	a. Public administration		
12	Other Services	a. Other services b. Information technology and services		
13	Hotel and Restaurant	a. Hotel and restaurant		

Table A.1: Input-Output Table for Bangladesh Economy, 1999-2000

(at market price) (in million Taka)

Sectors	Paddy	Grains	Jute	Commercial	Tea	Other Crops	Livestock	Poultry
Paddy	28131.400000	0.000000	0.000000	0.000000	0.000000	0.000000	20577.500000	389.020000
Grains	0.000000	4304.300000	0.000000	0.000000	0.000000	0.000000	4449.780000	1515.530000
Jute	0.000000	0.000000	2204.700000	0.000000	0.000000	0.000000	0.000000	0.000000
Commercial	0.000000	0.000000	0.000000	20055.015000	0.000000	0.000000	6451.680000	4890.270000
Tea	0.000000	0.000000	0.000000	0.000000	228.576000	0.000000	0.000000	0.000000
Other Crops	0.000000	0.000000	0.000000	0.000000	0.000000	3783.970000	8336.830000	0.000000
Livestock	25993.040000	4197.403000	2884.444000	13729.200000	0.000000	2421.550000	58.682100	0.000000
Poultry	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	3189.010800
Other Fish	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	350.837000
Forestry	0.000000	0.000000	0.000000	1577.660000	51.274900	0.000000	0.000000	0.000000
Rice Milling	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	1565.570000	4237.800000
Ata & Flour Mill	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	4797.230000	7358.450000
Other Food	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	6001.180000	168.789000
Tea Product	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Leather Products 45	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Jute Textile	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	26.051500	5.171320
Yarn	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Mill Cloth	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Clothing	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Ready Made Garments	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Tobacco Products	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Wood Products	1890.370000	367.019000	397.048000	1354.100000	80.869600	140.379000	0.000000	8.055230
Printing & Publishing	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Chemical	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	1240.560000	1026.070000
Fertiliser	28968.100000	3404.100000	2068.690000	11367.100000	566.308000	1297.970000	2.421660	0.000000
Petroleum Products	4271.570000	740.213000	538.313000	2757.180000	109.159000	334.785000	0.000000	0.787601
Clay Products	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	199.169000	0.000000
Cement	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Iron & Steel Basic	0.000000	0.000000	0.000000	0.000000	48.372500	0.000000	386.813000	76.783900
Machinery	13285.100000	1136.080000	49.567900	4428.470000	242.469000	526.391000	1329.210000	181.969000
Miscellaneous Industry	0.000000	0.000000	0.000000	23.989400	46.780300	152.358000	578.124000	114.760000

Table A.1: Input-Output Table for Bangladesh Economy, 1999-2000 (continued)

Sectors	Paddy	Grains	Jute	Commercial	Tea	Other Crops	Livestock	Poultry
Urban Building	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Rural Building	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Construction	2348.470000	388.021000	493.267000	1767.640000	0.000000	267.231000	0.000000	0.000000
Utility	159.123000	30.894100	33.421700	214.553000	4.574630	14.566700	66.511300	13.202800
Trade Services	19215.779197	2018.343916	3870.916475	29645.887613	107.356346	3218.626739	7196.134000	8068.830000
Transport Services	14192.070803	2888.100084	2950.122525	14824.942387	412.596654	2094.999261	0.000000	0.000000
Housing	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	1251.310000	248.391000
Health	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	9998.880000	784.807000
Education	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Public Administration	98.740100	193.595000	20.739100	903.313000	28.386800	103.705000	330.176000	65.541400
Other Services	5873.650000	1232.680000	1233.680000	5118.350000	212.880000	588.120000	5455.060000	713.985000
Hotel & Restaurant	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Communications	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Info Tech & Service	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Input Use	**144427.413100**	**20900.749100**	**16744.909700**	**107767.400400**	**2139.603730**	**14944.651700**	**30298.872560**	**33408.061051**
Indirect Tax	**0.000000**	**0.000000**	**0.000000**	**4.300000**	**0.000000**	**0.000000**	**0.000000**	**0.000000**
Labour	**55795.600000**	**6627.400000**	**7856.550000**	**36488.400000**	**612.778000**	**4501.740000**	**3560.790000**	**3329.120000**
Male low skilled	48507.315873	5761.697790	6830.290426	31722.113294	532.734051	3913.701513	3095.662835	2894.254662
Male high skilled	3900.885240	463.347053	549.281663	2551.044545	42.841670	314.733978	248.948540	232.751598
Female low skilled	2868.241262	340.689627	403.875590	1875.730962	31.500605	231.417467	183.046778	171.137497
Female high skilled	519.157625	61.665530	73.102321	339.511199	5.701675	41.887042	33.131847	30.976242
Land	**76365.100000**	**8364.650000**	**7951.330000**	**45430.100000**	**933.645000**	**9136.910000**	**8146.250000**	**7273.070000**
Capital	**0.000000**	**10.000000**	**0.000000**	**0.000000**	**0.000000**	**0.000000**	**0.000000**	**0.000000**
Value Added	**132160.700000**	**14992.050000**	**15807.880000**	**81922.800000**	**1546.423000**	**13638.650000**	**11707.040000**	**10602.190000**
Duty	0.000000	1062.120000	0.000000	2349.694730	0.000000	636.212000	2135.479030	17.777150
Import	0.000000	5906.980000	0.000000	36695.310000	0.000000	5157.461000	8594.029000	373.510300
Imports	0.000000	6969.100000	0.000000	39045.004730	0.000000	5793.673000	10729.508030	391.287450
Total Primary Input	**132160.700000**	**21961.150000**	**15807.880000**	**120967.804730**	**1546.423000**	**19432.323000**	**22436.548030**	**10993.477450**
Total Supply	**276588.113100**	**42861.899100**	**32552.789700**	**228735.205130**	**3686.026730**	**34376.974700**	**102735.420590**	**44401.538501**

Source: PC, 2000

Table A.1: Input-Output Table for Bangladesh Economy, 1999-2000

Sectors	Other Fish	Forestry	Rice Milling	Ata & Flour Mill	Other Food	Tea Product	Leather Products	Jute Textile
Paddy	0.000000	0.000000	265766.000000	0.000000	1562.720000	0.000000	0.000000	0.000000
Grains	0.000000	0.000000	0.000000	33649.200000	0.000000	0.000000	0.000000	0.000000
Jute	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	8945.880000
Commercial	0.000000	0.000000	0.000000	0.000000	39903.700000	0.000000	0.000000	0.000000
Tea	0.000000	0.000000	0.000000	0.000000	0.000000	1952.500000	0.000000	0.000000
Other Crops	0.000000	0.000000	0.000000	0.000000	2575.856000	0.000000	0.000000	0.000000
Livestock	0.000000	0.000000	0.000000	0.000000	8989.590000	0.000000	12011.600000	0.000000
Poultry	0.000000	0.000000	0.000000	0.000000	1822.909000	0.000000	0.000000	0.000000
Other Fish	14800.300000	0.000000	0.000000	0.000000	44009.200000	0.000000	0.000000	0.000000
Forestry	1608.670000	3571.360000	0.000000	0.000000	1052.260000	0.000000	0.000000	0.000000
Rice Milling	1810.110000	0.000000	25.734500	0.000000	0.000000	0.000000	0.000000	0.000000
Ata & Flour Mill	9463.380000	0.000000	0.000000	117.658000	1352.390000	0.000000	0.000000	1951.510000
Other Food	5693.040000	0.000000	0.000000	0.000000	27047.300000	0.000000	266.857000	342.420000
Tea Product	0.000000	0.000000	0.000000	0.000000	0.000000	423.847000	0.000000	0.000000
Leather Products 45	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	20374.200000	0.000000
Jute Textile	28.265100	515.835000	87.615500	13.072800	0.000000	0.000000	10.544400	4826.850000
Yarn	7861.040000	0.000000	0.000000	0.000000	0.000000	0.000000	1458.660000	1237.320000
Mill Cloth	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	182.493000	116.961000
Clothing	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	977.767000
Ready Made Garments	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Tobacco Products	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Wood Products	842.525000	0.000000	2826.410000	123.276000	2334.310000	106.201000	317.051000	0.000000
Printing & Publishing	0.000000	0.000000	496.109000	74.022700	304.295000	9.299930	90.836100	73.224400
Chemical	3402.270000	1337.140000	5597.410000	298.076000	1802.489000	62.335000	1074.313000	266.246000
Fertiliser	862.134000	928.094000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Petroleum Products	4677.970000	1267.170000	4734.970000	1134.660000	2993.580000	80.691400	578.066000	359.723000
Clay Products	0.000000	0.000000	0.000000	0.000000	335.760000	0.000000	0.000000	0.000000
Cement	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Iron & Steel Basic	572.292000	3369.200000	1526.000000	227.690000	1075.230000	35.757600	804.915000	531.803000
Machinery	7623.330000	2927.690000	3646.580000	791.409000	1958.320000	124.287000	716.509000	815.494000
Miscellaneous Industry	1512.730000	1520.540000	2213.660000	330.292000	1572.780000	46.107400	446.556000	263.759000

Table A.1: Input-Output Table for Bangladesh Economy, 1999-2000

Sectors	Other Fish	Forestry	Rice Milling	Ata & Flour Mill	Other Food	Tea Product	Leather Products	Jute Textile
Urban Building	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Rural Building	0.000000	0.000000	1392.960000	207.839000	1004.680000	0.237383	328.441000	161.630000
Construction	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Utility	2175.320000	0.000000	244.362000	77.499800	2855.710000	67.786600	508.702000	53.251500
Trade Services	30860.200000	13125.200000	54759.019584	7228.242402	31681.048653	780.378704	10563.026515	2812.708631
Transport Services	0.000000	0.000000	25380.620416	2153.978598	16874.921347	503.642296	4942.821485	2780.065369
Housing	505.529000	0.000000	4769.750000	547.444000	3622.860000	114.631000	940.471000	902.567000
Health	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Education	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Public Administration	358.232000	237.261000	1343.270000	200.425000	911.853000	2.797850	258.072000	183.578000
Other Services	4856.560000	4779.890000	13051.100000	1169.080000	4138.960000	123.222000	1063.990000	684.001000
Hotel & Restaurant	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Communications	0.000000	0.000000	1.730400	0.025819	0.733407	0.016219	0.299202	0.146386
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Male low skilled	17201.912271	6248.493034	17002.083756	3318.023010	16047.018361	382.396812	3165.730503	7422.859863
Male high skilled	1039.015130	3720.759634	3828.178567	747.083990	3613.136639	86.100228	2428.168297	1610.306037
Female low skilled	216.272599	662.447331	4040.877343	212.331417	1026.902506	63.401758	79.912840	84.009857
Female high skilled	0.000000	0.000000	30.860335	1.621583	7.842494	0.484202	34.248360	7.234243
Land	42225.600000	24322.800000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Capital	0.000000	0.000000	37065.500000	6437.890000	329523.300000	642.897000	9848.640000	7376.170000
Value Added	60682.800000	34954.500000	61967.500000	10716.950000	351467.600000	1504.080000	15800.000000	16657.480000
Duty	4.829840	9.250360	196.032000	139.710000	7064.220000	17.803900	56.732400	0.829028
Import	40.664300	40.929000	8894.330000	335.872000	55487.500000	64.575400	277.120000	4.120420
Imports	45.494140	50.179360	9090.362000	475.582000	62551.720000	82.379300	333.852400	4.949448
Total Primary Input	60728.294140	35004.679360	71057.862000	11192.532000	114019.320000	1586.459300	16133.852400	16662.429448
Total Supply	**160242.191240**	**68584.059360**	**458921.163400**	**59536.423119**	**315802.775407**	**6020.197682**	**73072.276102**	**44949.334734**

Source: PC, 2000

Table A.1: Input-Output Table for Bangladesh Economy, 1999-2000

Sectors	Yarn	Mill Cloth	Clothing	Ready Made Garments	Tobacco Products	Wood Products	Printing and Publishing	Chemical
Paddy	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Grains	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Jute	0.000000	0.000000	419.114000	0.000000	0.000000	1662.440000	0.000000	0.000000
Commercial	24343.700000	626.335000	0.000000	2971.840000	7161.860000	0.000000	0.000000	162.525000
Tea	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Other Crops	0.000000	0.000000	0.000000	0.000000	11.890400	0.000000	0.000000	1492.417000
Livestock	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Poultry	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Other Fish	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Forestry	454.762000	0.000000	213.639000	0.000000	0.000000	6866.270000	0.000000	156.835000
Rice Milling	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Ata & Flour Mill	0.000000	2275.880000	1687.380000	1781.770000	131.211000	0.000000	136.646000	0.000000
Other Food	0.000000	0.000000	264.186000	0.000000	0.000000	0.000000	198.759000	6019.900000
Tea Product	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Leather Products 45	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Jute Textile	0.000000	0.000000	0.000000	0.000000	0.000000	4.561310	0.000000	31.729500
Yarn	323.293000	14223.700000	18819.300000	8782.300000	0.000000	0.000000	166.056000	13.634500
Mill Cloth	0.000000	230.491000	103.130000	48881.500000	0.000000	33.803500	10.090800	0.000000
Clothing	0.000000	0.000000	7420.350000	0.000000	0.000000	0.000000	0.000000	0.000000
Ready Made Garments	0.000000	0.000000	0.000000	1706.770000	0.000000	0.000000	0.000000	0.000000
Tobacco Products	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Wood Products	0.000000	194.658000	354.838000	4693.640000	480.491000	6279.070000	3067.940000	573.448000
Printing & Publishing	83.685500	40.909500	50.296600	563.669000	19.571600	99.022500	0.000000	94.823800
Chemical	204.319000	474.052000	1818.520000	7452.290000	98.466200	2980.530000	1180.310000	12266.818100
Fertiliser	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Petroleum Products	726.102000	354.954000	499.929000	5674.510000	162.851000	1091.450000	310.796000	896.079000
Clay Products	0.000000	0.000000	0.000000	0.000000	0.000000	33.393400	0.000000	39.253200
Cement	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Iron & Steel Basic	278.863000	136.322000	195.754000	2011.780000	70.234700	2474.360000	159.762000	1049.320000
Machinery	978.598000	478.386000	643.197000	4447.470000	196.170000	1781.860000	646.260000	1176.740000
Miscellaneous Industry	0.000000	195.695000	266.841000	2825.370000	97.032600	678.726000	217.066000	507.072000

Table A.1: Input-Output Table for Bangladesh Economy, 1999-2000

Sectors	Yarn	Mill Cloth	Clothing	Ready Made Garments	Tobacco Products	Wood Products	Printing and Publishing	Chemical
Urban Building	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Rural Building	277.692000	125.307000	176.487000	1726.540000	64.944100	286.893000	71.316800	250.022000
Construction	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Utility	64.916500	587.862000	45.857900	704.708000	17.860500	119.946000	43.578900	1292.410000
Trade Services	2163.581378	9834.969356	15882.865703	18248.257716	4508.586734	3995.724727	877.933790	27774.403164
Transport Services	2900.732622	2323.335644	3515.249297	23873.032284	1351.149266	5780.685273	1042.872210	6725.256836
Housing	783.949000	403.402000	577.190000	6432.470000	192.992000	1081.190000	370.877000	717.644000
Health	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Education	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Public Administration	251.765000	110.767000	139.488000	1783.370000	57.845700	377.393000	129.316000	262.884000
Other Services	2178.190000	888.113000	1378.970000	20561.900000	1524.330000	5571.530000	677.624000	2803.290000
Hotel & Restaurant	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Communications	0.145945	0.071345	0.126023	7.849900	0.035332	0.366152	0.112445	0.316514
Info Tech & Service	0.000000	8.741020	0.000000	361.312000	0.000000	41.649300	22.960700	15.082000
Input Use	13614.294945	33513.950865	54472.708523	165492.348900	16147.522132	41240.864162	9330.277645	64321.903614
Indirect Tax	152.100000	24.100000	9.700000	4.000000	14010.400000	318.200000	62.000000	2694.900000
Labour	3507.340000	6753.940000	7510.600000	36034.500000	1611.360000	15378.100000	1640.950000	7905.400000
Male low skilled	2824.458637	5272.445250	5369.392609	9616.246570	1349.049293	12838.638005	647.781409	2771.703161
Male high skilled	612.734563	1143.797750	1164.829391	2995.828430	68.947507	1770.556995	960.349591	4738.426839
Female low skilled	64.585246	310.922861	898.966355	22768.865313	193.363200	768.905000	10.277367	34.222707
Female high skilled	5.561554	26.774139	77.411645	653.559687	0.000000	0.000000	22.541633	361.047293
Land	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Capital	7074.020000	6233.650000	16013.400000	40365.600000	2557.290000	18780.700000	1834.460000	10850.000000
Value Added	10733.460000	13011.690000	23533.700000	76404.100000	18179.050000	34477.000000	3537.410000	21450.300000
Duty	1251.450000	488.601000	0.000000	155.314000	10.504800	2290.460000	66.779000	8636.387000
Import	7466.520000	8713.540000	126.083000	15285.700000	119.948000	14057.900000	99.760800	35062.200000
Imports	8717.970000	9202.141000	126.083000	15441.014000	130.452800	16348.360000	166.539800	43698.587000
Total Primary Input	19451.430000	22213.831000	23659.783000	91845.114000	18309.502800	50825.360000	3703.949800	65148.887000
Total Supply	**55465.724945**	**55727.781865**	**78132.491523**	**257337.462900**	**34457.024932**	**92066.224162**	**13034.227445**	**129470.790614**

Source: PC, 2000

Table A.1: Input-Output Table for Bangladesh Economy, 1999-2000

Sectors	Fertiliser	Petroleum Products	Clay Products	Cement	Iron & Steel Basic	Machinery	Miscell. Industry	Urban Building
Paddy	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Grains	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Jute	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	920.849000	0.000000
Commercial	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	2057.180000	0.000000
Tea	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Other Crops	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	1363.430000	0.000000
Livestock	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	38.102900	0.000000
Poultry	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Other Fish	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Forestry	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	1456.500000
Rice Milling	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Ata & Flour Mill	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	2745.940000	0.000000
Other Food	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Tea Product	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Leather Products 45	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	2011.880000	0.000000
Jute Textile	0.000000	0.000000	8.660930	0.000000	0.000000	0.000000	10.935400	25.448800
Yarn	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	2224.630000	0.000000
Mill Cloth	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	18.024800	0.000000
Clothing	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	46.296900	0.000000
Ready Made Garments	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Tobacco Products	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Wood Products	456.737000	0.000000	673.673000	100.244000	469.513000	1288.100000	1099.220000	987.631000
Printing & Publishing	168.940000	76.872900	12.862000	2.808980	215.139000	304.493000	115.171000	0.000000
Chemical	2810.480000	2346.070000	974.365000	368.334000	1563.660000	3088.180000	1226.035000	1225.580000
Fertiliser	0.677768	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Petroleum Products	555.233000	4446.610000	609.987000	243.723000	830.039000	2587.240000	832.738000	891.456000
Clay Products	0.000000	0.000000	504.261000	0.000000	96.550400	152.395000	57.641700	7092.610000
Cement	0.000000	0.000000	0.000000	221.968000	0.000000	0.000000	580.907000	7345.250000
Iron & Steel Basic	265.730000	1970.470000	5.665080	0.000000	26665.100000	26442.700000	1998.180000	9425.310000
Machinery	1282.820000	3210.470000	1032.520000	328.475000	1172.330000	3717.710000	769.588000	1522.340000
Miscellaneous Industry	380.715000	2858.420000	565.317000	104.448000	406.288000	1415.460000	348.961000	541.401000

Table A.1: Input-Output Table for Bangladesh Economy, 1999-2000

Sectors	Fertiliser	Petroleum Products	Clay Products	Cement	Iron & Steel Basic	Machinery	Miscell. Industry	Urban Building
Urban Building	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Rural Building	245.013000	1962.200000	360.904000	71.699900	358.524000	986.249000	220.482000	410.485000
Construction	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Utility	3640.810000	3741.850000	4661.510000	2564.640000	6479.150000	5150.690000	1625.900000	2808.460000
Trade Services	7311.631681	16488.377061	1656.507500	3680.790094	22989.829774	24313.946065	13763.661302	0.000000
Transport Services	3712.534319	15345.012939	3715.472500	1245.588906	8180.760226	14509.973935	4175.103698	1502.510000
Housing	757.221000	6159.000000	787.060000	242.365000	737.198000	2557.280000	709.800000	0.000000
Health	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Education	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Public Administration	231.022000	1734.520000	205.827000	8.450720	330.867000	863.496000	207.892000	362.855000
Other Services	1831.690000	6354.380000	1446.390000	389.154000	1901.400000	4444.860000	1105.910000	2040.630000
Hotel & Restaurant	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Communications	0.200881	0.335160	0.437484	0.097976	0.354372	0.863050	0.200855	0.233714
Info Tech & Service	41.019100	328.504000	72.115600	15.004700	116.150000	97.590200	0.000000	57.268200
Input Use	23692.474749	67023.092060	17293.535094	9587.792276	72512.852772	91921.226250	40274.660555	37695.968714
Indirect Tax	0.000000	2543.700000	355.700000	647.600000	759.100000	648.200000	402.500000	3165.500000
Labour	8482.390000	5662.510000	2590.030000	2169.420000	18636.400000	21967.000000	7249.710000	12829.915643
Male low skilled	3005.306231	1376.297419	1479.126979	1238.922967	16303.247465	17882.863443	5867.755630	10093.381122
Male high skilled	5137.788169	4285.646330	1059.102421	887.108633	2332.966171	2985.786557	979.701373	2081.449698
Female low skilled	29.376411	0.051477	46.670379	39.091306	0.186364	1098.350000	362.485500	655.084823
Female high skilled	309.919189	0.514774	5.130221	4.297094	0.000000	0.000000	39.767497	0.000000
Land	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Capital	12905.000000	11090.500000	3946.970000	2728.650000	34733.800000	32432.600000	14387.000000	19578.815643
Value Added	21387.390000	19296.710000	6892.700000	5545.670000	54129.300000	55047.800000	22039.210000	35574.231286
Duty	213.247000	22178.900000	1303.510000	5299.800000	8383.190000	16412.800000	2118.660000	0.000000
Import	7379.150000	40137.700000	1290.730000	7273.480000	26628.600000	120503.000000	17770.400000	0.000000
Imports	7592.397000	62316.600000	2594.240000	12573.280000	35011.790000	136915.800000	19889.060000	0.000000
Total Primary Input	28979.787000	81613.310000	9486.940000	18118.950000	89141.090000	191963.600000	41928.270000	35574.231286
Total Supply	**52672.261749**	**148636.402060**	**26780.475094**	**27706.742276**	**161653.942772**	**283884.826250**	**82202.930555**	**73270.200000**

Source: PC, 2000

Table A.1: Input-Output Table for Bangladesh Economy, 1999-2000

Sectors	Rural Building	Construction	Utility	Trade Services	Transport Services	Housing	Health	Education
Paddy	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Grains	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Jute	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Commercial	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.036884	0.000000
Tea	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Other Crops	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Livestock	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	198.781000	0.000000
Poultry	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Other Fish	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Forestry	22766.800000	2051.680000	0.000000	0.000000	0.000000	0.000000	1.551340	0.000000
Rice Milling	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Ata & Flour Mill	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Other Food	0.000000	0.000000	0.000000	0.000000	705.890000	2795.170000	9.505230	186.541000
Tea Product	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Leather Products 45	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Jute Textile	79.559000	27.308600	37.690000	192.156000	183.316000	0.000000	0.000000	0.000000
Yarn	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Mill Cloth	0.000000	0.000000	0.000000	0.000000	358.498000	469.581000	3.562990	44.396200
Clothing	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Ready Made Garments	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Tobacco Products	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Wood Products	4615.260000	815.599000	1207.620000	8647.910000	6277.200000	5004.500000	14.373300	1836.460000
Printing & Publishing	0.000000	0.000000	68.080500	1293.350000	1320.940000	1950.280000	6.865940	170.204000
Chemical	4342.470000	1850.400000	2317.710000	2296.280000	6686.070000	0.000000	7800.912740	1284.172000
Fertiliser	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Petroleum Products	4240.940000	865.646000	4704.920000	6899.180000	8173.370000	13016.700000	165.131000	1230.660000
Clay Products	6849.070000	2508.810000	302.508000	0.000000	0.000000	0.000000	160.285000	399.376000
Cement	12679.000000	7720.030000	1134.560000	0.000000	0.000000	0.000000	0.000000	0.000000
Iron & Steel Basic	16646.500000	11283.800000	6593.730000	4110.360000	3998.650000	0.000000	0.000000	0.000000
Machinery	4899.170000	1471.200000	2219.610000	6474.790000	15406.300000	11479.100000	450.979000	1616.600000
Miscellaneous Industry	2331.110000	786.560000	901.000000	5938.460000	5747.710000	7437.810000	70.767700	826.263000

Table A.1: Input-Output Table for Bangladesh Economy, 1999-2000

Sectors	Rural Building	Construction	Utility	Trade Services	Transport Services	Housing	Health	Education
Urban Building	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Rural Building	1497.150000	101.009000	0.000000	3875.290000	3386.860000	5744.010000	0.000000	524.961000
Construction	0.000000	198.558000	626.902000	0.000000	9100.670000	0.000000	0.000000	0.000000
Utility	8826.710000	2972.470000	7425.120000	269.892000	3132.600000	785.343000	80.928100	46.743400
Trade Services	0.000000	0.000000	11515.185950	0.000000	0.000000	0.000000	0.000000	0.000000
Transport Services	4835.360000	1278.240000	9552.494050	10169.700000	8081.500000	0.000000	0.000000	0.000000
Housing	0.000000	0.000000	506.707000	14405.700000	13292.400000	20340.900000	281.506000	1748.290000
Health	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Education	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Public Administration	1386.460000	468.362000	663.026000	2668.980000	3234.430000	4513.350000	16.307300	426.711000
Other Services	5908.990000	5378.610000	8405.990000	13675.700000	16879.500000	25796.600000	120.675000	8591.920000
Hotel & Restaurant	0.000000	0.000000	0.000000	0.000000	1888.980000	0.000000	25.587000	0.000000
Communications	1.461290	0.317423	0.232811	3.413630	3.820150	5.232670	0.195365	0.494719
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Male low skilled	47666.549128	10146.550192	5261.930412	144794.860130	96206.171161	49258.753562	1320.590935	2436.922876
Male high skilled	9829.761017	2092.414185	3762.133239	54338.784987	15914.791135	49721.016438	3973.911049	32141.807018
Female low skilled	3093.674211	658.535624	438.676348	5686.663646	386.499396	0.000000	719.164644	609.003724
Female high skilled	0.000000	0.000000	0.000000	601.691238	130.538307	3061.230000	916.113373	7414.866382
Land	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Capital	88935.984357	15438.400000	24314.300000	122773.803142	74650.711078	83488.000000	14537.200000	16687.400000
Value Added	149525.968714	28366.100000	41853.640000	328641.903142	187304.011078	185567.300000	21466.980000	59290.000000
Duty	0.000000	0.000000	1177.680000	0.000000	0.000000	0.000000	0.000000	0.000000
Import	0.000000	0.000000	2894.060000	0.000000	0.000000	0.000000	4263.290000	3836.630000
Imports	0.000000	0.000000	4071.740000	0.000000	0.000000	0.000000	4263.290000	3836.630000
Total Primary Input	149525.968714	28366.100000	45925.380000	328641.903142	187304.011078	185567.300000	25730.270000	63126.630000
Total Supply	251611.013004	68374.556023	104228.921311	410157.950772	295849.336228	284905.876670	35141.849849	82151.339819

Source: PC, 2000

Table A.1: Input-Output Table for Bangladesh Economy, 1999-2000

Sectors	Public Administration	Other Services	Hotel & Restaurant	Communications	Info Tech & Service	Pvt. Consumption	Govt. Consumption
Paddy	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000
Grains	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000
Jute	0.000000	0.000000	0.000000	0.000000	0.000000	10674.500000	0.000
Commercial	0.000000	0.000000	2201.360000	0.000000	0.000000	111882.510000	0.000
Tea	0.000000	0.000000	0.000000	0.000000	0.000000	993.209000	0.000
Other Crops	0.000000	0.000000	662.102000	0.000000	0.000000	13618.600000	0.000
Livestock	0.000000	0.000000	9429.494000	0.000000	0.000000	8576.496000	0.000
Poultry	0.000000	0.000000	556.606200	0.000000	0.000000	37043.300000	0.000
Other Fish	0.000000	0.000000	2147.490000	0.000000	0.000000	68901.794140	0.000
Forestry	0.000000	1923.820000	92.657300	0.000000	0.000000	2467.699360	0.000
Rice Milling	0.000000	0.000000	291.356000	0.000000	0.000000	456542.991900	0.000
Ata & Flour Mill	0.000000	0.000000	573.928000	0.000000	0.000000	23401.000000	0.000
Other Food	76.102400	4020.050000	2864.260000	0.000000	0.000000	248120.475777	0.000
Tea Product	0.000000	0.000000	68.567500	0.000000	0.000000	5291.770000	0.000
Leather Products 45	35.756300	0.000000	0.000000	0.000000	0.000000	27376.500000	0.000
Jute Textile	0.000000	59.758600	0.000000	20.388200	0.000000	25551.700000	0.000
Yarn	0.000000	972.557000	0.000000	0.000000	0.000000	0.000000	0.000
Mill Cloth	72.448500	339.323000	4.081290	33.605900	0.000000	6458.970885	0.000
Clothing	0.000000	0.000000	0.000000	0.000000	0.000000	66132.627623	0.000
Ready Made Garments	0.000000	0.000000	0.000000	0.000000	0.000000	28388.292900	0.000
Tobacco Products	0.000000	0.000000	92.093400	0.000000	0.000000	33108.400000	0.000
Wood Products	2126.720000	10913.800000	56.379400	638.580000	322.012000	18120.521132	0.000
Printing & Publishing	254.604000	2908.900000	0.000000	150.309000	38.577900	2229.629800	0.000
Chemical	418.622000	3823.220000	220.929900	1015.420000	0.000000	40742.928674	0.000
Fertiliser	0.000000	0.000000	0.000000	0.000000	0.000000	1983.260000	0.000
Petroleum Products	2008.260000	8448.220000	87.025100	465.775000	223.149000	56482.600000	0.000
Clay Products	193.070000	1255.760000	70.294000	0.000000	0.000000	5793.612394	0.000
Cement	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000
Iron & Steel Basic	682.287000	1132.150000	46.277200	0.000000	98.886200	36693.972300	0.000
Machinery	1981.610000	9546.410000	138.339000	1196.990000	98.816800	970.274000	0.000
Miscellaneous Industry	1262.280000	5504.170000	69.617200	532.292000	143.447000	23197.669955	0.000

Table A.1: Input-Output Table for Bangladesh Economy, 1999-2000

Sectors	Public Administration	Other Services	Hotel & Restaurant	Communications	Info Tech & Service	Pvt. Consumption	Govt. Consumption
Urban Building	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000
Rural Building	827.123000	2587.770000	46.082900	452.181000	98.471000	0.000000	0.000
Construction	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000
Utility	199.717000	929.336000	21.777500	104.105000	27.431800	39337.127700	0.000
Trade Services	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000
Transport Services	2289.740000	704.080000	165.371000	0.000000	0.000000	57892.200000	0.000
Housing	1426.480000	13915.700000	163.191000	0.000000	253.607000	183159.000000	0.000
Health	2039.890000	0.000000	0.000000	0.000000	0.000000	10071.672849	12246.600
Education	2038.560000	1559.030000	0.000000	0.000000	0.000000	44466.749819	34087.000
Public Administration	696.334000	2706.320000	42.244500	0.000000	88.979500	22892.491230	62052.400
Other Services	6613.840000	58324.200000	696.284000	5969.810000	1219.030000	74039.433760	0.000
Hotel & Restaurant	607.968000	2806.590000	0.000000	404.625000	0.000000	24079.998924	0.000
Communications	4394.890000	3.781160	0.034984	0.374479	0.112131	16348.746587	0.000
Info Tech & Service	123.637000	382.393000	8.572250	68.820400	19.233200	597.165401	0.000
Input Use	30369.939200	134767.338760	20816.415624	11053.275979	2631.755531	1833629.892110	108386.000
Indirect Tax	0.000000	3921.700000	467.600000	0.000000	7.300000		
Labour	68828.400000	133427.000000	5295.440000	6573.810000	958.031000		
Male low skilled	19064.835905	40810.783988	4638.587063	651.102082	96.438519		
Male high skilled	47344.583113	57383.046358	264.654769	5265.326918	835.070540		
Female low skilled	1020.930899	35233.169243	317.726400	123.258938	0.000000		
Female high skilled	1398.050083	0.000411	74.471769	534.122063	26.521942		
Land	0.000000	0.000000	0.000000	0.000000	0.000000	230149.455000	
Capital	26407.800000	71482.000000	3165.420000	6173.440000	899.684000	875360.995220	
Value Added	95236.200000	134208830.700000	8928.460000	12747.250000	1865.015000		1105510.450220
Duty	0.000000	0.000000	0.000000	0.000000	0.000000		
Import	0.000000	313.823000	68.873300	0.000000	0.000000		
Imports	0.000000	313.823000	68.873300	0.000000	0.000000		
Total Primary Input	95236.200000	134209144.523000	8997.333300	12747.250000	1865.015000		
Total Supply	125606.139200	343911.861760	29813.748924	23800.525979	4496.768531		

Source: PC, 2000

Table A.1: Input-Output Table for Bangladesh Economy, 1999-2000

Sectors	RoW	GFC For	Stock	Total FD	T Use	T Sup	Difference
Paddy	0.000	0.000	-39838.526900	-39838.526900	276588.113100	276588.113100	0.000000
Grains	0.000	0.000	-1056.920000	-1056.920000	42861.890000	42861.899100	-0.009100
Jute	6847.140	0.000	878.166700	18399.806700	32552.789700	32552.789700	0.000000
Commercial	1552.070	0.000	4474.870000	117909.450000	228734.951884	228735.205130	-0.253246
Tea	481.313	0.000	30.428730	1504.950730	3686.026730	3686.026730	0.000000
Other Crops	174.565	0.000	2357.326000	16150.491000	34376.986400	34376.974700	0.011700
Livestock	0.000	12083.000	2124.076600	22783.572600	102735.459600	102735.420590	0.039010
Poultry	0.000	0.000	1789.662000	38832.962000	44401.488000	44401.538501	-0.050501
Other Fish	14556.800	0.000	15475.770100	98934.364240	160242.191240	160242.191240	0.000000
Forestry	0.000	21819.000	451.620460	24738.319820	68584.059360	68584.059360	0.000000
Rice Milling	0.000	0.000	-5552.399000	450990.592900	458921.163400	458921.163400	0.000000
Ata & Flour Mill	0.000	0.000	1762.060000	25163.060000	59536.433000	59536.423119	0.009881
Other Food	3407.580	0.000	7614.770000	259142.825777	315802.775407	315802.775407	0.000000
Tea Product	0.000	0.000	236.009000	5527.779000	6020.193500	6020.197682	-0.004182
Leather Products 45	22427.500	0.000	846.480000	50650.480000	73072.316300	73072.276102	0.040198
Jute Textile	11896.700	0.000	1305.940000	38754.340000	44949.257960	44949.334734	-0.076774
Yarn	0.000	0.000	-616.750000	-616.750000	55465.740500	55465.724945	0.015555
Mill Cloth	0.000	0.000	-1633.180000	4825.790885	55727.781865	55727.781865	0.000000
Clothing	0.000	0.000	3555.450000	69688.077623	78132.491523	78132.491523	0.000000
Ready Made Garments	222305.000	0.000	4937.400000	255630.692900	257337.462900	257337.462900	0.000000
Tobacco Products	0.000	0.000	1256.530000	34364.930000	34457.023400	34457.024932	-0.001532
Wood Products	0.000	0.000	-37.527500	18082.993632	92066.224162	92066.224162	0.000000
Printing & Publishing	0.000	0.000	-253.566205	1976.063595	13034.227445	13034.227445	0.000000
Chemical	3993.090	0.000	-3506.353000	41229.665674	129470.790614	129470.790614	0.000000
Fertiliser	1399.660	0.000	-176.259000	3206.661000	52672.256428	52672.261749	-0.005321
Petroleum Products	1104.520	0.000	-4772.070000	52815.050000	148636.561101	148636.402060	0.159041
Clay Products	965.356	0.000	-228.700000	6530.268394	26780.475094	26780.475094	0.000000
Cement	0.000	0.000	-1974.910000	-1974.910000	27706.805000	27706.742276	0.062724
Iron & Steel Basic	0.000	0.000	-1437.302300	35256.670000	161653.718180	161653.942772	-0.224592
Machinery	234.166	164691.000	-2158.030000	163737.410000	283885.134700	283884.826250	0.308450
Miscellaneous Industry	7531.360	0.000	-308.835000	30420.194955	82202.930555	82202.930555	0.000000

Table A.1: Input-Output Table for Bangladesh Economy, 1999-2000

Sectors	RoW	GFC For	Stock	Total FD	T Use	T Sup	Difference
Urban Building	0.000	73270.000	0.200000	73270.200000	73270.200000	73270.200000	0.000000
Rural Building	0.000	221780.000	0.000000	221780.000000	251611.454083	251611.013004	0.441079
Construction	0.000	53184.000	-0.202977	53183.797023	68374.556023	68374.556023	0.000000
Utility	0.000	0.000	0.000000	39337.127700	104228.930430	104228.921311	0.009119
Trade Services	0.000	0.000	0.000000	0.000000	410157.950772	410157.950772	0.000000
Transport Services	10982.500	0.000	0.000000	68874.700000	295849.336228	295849.336228	0.000000
Housing	0.000	0.000	0.000000	183159.000000	284906.072000	284905.876670	0.195330
Health	0.000	0.000	0.000000	22318.272849	35141.849849	35141.849849	0.000000
Education	0.000	0.000	0.000000	78553.749819	82151.339819	82151.339819	0.000000
Public Administration	11452.300	0.000	0.000000	96397.191230	125606.139200	125606.139200	0.000000
Other Services	6897.710	0.000	0.000000	80937.143760	343911.861760	343911.861760	0.000000
Hotel & Restaurant	0.000	0.000	0.000000	24079.998924	29813.748924	29813.748924	0.000000
Communications	3022.720	0.000	0.000000	19371.466587	23800.525979	23800.525979	0.000000
Info Tech & Service	214.152	0.000	0.000000	811.317401	4496.768531	4496.768531	0.000000
Input Use	**331446.202**		**-14454.772292**				0.666840
Indirect Tax					40783.500000		
Labour					1140697.942000		
Male low skilled							
Male high skilled							
Female low skilled							
Female high skilled							
Land							
Capital					875360.995220		
Value Added					2286991.892220		
Duty							
Import							
Imports							
Total Primary Input							
Total Supply							

Source: PC, 2000

Table A.2: Aggregated Input-Output Table for Bangladesh Economy, 1999-2000

(at market price) (in million Taka)

Code	Sectors	Agriculture	Fishing	Industry	Construction	Utility	Trade services	Trans.& Comm.	Housing	Health
1	Agriculture	162992.196	1608.670	429155.404	26274.980	0.000	0.000	0.000	0.000	200.369
2	Fishing	350.837	14800.300	44009.200	0.000	0.000	0.000	0.000	0.000	0.000
3	Industry	121763.486	44349.086	402722.315	113069.459	19487.429	35852.486	52911.304	42153.141	8682.383
4	Construction	5264.629	0.000	10280.061	2207.202	626.902	3875.290	12939.711	5744.010	0.000
5	Utility	536.847	2175.320	34549.002	14607.640	7425.120	269.892	3236.705	785.343	80.928
6	Trade services	86467.074	30860.200	281315.491	0.000	11515.186	0.000	0.000	0.000	0.000
7	Trans. & Comm.	37362.832	0.000	151047.274	7618.122	9552.727	10173.114	8085.695	5.233	0.195
8	Housing	1499.701	505.529	33407.361	0.000	506.707	14405.700	13292.400	20340.900	281.506
9	Health	10783.687	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
10	Education	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11	Public Administration	1981.457	358.232	9594.899	2217.677	663.026	2668.980	3234.430	4513.350	16.307
12	Other services	25208.295	4856.560	74408.213	13794.388	8526.445	14270.586	23604.751	25796.600	124.304
13	Hotel and Restaurant	0.000	0.000	0.000	0.000	0.000	0.000	2293.605	0.000	25.587
Intermediate input		454211.041	99513.897	1470489.220	179789.469	58303.541	81516.048	119598.601	99338.577	9411.580
Primary Input		380310.986	60728.294	987042.260	213466.300	45925.380	328641.903	200051.261	185567.300	25730.270
Total Input		834522.027	160242.191	2457531.480	393255.769	104228.921	410157.951	319649.862	284905.877	35141.850

Source: National table is aggregated following the rules of aggregation

Table A.2: Aggregated Input-Output Table for Bangladesh Economy, 1999-2000 (continued)

Code	Sectors	Education	Public Admin.	Other services	Hotel & Rest.	**Intermediate Output**	**Final Demand**	**Total Output**
1	Agriculture	0.000	0.000	1923.820	12942.220	635098.659	199423.368	834522.027
2	Fishing	0.000	0.000	0.000	2147.490	61309.827	98932.364	160242.191
3	Industry	7594.672	9111.760	49849.208	4583.148	912132.877	1545398.603	2457531.480
4	Construction	524.961	827.123	2686.241	46.083	45026.213	348229.556	393255.769
5	Utility	46.743	199.717	956.768	21.778	64896.803	39332.119	104228.921
6	Trade services	0.000	0.000	0.000	0.000	410163.951	-6.000	410157.951
7	Trans. & Comm.	0.495	6684.630	707.973	165.406	231410.696	88239.167	319649.862
8	Housing	1748.290	1426.480	14169.307	163.191	101755.072	183150.805	284905.877
9	Health	0.000	2039.890	0.000	0.000	12832.577	22309.273	35141.850
10	Education	0.000	2038.560	1559.030	0.000	3607.590	78543.750	82151.340
11	Public Administration	426.711	696.334	2795.300	42.245	29219.948	96386.191	125606.139
12	Other services	8682.838	6737.477	59944.856	704.856	266672.169	81736.461	348408.630
13	Hotel and Restaurant	0.000	607.968	2806.590	0.000	5746.750	24066.999	29813.749
Intermediate input		19024.710	30369.939	137399.092	20816.416	-	-	-
Primary Input		63126.630	95236.200	211009.538	8997.333	-	-	-
Total Input		82151.340	125606.139	348408.630	29813.749	-	-	**5585615.786**

Source: National table is aggregated following the rules of aggregation

Table A.3: Sectoral GDP and Output according to Regions, 1999-2000

Regions	Features	Agriculture	Fishing	Industry	Construction	Utility	Trade services	Trans & Comm
Barisal	GDP in million Tk.	31721	18769	6496	11458	1312	15276	9364
	Share of GDP*	19.04	10.69	13.67	7.62	1.16	13.15	9.00
	Sectoral output	61568.2679	34567.4781	44203.6881	24640.2417	3751.0079	42522.2018	29102.6476
Chittagong	GDP in million Tk.	71209	38272	78989	30880	5072	57978	41300
	Share of GDP*	16.13	8.75	18.07	7.09	1.22	13.68	9.94
	Sectoral output	174304.8715	94554.7195	195269.0036	76616.3384	13183.6295	147829.5500	107414.1614
Dhaka	GDP in million Tk.	113991	30720	206154	56925	14153	122063	85307
	Share of GDP*	13.01	3.65	24.19	6.73	1.75	14.83	10.58
	Sectoral output	274246.0678	76940.6724	509916.4012	141865.9520	36889.3635	312611.0058	223022.5516
Khulna	GDP in million Tk.	66097	20691	28264	21507	2634	32779	21954
	Share of GDP*	25.03	7.92	10.77	8.24	1.06	12.91	8.80
	Sectoral output	161965.6211	51249.2097	69691.1602	53319.8848	6859.1114	83538.8002	56943.5663
Rajshahi	GDP in million Tk.	131987	21165	35757	45864	5558	51457	31538
	Share of GDP*	28.59	4.63	7.72	9.99	1.27	11.52	7.18
	Sectoral output	325156.9049	52657.4491	87800.3255	113617.2606	14443.8359	131018.1023	81658.8520
Sylhet	GDP in million Tk.	31954	7120	15822	9584	1992	12484	7971
	Share of GDP*	25.21	6.25	13.84	8.36	1.83	11.20	7.33
	Sectoral output	72924.4995	18079.2591	40034.7114	24182.8170	5293.6071	32398.0323	21203.3551
Bangladesh	GDP in million Tk.	446959	136737	371482	176218	30721	292037	197434
	Share of GDP*	19.54	5.98	16.24	7.70	1.34	12.77	8.63
	Sectoral output	1091429.3246	334019.8240	907104.0036	430092.4155	74847.2515	713283.1359	482038.6423

* Shares of GDP are at constant market prices which is assumed to be equivalent to current market prices

N.B. The regional total output is distributed according to their share in national GDP.

Source: BBS, 2002; BBS, 2004

Table A.3: Sectoral GDP and Output according to Regions, 1999-2000 (continued)

Regions	Features	Housing	Health	Education	Public Admin	Other services	Hotel & Rest	Total
Barisal	GDP in million Tk.	11675	3399	4483	2708	15579	652	132892
	Share of GDP*	8.28	2.29	2.39	2.10	9.99	0.62	100.00
	Sectoral output	26774.4358	7405.0070	7728.3698	6790.6178	32303.9389	2004.8491	323362.7516
Chittagong	GDP in million Tk.	38061	10669	9525	10481	46594	3099	442129
	Share of GDP*	8.25	2.25	2.01	2.21	9.71	0.69	100.00
	Sectoral output	89151.5927	24314.0707	21720.5699	23881.8206	104928.7230	7456.3150	1080625.3657
Dhaka	GDP in million Tk.	79662	17961	15095	31905	79697	6267	859900
	Share of GDP*	8.87	1.95	1.64	3.47	8.61	0.72	100.00
	Sectoral output	186976.3736	41105.2907	34570.6035	73146.3378	181495.6682	15177.3381	2107963.6261
Khulna	GDP in million Tk.	23783	6295	6545	5802	27314	1638	265303
	Share of GDP*	8.61	2.22	2.31	2.04	9.48	0.61	100.00
	Sectoral output	55714.1030	14365.3088	14947.6862	13200.5540	61343.7510	3947.2245	647085.9811
Rajshahi	GDP in million Tk.	49094	12378	15416	9258	56096	2479	468047
	Share of GDP*	10.10	2.48	3.09	1.85	11.06	0.52	100.00
	Sectoral output	114868.3015	28205.2859	35142.8764	21040.2334	125786.4767	5914.0116	1137309.9158
Sylhet	GDP in million Tk.	9115	3060	2795	2185	14643	492	119217
	Share of GDP*	7.54	2.45	2.24	1.75	11.58	0.42	100.00
	Sectoral output	21810.8182	7087.0696	6479.6065	5062.1925	33497.2513	1214.9262	289268.1457
Bangladesh	GDP in million Tk.	211390	53762	53859	62339	239923	14627	2287488
	Share of GDP*	9.24	2.35	2.35	2.73	10.49	0.64	100.00
	Sectoral output	516110.8986	131261.9710	131261.9710	152487.3110	585931.0960	35747.9410	5585615.7860

* Shares of GDP are at constant market prices which is assumed to be equivalent to current market prices

N.B. The regional total output is distributed according to their share in national GDP.

Source: BBS, 2002; BBS, 2004

Appendix B

Input-Output Tables of Regions

Table B.1: Aggregated Input-Output Table for Barisal Region, 1999-2000

(at market price) (in million Taka)

Code	Sectors	Agriculture	Fishing	Industry	Construction	Utility	Trade services	Trans.& Comm.	Housing	Health
1	Agriculture	12025.024	347.023	7719.23	1646.312	0	0	0	0	42.221
2	Fishing	25.884	3192.724	791.595	0	0	0	0	0	0
3	Industry	2703.986	2879.677	2180.386	2132.472	211.097	1118.799	1450.022	1192.387	550.691
4	Construction	388.407	0	184.908	138.297	22.561	401.762	1178.101	539.802	0
5	Utility	29.116	344.963	456.829	672.835	196.436	20.569	216.63	54.255	12.536
6	Trade services	5743.831	5994.063	4556.012	0	373.132	0	0	0	0
7	Trans. & Comm.	2250.393	0	2218.052	389.688	280.664	861.029	601	0.401	0.034
8	Housing	105.186	103.674	571.26	0	17.336	1419.814	1150.519	1817.279	56.392
9	Health	795.585	0	0	0	0	0	0	0	0
10	Education	0	0	0	0	0	0	0	0	0
11	Public Administration	109.308	57.784	129.047	103.9	17.842	206.899	220.194	317.151	2.569
12	Other services	1859.784	1047.658	1338.383	864.315	306.851	1479.471	2149.104	2424.272	26.193
13	Hotel and Restaurant	0	0	0	0	0	0	160.225	0	4.137
Intermediate input		26036.504	13967.566	20145.702	5947.819	1425.919	5508.343	7125.795	6345.547	694.773
Primary Input		35531.764	20599.912	24057.986	18692.423	2325.089	37013.859	21976.853	20428.889	6710.234
Total Input		61568.268	34567.478	44203.688	24640.242	3751.008	42522.202	29102.648	26774.436	7405.007

Source: Based on simple location quotient method

Table B.1: Aggregated Input-Output Table for Barisal Region, 1999-2000 (continued)

Code	Sectors	Education	Public Admin.	Other services	Hotel & Rest.	**Intermediate Output**	**Final Demand**	**Total Output**
1	Agriculture	0	0	178.374	870.31	22828.494	38739.774	61568.268
2	Fishing	0	0	0	144.41	4154.613	30412.865	34567.478
3	Industry	215.055	148.275	1391.211	92.768	16266.826	27936.862	44203.688
4	Construction	49.386	44.717	249.064	3.099	3200.104	21440.138	24640.242
5	Utility	3.233	7.937	65.213	1.077	2081.629	1669.379	3751.008
6	Trade services	0	0	0	0	16667.038	25855.164	42522.202
7	Trans. & Comm.	0.038	295.036	53.59	9.081	6959.006	22143.642	29102.648
8	Housing	156.358	73.316	1248.957	10.433	6730.524	20043.912	26774.436
9	Health	0	110.282	0	0	905.867	6499.14	7405.007
10	Education	0	110.21	144.551	0	254.761	7473.609	7728.37
11	Public Administration	30.016	28.149	193.796	2.124	1418.779	5371.839	6790.618
12	Other services	816.836	364.247	5557.999	47.399	18282.512	14021.427	32303.939
13	Hotel and Restaurant	0	25.219	199.663	0	389.244	1615.605	2004.849
Intermediate input		1270.922	1207.388	9282.418	1180.701	-	-	-
Primary Input		6457.448	5583.23	23021.521	824.148	-	-	-
Total Input		7728.37	6790.618	32303.939	2004.849	-	-	**323362.753**

Source: Based on simple location quotient method

Table B.2: Aggregated Input-Output Table for Chittagong Region, 1999-2000

(at market price) (in million Taka)

Code	Sectors	Agriculture	Fishing	Industry	Construction	Utility	Trade services	Trans.& Comm.	Housing	Health
1	Agriculture	28061.802	782.439	28107.734	4219.546	0	0	0	0	114.272
2	Fishing	73.279	8733.269	3496.856	0	0	0	0	0	0
3	Industry	25432.485	26169.234	31999.259	22028.839	2464.911	12921.99	17780.153	13190.39	6007.199
4	Construction	996.957	0	740.571	389.875	71.892	1266.342	3942.289	1629.595	0
5	Utility	95.78	1096.436	2344.895	2430.973	802.239	83.091	929.06	209.914	47.828
6	Trade services	18060.197	18209.796	22352.591	0	1456.524	0	0	0	0
7	Trans. & Comm.	7803.897	0	12001.82	1484.206	1208.298	3666.604	2717.092	1.637	0.135
8	Housing	291.798	277.88	2472.76	0	59.705	4836.71	4160.984	5929.3	181.437
9	Health	2252.366	0	0	0	0	0	0	0	0
10	Education	0	0	0	0	0	0	0	0	0
11	Public Administration	360.005	183.875	663.174	375.835	72.951	836.774	945.448	1228.512	9.814
12	Other services	5265.204	2865.729	5912.281	2687.502	1078.487	5143.419	7932.068	8072.168	86.004
13	Hotel and Restaurant	0	0	0	0	0	0	770.736	0	17.703
Intermediate input		88693.77	58318.658	110091.941	33616.776	7215.007	28754.93	39177.83	30261.516	6464.392
Primary Input		85611.102	36236.062	85177.063	42999.562	5968.622	119074.62	68236.331	58890.077	17849.679
Total Input		174304.872	94554.72	195269.004	76616.338	13183.629	147829.55	107414.161	89151.593	24314.071

Source: Based on simple location quotient method

Table B.2: Aggregated Input-Output Table for Chittagong Region, 1999-2000 (continued)

Code	Sectors	Education	Public Admin.	Other services	Hotel & Rest.	**Intermediate Output**	**Final Demand**	**Total Output**
1	Agriculture	0	0	477.581	2668.047	64431.421	109873.451	174304.872
2	Fishing	0	0	0	537.08	12840.484	81714.236	94554.72
3	Industry	2008.009	1732.443	15012.871	1146.229	177894.012	17374.992	195269.004
4	Construction	125.841	142.582	733.478	10.449	10049.871	66566.467	76616.338
5	Utility	10.557	32.436	246.131	4.652	8333.992	4849.637	13183.629
6	Trade services	0	0	0	0	60079.108	87750.442	147829.55
7	Trans. & Comm.	0.131	1270.966	213.217	41.367	30409.37	77004.791	107414.161
8	Housing	430.602	252.655	3975.206	38.02	22907.057	66244.536	89151.593
9	Health	0	387.85	0	0	2640.216	21673.855	24314.071
10	Education	0	354.647	429.612	0	784.259	20936.311	21720.57
11	Public Administration	98.139	115.167	732.296	9.19	5631.18	18250.641	23881.821
12	Other services	2295.717	1281.014	18053.333	176.282	60849.208	44079.515	104928.723
13	Hotel and Restaurant	0	115.595	845.249	0	1749.283	5707.032	7456.315
Intermediate input		4968.996	5685.355	40718.974	4631.316	-	-	-
Primary Input		16751.574	18196.466	64209.749	2824.999	-	-	-
Total Input		21720.57	23881.821	104928.723	7456.315	-	-	**1080625.367**

Source: Based on simple location quotient method

Table B.3: Aggregated Input-Output Table for Dhaka Region, 1999-2000

(at market price) (in million Taka)

Code	Sectors	Agriculture	Fishing	Industry	Construction	Utility	Trade services	Trans.& Comm.	Housing	Health
1	Agriculture	36339.853	524.034	60412.698	6430.714	0	0	0	0	159.007
2	Fishing	68.906	4247.131	5457.445	0	0	0	0	0	0
3	Industry	40014.71	21294.32	83561.377	40789.501	6897.115	27325.77	36916.687	27664.018	10155.751
4	Construction	1486.737	0	1832.986	684.241	190.667	2538.172	7758.227	3239.397	0
5	Utility	176.422	1044.485	7168.617	5269.667	2627.946	205.704	2258.278	515.4	94.661
6	Trade services	28415.373	14817.599	58370.517	0	4075.528	0	0	0	0
7	Trans. & Comm.	12278.417	0	31340.995	2748.217	3380.962	7753.665	5641.461	3.434	0.228
8	Housing	492.842	242.731	6931.737	0	179.337	10979.625	9274.226	13349.208	329.277
9	Health	3149.458	0	0	0	0	0	0	0	0
10	Education	0	0	0	0	0	0	0	0	0
11	Public Administration	651.159	172.006	1990.858	800.021	234.662	2034.222	2256.691	2961.995	19.074
12	Other services	7320.269	2060.577	13642.744	4397.304	2666.625	9611.162	14553.071	14959.902	128.481
13	Hotel and Restaurant	0	0	0	0	0	0	1600.269	0	29.929
Intermediate input		130394.146	44402.883	270709.974	61119.665	20252.842	60448.32	80258.91	62693.354	10916.408
Primary Input		143851.922	32537.789	239206.427	80746.287	16636.521	252162.686	142763.642	124283.02	30188.883
Total Input		274246.068	76940.672	509916.401	141865.952	36889.363	312611.006	223022.552	186976.374	41105.291

Source: Based on simple location quotient method

Table B.3: Aggregated Input-Output Table for Dhaka Region, 1999-2000 (continued)

Code	Sectors	Education	Public Admin.	Other services	Hotel & Rest.	**Intermediate Output**	**Final Demand**	**Total Output**
1	Agriculture	0	0	679.916	4469.939	109016.161	165229.91	274246.068
2	Fishing	0	0	0	653.366	10426.848	66513.824	76940.672
3	Industry	3195.96	5306.205	25967.828	2333.151	331422.393	178494.01	509916.401
4	Construction	189.838	413.919	1202.502	20.16	19556.846	122309.11	141865.952
5	Utility	19.67	116.305	498.407	11.087	20006.649	16882.714	36889.363
6	Trade services	0	0	0	0	105679.017	206931.99	312611.006
7	Trans. & Comm.	0.208	3892.773	368.803	84.204	67493.367	155529.19	223022.552
8	Housing	735.709	830.706	7381.183	83.076	50809.657	136166.72	186976.374
9	Health	0	1055.734	0	0	4205.192	36900.099	41105.291
10	Education	0	885.097	605.505	0	1490.602	33080.001	34570.603
11	Public Administration	179.567	405.508	1456.149	21.506	13183.418	59962.92	73146.338
12	Other services	3228.754	3467.049	27593.72	317.074	103946.732	77548.936	181495.668
13	Hotel and Restaurant	0	354.048	1462.03	0	3446.276	11731.062	15177.338
Intermediate input		7549.706	16727.344	67216.043	7993.563	-	-	-
Primary Input		27020.897	56418.994	114279.625	7183.775	-	-	-
Total Input		34570.603	73146.338	181495.668	15177.338	-	-	**2107963.626**

Source: Based on simple location quotient method

Table B.4: Aggregated Input-Output Table for Khulna Region, 1999-2000

(at market price) (in million Taka)

Code	Sectors	Agriculture	Fishing	Industry	Construction	Utility	Trade services	Trans.& Comm.	Housing	Health
1	Agriculture	31633.835	514.49	12170.073	3562.513	0	0	0	0	81.907
2	Fishing	68.091	4733.483	1248.022	0	0	0	0	0	0
3	Industry	15502.96	9304.809	7491.984	10057.081	841.292	4790.368	6183.454	5407.62	2328.315
4	Construction	1021.769	0	291.524	299.265	41.255	789.299	2305.126	1123.256	0
5	Utility	77.025	514.317	724.288	1464.169	361.227	40.637	426.256	113.532	24.456
6	Trade services	16240.907	9551.763	7720.523	0	733.373	0	0	0	0
7	Trans. & Comm.	6952.375	0	4106.765	990.308	602.72	1986.549	1381.007	0.981	0.076
8	Housing	282.351	156.839	919.009	0	32.347	2846.232	2297.06	3858.627	111.629
9	Health	2092.918	0	0	0	0	0	0	0	0
10	Education	0	0	0	0	0	0	0	0	0
11	Public Administration	308.606	91.941	218.35	241.294	35.014	436.231	462.384	708.267	5.349
12	Other services	4802.403	1524.646	2071.236	1835.89	550.779	2853.047	4127.619	4951.722	49.878
13	Hotel and Restaurant	0	0	0	0	0	0	394.515	0	10.099
Intermediate input		78983.24	26392.288	36961.774	18450.52	3198.007	13742.363	17577.421	16164.005	2611.709
Primary Input		82982.381	24856.922	32729.386	34869.365	3661.104	69796.437	39366.145	39550.098	11753.6
Total Input		161965.621	51249.21	69691.16	53319.885	6859.111	83538.8	56943.566	55714.103	14365.309

Source: Based on simple location quotient method

Table B.4: Aggregated Input-Output Table for Khulna Region, 1999-2000 (continued)

Code	Sectors	Education	Public Admin.	Other services	Hotel & Rest.	**Intermediate Output**	**Final Demand**	**Total Output**
1	Agriculture	0	0	338.724	1713.5	50015.042	111950.579	161965.621
2	Fishing	0	0	0	284.319	6333.915	44915.295	51249.21
3	Industry	906.527	628.197	5757.742	398.063	69598.412	92.748	69691.16
4	Construction	95.518	86.926	472.962	6.101	6533.001	46786.884	53319.885
5	Utility	6.287	15.516	124.533	2.132	3894.375	2964.736	6859.111
6	Trade services	0	0	0	0	34246.566	49292.234	83538.8
7	Trans. & Comm.	0.086	673.546	119.511	20.996	16834.92	40108.646	56943.566
8	Housing	308.583	145.427	2420.075	20.959	13399.138	42314.965	55714.103
9	Health	0	214.382	0	0	2307.3	12058.009	14365.309
10	Education	0	214.242	274.496	0	488.738	14458.948	14947.686
11	Public Administration	62.306	58.726	394.952	4.488	3027.908	10172.646	13200.554
12	Other services	1550.783	695.038	10360.088	91.602	35464.731	25879.02	61343.751
13	Hotel and Restaurant	0	61.693	477.129	0	943.436	3003.788	3947.224
Intermediate input		2930.09	2793.693	20740.212	2542.16	-	-	-
Primary Input		12017.596	10406.861	40603.539	1405.064	-	-	-
Total Input		14947.686	13200.554	61343.751	3947.224	-	-	**647085.98**

Source: Based on simple location quotient method

Table B.5: Aggregated Input-Output Table for Rajshahi Region, 1999-2000

(at market price) (in million Taka)

Code	Sectors	Agriculture	Fishing	Industry	Construction	Utility	Trade services	Trans.& Comm.	Housing	Health
1	Agriculture	63507.057	528.628	15332.452	7591.22	0	0	0	0	160.819
2	Fishing	103.41	3679.214	1189.439	0	0	0	0	0	0
3	Industry	22318.495	6855.834	6768.546	15367.64	1270.403	5387.56	6358.722	7995.054	3278.215
4	Construction	2051.271	0	367.276	637.692	86.875	1237.897	3305.623	2315.869	0
5	Utility	184.952	632.06	1091.403	3731.658	909.809	76.229	731.113	279.969	57.432
6	Trade services	29012.281	8732.883	8654.991	0	1374.172	0	0	0	0
7	Trans. & Comm.	11365.185	0	4213	1718.299	1033.483	2536.972	1612.604	1.647	0.122
8	Housing	584.332	166.123	1193.546	0	70.218	4601.66	3395.722	8201.04	225.94
9	Health	4201.675	0	0	0	0	0	0	0	0
10	Education	0	0	0	0	0	0	0	0	0
11	Public Administration	560.359	85.443	248.808	465.044	66.689	618.803	599.726	1320.762	9.5
12	Other services	9821.971	1595.922	2658.385	3985.398	1181.578	4558.5	6030.151	10400.669	99.768
13	Hotel and Restaurant	0	0	0	0	0	0	485.331	0	17.01
Intermediate input		143710.988	22276.107	41717.846	33496.951	5993.227	19017.621	22518.992	30515.01	3848.806
Primary Input		181445.917	30381.342	46082.48	80120.31	8450.609	112000.481	59139.86	84353.292	24356.48
Total Input		325156.905	52657.449	87800.326	113617.261	14443.836	131018.102	81658.852	114868.302	28205.286

Source: Based on simple location quotient method

Table B.5: Aggregated Input-Output Table for Rajshahi Region, 1999-2000 (continued)

Code	Sectors	Education	Public Admin.	Other services	Hotel & Rest.	**Intermediate Output**	**Final Demand**	**Total Output**
1	Agriculture	0	0	694.56	2567.287	90382.023	234774.882	325156.905
2	Fishing	0	0	0	322.254	5294.317	47363.132	52657.449
3	Industry	1528.355	718.017	8466.345	427.683	86740.869	1059.457	87800.326
4	Construction	224.569	138.551	969.818	9.141	11344.582	102272.679	113617.261
5	Utility	17.68	29.581	305.425	3.82	8051.131	6392.705	14443.836
6	Trade services	0	0	0	0	47774.327	83243.775	131018.102
7	Trans. & Comm.	0.165	874.175	199.546	25.615	23580.813	58078.039	81658.852
8	Housing	747.887	238.949	5115.566	32.371	24573.354	90294.948	114868.302
9	Health	0	341.701	0	0	4543.376	23661.91	28205.286
10	Education	0	341.478	562.859	0	904.337	34238.539	35142.876
11	Public Administration	132.49	84.661	732.487	6.082	4930.854	16109.379	21040.233
12	Other services	3714.363	1128.592	21641.979	139.819	66957.095	58829.382	125786.477
13	Hotel and Restaurant	0	84.355	839.295	0	1425.991	4488.021	5914.012
Intermediate input		6365.509	3980.06	39527.88	3534.072	-	-	-
Primary Input		28777.367	17060.173	86258.597	2379.94	-	-	-
Total Input		35142.876	21040.233	125786.477	5914.012	-	-	**1137309.917**

Source: Based on simple location quotient method

Table B.6: Aggregated Input-Output Table for Sylhet Region, 1999-2000

(at market price) (in million Taka)

Code	Sectors	Agriculture	Fishing	Industry	Construction	Utility	Trade services	Trans.& Comm.	Housing	Health
1	Agriculture	14243.032	181.498	6991.208	1615.75	0	0	0	0	40.408
2	Fishing	30.631	1668.356	716.301	0	0	0	0	0	0
3	Industry	8695.548	4089.146	5361.515	5682.263	808.839	2314.361	2868.288	2637.21	1430.953
4	Construction	460.048	0	167.469	135.729	31.839	306.106	858.331	439.73	0
5	Utility	46.912	245.43	562.825	898.28	377.109	21.319	214.701	60.122	16.321
6	Trade services	6197.591	2855.874	3758.961	0	479.701	0	0	0	0
7	Trans. & Comm.	2529.222	0	1906.172	362.904	375.839	622.491	415.488	0.31	0.03
8	Housing	108.426	47.189	450.27	0	21.292	941.445	729.502	1288.349	46.97
9	Health	942.33	0	0	0	0	0	0	0	0
10	Education	0	0	0	0	0	0	0	0	0
11	Public Administration	116.448	27.182	105.121	91.715	22.647	141.783	144.291	232.371	2.212
12	Other services	2202.821	547.939	1212.156	848.27	433.043	1127.222	1565.775	1974.845	25.068
13	Hotel and Restaurant	0	0	0	0	0	0	98.193	0	3.33
Intermediate input		35573.009	9662.614	21231.998	9634.911	2550.309	5474.727	6894.569	6632.937	1565.292
Primary Input		37351.491	8416.645	18802.713	14547.906	2743.298	26923.305	14308.786	15177.881	5521.778
Total Input		72924.5	18079.259	40034.711	24182.817	5293.607	32398.032	21203.355	21810.818	7087.07

Source: Based on simple location quotient method

Table B.6: Aggregated Input-Output Table for Sylhet Region, 1999-2000 (continued)

Code	Sectors	Education	Public Admin.	Other services	Hotel & Rest.	**Intermediate Output**	**Final Demand**	**Total Output**
1	Agriculture	0	0	184.963	527.402	23784.261	49140.239	72924.5
2	Fishing	0	0	0	87.434	2502.722	15576.537	18079.259
3	Industry	489.539	300.106	3916.722	152.631	38747.121	1287.59	40034.711
4	Construction	41.406	33.335	258.265	1.878	2734.136	21448.681	24182.817
5	Utility	3.687	8.049	91.987	0.887	2547.629	2745.978	5293.607
6	Trade services	0	0	0	0	13292.127	19105.905	32398.032
7	Trans. & Comm.	0.03	208.697	52.729	5.222	6479.134	14724.221	21203.355
8	Housing	114.088	47.565	1127.098	5.502	4927.696	16883.122	21810.818
9	Health	0	82.212	0	0	1024.542	6062.528	7087.07
10	Education	0	81.808	149.252	0	231.06	6248.546	6479.606
11	Public Administration	22.635	18.874	180.743	1.158	1107.18	3955.013	5062.193
12	Other services	684.85	271.535	5763.313	28.723	16685.56	16811.691	33497.251
13	Hotel and Restaurant	0	15.814	174.153	0	291.49	923.436	1214.926
Intermediate input		1356.235	1067.995	11899.225	810.837	-	-	-
Primary Input		5123.371	3994.198	21598.026	404.089	-	-	-
Total Input		6479.606	5062.193	33497.251	1214.926	-	-	**289268.145**

Source: Based on simple location quotient method

Appendix C

Backward and Forward Linkages for Regions

Table C.1a: Backward Linkages for Barisal Region - Percentage Changes in the Total Output, 1999-2000

Sector affected	Isolated Sector												
	1	2	3	4	5	6	7	8	9	10	11	12	13
1	**4.152**	0.373	2.993	0.809	0.022	0.121	0.197	0.126	0.058	0.025	0.023	0.220	0.348
2	0.031	**0.328**	0.272	0.016	0.002	0.010	0.016	0.010	0.004	0.002	0.002	0.015	0.050
3	1.069	1.062	**4.582**	0.787	0.087	0.459	0.592	0.463	0.187	0.092	0.070	0.506	0.056
4	0.188	0.040	0.143	**0.952**	0.014	0.157	0.388	0.181	0.003	0.020	0.021	0.094	0.005
5	0.037	0.129	0.168	0.232	**0.615**	0.021	0.092	0.031	0.006	0.004	0.005	0.031	0.002
6	1.896	2.011	1.752	0.182	0.127	**5.154**	0.091	0.064	0.026	0.013	0.010	0.078	0.047
7	0.815	0.123	0.868	0.218	0.097	0.309	**2.008**	0.042	0.013	0.008	0.099	0.060	0.020
8	0.194	0.152	0.332	0.048	0.021	0.520	0.434	**1.630**	0.024	0.067	0.038	0.430	0.009
9	0.247	0.005	0.040	0.011	0.000	0.003	0.004	0.003	**0.280**	0.001	0.034	0.004	0.005
10	0.005	0.003	0.005	0.003	0.001	0.004	0.005	0.006	0.000	**0.079**	0.035	0.046	0.000
11	0.062	0.039	0.071	0.043	0.008	0.079	0.084	0.107	0.002	0.013	**0.432**	0.069	0.002
12	0.926	0.573	0.835	0.440	0.136	0.673	0.917	0.952	0.025	0.320	0.159	**4.753**	0.040
13	0.011	0.004	0.010	0.004	0.001	0.006	0.056	0.007	0.002	0.002	0.009	0.062	**0.120**
BL	5.480	4.515	7.490	2.793	0.518	2.362	2.876	1.992	0.349	0.566	0.506	1.615	0.586

Code:

1 = Agriculture 2 = Fishing 3 = Industry 4 = Construction
5 = Utility 6 = Trade services 7 = Trans. & Comm. 8 = Housing
9 = Health 10 = Education 11 = Public Admin. 12 = Other services
13 = Hotel & Restaurant

Note: BL - Backward linkages is the sum of the off-diagonal elements in each column

Source: Based on the sectoral extraction method

Table C.1b: Backward Linkages for Chittagong Region - Percentage Changes in the Total Output, 1999-2000

Sector affected	Isolated Sector												
	1	2	3	4	5	6	7	8	9	10	11	12	13
1	**4.011**	0.701	3.130	0.978	0.068	0.348	0.513	0.340	0.142	0.058	0.061	0.432	0.336
2	0.080	**0.419**	0.360	0.059	0.008	0.039	0.058	0.038	0.015	0.006	0.007	0.045	0.060
3	3.623	3.521	**16.147**	2.947	0.377	1.916	2.596	1.856	0.741	0.313	0.305	1.971	0.237
4	0.175	0.058	0.177	**0.898**	0.017	0.162	0.402	0.177	0.008	0.018	0.023	0.097	0.006
5	0.077	0.162	0.262	0.284	**0.742**	0.047	0.144	0.055	0.016	0.007	0.010	0.057	0.005
6	2.110	2.179	2.491	0.481	0.186	**5.560**	0.377	0.261	0.104	0.044	0.044	0.285	0.074
7	1.040	0.330	1.383	0.415	0.148	0.500	**2.629**	0.158	0.058	0.026	0.146	0.184	0.037
8	0.237	0.194	0.445	0.100	0.031	0.560	0.510	**1.683**	0.037	0.061	0.045	0.442	0.014
9	0.210	0.010	0.042	0.014	0.001	0.006	0.009	0.007	**0.244**	0.001	0.037	0.007	0.004
10	0.005	0.003	0.006	0.003	0.001	0.005	0.006	0.006	0.000	**0.073**	0.034	0.041	0.000
11	0.079	0.054	0.112	0.060	0.012	0.104	0.118	0.133	0.006	0.014	**0.513**	0.086	0.004
12	0.953	0.640	1.107	0.547	0.163	0.784	1.116	1.032	0.058	0.284	0.183	**4.783**	0.052
13	0.016	0.008	0.019	0.008	0.002	0.010	0.081	0.010	0.003	0.003	0.013	0.080	**0.162**
BL	8.605	7.860	9.534	5.897	1.015	4.482	5.929	4.072	1.187	0.834	0.907	3.728	0.830

Code:

1 = Agriculture
2 = Fishing
3 = Industry
4 = Construction
5 = Utility
6 = Trade services
7 = Trans. & Comm.
8 = Housing
9 = Health
10 = Education
11 = Public Admin.
12 = Other services
13 = Hotel & Restaurant

Note: BL - Backward linkages is the sum of the off-diagonal elements in each column

Source: Based on the sectoral extraction method

Table C.1c: Backward Linkages for Dhaka Region - Percentage Changes in the Total Output, 1999-2000

Sector affected	Isolated Sector												
	1	2	3	4	5	6	7	8	9	10	11	12	13
1	**3.974**	0.230	3.331	0.731	0.075	0.294	0.424	0.282	0.097	0.036	0.073	0.302	0.275
2	0.037	**0.310**	0.276	0.032	0.006	0.024	0.035	0.023	0.007	0.003	0.006	0.023	0.035
3	2.889	1.453	**14.063**	2.748	0.529	2.042	2.706	1.944	0.634	0.247	0.462	1.731	0.219
4	0.133	0.022	0.217	**0.900**	0.023	0.166	0.404	0.178	0.006	0.013	0.034	0.081	0.005
5	0.072	0.079	0.409	0.318	**0.888**	0.059	0.179	0.068	0.016	0.006	0.018	0.059	0.005
6	1.694	0.902	3.213	0.432	0.263	**5.013**	0.380	0.264	0.086	0.033	0.064	0.240	0.061
7	0.838	0.135	1.815	0.386	0.210	0.537	**3.010**	0.163	0.049	0.020	0.227	0.159	0.033
8	0.201	0.085	0.624	0.097	0.045	0.650	0.577	**1.914**	0.034	0.052	0.074	0.422	0.014
9	0.150	0.003	0.041	0.009	0.001	0.005	0.007	0.006	**0.199**	0.001	0.051	0.005	0.003
10	0.003	0.001	0.006	0.002	0.001	0.004	0.005	0.005	0.000	**0.071**	0.043	0.030	0.000
11	0.072	0.026	0.167	0.065	0.020	0.129	0.143	0.162	0.006	0.013	**0.610**	0.088	0.004
12	0.663	0.229	1.245	0.442	0.201	0.734	1.023	0.952	0.042	0.199	0.246	**4.272**	0.041
13	0.012	0.003	0.024	0.007	0.003	0.010	0.085	0.010	0.002	0.002	0.020	0.071	**0.163**
BL	6.764	3.168	11.368	5.269	1.377	4.654	5.967	4.058	0.978	0.625	1.317	3.212	0.697

Code:

1 = Agriculture
2 = Fishing
3 = Industry
4 = Construction
5 = Utility
6 = Trade services
7 = Trans. & Comm.
8 = Housing
9 = Health
10 = Education
11 = Public Admin.
12 = Other services
13 = Hotel & Restaurant

Note: BL - Backward linkages is the sum of the off-diagonal elements in each column

Source: Based on the sectoral extraction method

Table C.1d: Backward Linkages for Khulna Region - Percentage Changes in the Total Output, 1999-2000

Sector affected	Isolated Sector												
	1	2	3	4	5	6	7	8	9	10	11	12	13
1	**3.530**	0.521	2.361	1.137	0.045	0.259	0.377	0.279	0.112	0.052	0.046	0.365	0.360
2	0.080	**0.272**	0.214	0.042	0.004	0.022	0.033	0.024	0.009	0.004	0.004	0.029	0.051
3	3.367	1.899	**10.754**	2.051	0.195	1.087	1.387	1.156	0.436	0.214	0.167	1.157	0.134
4	0.275	0.044	0.119	**0.969**	0.015	0.162	**0.386**	0.196	0.006	0.021	0.022	0.097	0.006
5	0.075	0.110	0.134	0.267	**0.576**	0.030	0.100	0.041	0.010	0.005	0.007	0.038	0.003
6	2.906	1.751	1.484	0.378	0.140	**5.292**	0.208	0.165	0.062	0.030	0.025	0.174	0.061
7	1.395	0.194	0.809	0.368	0.114	0.403	**2.448**	0.102	0.034	0.018	0.121	0.119	0.029
8	0.322	0.148	0.277	0.086	0.024	0.537	0.451	**1.584**	0.030	0.070	0.041	0.433	0.012
9	0.325	0.007	0.032	0.016	0.001	0.005	0.006	0.006	**0.357**	0.001	0.034	0.006	0.005
10	0.008	0.003	0.004	0.003	0.001	0.004	0.006	0.007	0.000	**0.076**	0.034	0.044	0.000
11	0.100	0.038	0.062	0.057	0.009	0.087	0.092	0.124	0.004	0.014	**0.461**	0.074	0.003
12	1.320	0.490	0.661	0.544	0.131	0.688	0.923	1.010	0.039	0.311	0.159	**4.668**	0.044
13	0.021	0.005	**0.011**	0.007	0.002	0.009	0.069	0.009	0.002	0.003	0.012	0.075	**0.146**
BL	10.192	5.210	6.169	4.956	0.680	3.293	4.036	3.117	0.744	0.743	0.670	2.611	0.707

Code:

1 = Agriculture
2 = Fishing
3 = Industry
4 = Construction
5 = Utility
6 = Trade services
7 = Trans. & Comm.
8 = Housing
9 = Health
10 = Education
11 = Public Admin.
12 = Other services
13 = Hotel & Restaurant

Note: BL - Backward linkages is the sum of the off-diagonal elements in each column

Source: Based on the sectoral extraction method

Table C.1e: Backward Linkages for Rajshahi Region - Percentage Changes in the Total Output, 1999-2000

Sector affected	Isolated Sector												
	1	2	3	4	5	6	7	8	9	10	11	12	13
1	**2.937**	0.225	1.690	1.204	0.037	0.162	0.225	0.232	0.091	0.049	0.029	0.324	0.298
2	0.049	**0.153**	0.113	0.025	0.002	0.010	0.014	0.014	0.005	0.003	0.002	0.018	0.032
3	2.592	0.751	**7.619**	1.691	0.155	0.657	0.774	**0.923**	0.330	0.195	0.101	0.917	0.075
4	0.288	0.020	0.080	**0.947**	0.016	0.140	0.312	0.225	0.004	0.027	0.019	0.108	0.005
5	0.081	0.072	0.115	0.379	**0.670**	0.027	0.093	0.051	0.010	0.007	0.006	0.047	0.002
6	2.822	0.869	0.942	0.314	0.140	**4.201**	0.108	0.119	0.042	0.025	0.014	0.127	0.039
7	1.219	0.069	0.469	0.317	0.105	0.274	**1.971**	0.071	0.021	0.014	0.086	0.086	0.018
8	0.323	0.075	0.195	0.083	0.026	0.486	0.372	**1.550**	0.031	0.094	0.036	0.510	0.009
9	0.371	0.003	0.022	0.017	0.001	0.003	0.004	0.005	**0.399**	0.001	0.030	0.005	0.004
10	0.008	0.001	0.003	0.004	0.001	0.004	0.004	0.007	0.000	**0.080**	0.031	0.051	0.000
11	0.093	0.018	0.039	0.058	0.009	0.069	0.067	0.129	0.003	0.016	**0.428**	0.076	0.002
12	1.432	0.265	0.469	0.623	0.152	0.606	0.751	1.183	0.035	0.419	0.143	**4.812**	0.034
13	0.017	0.002	0.006	0.006	0.002	0.006	0.048	0.009	0.002	0.003	0.009	0.075	**0.125**
BL	9.294	2.371	4.142	4.722	0.646	2.441	2.773	2.966	0.575	0.853	0.505	2.343	0.518

Code:

1 = Agriculture
2 = Fishing
3 = Industry
4 = Construction
5 = Utility
6 = Trade services
7 = Trans. & Comm.
8 = Housing
9 = Health
10 = Education
11 = Public Admin.
12 = Other services
13 = Hotel & Restaurant

Note: BL - Backward linkages is the sum of the off-diagonal elements in each column

Source: Based on the sectoral extraction method

Table C.1f: Backward Linkages for Sylhet Region - Percentage Changes in the Total Output, 1999-2000

Sector affected	Isolated Sector												
	1	2	3	4	5	6	7	8	9	10	11	12	13
1	**4.099**	0.504	3.029	1.291	0.097	0.280	0.378	0.310	0.155	0.063	0.046	0.517	0.253
2	0.097	**0.318**	0.275	0.055	0.009	0.024	0.033	0.027	0.013	0.005	0.004	0.041	0.036
3	4.288	1.930	**13.326**	2.717	0.426	1.203	1.494	1.319	0.625	0.269	0.182	1.814	0.119
4	0.267	0.035	0.141	**0.903**	0.025	0.139	0.323	0.174	0.007	0.021	0.018	0.119	0.004
5	0.115	0.126	0.235	0.383	**0.808**	0.039	0.120	0.054	0.017	0.008	0.008	0.071	0.003
6	2.571	1.223	1.622	0.408	0.215	**4.595**	0.188	0.159	0.075	0.032	0.022	0.227	0.039
7	1.169	0.147	0.834	0.344	0.162	0.296	**2.138**	0.090	0.039	0.018	0.086	0.140	0.018
8	0.266	0.100	0.283	0.084	0.034	0.394	0.322	**1.337**	0.031	0.058	0.029	0.451	0.007
9	0.327	0.007	0.040	0.018	0.001	0.005	0.006	0.006	**0.354**	0.001	0.029	0.008	0.003
10	0.007	0.002	0.005	0.004	0.001	0.004	0.005	0.006	0.000	**0.080**	0.029	0.053	0.000
11	0.083	0.026	0.064	0.051	0.013	0.063	0.065	0.092	0.004	0.011	**0.378**	0.076	0.002
12	1.352	0.409	0.835	0.602	0.230	0.610	0.798	0.919	0.052	0.310	0.139	**4.560**	0.032
13	0.013	0.003	0.008	0.005	0.002	0.005	0.038	0.005	0.002	0.002	0.007	0.061	**0.101**
BL	10.554	4.513	7.371	5.961	1.215	3.061	3.770	3.161	1.019	0.799	0.599	3.577	0.516

Code:

1 = Agriculture
2 = Fishing
3 = Industry
4 = Construction
5 = Utility
6 = Trade services
7 = Trans. & Comm.
8 = Housing
9 = Health
10 = Education
11 = Public Admin.
12 = Other services
13 = Hotel & Restaurant

Note: BL - Backward linkages is the sum of the off-diagonal elements in each column

Source: Based on the sectoral extraction method

Table C.2a: Forward Linkages for Barisal Region - Percentage Changes in the Total Output, 1999-2000

Sector affected	Isolated Sector												
	1	2	3	4	5	6	7	8	9	10	11	12	13
1	**5.385**	0.035	1.249	0.235	0.044	2.377	0.999	0.226	0.311	0.006	0.077	0.956	0.013
2	0.327	**3.671**	1.087	0.043	0.135	2.209	0.132	0.156	0.006	0.004	0.042	0.519	0.005
3	2.562	0.266	**5.844**	0.153	0.171	1.881	0.911	0.332	0.043	0.005	0.077	0.738	0.011
4	0.648	0.015	0.736	**1.807**	0.221	0.183	0.214	0.045	0.011	0.003	0.043	0.364	0.004
5	0.018	0.002	0.086	0.015	**0.401**	0.133	0.100	0.021	0.000	0.001	0.009	0.118	0.001
6	0.096	0.009	0.428	0.156	0.020	**1.703**	0.302	0.484	0.003	0.004	0.079	0.554	0.006
7	0.161	0.015	0.565	0.395	0.089	0.093	**2.060**	0.413	0.004	0.006	0.086	0.772	0.057
8	0.108	0.009	0.464	0.194	0.031	0.069	0.044	**1.502**	0.004	0.006	0.115	0.843	0.007
9	0.046	0.003	0.173	0.003	0.006	0.026	0.013	0.022	**0.215**	0.000	0.002	0.020	0.002
10	0.020	0.002	0.086	0.020	0.003	0.012	0.007	0.063	0.001	**0.393**	0.013	0.263	0.002
11	0.019	0.002	0.066	0.021	0.005	0.010	0.097	0.035	0.035	0.035	**0.366**	0.131	0.009
12	0.213	0.017	0.573	0.114	0.036	0.095	0.071	0.485	0.005	0.056	0.084	**1.391**	0.076
13	0.276	0.046	0.052	0.005	0.002	0.047	0.020	0.009	0.005	0.000	0.002	0.033	**0.365**
FL	4.495	0.420	5.563	1.354	0.765	7.137	2.909	2.290	0.427	0.126	0.629	5.311	0.194

Code:

1 = Agriculture 2 = Fishing 3 = Industry 4 = Construction
5 = Utility 6 = Trade services 7 = Trans. & Comm. 8 = Housing
9 = Health 10 = Education 11 = Public Admin. 12 = Other services
13 = Hotel & Restaurant

Note: FL - Forward linkages is the sum of the off-diagonal elements in each column

Source: Based on the sectoral extraction method

Table C.2b: Forward Linkages for Chittagong Region - Percentage Changes in the Total Output, 1999-2000

Sector affected	Isolated Sector												
	1	2	3	4	5	6	7	8	9	10	11	12	13
1	**6.687**	0.090	3.425	0.215	0.089	2.568	1.230	0.272	0.260	0.006	0.097	0.961	0.019
2	0.627	**5.056**	2.978	0.063	0.168	2.372	0.350	0.199	0.011	0.004	0.060	0.577	0.009
3	3.310	0.425	**8.643**	0.230	0.321	3.207	1.730	0.539	0.055	0.008	0.146	1.180	0.025
4	0.797	0.054	2.269	**3.091**	0.268	0.477	0.400	0.094	0.014	0.003	0.061	0.449	0.008
5	0.059	0.007	0.308	0.018	**0.632**	0.196	0.151	0.030	0.001	0.001	0.013	0.142	0.003
6	0.286	0.036	1.488	0.164	0.045	**2.661**	0.486	0.528	0.006	0.005	0.105	**0.649**	0.011
7	0.434	0.055	2.075	0.417	0.141	0.388	**3.462**	0.495	0.009	0.007	0.123	0.951	0.085
8	0.297	0.037	1.530	0.190	0.056	0.277	0.163	**2.412**	0.007	0.007	0.143	0.907	0.011
9	0.114	0.013	0.564	0.008	0.015	0.102	0.055	0.034	**0.598**	0.000	0.006	0.047	0.003
10	0.046	0.006	0.239	0.018	0.006	0.043	0.025	0.057	0.001	**0.460**	0.014	0.230	0.003
11	0.049	0.006	0.234	0.023	0.009	0.043	0.140	0.042	0.037	0.034	**0.518**	0.150	0.013
12	0.428	0.050	1.849	0.118	0.065	0.345	0.216	0.503	0.009	0.051	0.106	**2.533**	0.098
13	0.271	0.054	0.180	0.006	0.005	0.073	0.035	0.013	0.004	0.000	0.004	0.042	**0.429**
FL	6.718	0.833	17.139	1.470	1.189	10.092	4.979	2.807	0.415	0.125	0.876	6.286	0.287

Code:

1 = Agriculture
2 = Fishing
3 = Industry
4 = Construction
5 = Utility
6 = Trade services
7 = Trans. & Comm.
8 = Housing
9 = Health
10 = Education
11 = Public Admin.
12 = Other services
13 = Hotel & Restaurant

Note: FL - Forward linkages is the sum of the off-diagonal elements in each column

Source: Based on the sectoral extraction method

Table C.2c: Forward Linkages for Dhaka Region - Percentage Changes in the Total Output, 1999-2000

Sector affected	Isolated Sector												
	1	2	3	4	5	6	7	8	9	10	11	12	13
1	**5.143**	0.041	2.651	0.157	0.079	1.979	0.950	0.220	0.179	0.004	0.085	0.658	0.014
2	0.206	**2.016**	1.191	0.023	0.078	0.941	0.137	0.083	0.003	0.001	0.027	0.203	0.003
3	3.631	0.337	**10.618**	0.279	0.490	4.090	2.244	0.744	0.053	0.008	0.215	1.347	0.031
4	0.621	0.030	2.140	**2.881**	0.296	0.428	0.372	0.090	0.009	0.002	0.065	0.373	0.007
5	0.069	0.006	0.442	0.025	**0.900**	0.280	0.217	0.045	0.001	0.001	0.021	0.181	0.003
6	0.252	0.023	1.604	0.167	0.055	**2.868**	0.522	0.608	0.005	0.004	0.130	0.623	0.011
7	0.374	0.034	2.189	0.419	0.173	0.391	**3.632**	0.556	0.007	0.005	0.149	0.895	0.089
8	0.258	0.023	1.630	0.192	0.069	0.282	0.169	**2.521**	0.006	0.006	0.175	0.864	0.010
9	0.081	0.007	0.489	0.006	0.014	0.084	0.046	0.031	**0.518**	0.000	0.006	0.035	0.002
10	0.030	0.003	0.190	0.013	0.006	0.033	0.019	0.048	0.001	**0.358**	0.013	0.166	0.002
11	0.062	0.006	0.359	0.033	0.017	0.063	0.218	0.069	0.051	0.043	**0.779**	0.207	0.021
12	0.304	0.026	1.601	0.096	0.065	0.283	0.182	0.465	0.006	0.036	0.105	**2.217**	0.085
13	0.231	0.033	0.169	0.005	0.005	0.060	0.031	0.013	0.003	0.000	0.004	0.035	**0.379**
FL	6.119	0.569	14.654	1.418	1.347	8.913	5.107	2.973	0.325	0.110	0.994	5.587	0.278

Code:

1 = Agriculture
2 = Fishing
3 = Industry
4 = Construction
5 = Utility
6 = Trade services
7 = Trans. & Comm.
8 = Housing
9 = Health
10 = Education
11 = Public Admin.
12 = Other services
13 = Hotel & Restaurant

Note: FL - Forward linkages is the sum of the off-diagonal elements in each column

Source: Based on the sectoral extraction method

Table C.2d: Forward Linkages for Khulna Region - Percentage Changes in the Total Output, 1999-2000

Sector affected	Isolated Sector												
	1	2	3	4	5	6	7	8	9	10	11	12	13
1	**9.093**	0.092	3.623	0.349	0.091	3.682	1.720	0.381	0.417	0.010	0.127	1.386	0.026
2	0.450	**3.688**	1.764	0.048	0.115	1.915	0.207	0.152	0.008	0.003	0.042	0.444	0.006
3	2.194	0.231	**5.103**	0.141	0.151	1.748	0.928	0.305	0.038	0.005	0.074	0.645	0.013
4	0.897	0.038	1.740	**2.821**	0.255	0.377	0.358	0.081	0.016	0.003	0.057	0.450	0.007
5	0.038	0.004	0.173	0.016	**0.463**	0.147	0.116	0.023	0.001	0.001	0.010	0.113	0.002
6	0.204	0.020	0.923	0.163	0.028	**2.124**	0.393	0.501	0.005	0.005	0.088	0.570	0.009
7	0.306	0.031	1.210	0.397	0.098	0.214	**2.565**	0.433	0.007	0.006	0.095	0.786	0.071
8	0.236	0.023	1.051	0.210	0.041	0.177	0.106	**2.043**	0.006	0.007	0.133	0.896	0.010
9	0.088	0.008	0.366	0.005	0.009	0.061	0.033	0.028	**0.404**	0.000	0.004	0.032	0.002
10	0.040	0.004	0.180	0.021	0.005	0.030	0.017	0.064	0.001	**0.453**	0.014	0.255	0.003
11	0.036	0.004	0.141	0.022	0.006	0.024	0.117	0.038	0.034	0.034	**0.425**	0.131	0.012
12	0.348	0.032	1.185	0.117	0.044	0.210	0.139	0.488	0.007	0.053	0.090	**1.930**	0.091
13	0.281	0.046	0.113	0.006	0.003	0.060	0.028	0.011	0.005	0.000	0.003	0.036	**0.393**
FL	5.115	0.533	12.469	1.495	0.847	8.646	4.162	2.505	0.543	0.127	0.736	5.744	0.252

Code:

1 = Agriculture 2 = Fishing 3 = Industry 4 = Construction
5 = Utility 6 = Trade services 7 = Trans. & Comm. 8 = Housing
9 = Health 10 = Education 11 = Public Admin. 12 = Other services
13 = Hotel & Restaurant

Note: FL - Forward linkages is the sum of the off-diagonal elements in each column

Source: Based on the sectoral extraction method

Table C.2e: Forward Linkages for Rajshahi Region - Percentage Changes in the Total Output, 1999-2000

Sector affected	Isolated Sector												
	1	2	3	4	5	6	7	8	9	10	11	12	13
1	**8.764**	0.057	2.920	0.362	0.096	3.558	1.504	0.377	0.471	0.010	0.118	1.486	0.022
2	0.191	**1.758**	0.718	0.021	0.073	0.930	0.072	0.075	0.003	0.002	0.019	0.234	0.002
3	1.500	0.119	**3.330**	0.089	0.121	1.054	0.513	0.203	0.025	0.003	0.044	0.432	0.007
4	0.958	0.024	1.514	**2.906**	0.357	0.315	0.311	0.078	0.017	0.004	0.058	0.514	0.006
5	0.031	0.002	0.147	0.017	**0.477**	0.149	0.110	0.025	0.001	0.001	0.010	0.133	0.002
6	0.128	0.009	0.587	0.139	0.025	**1.672**	0.268	0.451	0.003	0.004	0.069	0.499	0.006
7	0.182	0.014	0.707	0.319	0.090	0.110	**1.875**	0.353	0.004	0.005	0.068	0.632	0.049
8	0.198	0.014	0.888	0.241	0.051	0.128	0.074	**2.113**	0.006	0.008	0.139	1.049	0.010
9	0.072	0.005	0.293	0.004	0.010	0.042	0.021	0.028	**0.338**	0.000	0.003	0.028	0.002
10	0.039	0.003	0.173	0.027	0.006	0.025	0.014	0.087	0.001	**0.560**	0.016	0.343	0.003
11	0.023	0.002	0.090	0.018	0.006	0.013	0.084	0.033	0.031	0.031	**0.344**	0.117	0.009
12	0.312	0.020	0.994	0.131	0.054	0.154	0.102	0.575	0.007	0.062	0.092	**1.899**	0.091
13	0.235	0.029	0.067	0.005	0.002	0.039	0.017	0.008	0.004	0.000	0.002	0.028	**0.311**
FL	3.870	0.298	9.099	1.373	0.891	6.516	3.088	2.293	0.572	0.129	0.637	5.496	0.209

Code:

1 = Agriculture
2 = Fishing
3 = Industry
4 = Construction
5 = Utility
6 = Trade services
7 = Trans. & Comm.
8 = Housing
9 = Health
10 = Education
11 = Public Admin.
12 = Other services
13 = Hotel & Restaurant

Note: FL - Forward linkages is the sum of the off-diagonal elements in each column

Source: Based on the sectoral extraction method

Table C.2f: Forward Linkages for Sylhet Region - Percentage Changes in the Total Output, 1999-2000

Sector affected	Isolated Sector												
	1	2	3	4	5	6	7	8	9	10	11	12	13
1	**9.164**	0.113	4.453	0.341	0.137	3.280	1.459	0.321	0.422	0.010	0.107	1.424	0.017
2	0.432	**3.045**	1.719	0.038	0.129	1.338	0.157	0.103	0.008	0.002	0.028	0.370	0.003
3	2.917	0.309	**6.335**	0.173	0.270	1.992	1.003	0.329	0.050	0.006	0.079	0.846	0.010
4	1.010	0.050	2.207	**3.302**	0.358	0.407	0.337	0.079	0.018	0.004	0.051	0.496	0.005
5	0.081	0.008	0.370	0.026	**0.809**	0.230	0.170	0.034	0.002	0.001	0.014	0.203	0.002
6	0.219	0.022	0.979	0.139	0.036	**1.893**	0.290	0.373	0.005	0.004	0.064	0.503	0.005
7	0.302	0.031	1.243	0.330	0.115	0.193	**2.285**	0.312	0.006	0.005	0.067	0.673	0.040
8	0.257	0.026	1.135	0.184	0.053	0.168	0.093	**1.964**	0.006	0.006	0.098	0.802	0.006
9	0.120	0.011	0.502	0.007	0.016	0.074	0.038	0.029	**0.541**	0.000	0.004	0.042	0.002
10	0.049	0.005	0.216	0.020	0.007	0.032	0.017	0.054	0.001	**0.469**	0.011	0.253	0.002
11	0.036	0.004	0.147	0.018	0.008	0.022	0.083	0.028	0.029	0.029	**0.364**	0.114	0.007
12	0.490	0.045	1.789	0.144	0.080	0.275	0.166	0.517	0.010	0.065	0.093	**2.562**	0.075
13	0.196	0.032	0.096	0.004	0.003	0.038	0.017	0.007	0.003	0.000	0.002	0.026	**0.280**
FL	6.111	0.656	14.858	1.427	1.212	8.051	3.830	2.185	0.559	0.132	0.618	5.752	0.173

Code:

1 = Agriculture
2 = Fishing
3 = Industry
4 = Construction
5 = Utility
6 = Trade services
7 = Trans. & Comm.
8 = Housing
9 = Health
10 = Education
11 = Public Admin.
12 = Other services
13 = Hotel & Restaurant

Note: FL - Forward linkages is the sum of the off-diagonal elements in each column

Source: Based on the sectoral extraction method

Appendix D

Results of MPM Analysis

Table D.1: MPM Analysis for Barisal Region, 1999-2000

Forward Linkage Sector	Backward Linkage Sector												
	13	3	1	2	5	12	4	7	8	11	10	6	9
1	0.245	0.210	0.204	0.197	0.192	0.178	0.173	0.171	0.168	0.157	0.156	0.149	0.145
12	0.225	0.193	0.187	0.181	0.177	0.164	0.159	0.157	0.155	0.144	0.143	0.137	0.133
3	0.199	0.171	0.166	0.161	0.157	0.145	0.141	0.139	0.137	0.128	0.127	0.122	0.118
6	0.182	0.156	0.152	0.147	0.143	0.132	0.129	0.127	0.125	0.117	0.116	0.111	0.108
7	0.147	0.126	0.122	0.118	0.115	0.107	0.104	0.102	0.101	0.094	0.093	0.089	0.087
8	0.143	0.123	0.120	0.116	0.113	0.104	0.102	0.100	0.099	0.092	0.091	0.087	0.085
2	0.127	0.109	0.106	0.103	0.100	0.093	0.090	0.089	0.088	0.082	0.081	0.078	0.076
4	0.122	0.105	0.102	0.098	0.096	0.089	0.086	0.085	0.084	0.078	0.078	0.074	0.072
5	0.120	0.103	0.100	0.097	0.094	0.087	0.085	0.083	0.082	0.077	0.076	0.073	0.071
11	0.113	0.097	0.094	0.091	0.089	0.082	0.080	0.079	0.078	0.072	0.072	0.069	0.067
9	0.109	0.094	0.091	0.088	0.086	0.080	0.077	0.076	0.075	0.070	0.070	0.067	0.065
10	0.107	0.092	0.089	0.086	0.084	0.078	0.076	0.075	0.074	0.069	0.068	0.065	0.063
13	0.107	0.092	0.089	0.086	0.084	0.078	0.076	0.075	0.074	0.069	0.068	0.065	0.063

Code:

1 = Agriculture
2 = Fishing
3 = Industry
4 = Construction
5 = Utility
6 = Trade services
7 = Trans. & Comm.
8 = Housing
9 = Health
10 = Education
11 = Public Admin.
12 = Other services
13 = Hotel & Restaurant

Source: Based on MPM analysis

Table D.2: MPM Analysis for Chittagong Region, 1999-2000

Forward Linkage Sector	Backward Linkage Sector												
	13	2	3	5	1	4	12	7	8	9	11	10	6
3	0.452	0.433	0.412	0.403	0.391	0.380	0.350	0.344	0.332	0.314	0.291	0.290	0.278
1	0.247	0.236	0.224	0.219	0.213	0.207	0.191	0.187	0.181	0.171	0.159	0.158	0.151
12	0.225	0.216	0.205	0.201	0.195	0.189	0.174	0.171	0.165	0.156	0.145	0.145	0.138
6	0.211	0.202	0.192	0.188	0.182	0.177	0.163	0.160	0.155	0.146	0.136	0.136	0.130
7	0.165	0.158	0.150	0.147	0.142	0.139	0.127	0.125	0.121	0.114	0.106	0.106	0.101
8	0.139	0.133	0.127	0.124	0.120	0.117	0.108	0.106	0.102	0.097	0.090	0.090	0.086
2	0.124	0.118	0.113	0.110	0.107	0.104	0.096	0.094	0.091	0.086	0.080	0.079	0.076
5	0.118	0.112	0.107	0.105	0.102	0.099	0.091	0.089	0.086	0.081	0.076	0.075	0.072
4	0.115	0.110	0.104	0.102	0.099	0.096	0.089	0.087	0.084	0.079	0.074	0.074	0.070
11	0.108	0.103	0.098	0.096	0.093	0.090	0.083	0.082	0.079	0.075	0.069	0.069	0.066
9	0.102	0.097	0.093	0.091	0.088	0.086	0.079	0.077	0.075	0.071	0.066	0.065	0.063
13	0.100	0.096	0.091	0.089	0.087	0.084	0.078	0.076	0.074	0.070	0.065	0.065	0.062
10	0.099	0.095	0.090	0.088	0.086	0.084	0.077	0.076	0.073	0.069	0.064	0.064	0.061

Code:

1 = Agriculture
2 = Fishing
3 = Industry
4 = Construction
5 = Utility
6 = Trade services
7 = Trans. & Comm.
8 = Housing
9 = Health
10 = Education
11 = Public Admin.
12 = Other services
13 = Hotel & Restaurant

Source: Based on MPM analysis

Table D.3: MPM Analysis for Dhaka Region, 1999-2000

Forward Linkage Sector	Backward Linkage Sector												
	2	13	5	3	1	4	12	7	8	9	11	10	6
3	0.411	0.407	0.401	0.394	0.374	0.372	0.340	0.339	0.328	0.311	0.288	0.286	0.277
1	0.200	0.198	0.195	0.192	0.182	0.182	0.166	0.165	0.160	0.151	0.140	0.139	0.135
12	0.193	0.191	0.188	0.185	0.176	0.175	0.160	0.159	0.154	0.146	0.135	0.134	0.130
6	0.191	0.190	0.186	0.184	0.174	0.173	0.158	0.158	0.153	0.145	0.134	0.133	0.129
7	0.152	0.151	0.149	0.146	0.139	0.138	0.126	0.126	0.122	0.115	0.107	0.106	0.103
8	0.132	0.131	0.129	0.127	0.120	0.120	0.110	0.109	0.106	0.100	0.093	0.092	0.089
5	0.113	0.112	0.110	0.109	0.103	0.103	0.094	0.093	0.090	0.086	0.079	0.079	0.076
4	0.106	0.105	0.103	0.102	0.097	0.096	0.088	0.088	0.085	0.080	0.074	0.074	0.071
2	0.105	0.104	0.102	0.101	0.096	0.095	0.087	0.087	0.084	0.079	0.074	0.073	0.071
11	0.102	0.101	0.099	0.098	0.093	0.093	0.085	0.084	0.081	0.077	0.071	0.071	0.069
9	0.094	0.094	0.092	0.091	0.086	0.086	0.078	0.078	0.075	0.071	0.066	0.066	0.064
13	0.094	0.093	0.092	0.090	0.086	0.085	0.078	0.078	0.075	0.071	0.066	0.065	0.063
10	0.093	0.092	0.090	0.089	0.084	0.084	0.077	0.076	0.074	0.070	0.065	0.064	0.062

Code:

1 = Agriculture
2 = Fishing
3 = Industry
4 = Construction
5 = Utility
6 = Trade services
7 = Trans. & Comm.
8 = Housing
9 = Health
10 = Education
11 = Public Admin.
12 = Other services
13 = Hotel & Restaurant

Source: Based on MPM analysis

Table D.4: MPM Analysis for Khulna Region, 1999-2000

Forward Linkage Sector	Backward Linkage Sector												
	13	3	2	1	5	4	12	7	8	11	9	10	6
3	0.333	0.289	0.283	0.278	0.268	0.249	0.240	0.234	0.227	0.206	0.206	0.204	0.196
1	0.273	0.237	0.232	0.228	0.220	0.205	0.197	0.192	0.186	0.169	0.169	0.167	0.160
12	0.230	0.200	0.195	0.192	0.185	0.172	0.166	0.162	0.157	0.142	0.142	0.141	0.135
6	0.205	0.178	0.174	0.171	0.165	0.154	0.148	0.144	0.140	0.127	0.127	0.125	0.120
7	0.164	0.142	0.139	0.137	0.132	0.123	0.118	0.115	0.112	0.101	0.101	0.100	0.096
8	0.147	0.128	0.125	0.123	0.118	0.110	0.106	0.103	0.101	0.091	0.091	0.090	0.087
2	0.129	0.112	0.110	0.108	0.104	0.097	0.093	0.091	0.088	0.080	0.080	0.079	0.076
4	0.123	0.107	0.105	0.103	0.099	0.092	0.089	0.086	0.084	0.076	0.076	0.075	0.072
5	0.121	0.105	0.103	0.101	0.097	0.090	0.087	0.085	0.082	0.075	0.075	0.074	0.071
11	0.114	0.098	0.096	0.095	0.091	0.085	0.082	0.080	0.077	0.070	0.070	0.069	0.067
9	0.109	0.095	0.093	0.091	0.088	0.082	0.079	0.077	0.074	0.067	0.067	0.067	0.064
13	0.107	0.093	0.091	0.090	0.086	0.080	0.077	0.075	0.073	0.066	0.066	0.066	0.063
10	0.107	0.092	0.090	0.089	0.086	0.080	0.077	0.075	0.073	0.066	0.066	0.065	0.063

Code:

1 = Agriculture
2 = Fishing
3 = Industry
4 = Construction
5 = Utility
6 = Trade services
7 = Trans. & Comm.
8 = Housing
9 = Health
10 = Education
11 = Public Admin.
12 = Other services
13 = Hotel & Restaurant

Source: Based on MPM analysis

Table D.5: MPM Analysis for Rajshahi Region, 1999-2000

Forward Linkage Sector	Backward Linkage Sector												
	13	3	1	2	5	4	12	7	8	11	10	9	6
3	0.255	0.221	0.215	0.208	0.206	0.190	0.189	0.182	0.179	0.163	0.163	0.157	0.156
1	0.254	0.220	0.214	0.207	0.205	0.189	0.188	0.181	0.178	0.162	0.162	0.156	0.155
12	0.225	0.195	0.189	0.183	0.182	0.167	0.167	0.160	0.158	0.144	0.144	0.139	0.137
6	0.182	0.158	0.153	0.148	0.147	0.135	0.135	0.130	0.128	0.117	0.116	0.112	0.111
7	0.146	0.127	0.123	0.119	0.118	0.109	0.108	0.104	0.103	0.094	0.093	0.090	0.089
8	0.144	0.125	0.122	0.118	0.117	0.107	0.107	0.103	0.101	0.092	0.092	0.089	0.088
5	0.122	0.106	0.103	0.099	0.098	0.091	0.090	0.087	0.086	0.078	0.078	0.075	0.074
4	0.121	0.105	0.102	0.098	0.097	0.090	0.089	0.086	0.085	0.077	0.077	0.074	0.074
2	0.120	0.104	0.101	0.098	0.097	0.090	0.089	0.086	0.085	0.077	0.077	0.074	0.074
11	0.111	0.096	0.093	0.090	0.090	0.083	0.082	0.079	0.078	0.071	0.071	0.068	0.068
9	0.108	0.093	0.091	0.088	0.087	0.080	0.080	0.077	0.076	0.069	0.069	0.066	0.066
13	0.106	0.091	0.089	0.086	0.085	0.079	0.078	0.075	0.074	0.068	0.067	0.065	0.064
10	0.105	0.091	0.089	0.086	0.085	0.078	0.078	0.075	0.074	0.068	0.067	0.065	0.064

Code:

1 = Agriculture
2 = Fishing
3 = Industry
4 = Construction
5 = Utility
6 = Trade services
7 = Trans. & Comm.
8 = Housing
9 = Health
10 = Education
11 = Public Admin.
12 = Other services
13 = Hotel & Restaurant

Source: Based on MPM analysis

Table D.6: MPM Analysis for Sylhet Region, 1999-2000

Forward Linkage Sector	Backward Linkage Sector												
	13	2	3	1	5	4	12	7	8	9	10	11	6
3	0.399	0.341	0.341	0.328	0.322	0.310	0.287	0.280	0.272	0.253	0.243	0.241	0.231
1	0.287	0.245	0.245	0.236	0.232	0.223	0.207	0.202	0.195	0.182	0.175	0.173	0.166
12	0.235	0.201	0.201	0.193	0.190	0.182	0.169	0.165	0.160	0.149	0.143	0.142	0.136
6	0.198	0.169	0.169	0.163	0.160	0.154	0.142	0.139	0.135	0.126	0.120	0.120	0.114
7	0.156	0.133	0.133	0.128	0.126	0.121	0.112	0.110	0.106	0.099	0.095	0.094	0.090
8	0.141	0.121	0.120	0.116	0.114	0.109	0.101	0.099	0.096	0.089	0.086	0.085	0.081
2	0.131	0.112	0.112	0.107	0.105	0.101	0.094	0.092	0.089	0.083	0.079	0.079	0.076
5	0.128	0.110	0.110	0.105	0.104	0.100	0.092	0.090	0.087	0.081	0.078	0.078	0.074
4	0.123	0.105	0.105	0.101	0.099	0.096	0.089	0.086	0.084	0.078	0.075	0.074	0.071
11	0.112	0.096	0.096	0.092	0.090	0.087	0.081	0.079	0.076	0.071	0.068	0.068	0.065
9	0.109	0.093	0.093	0.090	0.088	0.085	0.079	0.077	0.074	0.069	0.066	0.066	0.063
10	0.106	0.091	0.091	0.088	0.086	0.083	0.077	0.075	0.073	0.068	0.065	0.064	0.062
13	0.106	0.091	0.091	0.087	0.086	0.082	0.076	0.074	0.072	0.067	0.065	0.064	0.061

Code:

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9 = Health
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12 = Other services
13 = Hotel & Restaurant

Source: Based on MPM analysis

Appendix E

Results of Impact Analysis

Table E.1: Sectoral Output Change in Barisal Region due to Different Scenarios, 1999-2000

Sector Code	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6	Scenario 7	Scenario 8	Scenario 9	Scenario 10	Scenario 11	Scenario 12	Scenario 13
1	126005	3857	23617	10712	1991	923	2253	1640	2532	1048	1120	2688	56171
2	204	110398	2145	215	168	73	185	127	167	84	102	184	8146
3	7076	10968	107854	10421	7954	3510	6765	6039	8149	3860	3366	6182	9085
4	1246	408	1130	100897	1299	1197	4432	2363	116	850	993	1147	840
5	246	1333	1325	3067	105761	164	1047	400	284	150	252	383	342
6	12544	20766	13824	2416	11555	100477	1044	837	1133	525	494	958	7623
7	5392	1272	6849	2883	8877	2359	102776	542	566	320	4735	732	3249
8	1282	1570	2621	639	1956	3972	4951	107958	1048	2824	1802	5246	1503
9	1635	56	314	148	38	22	45	44	100034	22	1647	48	732
10	34	33	39	35	68	33	62	78	6	100069	1666	560	35
11	407	398	564	569	760	605	957	1400	94	527	100547	841	371
12	6129	5921	6587	5830	12427	5144	10468	12418	1078	13404	7621	122025	6412
13	70	45	81	54	129	47	634	85	66	87	448	761	100059
Total	**162270**	**157026**	**166950**	**137885**	**152983**	**118527**	**135617**	**133931**	**115274**	**123768**	**124795**	**141756**	**194568**

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8 = Housing
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12 = Other services
13 = Hotel & Restaurant

Source: Based on impact analysis

Table E.2: Sectoral Output Change in Chittagong Region due to Different Scenarios, 1999-2000

Sector Code	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6	Scenario 7	Scenario 8	Scenario 9	Scenario 10	Scenario 11	Scenario 12	Scenario 13
1	124168	8899	22747	13949	5959	2598	5418	4466	6305	2867	2765	5478	48777
2	617	111070	2613	845	673	289	611	493	662	319	323	576	8644
3	27886	44696	131325	42036	33122	14283	27420	24352	32943	15589	13880	25006	34350
4	1348	732	1290	101138	1525	1210	4243	2323	351	886	1044	1228	942
5	593	2056	1902	4057	107140	350	1520	728	692	344	457	720	755
6	16242	27656	18103	6868	16375	101999	3986	3426	4628	2181	1988	3621	10734
7	8007	4194	10053	5922	12974	3728	104999	2069	2578	1288	6636	2335	5385
8	1826	2465	3231	1434	2691	4178	5387	108246	1642	3056	2071	5607	2048
9	1614	126	307	194	94	46	90	86	100086	48	1671	89	639
10	39	43	45	45	75	35	67	81	15	100068	1530	521	39
11	605	689	811	862	1076	775	1245	1741	263	686	100712	1094	558
12	7339	8119	8045	7802	14329	5846	11788	13535	2596	14121	8356	123180	7524
13	121	99	141	110	214	78	854	132	114	126	604	1014	100102
Total	**190405**	**210844**	**200613**	**185260**	**196248**	**135416**	**167628**	**161678**	**152874**	**141580**	**142038**	**170467**	**220500**

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Source: Based on impact analysis

Table E.3: Sectoral Output Change in Dhaka Region due to Different Scenarios, 1999-2000

Sector Code	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6	Scenario 7	Scenario 8	Scenario 9	Scenario 10	Scenario 11	Scenario 12	Scenario 13
1	119020	6706	17863	10982	4673	2023	4207	3464	4954	2192	2123	4209	38239
2	336	106328	1480	475	381	163	343	276	375	176	180	319	4915
3	26434	42318	129730	41257	32756	14028	26839	23844	32525	15068	13412	24118	30431
4	1218	645	1166	101049	1434	1141	4004	2189	318	821	974	1131	760
5	659	2315	2195	4774	108433	404	1771	840	805	388	524	820	749
6	15495	26272	17229	6480	16287	101891	3770	3234	4398	2029	1848	3349	8475
7	7664	3931	9733	5796	13013	3690	104926	2003	2494	1224	6581	2222	4588
8	1838	2478	3345	1462	2819	4464	5721	108800	1732	3194	2159	5876	1919
9	1376	88	218	140	71	36	69	68	100061	36	1479	66	447
10	28	31	33	34	56	28	51	63	11	100050	1244	415	26
11	658	745	895	971	1227	886	1417	1990	294	769	100804	1226	553
12	6064	6662	6679	6643	12427	5041	10144	11680	2178	12148	7145	119930	5753
13	108	86	128	100	199	71	842	118	110	110	594	988	100082
Total	**180899**	**198604**	**190693**	**180163**	**193778**	**133866**	**164105**	**158572**	**150254**	**138206**	**139066**	**164668**	**196938**

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7 = Trans. & Comm.
8 = Housing
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10 = Education
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12 = Other services
13 = Hotel & Restaurant

Source: Based on impact analysis

Table E.4: Sectoral Output Change in Khulna Region due to Different Scenarios, 1999-2000

Sector Code	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6	Scenario 7	Scenario 8	Scenario 9	Scenario 10	Scenario 11	Scenario 12	Scenario 13
1	128253	7281	26121	13954	4541	2030	4453	3516	5059	2245	2258	4702	59012
2	408	110709	2373	510	401	174	390	298	397	193	209	373	8404
3	17250	26549	119177	25162	19452	8519	16390	14552	19631	9278	8250	14903	21988
4	1411	609	1321	101085	1504	1272	4563	2465	249	912	1085	1250	1014
5	385	1539	1487	3274	105954	232	1178	510	430	219	323	495	511
6	14889	24470	16423	4632	14013	101205	2461	2075	2802	1312	1214	2245	9974
7	7149	2712	8957	4516	11361	3162	104007	1286	1533	787	5958	1529	4818
8	1651	2074	3065	1060	2395	4206	5327	108349	1374	3018	2004	5578	1913
9	1666	103	349	192	73	37	75	71	100068	39	1663	76	770
10	39	39	44	41	73	35	66	82	11	100070	1668	562	40
11	511	529	689	701	903	683	1089	1554	169	597	100624	953	482
12	6762	6851	7315	6670	13066	5392	10904	12704	1777	13456	7849	122114	7152
13	106	75	122	87	185	67	811	115	96	113	574	965	100092
Total	**180477**	**183539**	**187444**	**161883**	**173920**	**127016**	**151715**	**147577**	**133596**	**132238**	**133679**	**155746**	**216170**

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Source: Based on impact analysis

Table E.5: Sectoral Output Change in Rajshahi Region due to Different Scenarios, 1999-2000

Sector Code	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6	Scenario 7	Scenario 8	Scenario 9	Scenario 10	Scenario 11	Scenario 12	Scenario 13
1	126976	5245	24678	12174	3118	1414	3227	2492	3666	1591	1603	3586	57326
2	216	107771	1655	257	200	87	203	151	200	98	109	197	6093
3	11513	17470	112727	17088	13085	5746	11093	9911	13320	6321	5494	10136	14484
4	1277	461	1165	100968	1345	1220	4480	2412	170	878	1009	1193	883
5	361	1681	1673	3829	107080	232	1337	545	421	219	336	525	466
6	12535	20223	13748	3178	11789	100729	1542	1276	1713	802	735	1402	7598
7	5413	1599	6845	3206	8875	2392	102931	757	858	457	4657	946	3420
8	1432	1755	2850	844	2176	4246	5333	108500	1235	3043	1946	5639	1679
9	1647	74	328	167	53	28	57	55	100049	29	1654	60	747
10	35	34	40	38	70	33	64	79	8	100069	1666	561	36
11	414	408	568	588	767	600	954	1384	118	526	100541	839	379
12	6358	6178	6844	6292	12824	5295	10771	12704	1399	13570	7746	122302	6625
13	77	52	89	63	141	52	687	95	75	95	483	825	100067
Total	**168254**	**162953**	**173210**	**148690**	**161524**	**122075**	**142680**	**140362**	**123233**	**127699**	**127979**	**148211**	**199801**

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Source: Based on impact analysis