TAXATION AND ECONOMIC DEVELOPMENT IN BANGLADESH WITH SPECIAL REFERENCE TO INDIRECT TAXATION

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LIST OF CONTENTS

CHAPTER ON INTRODUCTION

CHAPTER 1 TAXATION 1N BANGLADESH

CHAPTER 2 THEORETICAL ANALYSIS OF THE CAUSES OF TAX REVENUE CHANGES

CHAPTER 3 DETERMINANTS OF TAX REVENUE IN BANGLADESH

CHAPTER 4 REVENUE EFFECT OF TAX RATE CHANGE IN BANGALADESH SOME CASE STUDIES.

CHAPTER 5. EFFECTIVE TAXES IN BANGLADESH. 1986-87

CHAPTER 6 REDISTRIBUTIVE EFFECTS OF INDIRECT TAXES IN BANGLADESH

Chapter 7 SUMMARY AND CONCLUDING OBSERVATIONS

LIST OF TABLES

CHAPTER 1

CHAPTER 3

CHAPTER 4

CHAPTER 5

CHAPTER 6

CHAPTER 7

ABSTRACT

In this thesis we have tried to analyse certain aspects of indirect taxation in the context of economic development in Bangladesh, emphasizing the revenue and the equity aspects, assuming that these two are of major concern for growth with increased welfare for the people in a developing country. Since indirect taxes contribute the largest amount to the total tax revenue of the government in Bangladesh, we have concentrated on indirect taxation in this thesis.

(1) The introduction of the thesis gives a brief discussion of the major issues of taxation and development and presents the organization of the study. (2) We then present an overall analysis of the tax system in Bangladesh in the context of development objectives and their policy implications. The (low) tax/GDP ratio in Bangladesh and the Bangladesh tax structure are compared with other developing countries. (3) We have tried to identify the factors determining the responsiveness of taxes in general, and have estimated elasticity and buoyancy of various taxes in Bangladesh to get an indication of how tax revenue responds to development. It is shown that all the indirect taxes, except excise, are income elastic and that direct taxes are more elastic than indirect taxes, while trade taxes are more elastic than domestic taxes. The implications of these findings are analysed in the context of the policy shift of the government to move away from trade taxes to domestic taxes. (4) We have also tried to relate the revenue raised from some individual indirect taxes in Bangladesh to a small number of explanatory variables in order to analyse the revenue effect of tax rate changes. It is shown that there is a predictable relationship between changes in

tax rates and changes in tax revenue. (5) Since the indirect tax system in Bangladesh provides limited rate rebates for taxation levied at earlier stages of production, the effective rates of tax on commodities are greater than, and may be substantially different from, the nominal rates imposed. In Chapter 5, we therefore have computed effective as opposed to nominal rates, using a 53 sector I-0 table, and have considered the division of these effective rates between import and domestic supply. It is shown that the effective taxes are in all cases higher than the corresponding nominal rates and, specifically, are positive even where nominal rates are zero: therefore the indirect tax structure affects all the sectors of the economy in Bangladesh. (6) It is these effective rates rather than nominal rates which determine distributive effects. In Chapter 6, we therefore have applied these rates in an attempt to assess the distributional impact of the indirect tax system. It is shown that indirect taxation is mildly progressive for the country as a whole, while domestic taxes are slightly progressive and import taxes are proportional. Some simulation exercises are done to test the scope of making the existing tax system more progressive. (7) Finally, concluding chapter reviews the results derived in the thesis and considers their relevance for policy and improvement of data and further research required to facilitate the choice of tax policy appropriate for Bangladesh.

DECLARATION

No portion of the work referred to in the thesis has been submitted in support of an application for another degree or qualification of this or any other university or other institute of learning.

ABBREVIATIONS

ACT	=	Adjusted Customs Tax
ADA	=	Accelerated Depreciation Allowance.
ADM1	=	Administration 1
ADM2	=	Administration 2
ADP	=	Annual Development Programme
AIM	=	Adjusted Import Tax
AP	=	Annual Plan
AT	=	Adjusted Total Tax
ATE	=	Adjusted Excise Tax
ATS	=	Adjusted Sales Tax
ATSM	=	Adjusted Import Sales Tax
ATX	=	Adjusted Export Tax
ATY	=	Adjusted Income Tax
Bank	=	World Bank
BBS	=	Bangladesh Bureau of Statistics
BIDS	=	Bangladesh Institute of Development Studies
Bn	=	Billion
C.i.f	=	Cost, Insurance, Freight.
Cr	=	Crore
DFFYP	=	Fourth Five Year Plan (1990-95)
EPZ	=	Export Processing Zone
FFYP	=	First Five Year Plan (1973-78)
GDP	=	Gross Domestic Product

GDPNA	=	Non-Agricultural GDP (N.A. GDP)
GOB	=	Govt. of Bangladesh
HES	=	Household Expenditure Survey
HIG	=	Household Income Group
I-O	=	Input-Output
MDPV	=	Duty Paid Value of Import
MDV	=	Dutiable Value of Import
MHHIG	=	Monthly Household Income Group
Mn	=	Million
MODVAT	=	Modified Value Added Tax
MV	=	Import Value
MVA	=	Value Added in the Manufacturing Sector
NIP	=	New Industrial Policy (1982)
PC	=	Private Consumption (Table 12, Chapter 6)
RIP	=	Revised Industrial Policy (1986)
SFYP	=	Second Five Year Plan (1980-85)
TEC	=	Taxation Enquiry Commission
TFYP	=	Third Five Year Plan (1985-90)
TIP	=	Trade and Industrial Policy (Reform Programme)
TK	=	Taka
TYP	=	Two Year Plan (1978-80)
VAT	=	Value Added Tax
XDPV	=	Duty Paid Value of Export
XDV	=	Dutiable Value of Export

INTRODUCTION

Introduction and Organization of the Study

I. Introduction

(1) Over the last few decades, a number of developing countries have been trying hard to develop their economies at faster rates. In this race, the newly industrialised countries (NICs), consisting of South Korea, Singapore, Hongkong and Taiwan, and more recently some other countries in the South East like Malayasia, Thailand, Indonesia have come out relatively more successful. This success has brought out at least two important lessons for other developing countries: (i) for rapid economic development, a country has to increase its growth-GDP ratio to around 6-10% per annum, and (ii) the main strategy for achieving this high rate of growth should be an outward-looking open-economic policy, designed to promote growth through export expansion on the basis of competitive efficiency, in place of conventional inward-looking import substitution policy.

The implication of these lessons on domestic resource mobilisation for the developing countries is profound : if in the initial years the saving-GDP ratio is low, foriegn assistance may help, but over the years, the domestic savings ratio has to go up to make the higher growth rate sustainable. This requires economic policies - fiscal, monetary and commercial - to be restructured in such a way that they not only help transition from an inward-looking import-substitution orientation to an outward-looking export-promoting orientation but also in the process, raise the domestic savings so as to take the economy towards a more selfreliant growth. In the specific field of fiscal policy, the suggested recommendations are mainly a gradual shift from trade to consumption taxes in the case of indirect taxes, lowering of the rates of direct taxes while widening their bases, greater mobilisation of resources from non-tax sources, improvement in the tax administration and reduction of public expenditures to the minimum.

(2) It is now admitted that it is difficult to change the orientation of the economy from import-substitution to export-promotion overnight : it involves complex questions of structural adjustment reforms and their appropriate ordering, sequencing and timing. (W.B.1993). In the context of Bangladesh, systematic structural adjustment reform was introduced in the economy primarily after 1986 with the Structural Adjustment Facility of the IMF and Sectoral Programme Loans of the World Bank. However, as the pace of adjustment was slow, the economy had to depend mainly on conventional patterns of economic policy for resource mobilization in general and on indirect taxation in the case of fiscal policy in particular. Foreign assistance financed only about 3% of the GDP in 1965 with investment ratio at 11% and domestic savings at 8%. In contrast, foreign assistance rose to 10% in 1985 to finance an investment ratio of 13% with the domestic saving ratio only at about 3%. The situation did not change substantially even after some structural adjustment reforms were introduced during 1986-90. As such, the dependence of Bangladesh economy on the conventional fiscal policy with emphasis on indirect taxation continued throughout the period under consideration.

(3) The nature of development in the developing countries is such that a substantial part of this would be undertaken by the public sector rather than the private sector (e.g., social and

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economic infrastructure building). The government of the developing countries play a dominant role in the process of development in undertaking directly productive activities and in providing necessery support for efficient operation of the private sector. The public sector activities have therefore expanded tremendously in these countries and with it, the need for mobilising larger resources for financing public sector programmes from various sources.e.g., tax and non-tax resources, domestic and external borrowings, loans and grants from external sources. Taxation is, however, regarded as the most important instrument in generating larger domestic savings for financing invesment programmes. This is due to the fact that (i) revenue from non-tax sources is small; (ii) the internal borrowing may be difficult in an economy with limited financial markets and there is need to guard against the inflationary consequences of relying heavily on domestic loan finance; (iii) as far as the possibility of external borrowing is concerned, this may again be conditional on the creation of confidence that the government is managing its finances responsively. Further, there is the question of debt servicing which drains away foreign exchanges from the country; (iv) foreign grants are also limited and are often conditional on raising a substantial part of the revenue by the receiving country's own action. For all these reasons, the tax system may be required to provide major part of the funding for development.

(4) Appropriate taxation policies for resource mobilization are usually formulated and implemented through national budgets. A budget is a financial plan of the government in the sense that it serves as the basis of decision making regarding various expenditure programmes of the government that are to be financed from expected revenue from different sources. For the same reason, it is an instrument of financial control. As the role of the government in the developing countries increases in the context of attaining broad national

objectives, such as a higher level of income and employment and reduction of economic disparity in the process of growth, the crucial importance of taxation also increases as an important policy variable to attain these objectives.

(5) The major objectives of taxation in the developing countries are mobilization of increased resources to finance government expenditure efficiently, reduction of inequality, increasing the rate of savings and investment to accelerate growth of the economy, accelerate domestic production, allocating resources according to the plan, etc. Taxation is used to serve many other purposes in the developing countries. However, mobilization of domestic resources is the dominant objective of taxation in these countries, owing to their very poor resource base.

(6) Since a large part of the country's national product is allocated, not by individual choices in the market but by the public decision making, the economic welfare of all the sections of the community can be affected by the way in which the government raises the revenues and by the way in which it disposes of them. For this, it is essential to know the market reactions to various tax and expenditure policies so that a choice can be made regarding the policies that would produce optimal results and also to be able to predict about future changes (Musgrave, 1959, pp 4-5). Where the national planning goals include a concern for reducing inequality, taxation and expenditure policies need to be framed in such a way as to achieve the equity objective simultaneously with the objective of accelerating growth. Reconciling the conflicts between equity and growth has to be achieved mainly through the political mechanism.

(7) In the economies where the market mechanism predominates, it may be difficult to predict the market behaviour with a high degree of accuracy, but where there is a sizeable public sector, it would be relatively easy as well as more desirable to know the impact of taxation on different social groups and the implication of these impacts on growth and equity. In most developing countries of the Third World, the public sector happens to be quite large and important due to market failure; it is therefore all the more important to know the social and the political aspects of taxation, besides the economic aspects only. There is however emphasis on government failure arising from corruption, inefficiency and rent seeking in the developing countries in recent years, since the performance of the public sector in achieving the desired goals is affected seriously by the presence and the degree of such factors (Burgess and Stern, 1992, pp2-6).

(8) The classicists, beginning with Adam Smith, were proponents of least government intervention in the operation of the economic system, disregarding the effects of such government action on national income. Keynes, on the other hand, emphasized the role of government in correcting the market imperfections arising from macro-economic imbalances. The classicists believed in the self-correcting mechanism of the economic system, and taxation therefore had little role to play in achieving the objectives of stability in income, employment and prices. The economic system however did not work the way expected by the classicists, as their theory was based on several assumptions which were found contradictory to practical situations created by market imperfections and changes in the behaviour pattern (Due, 1959, pp 520-540). After the great depression of the thirties, the role of the government became important, and with it the role of fiscal policy, influenced by the writings of Keynes. The Keynesian economics greatly influenced the economic thinking

and policies of the developing countries in framing their development plans to accelerate growth. Similarly, an important element was the influence of the Harrod - Domar type growth model.

(9) The later economists emphasized the role of stabilization along with allocation, distribution and growth (Musgrave,1959,pp.1-30). Stabilization for the developing countries has been used in a different way from that in Keynesian economics, where it is regarded mainly as a countercyclical fiscal policy for stability in income, employment and prices.These are more important problems of the developed countries. In the developing countries, it is not easy to interpret stabilization in this sense, because of the very nature of these economies. The stabilisation objective takes on a different meaning in these countries, where the major problems are related to budgetary and balance of payment deficits and with inflation, rather that cyclical fluctuations.(Ahmed and Stern,1986,pp 8-9). The question of revenue raising is associated with these problems of chronic deficits in the developing countries and hence with the related problems of foreign exchange, foreign trades and foreign aid, besides domestic resource mobilization and their various effects on the economy. The present day governments of the developing countries are concerned with long term problems of structural adjustments also, besides short run problems of stabilization. (Stern,1989, Part 3.5).

(10) Growth being the major objective of the developing countries, the question of capital formation and hence savings and investment became important in the poor developing countries, like Bangladesh. The development plans are usually formulated on the basis of investment requirements to achieve the target growth rate. The estimates of investments are made on the basis of capital-output ratios. The role of government became important for

increasing the rate of capital formation by using tax and expenditure policies and by reallocation of resources between the public and the private sectors. The question of mobilizing larger resources through taxation, therefore, came to the forefront.

The developing countries, however, started facing difficulties in raising sufficient resources through taxation for a number of reasons: limitations on the choice of taxes imposed by weak administration and poor taxpayer compliancy, political resistance to high taxation, the very low income level of most of the population and so on. The factors which affect the level of taxation are important to consider in framing tax policy, as also the distortive effects and the distributive aspects. These areas were not given proper attention in the Keynesian economics, as the approach was aggregative. (Tanzi, 1991, pp 23-24). Though the planning in many developing countries still reflects the influences of Keynesian economics and the Harrod-Domar type growth model, the problems associated with raising of revenue through taxation in these countries limit the success of taxation in realizing the objectives of growth.

(11) Thus, inspite of the importance of taxation in mobilising larger domestic resources, savings are low in the developing countries, financing only a small part of development expenditures. Most of the developing countries have, therefore, been depending on foreign assistance to cover the gap. Domestic savings are low in these countries because there are strict limits to the effectiveness of a policy of trying to raise the overall savings ratio by collecting tax revenue greatly in excess of current government expenditures. The surplus increases the overall savings ratio only to the extent that it is not matched by a decrease in the private savings. Indirect taxation is less likely than, say profit taxation, to single out groups in the economy who have high marginal propensities to save. But to the extent that

market money wage levels are sensitive to changes in the cost of subsistance produced by indirect tax changes, even these changes may affect the real income of the high-saving employer-entrepreneurs. Further, credibility of a high public-surplus strategy for promoting development depends on the efficient use of the surplus, whether by using it directly for infrastructure investment, or to finance public enterprise invesment, or through a Public Investment Bank or similar agency, to finance desirable private investment. Nothing is gained by forced saving, however, if the surplus simply leads to an increase in unproductive investment which is economically worthless in terms of net social benefits.

Moreover, taxation is more than a lump-sum transfer, from the private to the public sector, of power to make claims on resources. The behaviour may be responsive to taxation and so there may be conflicts between, for example, raising of enough revenue on the one hand and providing sufficient incentive for work and for private investment on the other. Besides, not only are increases in tax revenue likely to impose additional deadweight loss through the distortion of economic decisions, but there is likely to be additional loss through the absorption of resources in activities such as administration, compliance, avoidance and evasion. The choice of taxes may also be tempered by a concern to ensure that the system is reasonably progressive and does not impose severe burdens on the lowest income group in the society.

In recent years, therefore, the emphasis is on tax reform and tax design appropriate for the developing countries, taking these various aspects into consideration. A properly designed tax system, or tax reform of an existing one, may help to generate automatic increases in tax revenue for economic development. The tax policies of the developing countries thus have to deal with many specific issues in the context of revenue requirements and objectives of development policy (Musgrave, 1987, pp 262-262).

(12) Most of the developing countries have been dependent on foreign assistance to meet the savings-investment gap. These countries have a significant tradeables sector and have received assistance with their development programmes, in loans and/or grants, from private sector lenders, foreign governments and international agencies. The availability of these funds not only provides an additional element of flexibility in development policies, it also affects the use of taxation as an economic instrument, because the availability of foreign assistance may be dependent on the policies and the interests of the foreign donors and they may see the borrowers taxation policies as relevent to these concerns. There have, however, been some changes in the attitudes of the donor countries in the 80's. (Ferreira, 1992). Previously, while donors were concerned that borrowers should follow responsible policies, they did not try to lay down in details the particular form which these policies should take. More recently, however, the donors, particularly international agencies, such as IMF and W.B., have been insisting that the countries receiving foreign assistances should follow short term stabilisation and long run structural adjustment programmes to maintain budget deficits (savings-investment gap), current-account foreign deficits (balance-of-payments gap) and inflation under control. The availability of foreign assistance was made conditional to the vigorous pursuit of various reform measures suggested by IMF and W.B., fiscal reform measures being the most important ones of them. Most of the developing countries are now pursuing structural adjustment programmes and have achieved some success in reducing deficits and improving the overall management of the economy. (W.B. 1989).

The change in the attitude of donor countries has reflected, in part, a change in the prevailing intellectual climate, with greater trust in the effectiveness of the market forces in guiding the efficient allocation of resources and a greater stress on the significance of government failure. A corollery has been a greater emphasis on trying to ensure that the tax, control and expenditure systems of the borrowing countries hinder the efficient working of the market as little as possible. Without requiring that the borrowing countries should try to impliment optimal tax system, there has been concern that the systems should be rationalised so as to reduce distortions of economic choice. In the area of taxation, this means a pressure for generally more uniform taxation of commodities (even when this implies a retreat from distributional objectives) and, analogously, cost-related prices for the output of the public undertakings. Other forms of measures which have been encouraged as facilitating the efficient operation of the market have included the replacement of quantitative restrictions on imports by tariffs, the reduction of effective protection to the relevant domestic industries and the restraint on inflation as a specific objective of economic policy. Associated with this change in the donors' attitudes, there has been a change in the purposes for which international loans are offered : a significant part of W.B. lending, for example, is now to support countries' efforts to undertake structural adjustments along the lines indicated above, rather than to finance specific investment projects.

(13) Inspite of such changes in policies, the outcome has not been very encouraging so far as private sector activities are concerned. This is due to the fact that the private sector activities depend on many factors. Fiscal measures are important to influence private savings and investments. There is need to have appropriate monetary and commercial policies also to encourage private savings and investments. The financial institutions do not always follow

policies particularly encouraging for the private sector. The money markets are not well developed to channelise capital for investments. The relaxation of import restrictions and controls have not encouraged private investments to a large extent in risky ventures. Besides, there has to be a politically stable and economically sound domestic environment for large scale private prticipation. International environments also affect private decision making.

(14) The srtuctural adjustment programmes favoured by the donor agencies may not be completely coincide with a country's own perception of what is required for its effective development : after all government willingness to promote infrastructure and large-scale investments which the private sector does not undertake, implies a refusal to accept the market test as an infallible guide to the efficient allocation of resources. The public sector therefore will continue to play an important role in the task of develpment. And with it, taxation will continue play a dominant role in the process of development, both in terms of financing public sector programmes and in terms of designing a tax structure which encourages efficiency in resource use and investment, and promotes faireness in the distribution of the rewards from development.

(15) The role of the government is thus much more absorbing and complex in the present day developing countries, owing to international economic relationships and owing to increased consciousness of the people regarding the effects of government interventions in various aspects of their lives. We have, therefore, been observing continuous shifts in the emphasis on the major development goal of the developing countries from growth with distribution to growth first and distribution later, and on the critical factor determining the level of development from capital to surplus labour, from labour to technology, from

technology to human capital and reversing the process again. The role of taxation varies with such changes in the development goals, emphasizing on different aspects, while raising revenue for government finances.

II. Organisation of the study

Mobilization of domestic resources has been crucial for financing economic development programmes in Bangladesh. Taxation which largely takes the form of indirect taxation, plays a very important role in mobilizing domestic resources in the country. In this thesis, we intend to analyse some aspects of indirect taxation in the context of economic development in Bangladesh.

In the first part of the Chapter on Introduction, we discuss briefly about some important issues of taxation and development in the developing countries.

In Chapter 1, we present an overall analysis of the tax system in Bangladesh in the context of development objectives and their policy implications. The major development goals and strategies followed to achieve the goals, during the Five Year Plan periods are analysed in relation to the growth philosophy pursued in development planning. The tax-GDP ratio and tax structure of Bangladesh are analysed and compared with other developing countries.

In Chapter 2 we present a theoretical discussion of the determinants of tax revenue change. Here we try to identify the factors that affect the responsiveness of taxes with respect to changes in national income and also with respect to changes in the proxy bases. One issue is the extent to which changes in observed tax revenue may be attributed to changes in tax rates or tax policy, rather than to changes in income or in the tax base. We discuss different methods of adjusting observed revenues so as to neutralize the effects of tax changes, with the aim of estimating the "elasticity" of the tax system or of individual taxes.

Chapter 3 presents an analysis of the determinants of tax revenue in Bangladesh. The elasticity and buoyancy of direct and indirect taxes are estimated by using regression techniques. The reasons for the differences in elasticity and buoyancy of different taxes are also discussed in details.

In Chapter 4 we develop a model for estimating the revenue effects of tax rate changes of five different commodities. The responsiveness of tax revenue with respect to tax-rate changes is analysed under a partial equilibrium framework.

In Chapter 5, a distinction is made between nominal tax rate and effective tax rate; and effective tax rates for Bangladesh are estimated and analysed for the year 1986-87, using an economy-wide input-output table. The differences between nominal and effective taxes are estimated to show the extent of input taxation and its effects.

Chapter 6 presents the redistributive effects of taxation in Bangladesh, using the effective taxes estimated in Chapter 5. The distribution pattern is estimated for Bangladesh as a whole and for rural and urban areas separately, both for domestic and for import taxes. Estimates are made for tax incidence by socio-economic groups also. Some simulation exercises are carried out to examine the possibilities of making the existing tax system more progressive.

Finally, Chapter 7 presents the summary and the concluding observations of the thesis along with policy implications.

CHAPTER 1

TAXATION IN BANGLADESH

1. Introduction.

Taxation has been relied upon as an important policy instrument by the government of Bangladesh to achieve various development goals. Bangladesh started the process of planned development from 1973 and so far implemented three Five Year Plans and one Two-Year Plan. The aims and objectives of these plans are largely determined by the nature of the economy and the socio-economic imperatives of the country.

2. The Economy of Bangladesh.

Bangladesh is a small country (56,000 square miles) with a very large population (about 110 million in 1990). The per-capita income is low ($210 in 1990). Agriculture accounts for about 48% of GDP, but it depends mostly on rain-fed irrigation. The country is exposed to frequent natural calamities (floods, cyclones, droughts, tidal bores, etc.). It exports mainly primary commodities (jute, tea, leather) and is therefore to suffer more due to the deterioration in the international economic situation and fluctuations in the prices of world commodity market. Moreover, it is a comparatively new country that achieved its independence in 1971, after a violent civil war and as such, it inherited additional problems of economic rehabilitation, reconstruction and nation building.

3. Development Planning in Bangladesh.

The major objective of planning in Bangladesh has been to increase the rate of growth of national income, to reduce poverty and unemployment, to reduce dependence on foreign assistance and to reduce inequality in the distribution of income. The major strategy to achieve most of these objectives has been to increase investment, mainly in the public sector. Agriculture has been given importance to cope with the problem of unemployment and to increase the supply of food and raw material. Moving towards self-sufficiency by mobilizing larger domestic resources on the one hand and by having import-substitution and export promotion on the other hand has been the strategy to reduce dependence on foreign assistance. Poverty alleviation and increasing the supply of essential consumable at stable prices have been the strategies to reduce inequality.

The sectoral allocation pattern in the Plans and the polices adopted however, do not seem to be consistent with the Plan objectives. The emphasis was more on industrialization and urbanization than on agricultural and rural development, so far as the public sector allocation and policy support were concerned (First Five Year Plan, pp.32; Two Year Plan, pp.4; Second Five Year Plan, pp.41; Third Five Year Plan, pp.11-17). The growth philosophy that became apparent from this allocative pattern was one of growth before distribution. The implicit assumption behind this approach seems to have been that the richer section of the community being the saving sector, total domestic saving as a percentage of national income could be increased by transferring resources from the poorer consuming sector and, at the same time, industrialization could be accelerated by providing appropriate incentives to this investing richer section through cheaper institutional capital, lower tax- rate, etc. This was, however, not the approach in the beginning of the planning process. The First Five Year Plan (1973-78) emphasized on socialism and as such, the focus was on growth with distribution. But it was realized later on that the "cake" should be allowed to grow in size before major attention could be paid to the question of its distribution, and the philosophy of growth before distribution gained importance, specially after the change of the Mujib government in 1975. (1971-75).

The FFYP (1973-78) was pre-occupied with the problems of economic reconstruction and rehabilitation in the early years. Further,the country suffered in the early 70's from sharp increases in the price of oil and from acute political instability after 1975 which led to changes in plan priorities and policies. The formulation of the Second Five Year Plan (SFYP) was postponed till 1978, in favor of a Two Year Plan (TYP), 1978-80, largely to determine the future direction of economic development of the country by the new government of Ziaur Rahman, which came into power in 1976.

The SFYP (1980-85) emphasized accelerated economic growth with focus on basic needs, employment generation, population control and infra-structure development, in addition to development of industry and agriculture. In a poor country like Bangladesh, the development of almost every sector is important and, therefore, it is extremely difficult to decide clearly on the inter-sectoral priorities. However, in actual practice, the relative practical strength of the various sectors and the nature of the immediate economic crisis mostly decided the inter sectoral priorities in resource allocation. Thus the two oil crises of the early and late 1970s necessitated the development of energy resources (particularly gas) in Bangladesh. Political pressures also placed high priority on the development of roads and transport. In the case of industry, the initial emphasis was to depend on and enlarge the public sector. Under the First Five Year Plan (FFYP), most of the industries which had been abandoned after the civil war, by their former Pakistani owners and managers, were nationalized and private investment was discouraged. With the change in Government in 1975, the country gradually moved from a socialistic overtone to the philosophy of a more liberal mixed economy. As a result, the ceiling of Tk. 2.5 million for private investment imposed in January 1973 was raised to Tk. 30 million in 1974 and to taka 100 million by 1976. The ceiling was totally abolished in September, 1978 (The Second Five Year Plan, 1983, pp. 103-4). From 1978, the Government also followed a policy of gradual denationalization and privatization. This trend increased with the increased flow of foreign assistance from the Western World and when the world economic situation worsened in the 1980's, the need for even greater dependence on market-oriented economy, increased. This was reinforced by the structural adjustment programme of the IMF and the donor countries and agencies. The policy changes of the Government were pronounced after the change of Government in 1982 from Zia to Ershad. The Third Five Year Plan (TFYP), 1985-90, therefore, saw a sharp switch over of the economy to structural adjustment, particularly financial adjustment programme characterized by tariff liberalization, fiscal reform, greater flexibility in monetary and exchange rate policies and overall relaxation of regulation, withdrawal of subsidies, etc., all meant to promote greater competition in the economy through greater dependence on market forces. In the process, however, agricultural and social sectors suffered heavily in terms of public sector resource allocation. Although each plan emphasized the need to pay more attention to agriculture because of its critical role and to human resource development also (education, health, sanitation), the bulk of the public sector development funds went to energy, industry and physical infrastructure (roads and communications).

The Draft Fourth Five Year Plan (DFFYP), 1990-95 that has started from July 1990, is now trying to restore the imbalance by paying more attention to agriculture and human resources development. It also observed that the development of infra-structure (particularly energy) and industry (particularly fertilizer) during the Second and the Third Plan were not unwarranted, but those were not linked up with the development of agriculture and the small and medium industries. As a result, the internal market did not expand and the economy remained heavily imbalanced and dependent on foreign assistance.

Bangladesh used to earn most of its foreign exchange resources from jute exports (raw and manufactured). As the world economic situation worsened and the competition from synthetics increased, the foreign exchange earnings decreased substantially and the balance of payments gap widened. This was partly offset in the 1980s through expansion of non traditional export (particularly readymade garments, shrimp and frog legs), but exports still cannot pay for more than about 40% of the imports. The balance of payment gap also widened by the investment savings gap.

TABLE 1

SAVINGS AND INVESTMENT IN BANGLADESH

Five Year Plans	Years	Savings/GDP Ratio	Investment/GDP Ratio	Tax/GDP Ratio
First Plan	1973-74	4.6	13.5	7.9
Two Year Plan	1979-80	4.3	15.9	7.9
Second Plan	1980-85	4.2	18.8	8.4
Third Plan	1985-90	3.6	12.3	7.8

Source: Managing Public Resources for Higher Growth. PP.37.

World Bank.1991. Report no. 9379-BD.

Domestic saving is low in Bangladesh - only about 3 to 5% of the GDP, on the average - for the 18 years period. As can be seen in Table 1, the domestic savings/GDP ratio has not increased during the successive Plan periods. On the other hand, it has declined during the TFYP period due to the fall in tax/GDP ratio. Consequently the ratio of investment / GDP also fell from 18.8% during SFYP period to 12.3% during TFYP period.The Draft Fourth Five Year Plan of Bangladesh (1990-95) proposes 5% increase in GDP per annum. Since the rate of growth of population is still high (about 2.4% per annum), a minimum growth rate of GDP of 5% with a 4:1 capital-output ratio requires savings investment of at least 20% of the GDP (following Harrod-Domar growth model of $g=s/k$)[1]. This is expected to be realised with 9.7% growth rate of tax revenue and 10.4% growth rate of non-tax revenue (in real terms). The growth rate of current expenditure of the government is expected to be kept within 5% by applying proper control and prioratisations. In view of the performances of the previous plans, this appears to be optimistic and calls for serious efforts to mobilise domestic resources, since resource shortage is the major factor for lower investments and grwoth rates. In the absence of required domestic savings, the country depends heavily on foreign assistance, which forms about 8 to 10% of GDP.

4. Planning and Budgeting.

The development programmes in the Five Year Plans are phased out annually in the Annual Development Programme (ADP) which is the development budget of the Government of Bangladesh. The ADP is prepared in accordance with the Annual Plan which is the

[1]. (g = growth rate, s = savings rate, k = capital-output ratio).

instrument through which the Five Year Plan is implemented. Within the framework of the medium term plan, the Annual Plan projects the growth of the economy over the next year and spells out the programme and projects along with their consistency. It formulates appropriate policies on an annual basis in a coordinated manner for the realization of the public sector programmes as well as giving concrete shape to the targets and programmes of the private sector, which are tentative and indicative in nature in the Five Year Plan. The ADP gives a detailed project-wise list with allocation during the planning year. The Five Year Plans are prepared by the Planning Commission and the Annual Budgets are prepared by the Finance Ministry. The Programming and Appraisal Division of the Planning Commission (under the Planning Ministry) coordinates the preparation of the ADP. As the programmes for public expenditure proposed in the medium term plans do not take into account the details of current expenditures, the control and rationalization of current expenditures is intended to be achieved through the fiscal budget of the Government of Bangladesh. The national budget of the Government is, therefore, divided into two parts - current budget and development budget. The revenue surplus generated in the current account of the budget over and above the revenue expenditures is transferred in the capital account of the budget for financing development expenditures. The fiscal budget is thus linked with planning with reference to its role as a principal means for mobilization of domestic resources for public sector programmes. It further provides the mechanism for the use of selective fiscal and credit policies to provide incentives to the private sector. But the fact that two separate ministries are involved in preparing the plans and the budgets, means that inconsistencies often arise between plan objectives, strategies and their actual implementation through budgetary measures which are taken more on an ad-hoc basis for revenue and other considerations than on economic considerations. There are, however, attempts to overcome this problem by having better coordination between these two ministries through the formation of joint committees on resource mobilization.

Table 2 shows the proposed financing of the development outlay in the Five Year Plans. The actual plan allocations were, however, much less than the target allocations due to domestic resource shortfall mainly. The gross aid inflow therefore, was greater than the plan estimates, which can be seen in Table 3.

TABLE 2
Development Outlay and its Financing During Five Year Plans.
(In Tk. Crore, at base year prices)

Plan Size	FFYP 1973-78	TYP 1978-80	SFYP 1980-85	TFYP 1985-90	DFFYP 1990-95
Total	4,452	3,600	17,200	38,000	67,230
1. Public Sector	3,952	3,000	11,100	25,000	40730
2. Private Sector	503	600	6,100	13,000	26,500
Proposed Financing					
1. Domestic Resources	2698	835	8132	17,572	32,470
2. External Resources	1,799 (40%)	2,167 (60%)	7,091 (41.2%)	21,028 (54%)	34,760 (52%)
Actual Plan Allocations					
	46.55%	87%	88.94%	47.69%	

Notes: * Taka 1 crore = Tk. 10 million.
*Figures in parenthesis represent percentage of total.

Sources:

1. The First Five Year Plan, 1973-78, Government of Bangladesh, (GOB) P 13-14;
2. The Two Year Plan, 1979-80,May 1978,(GOB) P 47
3. The Second Five Year Plan,1980-85, May 1983,(GOB) P37-38
4. The Third Five Year Plan,1985-90, Nov.1985,(GOB) PII 5-6;
5. The Draft Fourth Five Year Plan,1990-95,June 1990,(GOB)P.I-22.
6. BBS Yearbook, GOB, 1989. P. 618.

TABLE 3
Resource Mobilization for the Public Sector during Five Year Plan Periods.
(Financing of the Annual Development Plan)

	FFYP 1973-78 (Actual)	TYP 1978-80 (Actual)	SFYP 1980-85 (Actual)	TFYP 1985-90 (Target)	TFYP 1985-90 (Actual)	FFYP 1990-95 (Target)
A. Domestic Resources	956.94	882.09	3812.85	5960	2417	10463
1. Revenue Surplus	471.63	859.38	3206.62	4983	1378	7298
(a)Revenue Receipts	3841.51	3151.37	13516.92	21833	26779	44763
(b)Revenue Expenditure	3369.88	2291.99	10310.3	16850	25401	27465
2. Net Capital Receipts	-75.98	-98.95	-286.62	977	1039	720
3. Deficit Financing	481.71	-	375	-111	-136	
4. Other Services	79.58	121.66	519.85	253.96	200	2445
B. External Resources	3026.99	2632.14	11299.88	19040	24766	30260
1. Project Aid	1017.54	1285.77	6327.44	-	13490	21008
2. Commodity Aid	1586.27	1150	4275.13	-	7504	9252
3a.Net Food Aid	423.18	196.37	243.36	-	3772	-
3b.Sale proceeds of food grains in Title III deposit account PL480, EEC, etc	-	-	453.95	-	-	
C. Financing Available for Development Expenditures	3983.93	3514.23	15112.73	25000	27183	40730
A as % of C	24.02	25.1	25.23	23.84	9.0	26.00
B as % of C	75.98	74.9	74.77	76.16	91.00	74.00

Sources:
(1) Fiscal Statistics . 1987. pp. 150-160. Planning Commission. GOB.
(2) Memorandum for the Bangladesh AID Group; 1990-91. pp.25 Planning Commission,Ministry of Finance, ERD. GOB.
(3) The Fourth Five Year Plan (1990-95). pp. 111-9. Planning Commission. GOB.

The utilization of available foreign funds, however, became limited in the absence of sufficient matching domestic funds. The shortfall in the actual plan expenditures along with deterioration in the terms of trade and frequent national calamities reduced the performance of the economy during each plan period. The actual growth rates of the economy as percentage of GDP therefore were less than the target rates in all the Plans as can be seen from Table 4.

TABLE 4
Growth rates of the Economy during different Plan Periods.
(Percentage of GDP)

Plans:	Target	Actual
FFYP (1973-78)	7.6	6.1 *
TYP (1978-80)	5.6	3.5
SFYP (1980-85)	5.4	3.80
TFYP (1985-90)	5.4	3.8
DFFYP (1990-95)	5.0	-

* Higher growth rate is due to efforts for rehabilitation and reconstruction works.
Source: Planning Commission, Government of Bangladesh, 1989.

These imply that: (1) Government would have to mobilize larger domestic resources and at the same time (2) capital-output ratio would have to be reduced by better sectoral allocations of planned expenditures, if there has to be better performance of the economy with greater self-reliance.

5. Taxation Policy in Bangladesh.

The taxation policy of the Government of Bangladesh follows from the following imperatives:

- Government has Five Year Plans and the Annual projections of the expenditures in the plans.
- Government has to provide local funds from the revenue budget as counterpart fund for foreign assistance.
- The more Government can mobilize local funds, the greater can be the amount of assistance from project pipe-line built up over the years.

- Because of the pressures on the revenue budget arising from nominal increases in expenditures as well as additional demand on the revenue from completed projects, increased defence and welfare expenditures, including pay rises, the revenue surplus shrinks and the need for higher rates of taxation and new sources of tax revenue increases.[2]

Taxation, therefore, has to play a crucially important role in Bangladesh. Since voluntary private saving is low and the scope of deficit financing is limited, Government has to depend on taxation mainly to generate larger public savings. Tax revenue constitutes about 80% of the total Government revenues on the average. Non-tax revenues, including profits of public sector corporations contribute the remaining 20% of the revenue to the Government. It shows that internal revenue mobilization effort is not much geared up to generate much revenue for development financing. Table 5 shows the annual contribution of non-tax revenue from various sources.

The growth of non-tax revenue depends directly on the quantity and quality of services rendered, on proper pricing policy and management efficiency. The revenue from post offices and railway are showing continuously negative return, which is generally ascribed to

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[2]. Government current expenditure increased from 6.6% of GDP in 1983-84 to an estimated 8.1% in 1988. (This rapid growth was only to a small extent due to higher expenditure for natural calamities). At the same time, development expenditure decreased from 10% of GDP at the beginning of 1980's to 6.7% in 1988.
Net foreign finance increased during this period. Government current expenditure increased by 114% while development expenditure increased by 35% only. The total Government revenue and net foreign finance increased by 73%. This trend need to be reversed to have more funds for development budget.

inefficient management of the system. These and other non-tax sources of revenue e.g.,

TABLE 5
Non Tax Revenue of Bangladesh (Selected Years)
(In Crore Taka)

Components	1972/73	1975/76	1980/81	1985/86	1988/89
Total Revenue Receipts	229.44	876.26	2254.71	4129.45	5673.42
Total Tax Revenue	190.29	727.98	1821.38	3302.97	4817.62
Non-Tax Revenue	39.15	148.28	433.33	826.48	852.8
Stamp (Judicial)	2.15	5.82	20.29	7.18	15.8
Forest	1.44	5.06	28.21	60.58	51.20
Post Office (net)	-2.97	-4.10	-5.62	-14.45	-15.50
Telegraph, Telephone (net)	0.20	1.40	3.93	84.63	122.00
Railway (net)	0.71	-2.54	-18.90	-116.04	-123.10
Interest		56.47	151.51	230.90	107.70
Nationalized Industries and Corporations		4.75	85.98	76.67	57.60
Nationalized Financial Institutions	18.76	26.83	74.06	268.33	136.60
Others	18.86	54.95	93.87	228.68	500.50

Source: Fiscal Statistics. 1987. pp. 16-18. Planning Commission, Government of Bangladesh.
Bangladesh: An Agenda for Tax Reform. pp 5. World Bank, 1989.

forest, telephone etc., can be made profitable by running these on a commercial basis and by improving management. Similarly the performance of nationalized industrial sector can also be improved by allowing some autonomy in the operation in these sectors regarding the pricing and other policies to make them profitable concern. But, since wastage and malpractice are rampant in these sectors and there is not much accountability in these enterprises, Government is denationalizing many public enterprises while introducing performance monitoring and physical restructuring of the retained public enterprises. Inspite of such possibilities of increased revenue, the fact remains that the absolute amount of non tax revenue would not increase substantially in the near future and its proportion of GDP would not change much relative to that of the tax revenue. The increased revenue from non-tax revenue, however, could possibly lead to the availability of larger revenue surplus for the public sector if appropriate measures are taken in that direction.

The revenue role of taxation has been emphasized by all the plans and the budgets. The dominant objective of taxation in Bangladesh has thus been the mobilization of internal resources for investment in the public sector. The annual budget speeches of the Finance Ministers spell out some other important objectives of taxation in line with plan objectives. Thus, allocation of resources through a differentiated rate structure has been another important objective of taxation, as also the provision of incentives to increase production through various tax exemption measures and rate variations. The objective of equity has also been emphasized to be achieved through higher luxury taxation and greater relief for the poorer sections of the community.

Such multiple objectives of taxation - some non-complementary and conflicting - has made the tax system of Bangladesh quite complicated. The realization of development goals has, therefore, been difficult as it depended on the consistency of the policy measures undertaken and their coordination with other policy instruments (e.g. those affecting trade, expenditures, etc.) and control variables. The problem is sharpened due to the difficulty of identifying and managing the impact of the dynamics of raising revenue through various tax measures on resource allocations, income distribution and economic growth in a country like Bangladesh where the political and socio-economic institutions of interest articulation and conflict resolution are far less developed.

All these factors, and the compulsion of raising savings and investment from their very low level at the early stage of economic development which promoted ad-hocism in decision making regarding taxation, led to the growth of a tax structure which appears to be less elastic and less flexible to changes in subsequent periods.

6. The Main Features of Bangladesh Tax System.

The tax system of Bangladesh is characterised by: (i) low tax-GDP ratio ; (ii) low ratio of direct taxes to total tax revenue ; (iii) overwhelmingly heavy dependence on indirect taxes in general and on trade taxes in particular; (iv) low contribution of domestic indirect taxes to total tax revenue compared to other Asian countries. These features of the tax system have serious economic implications as they affect the savings-investment ratios and the growth rate of the economy. This is reflected in the poor performance of the economy in generating larger savings and increasing the growth rates (vide tables 1 and 4), and also in the greater dependence of the economy on foreign assistance to finance development expenditures (as consequence of domestic resource shortfall).

6.1 The Tax- GDP Ratio.

Tax revenue contributes a small proportion of GDP in Bangladesh as can be seen in Table 6. Though the tax-GDP ratio has increased from 4.20% in 1972-73 to 9.1% in 1986-87, it is still very low relative to the need to generate increasd revenue surplus for financing development expenditures. The low tax-GDP ratio indicates that the efforts to mobilize larger resources for development expenditure was not sufficient. The financing of the development expenditures, therefore, remained dependent on foreign assistance to the extent of about 80 to 90 percent. However, the available foreign resources could not be fully utilised in the absence of sufficient matching domestic resources. This had adverse effects on the growth of the economy.

The tax-GDP ratio in Bangladesh is low compared to the neighbouring countries also. The tax-GDP ratio in India and Pakistan was 13% and 11.30% respectively in 1986-87, whereas it was only 7.15% in Bangladesh, as is shown in Table 7. There may be several reasons for the differences in the tax-GDP ratios between Bagladesh and other countries. From a study of 86 countries, Tanzi (1987) shows that there is a relationship between per capita income

TABLE 6
TAX-GDP RATIO OF BANGLADESH

Year	GDP (At markt.prices) Crore Taka.	TOTAL TAX REVENUE (Crore Taka)	TAX/GDP RATIO (%)
1972/73	4566.00	190.29	4.17
1973/74	7152.00	309.83	4.33
1974/75	12297.00	515.21	4.19
1975/76	10782.00	727.98	6.75
1976/77	11071.00	778.28	7.03
1977/78	13306.00	1004.10	7.55
1978/79	15493.00	1226.31	7.92
1979/80	18207.00	1459.57	8.02
1980/81	20975.00	1821.38	8.68
1981/82	23739.00	1979.45	8.34
1982/83	26787.00	2134.55	7.97
1983/84	31368.00	2372.49	7.56
1984/85	34965.00	2927.22	8.37
1985/86	38536.00	3302.97	8.57
1986/87	43261.00	3868.80	8.94
1987/88	48058.00	4372.15	9.10

Source: Fiscal Statistics, 1987. pp 23-26. Planning Commission.

and tax ratios. This finding implies that the tax-GDP ratio would grow with the growth of income (Musgrave, 1969, Tanzi 1991, pp. 218). Tanzi, however, observes that socio-political and historical factors are also important. Various studies have shown that the variations in the tax-GDP ratio may be the result of other economic characteristics of a country, such as, openness of the economy, degree of monetization, urbanization, literacy rate, level

TABLE 7
TAX-GDP Ratio in Bangladesh and some other Asian Countries (%)

Countries	$ GNP'81 per capita	1975	1980	1981	1985	1986-87
Bangladesh	140	6.75	8.68	8.34	8.57	7.15
India	260	11.60	12.00	16.40	16.70	13.02
Pakistan	350	10.90	13.60	13.70	12.80	11.30
Sri Lanka	300	-	19.60	16.70	18.90	-
Nepal	150	5.10	7.30	7.10	-	7.38
Thailand	770	11.40	12.30	12.80	13.60	14.74
Burma	190	9.60	10.20	9.80	-	-
Malaysia	1910	20.30	20.50	23.40	24.40	18.27
Indonesia	530	-	20.80	21.10	19.60	15.04
Philippines	790	-	11.20	10.30	10.10	10.86

Sources:
(i) Fiscal Statistics, 1987-88, P. 29-30, Planning Commission, GOB
(ii) Economic and Social Survey of Asia and Pacific, United Nations, 1982, P. 105
(iii) Tanzi, V. 1987. P. 206-8. "Quantitative characteristics of Tax System in Developing Countries," in The Theory of Taxation for Developing Countries. Newberry, D. and Stern, N. (eds.) Oxford University Press.
(iv) Tanzi, V. 1991. P. 52. Public Finance in Developing Countries. Edward Edgar Publishing Company.

of public expenditure etc., besides per capita income (Chelliah, 1971, Chelliah et. al, 1975, Tait, A. et. al. 1979, Tanzi. 1987). The empirical studies suggest that per capita income is less effective as an explanatory variable (Burges and Stern, 1992, pp. 16). The fact that tax-

GDP ratio varies considerably among countries with similar income levels implies the existence of other factors responsible for the tax to GDP relationship (Newberry, 1987, pp. 194).

Low per capita income and the existence of a large agricultural sector may partly explain the low tax-GDP ratio of Bangladesh, but lower coverage and weak tax administration may be the more important reasons for differences in tax-GDP ratio in Bangladesh and in other less developed countries. The tax bases get eroded due to provisions of incentives to save and invest. There may be a need to reduce incentive provisions (to broaden the bases) upto a point, without actually discouraging savings and investment which are to be promoted by such measures. Weak tax administration includes possible evasion / avoidance of tax payments as tax rates increase (TEC. 1979, World Bank. 1989, pp. 47-77). The economic structure of the country together with international conditions and internal environment also effect the performance of the tax system in Bangladesh. If the tax system is such that it is very difficult to make it progressive, the increase in tax-GDP ratio may involve an unacceptable sacrifice imposed on the poorest members of the community. All these factors constrain the policies which can be applied to raise tax-GDP ratios in Bangladesh. However, the remarkable achievement of the neighbouring countries shows that there are possibilities of raising the tax-GDP ratio in Bangladesh also, if sufficiently higher tax effort is made.

6.2 Ratios of Direct Tax, Domestic Indirect Taxes and Trade Taxes to Total Tax.

The contributions of the major tax sources to total tax revenue of the government of Bangladesh can be seen in Table 8. The ratios of principal groups of taxes to total tax revenue, on the average during the period, show that direct taxes contribute only about 20% to the total tax revenue; indirect taxes contribute the largest amount, 80%, to the total tax, and within these,trade taxes contribute about 55%; the domestic indirect taxes, on the other hand, contribute about 25% to the total tax revenue.

TABLE-8
CERTAIN SPECIAL FEATURES OF BANGLADESH TAX SYSTEM, 1972/73-1988/89.

YEARS	DIRECT / TOTAL TAX REVENUE	TRADE TAX / TOTAL TAX REVENUE	DOMESTIC TAX/ TOTAL TAX REVENUE
1972/73	15.83	45.62	38.82
1973/74	14.55	52.12	33.33
1974/75	17.98	38.41	37.04
1975/76	18.56	53.09	29.20
1976/77	20.25	49.34	31.05
1977/78	18.56	55.07	26.69
1978/79	17.49	59.04	23.99
1979/80	17.29	61.01	22.06
1980/81	17.75	58.99	23.37
1981/82	20.42	56.25	23.49
1982/83	21.27	55.28	23.84
1983/84	19.97	55.10	25.73
1984/85	19.80	57.03	24.31
1985/86	21.23	55.92	24.02
1986/87	21.65	55.21	24.34
1987/88	21.68	53.23	27.29
1988/89	20.67	49.83	29.50
1989/90	20.99	48.56	30.45

Source: Table 11.

(i) The table (8) shows that though over the period, the share of direct taxes has increased from 15.83 % in 1972-73 to 21.07 % in 1989-90, it is still low compared to other Asian countries like Pakistan, Srilanka, Thailand . This can be seen in the case of income tax (in

Table 9), which is the dominant source of direct tax.

The reason for low income tax ratio is low per capita income, existence of a large non-monetised sector and a high exemption limit. The tax base is therefore very small, covering only 0.5% of the population to collect the tax. Besides, virtual exemption of agricultural income from taxation and numerous tax incentive provisions given in the form of exemptions, deductions, allowances and concessions have eroded the tax base further. (Ali, 1985). Though direct taxes are also raised from property taxes, stamp duties, etc., their share in total tax revenue is very small in Bangladesh. The ratio of direct tax to total tax therefore remained low, with only marginal improvement over the period.

TABLE 9
Major Tax Revenues as % of Total Tax Revenue in some Asian Countries (Three Year Averages)

Countries	Years	Total Tax	Income Taxes	Property Taxes	Domestic Taxes	Trade Taxes
Bangladesh	1981-83	100	15.64	2.40	37.37	42.35
India	1981-83	100	14.75	1.13	62.37	18.83
Pakistan	1982-84	100	18.22	0.62	41.92	39.49
SriLanka	1982-84	100	17.34	3.46	43.96	36.88
Thailand	1983-85	100	20.89	0.37	53.13	22.79
Malaysia	1982-84	100	45.98	0.62	21.92	28.78

Source: Tanzi. V. 1991. P. 52-53. Public Finance in Developing Countries. Edward Edgar Publishing Company.

(ii) The ratio of domestic indirect taxes to total tax revenue is also low in Bangladesh compared to other Asian countries (Table 9). More important, domestic indirect tax ratio has been falling till 1979-80, after which it started moving up, but not very significantly as can be seen in table 8. The small industrial base for domestic taxes accounts for the low share of domestic tax to total tax revenue. The relatively higher level of domestic taxation in the neighbouring countries like India, Pakistan, SriLanka may be the result of broader coverage and stronger tax administration than in Bangladesh. The small formal industrial sector, which is the base of excise tax (the major domestic indirect tax in Bangladesh), is further narrowed down by the existence of numerous concessions and exemptions on various grounds. Administrative problems of handling large number of small industrial outlets also account for reduced collections from many sources. The revenue from excise tax is therefore not increasing in proportion, either to the growth of income or to the value-added in the manufacturing sector.

(iii) Trade taxes, on the other hand, have been the major source of revenue to the government of Bangladesh, though the ratio of trade taxes to total tax revenue started declining from 1979-80 (Table 8). There is thus a gradual change in the relative proportions of trade taxes and domestic indirect taxes to total tax revenue in Bangladesh, which seems to be the outcome of Government policy changes from the end of 1970's to shift the emphasis from trade based taxes to domestic indirect taxes. The ratio of trade taxes to total tax revenue in Bangladesh is, however, still high compared to other developing countries of the region (Table 9), showing heavy dependence of the tax system on the trade sector.

6.3 The Tax Structure of Bangladesh.

The major sources and the composition of tax revenue in Bangladesh from 1972-73 to 1989-90 can be seen in Tables 10 and 11 at the end of the Chapter. The tables show the highly imbalanced overall structure of the tax system, depending largely on indirect taxes rather than on direct taxes, as discussed earlier, and this structure remained more or less the same over the period. The heavy reliance on indirect taxation has imparted a regressive character to the tax structure in Bangladesh, though direct taxes- specially personal income taxes- could be the most important instrument in introducing progressivity in the tax system.

6.3.1 Direct Taxes

Direct taxes are raised from two major sources in Bangladesh: taxes on income (personal, corporate and agricultural income) and taxes on property (wealth, gift, estate, capital gains, urban property, house rent, land revenue, stamp duty, registration fees etc.). Of these two taxes, contribution of income tax is about 15 percent (though the share of agricultural income tax is insignificant as it is hard to tax) and of property tax is about 5 percent of the total tax revenue on the average during 1972-73 to 1989-90. The share of income tax to total tax has been increasing during the period (it more than doubled from 5.44 percent to 15.49 percent), but the share of property tax has been decreasing (from 10.39

TABLE 12
Structure of Income Taxation
(In Crore Taka)

Years	Total Collection of Income Tax	Collection from Salary Group	Col. 2 as % of Col. 1	Collection from Company Group	Col. 4 as % of Col. 1	Others (Non-Company Group)	Col. 6 as % of Col. 1
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1980-'81	226.68	13.82	6.11	148.17	65.36	28.16	12.45
1981-'82	280.37	15.69	5.59	203.03	72.41	61.65	21.98
1982-'83	325.98	14.43	4.42	203.64	62.47	107.9	33.1
1983-'84	338.22	14	4.13	257.71	76.19	60.5	19.66

Source: Computed from National Board of Revenue (NBR) data.

percent to 5.50 percent). The contribution of total direct tax to total tax revenue, therefore, though increasing over the period, remained low compared to that of total indirect tax.

Among income taxes again, the share of tax on personal income is low compared to corporation income taxes, the bulk of which comes from a few multi-national companies, and public corporations (banking, insurance, trading companies mainly, most of which are in the public sector) as can be seen from table 12. Of the property tax, stamp duty contributes the major amount, though land revenue and registration fees are gradually becoming important contributors.

6.3.2 Indirect Taxes.

Indirect taxes contribute the largest proportion to total tax revenue of the Government of Bangladesh, as mentioned before. There are two major categories of indirect taxes: taxes imposed on the trade sector and taxes imposed on the domestic production, as can be seen in table 10.

The taxes in the trade sector consist of import taxes, export taxes and sales taxes on duty paid value of import. Import taxes, with import sales tax and development surcharges, have been the major source of revenue to the Government accounting for about 55 percent of the total indirect taxes on the average. The average effective coverage rate of import taxation is about 40 percent. This dependence of the tax system on the trade sector has increased the reliance on foreign assistance to maintain the flow of imports, since the country's own foreign exchange earnings are not sufficient for import financing. Moreover, major import duty and sales taxes are realized from duties on machineries, petroleum oil and lubricant products (POL), iron and steel products, chemicals, motor cars and other vehicles. Of these items, raw materials and capital goods contribute largest amount (about 80 percent) as shown in Chapter 3. Due to high import contents of excisable goods and services, more than 70 percent of the total excise tax comes from import-based domestic products. (Ali, 1982). Such heavy dependence of the Government tax revenue on trade sector implies that domestic resource mobilization would be hampered if the current level of import could not be maintained.

The taxes on domestic production are realized from excise taxes and taxes on domestic services. Domestic sales tax imposed at the manufacturing stage was a source of revenue for the Government till 1981-82, after which it has been merged with excise taxes as its contribution was small (varying between 5 to 10 percent of the total sales tax). Sales taxes are realized now mainly from imported goods. Excise tax is the second largest source of revenue to the Government, but it is not increasing in proportion to the growth of domestic production. Almost entire part of excise tax (98 percent) is raised from ex-factory value of domestically manufactured goods. The rest comes from some services. Though most domestic products are excisable, various exemptions allowed on incentive and equity grounds have narrowed down the base of excise tax. The bulk of the excise tax is raised from only a few commodities: tobacco products, gas, P.O.L., sugar, cement, paper, jute products, narcotics and liquor, of which again, tobacco products alone contributes about 50 percent of the total excise tax. The contribution of domestic taxes is thus low (about 25 percent of the total tax revenue on the average) and the average rate of excise taxation (in terms of effective base coverage) is only 8 percent.[3]

The tax system of Bangladesh therefore has many drawbacks. The characteristic features of the tax system have significant influences on the working of the market mechanism, and on the efforts to realise the development objectives.

(i) The tax system does not help in achieving the objective of mobilising larger resources for development expenditures, because total tax revenue does not grow more than in proportion to the growth of income. The overall tax stucture of Bangladesh is thus not elastic. A large number of exemptions, both in the direct and indirect taxes, have eroded the tax base substantially, reducing revenue productivity of the taxes. The large number of provisions of exemptions and allowances as incentive measures to increase savings and investment could not produce substantial results to justify the revenue cost.(We would turn to the aspect of revenue of productivity of the tax system in Chapter 3).

(ii) The present import duty structure of Bangladesh is such that it has resulted into a relatively more capital intensive and overprotected industrial process with considerable inefficiency and under-utilisation of capacity, and a production pattern more oriented towards limited domestic market than for export markets and thereby inhibiting the growth of the industrial sector.

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[3]. Industry accounts for 9.14 percent, and services account for 33.54 percent of GDP (of which trade and transport account for 21 percent). Source: The Fourth Five Year Plan; 1990-95, P. 11.2; Planning Commission, Government of Bangladesh, 1990.

(iii) The dependence of the domestic indirect taxes on intermeditiate goods and raw materials have adverse effects on the growth of the industrial sector due to cost escalation at different stages of production. The cost escalation through input taxation leads to unintended results of effective taxation being higher than nominal taxation, distorting production decisions.

(iv) Furthermore, excessive dependence of the tax revenue on indirect taxes has given the tax system a regressive character, since the marginal utility of income lost as taxes is much higher to the poorer people than to the rich.

The tax system therefore needs rationalisation and reforms with appropriate measures so that the system can be made more revenue productive, efficient and equitable by overcoming the existing drawbacks gradually.

7. Conclusion

The tax regime in Bangladesh is characterised by the weaknesses of a low tax-GDP ratio, overall low income-elasticity of the tax structure, overwhelming dependence on import taxes and a low share of domestic indirect taxes to total indirect tax revenue. The relatively low tax-GDP ratio indicates that much greater effort is needed to mobilise larger resources for financing development expenditures. The relatively higher tax-GDP ratios of the similarly situated Asian countries indicate that it may be possible to increase the ratio to a higher level if sufficient and appropriate measures are taken in that direction.

As discussed earlier, the savings and investments ratios in Bangladesh are low. Low domestic savings made the country dependent on foreign assistance to finance investments. Though larger investments were possible with the availability of foreign funds, such dependency has its undesirable aspects also as it discourages domestic efforts to increase larger savings. On the other hand, the conditionalities imposed by the donor countries create problems of adjustments in pursuing various polcies of the government within the country specific conditions. It is thus necessary that the tax ànd expenditure policies should be rationalised and appropriate reform measures should be undertaken to generate larger savings, giving sufficient attention to the resource allocation and distribution aspects at the same time.

All these indicate that to achieve the objective of 5 percent growth rate of the economy, as proposed in the Fourth Five Year Plan of Bangladesh, substantial efforts would be required to mobilize larger domestic resources through taxation. In view of the weaknesses identified in the present tax system, it seems unlikely that such an increase will be achieved without appropriate tax reform.

In the above background, a number of tax reform proposals emerge from our thesis: in the case of direct taxes: (i) there a clear case for increasing the share of direct taxes relative to indirect taxes, particularly through rationalising exemption limits and various deductions allowed that could widen the tax base; (ii) the case of taxing agricultural income, particularly the income of the large farmers and absentee owners as well as urban property income deserve serious considerations; (iii) the case of checking tax evasion through improvement of tax administration remains crucial and (iv) for corporation tax, the industrial base needs to be expanded which is still quite low (large scale manufacturing contributes only about 6% of the GDP).

Since indirect taxes have been contributing the largest proportion of tax revenue, reform in this area remains more important. In this context, the following direction of tax reforms may be considered: (i) the conventional system of indirect taxes (customs duties and excise taxes) distort prices, raise production costs, leads to inefficiencies and often to losses. The case for value-added taxes naturally became stronger. It was introduced in Bangladesh from 1991. It is, however, necessary to make assesments of the tax not only from revenue point of view but also from equity point of view; (ii) the administrative problems need to be overcome; (iii) small industries may be protected and promoted by means other than concessions in the value-added tax; (iv) in general, tax measures should be designed to encourage both domectic production and export through correcting and reducing market distortions; (v) efforts have to be made to improve the efficiency of the public enterprises, (most of which are incurring losses instead of making profits), either through privatisation or through better management.

An important area to consider for increasing total tax revenue is to reduce the public expenditures. In Bangladesh, public expenditures have been increasing at higher rate than the increases in the rate of revenue. The resultant gap was financed through borrowing from central bank, diversion of part of the revenue expenditure to capital budgets and from foreign assistance. The current effort to improve the situation needs to be intensified.

The present structural adjustment reform programmes would further limit government investment in the directly productive sector. Government, however, would have to continue to invest significant amount in physical infrastructure and particularly in social sectors as part of its efforts to create enabling environment for further private investment, both domestic and foreign. Simultaneous action for community involvement in these areas might help government to transfer a part of the maintenance expenditure from the government to the community. By limiting subsidies only to the poorer sections of the community, the situation may improve further.

A number of tax reforms have been undertaken in Bangladesh in recent years which need proper assesment. Till that time, the reliance would remain substantially on conventional tax structure with focus on indirect taxation for resource mobilisation for development.

TABLE 10

TAX STRUCTURE OF BANGLADESH
(Taka Crore)

COMPONENTS	1972/73	1973/74	1974/75	1975/76	1976/77	1977/78
TOTAL TAX RECEIPTS	190.29	309.83	515.21	727.98	778.28	1004.10
I. DIRECT TAXES	30.13	45.08	92.66	135.10	157.63	186.38
INCOME TAX	10.36	19.23	47.87	85.61	114.64	132.65
PROPERTY TAX:	19.77	25.85	44.79	49.49	42.99	53.73
LAND REVENUE	2.54	5.50	8.72	16.62	16.77	19.33
STAMP DUTY	7.70	8.45	19.46	16.55	15.55	20.90
REGISTRATION	3.19	4.53	11.05	9.68	9.81	12.60
II. INDIRECT TAXES	160.16	264.75	422.55	592.88	620.65	817.72
CUSTOMS DUTY	70.65	125.98	152.01	285.61	281.61	401.57
M-DUTY	62.53	121.62	149.32	276.16	262.56	377.37
X-DUTY	5.32	0.73	0.18	7.13	16.26	21.37
OTHER	2.80	3.63	2.51	2.32	2.59	2.83
TOTAL TRADE TAXES	86.81	161.49	197.89	386.46	383.98	552.91
TOTAL TAXES ON DOM. G&S	73.87	103.26	190.83	212.55	241.68	268.04
EXCISE DUTY	59.18	83.38	145.78	181.97	207.75	234.97
SERVICES TAX	6.06	7.58	18.56	10.60	11.07	12.04
TOTAL SALES TAX:	20.99	42.79	61.57	119.98	125.27	172.33
IMPORT SALES	16.16	35.39	45.89	100.85	102.55	151.28
EXPORT SALES	negl	0.03	negl	negl.	0.02	0.06
DOMESTIC SALES	4.83	7.37	15.68	19.13	22.70	20.99

TABLE 10

(Continued)

(In Crore Taka).

COMPONENTS	1978/79	1979/80	1980/81	1981/82	1982/83	1983/84
TOTALTAX RECEIPTS	1226.31	1459.57	1821.38	1979.45	2134.55	2372.49
I. DIRECT TAXES	214.54	252.32	323.35	404.18	454.08	473.82
INCOME TAX	148.98	181.82	226.68	280.37	325.98	338.87
PROPERTY TAX:	65.56	70.50	96.67	123.81	128.81	134.95
LAND REVENUE	19.13	18.89	19.71	20.40	19.62	30.37
STAMP DUTY	25.94	29.37	53.23	71.83	79.41	71.97
REGISTRATION	19.17	20.61	20.58	27.93	27.49	31.82
II. INDIRECT TAXES	1011.76	1207.25	1498.03	1575.27	1680.47	1898.67
CUSTOMS	501.25	630.57	753.26	787.78	879.18	948.51
M-DUTY	467.50	582.56	702.91	758.15	850.27	918.91
X-DUTY	30.25	42.39	41.90	22.08	10.89	11.87
OTHER	3.50	5.62	8.45	9.55	18.02	17.73
TOTAL TAXES ON TRADE	724.01	890.51	1074.38	1113.41	1180.07	1307.14
TOTALTAXES ON DOMESTIC GOODS AND SERVICES:	294.18	321.94	425.63	465.05	508.96	610.54
EXCISE DUTY	255.64	284.92	386.05	453.90	497.51	597.57
SERVICE TAX	17.98	13.18	8.97	6.32	10.32	12.97
TOTAL SALES TAX:	243.31	283.70	351.72	328.39	302.02	358.63
IMPORT SALES	222.46	259.88	321.09	323.58	300.78	358.38
EXPORT SALES	0.30	0.06	0.03	0.06	0.11	0.25
DOMESTIC SALES	20.55	23.76	30.60	4.75	1.13	-

TABLE 10
(Continued)

(In crore Taka.)

COMPONENTS	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90
TOTAL TAX RECEIPTS	2927.22	3302.97	3868.80	4406.35	4817.62	6238.29
I. DIRECT TAXES	579.45	701.14	837.58	955.19	995.93	1309.68
INCOME TAX	385.85	462.15	553.29	664.26	697.84	966.33
PROPERTY TAX:	193.60	238.99	284.29	290.93	298.09	343.35
LAND REVENUE	42.38	54.72	65.65	81.86	91.69	90.00
STAMP DUTY	110.00	139.27	146.79	150.42	147.72	183.00
REGISTRATION	39.95	43.38	67.85	57.15	57.53	70.00
II. INDIRECT TAXES	2347.77	2601.83	3031.22	3451.16	3821.69	4928.61
CUSTOMS	1213.46	1374.33	1584.68	1654.41	1898.44	2396.78
M-DUTY	1175.25	1335.42	1540.68	1645.45	1848.09	2341.78
X-DUTY	22.35	11.45	15.37	15.58	12.69	15.00
OTHER	15.86	27.45	28.63	44.70	37.66	40.00
TOTAL TAXES ON INCOME	1669.26	1846.89	2136.05	2248.55	2400.45	3029.07
TOTAL TAXES ON DOMESTIC GOODS AND SERVICES	711.47	793.46	941.69	1202.61	1421.24	1899.54
EXCISE DUTY	691.92	772.41	914.30	1171.78	1387.30	1804.52
SERVICES TAX	19.55	21.05	27.39	30.83	33.94	95.02
TOTAL SALES TAX:	455.80	472.58	551.37	542.82	502.01	632.29
IMPORT SALES	455.71	472.30	551.33	542.82	502.01	632.29
EXPORT SALES	0.09	0.28	0.04	0.00	0.00	neg.
DOMESTIC SALES	-	-	-	-	-	-

Notes:

1. Total tax on trade includes sales tax on imports and exports (which are shown separately under sales tax).
2. Total tax on domestic goods and services also includes domestic sales tax and jute tax.
3. Sales tax are given separately to show their contributions, but they are not double counted in the total indirect taxes.
4. Total taxes include miscellaneous items and refunds (which are 0.3 to 0.7% and 1.2 to 1.4 % of the total respectively).

Sources:

(i) Fiscal Statistics, 1987, pp.23-26. Planning Commission, GOB. (ii) National Board of Revenue, GOB.

TABLE 11

TAX AS A PERCENTAGE OF TOTAL TAX REVENUE

TAXES	1972/73	1973/74	1974/75	1975/76	1976/77	1977/78
TAX/GDP RATIOS	4.17	4.33	4.19	6.75	7.03	7.55
DIRECT TAXES:	15.83	14.55	17.98	18.56	20.25	18.56
INCOME TAXES	5.44	6.21	9.29	11.76	14.73	13.21
PROPERTY TAXES:	10.39	8.34	8.69	6.80	5.52	5.35
LAND REVENUE	1.33	1.78	1.69	2.28	2.15	1.93
STAMP DUTY	4.05	2.73	3.78	2.27	2.00	2.08
REGISTRATION	1.68	1.46	2.14	1.33	1.26	1.25
INDIRECT TAXES:	84.17	85.45	82.02	81.44	79.75	81.44
TRADE TAXES	45.62	52.12	38.41	53.09	49.34	55.07
IMPORT DUTY	32.86	39.25	28.98	37.94	33.74	37.58
EXPORT DUTY	2.80	0.24	0.03	0.98	2.09	2.13
TAXES ON DOM. G&S	38.82	33.33	37.04	29.20	31.05	26.69
EXCISE TAXES	31.10	26.91	28.30	25.00	26.69	23.40
SERVICES TAXES	3.18	2.45	3.60	1.46	1.42	1.20
TOTAL SALES TAX:	11.03	13.81	11.95	16.48	16.10	17.16
IMPORT SALES TAX	8.49	11.42	8.91	13.85	13.18	15.07
EXPORT SALES TAX	0.00	0.01	0.00	0.00	0.00	0.01
DOMESTIC SALES TAX	2.54	2.38	3.04	2.63	2.92	2.09

TABLE 11

(Continued)

TAXES:	1978/79	1979/80	1980/81	1981/82	1982/83	1983/84
I. TAX/GDP RATIOS	7.92	8.02	8.68	8.34	7.97	7.56
DIRECT TAXES:	17.49	17.29	17.75	20.42	21.27	19.97
INCOME TAXES	12.15	12.46	12.45	14.16	15.27	14.28
PROPERTY TAXES:	5.35	4.83	5.31	6.25	6.03	5.69
(a) LAND REVENUE	1.56	1.29	1.08	1.03	0.92	1.28
(b) STAMP DUTY	2.12	2.01	2.92	3.63	3.72	3.03
(c) REGISTRATION	1.56	1.41	1.13	1.41	1.29	1.34
INDIRECT TAXES:	82.50	82.71	82.25	79.58	78.73	80.03
TRADE TAXES	59.04	61.01	58.99	56.25	55.28	55.10
IMPORT DUTY	38.12	39.91	38.59	38.30	39.83	38.73
EXPORT DUTY	2.47	2.90	2.30	1.12	0.51	0.50
TAXES ON DOM. G&S	23.99	22.06	23.37	23.49	23.84	25.73
EXCISE TAXES	20.85	19.52	21.20	22.93	23.31	25.19
SERVICES TAXES	1.47	0.90	0.49	0.32	0.48	0.55
TOTAL SALES TAX:	19.84	19.44	19.31	16.59	14.15	15.12
IMPORT SALES TAX	18.14	17.81	17.63	16.35	14.09	15.11
EXPORT SALES TAX	0.02	0.00	0.00	0.00	0.01	0.01
DOMESTIC SALES TAX	1.68	1.63	1.68	0.24	0.05	0.00

TABLE 11 (Continued)

TAXES:	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90
TAX/GDP RATIOS	8.37	8.57	8.94	9.10		
DIRECT TAXES:	19.80	21.23	21.65	21.68	20.67	20.99
INCOME TAXES	13.18	13.99	14.30	15.08	14.49	15.49
PROPERTY TAXES:	6.61	7.24	7.35	6.60	6.19	5.50
LAND REVENUE	1.45	1.66	1.70	1.86	1.90	1.44
STAMP DUTY	3.76	4.22	3.79	3.41	3.07	2.93
REGISTRATION	1.36	1.31	1.75	1.30	1.19	1.12
INDIRECT TAXES:	80.20	78.77	78.35	78.32	79.33	79.01
TRADE TAXES	57.03	55.92	55.21	51.03	49.83	48.56
IMPORT DUTY	40.15	40.43	39.82	37.34	38.36	37.54
EXPORT DUTY	0.76	0.35	0.40	0.35	0.26	0.24
TAXES ON DOMESTIC G&S	24.31	24.02	24.34	27.29	29.50	30.45
EXCISE TAXES	23.64	23.39	23.63	26.59	28.80	28.93
SERVICES TAXES	0.67	0.64	0.71	0.70	0.70	1.52
TOTAL SALES TAX:	15.57	14.31	14.25	12.32	10.42	10.14
IMPORT SALES TAX	15.57	14.30	14.25	12.32	10.42	10.14
EXPORT SALES TAX	0.00	0.01	0.00	0.00	0.00	0.00
DOMESTIC SALES TAX	0.00	0.00	0.00	0.00	0.00	0.00

Source: Table 10

CHAPTER 2

THEORETICAL ANALYSIS OF THE CAUSES OF TAX REVENUE CHANGE.

1. Introduction.

In order to evaluate the effectiveness of government policy in channeling resources to the public exchequer, it is necessary not only to look at a single year but also to have quantitative measurements of tax-revenue changes with changes in national income, i.e, of the responsiveness of tax revenue to changes in income. This responsiveness has been pointed out to be a vitally important criterion of tax system for developing countries in a number of studies (Shahota 1961, Prest 1962, Levin 1968, Berney 1970, Chelliah 1971, Mansfield 1972, Wilford and Wilford 1978, Chowdhury, N, 1979).

2. Concept of Elasticity and Buoyancy.

The responsiveness of tax revenue to changes in national income is measured by the use of two concepts: (i) the concept of buoyancy and (ii) the concept of elasticity. The first relates to the measurement of total response of tax revenue changes to changes in national income, including the changes in tax revenue that are due to discretionary tax measures (such as tax rate and tax base changes, etc.). It thus helps in evaluating the ability of tax structure to produce higher revenues with growing national income both through discretionary measures (such as tax rate and base changes, etc.) and through automatic growth of tax revenue. The second concept relates to the responsiveness of tax yield to changes in national income at constant rate formula, i.e., it refers to the automatic changes in tax revenue yields due to economic movements alone, and not due to any discretionary tax measures. The measurement of responsiveness in terms of elasticity is, therefore, of great interest to policymakers as it is done with reference to a given tax-structure. An elastic tax structure produces revenue more than in proportion to the growth of national income and, therefore, provides the government with much needed extra funds for development financing, without having to take politically and socially different decisions to raise tax. However, the tax structure in most developing countries tend to be inelastic, so that the government in these countries have to take recourse to discretionary tax measures quite often to raise additional tax revenues. By focusing on the over all revenue-income situation, the concept of buoyancy points to the future policy implications.

3. Factors Determining Tax Revenue Changes.

3.1 Built-in-Flexibility of the Tax System.

The relationship of automatic changes in tax-revenue to changes in income is referred to as built-in-flexibility of the tax system (Musgrave 1959, Shahota 1961). What factors determine the magnitude of built-in-flexibility ? To answer this question, we have to analyze the factors which are responsible for causing changes in the tax-revenue with changes in income overtime. The response of tax-revenue (T) to changes in the level of national income (Y) may be expressed in the form of arc elasticity as follows:

$$E_T = \frac{\frac{\Delta T}{T_o}}{\frac{\Delta Y}{Y_o}}$$

where T_o and Y_o are the initial levels of tax revenue and income respectively and E_T measures the percentage change in revenue resulting from a given percentage change in income.

3.2. Disaggregation of Overall Tax Elasticity.

The overall elasticity of the tax system may be disaggregated into estimates of elasticities for various taxes constituting the tax system. Mansfield (1972) holds the view that instead of estimating the overall elasticity as a single number (relating total tax revenue to national income), it should be estimated as the weighted average of the elasticities of the component taxes which often have very divergent responses to changes in income. Thus, in a system of n taxes, the elasticity of total tax revenue to changes in income can be stated as the weighted sum of individual tax elasticities as follows:

$$E_T = \frac{T_1}{T_t}\left(\frac{\Delta T_1}{\Delta Y} x \frac{Y}{T_1}\right) + \ldots \frac{T_k}{T_t}\left(\frac{\Delta T_k}{\Delta Y} x \frac{Y}{T_k}\right) + \ldots \frac{T_n}{T_t}\left(\frac{\Delta T_n}{\Delta Y} x \frac{Y}{T_N}\right)$$

where,

T_t = Total tax revenue, and

T_k = Revenue from kth tax.

y = Income or component of income (GDP)

Obviously, the income elasticies of individual taxes comprising a group (e.g. T_1, T_2 , ... T_5) may be quite different from the weighted average income elasticity for the group as a whole.

The size of elasticity of tax in relation to national income or its components is of great significance, as it shows the potential of resource mobilization for increasing and sustaining development with higher tax / GDP ratio. The size of elasticity is influenced by many factors such as tax-rate structure, tax-structure, base-structure, administrative efficiency, rate of economic growth, pattern of income distribution, etc. It is, therefore, necessary to have further analysis of the size of elasticity to find out the relationship between the growth of tax revenue and its causes.

The income elasticity of each separate tax may, therefore, be decomposed into the product of two elements:

(i) Elasticity of tax to base (ET_B) and

(ii) Elasticity of base to income (EB_Y).

Thus if T_k is the revenue from the kth individual tax and B is the base of kth tax, then elasticity of kth tax would be a product of the above mentioned two elasticities which can be expressed as:

$$E_{(TY)_k} = \frac{\frac{\Delta T_k}{T_k}}{\frac{\Delta B_k}{B_k}} \cdot \frac{\frac{\Delta B_k}{B_k}}{\frac{\Delta Y}{Y}}$$

$$= E_{(TB)_k} \cdot E_{(BY)_k}$$

3.2.1 Elasticity of tax to base

Symbolically the elasticity of kth individual tax to base is thus written as:

$$E_{(TB)\,k} = \frac{\frac{\Delta T_k}{T_k}}{\frac{\Delta B_k}{B_k}}$$

where B_k is the base of kth tax and $E_{(TB)K}$ shows the rate elasticity.

The size of $E_{(TB)K}$ will depend both on the rate structure of the tax k and the nature of changes in the tax base B_K. Consider, for example, the personal income tax. If the rate structure is progressive, and if changes in the base are mainly due to changes in income per head, the ratio of the tax yield to the tax base will rise as the base expands and E_{TK} will be greater than one: on the other hand, with the same rate structure, if changes in B_K are mainly due to changes in the number of tax payers, T_K will change roughly proportionately to B_K and $E_{(TB)K}$ will be approximately one. Another illustration can be taken from indirect taxation. If this is mainly in the form of specific rather than ad-valorem taxation, changes in B_K which are mainly due to price rather than volume changes will have little effect on T_K, so the tax to base elasticity will be low; on the other hand, if the indirect tax system is progressive and the increase in B_K is due mainly to increased income per head, the ratio of tax to base will rise as B_K rises and the elasticity will be greater than one.

3.2.2. Elasticity of Base to Income.

The elasticity of kth tax base to changes in total income is written symbolically as:

$$E_{(BY)_k} = \frac{\frac{\Delta B_k}{B_k}}{\frac{\Delta Y}{Y}}$$

where $E_{(BY)K}$ shows the base-elasticity of kth tax.

The value of $E_{(BY)K}$ does not depend upon the progressivity of statutory rates. It shows the responsiveness of base to changes in income. Thus, for example, if proportional cyclical fluctuations in profits exceed those of total income, the value of $E_{(BY)K}$ would exceed one for a tax on profit.

The elasticity of the yield of tax k with respect to income, E_{TK}, thus depends on the progressivity of the rate structure, the form of the tax, the nature of changes in the tax base and the responsiveness of the tax base to changes in total income. The overall elasticity of revenue with respect to income, E_T will be weighted average of the individual elasticities E_{TK}, with the weight given to E_{TK} being the share of tax K in total revenue, T_K/T. The analysis of income elasticity of a tax system in this way helps in identifying the factors that are responsible for faster or slower growth of revenue, i.e., to determine the speed of response of tax to changes in national income.

Ahmed and Stern (1989) are of the opinion that elasticity of a tax depends not only on its design and coverage but also on its administration, enforcement and evasion in practice. The latter set of factors may not remain constant overtime. Besides, it may be difficult to isolate the separate effects of changes in policy, income, compliance, administration, etc., so that elasticity estimates may not prove to be as useful as they are expected to be.

The problem of isolating the influence of multiple factors are always there in such studies. But the usual practice is to consider the main control variables for such analysis and to find if there is significant correlation between the dependent and the independent variables for policy implications.

4. Methodologies.

4.1 Methods of Adjusting the Gross Revenue Series.

Since built-in-elasticity relates to the capacity of the tax structure to generate revenue through changes in gross income or output levels without the effects of discretionary measures, the historical tax revenue series has to be adjusted to net out the discretionary effects on revenues. To measure buoyancy, no such adjustment is made in the tax revenue series. The method of adjustment depends on the frequency of discretionary changes and the availability of data on such changes. Other types of information are also needed (e.g. data on legal base) for making the adjustments and these may not be available for sufficiently long time period in many cases.

Different authors have used different methods to eliminate discretionary effects from tax-revenue series, e.g. proportional adjustment method (Prest, 1962; Shahota, 1961; Mansfield, 1972), constant rate structure method (Chowdhury, N., 1975), dummy variable method (Singer 1968; Wilford & Wilford 1978), divisia index method (Chowdhury, N., 1979). Different methods have been found suitable for different country studies, depending on the availability of data and the nature of the rate structure.

In the case of <u>proportional adjustment method</u>, an adjusted tax yield series is prepared first by subtracting from the actual yield for each year the estimated amount (prepared by the concerned officials) due to the discretionary change in that year. Next, the adjusted series is further refined by the application of a formula to form a final series that excludes the continuing impact of each discretionary change in the later years. This final series helps in estimating elasticity of tax revenue of any year with reference to the given tax structure in the base year.

In the case of <u>constant rate structure method</u>, a constant rate-base series is constructed to represent the hypothetical yields under a system assumed to remain unchanged throughout the period. The construction of the series involves multiplication of bracket rates (for example) of the reference year by the corresponding base values and summing up the products for each year.

In the case of <u>dummy variable method</u>, no adjustments are made in the gross tax-revenue series, but for each exogenous changes (due to tax rate, base changes, etc.) a dummy variable is introduced in the equation for estimating the functional relationship between tax revenue and income.

In the case of divisia index method, the effects of discretionary changes on tax revenues are estimated by an index that isolates the automatic growth of revenues from total revenue. By a suitable transformation of this index, the buoyancy estimates derived through regression are adjusted. This adjusted buoyancy estimates provides the estimates of elasticity. This method also does not require any adjustment of the historical revenue series.

Each of these methods suffers from some shortcomings. Thus, proportional adjustment method requires the use of budget estimates of tax yield due to the discretionary changes. Such data are difficult to get in many countries. Then there is the question of reliability of such data also. In the case of constant rate structure method, disaggregated data on taxes are needed along with the changing composition of the bases to construct a constant rate-base series. Most often, informations are not sufficient on legal rates and bases, so that effective rates are used for commodity groupings or for income classes to adjust the gross tax series. Dummy variable method does not require any data adjustment, but it can be used properly only when frequency of discretionary changes is very few. The divisia index method also requires no adjustment of historical revenue series, but it can under/over-estimate positive/negative revenue effects of discretionary tax measures. And if discretionary tax changes produce very big revenue effects, then this method does not provide satisfactory results.

In the case of developing countries, data on legal bases etc. are not available in most cases and the rate structure tends to be very complex, so that data adjustment becomes a great problem. In the case of constant rate structure and proportional adjustment methods, data requirement may render complete adjustment unfeasible. But if full and reliable information about the discretionary effects are available, then proportional adjustment method is preferable to others, since it can handle large or small discretionary changes without bias.

4.2 Methods of Measuring Elasticity and Buoyancy.

In measuring the responsiveness of tax revenue to change in income, regression technique is used in most cases. Once the tax revenue series is adjusted, it is then regressed on income and output, to measure the built-in-income elasticity of the tax revenue. However, the forms of the equation may be different to estimate the tax-revenue and income relationship, e.g., linear, log-linear, etc.

In case of linear equation, taking $T = f(Y)$ as the tax function, the equation would be:

$$T = a + by$$

where,

T	=	tax revenue
y	=	income
b	=	responsiveness coefficient.

By introducing an error term u, the equation can be of the stochastic form:

$$T = a + by + u$$

where u stands for other factors which may affect tax- revenue, e.g. composition of income, expenditure pattern, etc. The 'b' coefficient shows the marginal effect, e.g. marginal rate of taxation. Of course this approach implies a varying elasticity (except if a = 0), so it is necessary to calculate a representative elasticity at some point, e.g., average income, as:

$$b.\frac{\bar{y}}{a+b\bar{y}}$$

In order to present an overall figure for elasticity, it is necessary to specify the equation in constant-elasticity form, as:

$$T = \alpha y^{\beta}$$

or, $$\ln T = \ln \alpha + \beta \ln y$$

where:

T	=	Total revenue
y	=	Income.

In this equation, the regression coefficient ß gives the percentage change in tax revenue when income changes by one percent, i.e., it is the coefficient of income elasticity. In the case of strong correlation between revenue and income, the regression coefficient would have significant meaning. If there is no correlation between the two, the coefficient would convey little meaning. The level of R^2 specifies the goodness of fit of the functional relationship being measured.

In the case of buoyancy, the same form of the equation is used, with the difference that tax revenues T' would refer to gross tax series and regression coefficient ß would refer to buoyancy. The equation therefore would be:

$$\log T' = \log \alpha + \beta' \log y$$

The regression results would be very useful measures when there is significant correlation between the variables. But existence of no correlation also would be an important information. To mitigate the problem of non-correlated variables, Time Rate of Growth method is also used (Shahota 1961), using an exponential function of the type:

$$T = ab^t$$

or, $$\log T = \log a + t \log b$$

where:

t	=	time
T	=	tax revenue
log b	=	proportionate rate of growth of tax revenue per unit of t (a year), i.e., $[\Delta T/\Delta t]/T$. This rate of growth is compared with rate of growth of national income, or one of its relevant components, $[\Delta Y/\Delta t]Y$.

Besides these methods, the relationship between tax-revenue and national income can be presented in the form of a simple computation of the percentage that a tax forms of national income for each of the periods studied. The methods need not be alternatives, and can be complementary to each other.

5. Case Studies

There have been many tax-elasticity and buoyancy studies for various countries (Shahota 1961; Mansfield 1972; Wilford & Wilford 1978; Purohit 1981; Chowdhury and Hossain. 1988).

Mansfield used elasticity and buoyancy method in analyzing the growth of tax revenues in Paraguay over the period 1962- 70, when efforts at conscious tax reform were going on. The results showed that overall elasticity of the tax system was 1.14 and therefore without discretionary changes development would in itself not do very much to raise the ratio of taxes to GDP. The tax-to-base elasticities of major taxes were substantially less than unity, but base-to-income elasticity of major taxes was relatively high. The expansion of tax bases and significant discretionary changes were however offset in part by evasion, exemption, specific nature of a number of duties and weak tax administration. The conclusion was that since modest overall elasticity of major taxes was not due to sluggish growth of bases, the tax-to-base elasticities needed to be increased to improve the income elasticity of the tax system.

Shahota calculated elasticity and buoyancy of the Indian tax system for the period 1948-49 to 1957-58. The findings were considered highly significant for understanding the current responses of Indian tax system to changes in national income and in formulating suitable tax policy for the economy in the light of the outcome. The overall elasticity of Union taxes was only 0.61 and that of Union and State taxes together was only 0.83. It was observed that an efficient tax system ought to give better results.

Wilford & Wilford studied elasticity and buoyancy of tax revenue in Central-America during the period 1955-74 and found that, though buoyancy was approximately unity over the period, elasticity was less than unity in most Central American countries. However, to raise resources further, the countries would have to depend on discretionary alterations of the rate-base structures. The alternative would be to weigh the tax system more heavily with income elastic direct and excise tax sources.

Chowdhury and Hossain (1988) studied elasticity and buoyancy of tax revenue in Bangladesh for the period 1975-76 to 1984-85 and found the elasticity of total tax revenue to be less than unity. The buoyancy value was a little more than unity (1.03), but considering the extent of discretionary tax measures taken from year-to-year, the result was not found satisfactory.

6. Conclusion.

From the various country case studies, some broad conclusions emerge. The general sales taxes, excise and consumption taxes seem to have elasticities in excess of unity. Customs duties and stamp duties appear to be relatively inelastic. But income taxes were found surprisingly to be an inelastic source of revenue in many cases, though some found it to be elastic.

There are views (Ahmed and Stern 1989) that such studies of elasticity and buoyancy provide useful 'commentary' on particular taxes, but they do not provide a very sound basis for policy. This is due to the fact that such studies tend to encourage policy recommendations to put greater reliance on more elastic taxes for resource mobilization, but low elasticity relates to the actual revenue collection during the period under study. Elasticities can change later on. Besides, the studies also do not tell anything about the desirability or undesirability to increase yields from the relatively inelastic tax in future. In some poor countries, the majority of government revenues comes from (inelastic) customs duties, while (supposedly elastic) income taxes contribute very little. An attempt to switch from customs (through lower rates) to income taxes (higher rates, etc.) may not be desirable on revenue grounds and would be unmanageable to handle administratively. The estimates of elasticity and buoyancy thus do not provide direct guidelines for policy proposals, though they may be of assistance in anticipating revenue problems.

In commenting on this position, it is first of all necessary to make distinction between buoyancy and elasticity studies. Estimates of tax buoyancies by their nature take into account the discretionery changes in taxation made during the period of the study. If these changes are regarded as autonomous, then there is no reason to assume that they will be followed by similar autonomous changes in future. Thus the buoyancy estimates for a past period may be a very poor guide to buoyancy in a coming period.

The elasticity estimates on the other hand do have a greater claim to be measuring inherent properties of some taxes. In considering tax reform, it is necessary to look not only at the likely growth of revenue in periods subsequent to the reform, but also to the efficiency and equity characteristics of the tax system at a given point of time. The elasticity estimates may focus on some long run advantages or disadvantages in current changes in the balance between broad areas of taxation. This does not of course imply that policy makers can ignore the possibility that not only the current revenue yield but also its elasticty of yield are changed. It also does not imply that the future sensitivity of tax revenue to income is so important that the distortions caused by excessive expansion of elastic taxes can be ignored (Dwivedi, 1981). But it does imply that knowledge of the elasticity properties of different taxes in the past is a relevant element in reaching decisions about desirable tax changes.

The points just made draw attention to the importance of evaluating these measures of tax responsiveness on the basis of some knowledge of the historical period for which they have been calculated. Thus, for example, if it is known that the period studied included a large and once-for-all discretionary tax change, a buoyancy estimate for the period is likely to be a poor guide to the responsiveness of revenue to income in other periods. Elasticity measures, on the hand, are computed on the basis of hypothetical constant policy revenues, rather than observed revenues. No method of computing these hypothetical revenues is completely satisfactory, and detailed knowledge of the period may indicate to the researcher that the chosen method is seriously inappropriate for the period concerned.

Inspite of the criticisms and the problems associated with the estimations, the study of elasticity and buoyancy remains an useful area of research in public finance. The study of buoyancy and elasticity of major components of a tax system may throw light on the causes of tax revenue changes with the changes in national income or any component thereof, which may be of assistance in anticipating revenue problems. The research devoted to account for the elasticity estimates of particular taxes may also be important in anticipating where corrections can most usefully be made in the future.

CHAPTER 3

DETERMINANTS OF TAX REVENUE IN BANGLADESH

1. Introduction

The responsiveness of taxes is an important measure of determining the revenue productivity of taxes. Since mobilization of larger domestic resources is the major objective of taxation in Bangladesh, it is important to trace the factors affecting the growth of tax revenue with respect to the growth of national income. An analysis of the buoyancy and elasticity of the major taxes would help in:

(a) identifying the more responsive and less responsive taxes;

(b) explaining the reasons for such differences in responsiveness of various taxes and

(c) tracing shifts in tax-revenues over time as a result of deliberate policy changes following government tax reform programs or as a result of overall growth of the economy which itself may have changed in structure over time.

2. Methodology of Estimating Buoyancy and Elasticity of Taxes.

Responsiveness of taxes in Bangladesh is measured by using the concepts of buoyancy and elasticity (as disscussed in Chapter 2). Since buoyancy of taxes shows the overall growth of revenues both as a result of changes in national income and as a result of year to year discretionary measures, the actual gross tax series are used to find the buoyancy of the taxes in Bangladesh. The period considered is from 1972-73 to 1986-87. The revenue data after 1986-87 are not considered at present since they are revised and budget estimates, which would change subsequently when actual estimates would be available. The buoyancy of taxes however, does not reflect the automatic growth of revenue with changes in national income only, as it is the result of revenue effects of discretionary measures also. In Bangladesh, discretionary measures are taken every year for almost all the major taxes. It is therefore, desirable to eliminate the revenue-effects of such discretionary measures from the gross tax series to assess the real potentiality of the taxes to mobilize incremental income with the growth of the economy without the need for constant tampering with the tax system.

Of the different methods of adjusting the gross tax series (as discussed earlier), the proportional adjustment method is used to derive the net tax series by eliminating the revenue effects of discretionary measures. The constant rate structure method can not be used, owing to insurmountable data handling problems, even if and when the data are available. The dummy variable technique is also not very useful for the tax series since discretionary measures are taken almost every year for the major taxes. However, the dummy variable method is used to estimate elasticity for the total tax revenue changes with respect to GDP changes and changes in government/ administration in 1975 and 1981, to take into account the effect of changes in policy variables on tax revenue.

Accordingly, the gross tax series are adjusted to derive the net tax series for some taxes (for which data are available at present) by using proportional adjustment method (Prest, 1962; Mansfield, 1972; Shahota, 1961). This method involves two steps:

(1) First, an adjusted tax series is prepared by subtracting or adding from the actual tax yield of each year the estimated amount due to discretionary changes (except for the reference year for which actual revenue is taken). Thus if D is assumed as the gross tax yield from discretionary measures and T is the gross tax yield in any year, then T2-D2 would be the automatic increase in tax revenue in year 2 at the base year rate structure.

(2) Second, the series are converted into base year structure by adjusting the year to year changes by the ratio of the actual tax yield to the yield of the reference year, which forms a sequence of multiplicative factors. The adjusted series is therefore further refined by the application of a formula to form the final series that excludes the continuing impact of each discretionary change in the later year.

The formula used for the purpose of adjustment is as follows:

$$AT_n = T_n$$

$$AT_{n-1} = T_{n-1}\left(\frac{T_n}{T_n - D_n}\right)$$

$$AT_{n-2} = T_{n-2}\left(\frac{T_n}{T_n - D_n}\right)\left(\frac{T_{n-1}}{T_{n-1} - D_{n-1}}\right)$$

$$\vdots$$

$$AT_1 = T_1\left(\frac{T_n}{T_n - D_n}\right)\left(\frac{T_{n-1}}{T_{n-1} - D_{n-1}}\right)\cdots\left(\frac{T_3}{T_3 - D_3}\right)\left(\frac{T_2}{T_2 - D_2}\right)$$

where:

$AT_n \ldots AT_1$	= Adjusted tax yield from period n to 1
$T_n \ldots T_1$	= Gross tax yield
$D_n \ldots D_1$	= Discretionary tax measures
$1 \ldots n$	= Number of years
n	= Reference/Current year.

The term $[T_n/(T_n-D_n)]$ is the ratio of actual tax yield to what it would have been had there been no discretionary changes. Hence all earlier revenue levels have been multiplied by this factor so as to show what the revenue would have been had the changes in year n-1 had actually taken place before that data period.

The adjusted tax structure revenue could be derived by either taking the first year of the series as the reference year or the last year of the series (T_n). The last year of the series is taken as the reference year since it can be useful for projection purposes in a better way. The actual and the adjusted revenue being same for the reference year, T_n is equal to AT_n.

Since actual tax yield (ex-post) may differ from budget estimates (i.e. ex-ante estimates), the initial estimates need to be updated. The data used for the proportional adjustment method are the actual tax revenues and the discretionary measures published in the budget speeches. No revised estimates of discretionary measures are published in the subsequent budget speeches. The discretionary tax series are therefore updated by multiplying the ex-ante discretionary measures with the ratios of the ex-post tax-revenues to ex-ante tax revenue (to get the ex-post discretionary measures), on the assumption that both ex-ante estimates were in error in the same proportion.

For the proprotional adjustment method to be fully appropriate, it would be necessary that the amount of revenue gained or lost by the discretionary changes of a particular year would vary with income in subsequent years in the same proportionate way as revenue from the tax structures which the discretionary changes modify. If we look at the tax-to-base elasticity, then it would mean a form of average elasticity of the structure that existed during the given period. The most serious implication of this is that the method cannot be used to measure changes in elasticity brought about by discretionary measures during a period. Inspite of this limitation, however, proportional adjustment method can be used as the second best alternative to purge the gross tax series of the revenue effects of the discretionary measures, since all adjustments have some limitations and cannot therefore be one hundred percent correct.

Factors Affecting Tax Revenue Change in Bangladesh

In order to identify and examine the determinants of tax revenue in Bangladesh, changes in tax revenue from different sources have been related to changes in relevant independent variables. The precise bases to which the taxes are related are therefore analysed. Besides tax bases, other factors like the effects of changes in tax rates, changes in tax bases, changes in tax administration, etc. are also examined as determinants of tax revenue changes.

The regression technique is used to estimate buoyancy and elasticity of various taxes in Bangladesh. The gross tax series are used to estimate buoyancy and the net tax series (or the adjusted tax series) are used to estimate elasticity of taxes. Regressions are carried on for estimating buoyancy and elasticity of taxes based on double log equation of the form:

$$\log T \quad = \log a + b.\log Y \qquad (1)$$

$$\log AT = \log a + b'.\log Y \qquad (2)$$

where,

T = Gross Tax Yield

AT = Net/Adjusted Tax Yield

Y = GDP at current factor cost

b = Buoyancy coefficient

b' = Elasticity coefficient

For taking into account major policy shifts, it is possible to use the technique of multiple regression, where dummy variables are used to represent the existence of particular policy regimes. The elasticity coefficients are estimated on the basis of estimating equations of the form:

$$\log T = a + b \log Y + cX_1 + dX_2 \qquad (3)$$

where,

Y = GDP at current factor cost

X_1 = Administration 1 dummy variable. (for 1975-76 to 1980-81 period)

X_2 = Administration 2 dummy variable. (for 1981-82 to 1985-85 period)

Regressions are run for 18 different unadjusted taxes to get the buoyancy values. The elasticity values could not be estimated for all the 18 different taxes owing to the non-availability of relevant data e.g.,revised budget estimates, discretionary changes for the period at present. However, regressions are run for seven major taxes to get the elasticity values. GDP at current factor cost has been used as the main explanatory variable for all the tax revenue changes. To examine the determinants of tax revenue changes, it is also thought appropriate to relate changes in tax yield to changes in the legal or the relevant proximate bases of the taxes (Maxwell 1954). The elasticity estimates of the taxes are, therefore, further decomposed to determine the influences of such factors as the composition of bases, growth of the economy, etc.

Since elasticity of any tax is the product of tax-to-base and base-to-income elasticity (Musgrave 1959, Mansfield 1972), regressions are run for estimating tax-to-base and base-to-income elasticity for some taxes (for which data are available at present) based on the double log equation.

Tax-to-Base Elasticity

$$E_{Tb_K}: \quad \log AT_K = \log a + b_1 \log B_k$$

where, k is any tax and B is the base of k.

Base-to-Income Elasticity

$$E_{BY_k}: \quad \log B_k = \log a + b_2 \log Y$$

where, B is the base of any tax k and Y is GDP.

The elasticity of tax would be a product of b_1 and b_2. Actually, however, due to the random error term, the estimates may be affected and the products may not equal the income elasticity of the tax.

Thus for tax-to-base elasticity of import and export tax, the legal bases of the taxes, i.e. the dutiable value of import and export as well as the more proximate bases of the taxes, i.e. import and export value, value-added in the manufacturing sector are considered. Excise tax has been related to value-added in the manufacturing sector because data on the legal base of the tax is not available. Import and export sales taxes are related to their legal as well as more proximate bases - duty-paid value of import and export and value-added in the manufacturing sector. Due to lack of information on the legal base of income tax, value added in the non-agricultural sector is considered as the proxy base (since major part of the tax is realized from non-agricultural sector). Other taxes have been related to different appropriate independent variables. For base-to-income elasticity, all the different bases have been related to GDP for running the regressions.

The results of buoyancy and built-in-income elasticity are summarized in Table 1 and the results of tax-to-base elasticity and base-to-income elasticity are presented in Table 2. The details of the regression results are given in Appendix 1 and Appendix 2. Table 4 presents the results for the multiple regression model presented earlier. The regression results are however to be accepted with some caution because of low R^2s and low D.W. statistics of some of the coefficients.

3. <u>Buoyancy & Elasticity of Taxes in Bangladesh</u>

The estimates of buoyancy and elasticity of different taxes in Bangladesh show different degrees of responsiveness for different taxes as can be seen in Table 1. If we look at the total tax system, the estimated bouyancy with respect to GDP is 1.37, indicating that a one percentage change in GDP results in more than one percent change in tax yield. However, the elasticity of total tax is 1.07 which shows that the overall tax system is not income elastic so that it becomes necessary to take recourse to discretionary tax measures to increase tax yield, the contribution of which comes to 21.3%. This is reflected in higher buoyancy value of the total tax.

TABLE 1
Buoyancy and Elasticity of Taxes in Bangladesh - 1972/73 to 1986/87

Tax Heads:	Buoyancy	Built-in-Elasticity	Contribution ofdiscretionary tax measures [1]
Total Tax	1.37	1.07	21.30
Direct Tax	1.54	1.33	13.64
Income Tax	1.76	1.61	8.52
Indirect Tax	1.34	-	
Total Trade Taxes:	1.46	1.43	2.06
Customs Duty	1.42	0.99	30.28
Import Duty	1.45	1.33	8.28
Export Duty	1.03	1.24	-20.39
Total Sales Tax	1.43	1.44	-0.699
Import Sales Tax	1.58	1.45	8.23
Excise Tax	1.26	0.81	35.72

Note: Estimates are made with respect to GDP. Data and methodology of the estimates are explained in the text.

1. Estimated as the difference of the ratio of built-in-elasticity to buoyancy from 100 %

The buoyancy and elasticity of total tax is the result of buoyancy and elasticity of the components of total tax. The relative weight of the components determine the overall elasticity of the tax system. If the weights of the inelastic taxes are relatively higher than the weights of the elastic taxes, then on balance, the overall tax becomes inelastic. In case of Bangladesh, import taxes have got heavy weight in the total tax revenue of the government (55% of the total tax). Import tax is elastic, but import tax together with export tax,and other customs, i.e., total customs duty is inelastic (0.99). Excise tax, the second largest source of government revenue, contributing 25% of the total tax) is also inelastic (0.81). Though other (income and sales) taxes are elastic with respect to GDP, their weights are less in the total tax revenue compared to customs duty and excise tax. The overall tax system thus appears to have an elasticity with respect to GDP which is not appreciably different from one (1.07).

3.1 Buoyancy and Elasticity of Direct Taxes

Buoyancy: The buoyancy of the total direct tax with respect to GDP is found to be 1.54 which shows good response of tax yield to changes in national income. Both components of direct tax - income tax and property tax - also have high responsiveness, with high degree of correlation, but income tax has got a much higher buoyancy (1.76) relative to property tax (1.23).

Elasticity: The elasticity of income tax, the most important single component of total direct tax revenue, is also quite high (1.61), showing a high degree of responsiveness of income tax with respect to changes in national income.

3.2 Buoyancy and Elasticity of Indirect Taxes

Buoyancy: All the indirect taxes have been found to have buoyancy greater than one with respect to GDP, except sales tax on export, domestic sales tax and taxes on domestic services. However, the buoyancy of all the indirect taxes, except import sales tax, are less than one with respect to their legal or more proximate bases, indicating that the taxes are less responsive inspite of the discretionary measures (Appendix 1).

Elasticity: The elasticity of all the indirect taxes, except excise and customs duties, are also found to be more than one with respect to GDP, but they are less than one (except sales tax),with respect to their legal/proxy bases. The values of elasticity coefficients of these taxes are lesser than the corresponding buoyancy values of these taxes with respect to legal/proxy bases. Excise tax is inelastic with respect to GDP (0.81) as well as with respect to Proxy base (0.06).

The higher buoyancy value of the tax relative to the elasticity value are the result of discretionary tax measures. However, sales tax and export duty have lower buoyancy value relative to the elasticity value which indicates that the effects of some discretionary tax measures have been to reduce rather than to increase the tax revenue.

The R^2 statistics of almost all the taxes, except export tax and export sales tax, are high, reflecting high correlation between taxes and income. Very low R^2 statistics for export tax and sales tax on export shows low correlation between the taxes and the bases. This is also borne out by the fact that there is relative bias in export - only few goods are taxed and the rates are also very low to encourage export growth. Besides, revenue from this tax will depend mainly on conditions of international demand and of local output rather than on GDP alone, which are not considered in the equation.

The D.W.statistics for some of the coefficients are low. This weakens the confidence in the estimates of buoyancy and elasticity of those taxes to some extent. In some cases, it is possible to identify the low D.W. statistics by examining the residuals. Commonly, the early first two or three years are associated with a cluster of large positive or large negetive residuals, giving support to the practice in some studies of excluding these years from the empirical studies. For example, in the case of sales tax with respect to income, the first three years give large negetive residuals. In other cases, there is a steady downward or upward drift in the residuals, e. g. income tax and customs duty with respect to income, respectively, suggesting that some trended explanatory variable may have been omitted.

3.3 Decomposition of Elasticities: Tax-to-Base and Base-to-Income Elasticity.

Direct Tax: Income Tax

Table 2 reports our results of decomposition of elasticities. The estimated tax-to-base and base-to-income elasticity of income tax are 1.40 and 1.25 respectively. Since the base itself (non-agricultural value-added) has been growing faster than GDP, the estimated elasticity of income tax with respect to GDP is high (1.61). Despite this high elasticity, a number of problems in the collection of income tax remain. If these could be overcome, it should be possible to achieve an even higher elasticity.

Indirect Taxes

All the indirect taxes, except customs duty and excise tax, are income elastic. But they are inelastic with respect to their legal/proxy bases, except sales tax, which has unitary elasticity.

TABLE 2

Decomposition of Elasticities - 1972/73 to 1986/87

Tax Heads	Alternative Bases	Tax-to-Base Elasticity	Base-to-income Elasticity [1]	Built-in Income Elasticity [2]
Income Tax				
	NA GDP (13 OBS.)	1.40	1.25	1.61
	MVA	1.23	1.30	
Import Tax				
	MV	0.89	1.51	1.33
	MDV	0.92	1.47	
	MDPV	0.92	1.46	
	MVA	1.02	1.30	
Export Tax				
	XDV	0.83	1.84	1.24
	MVA	1.05	1.30	
Total Sales Tax				
	MDPV	1.00	1.46	1.44
Import Sales Tax				
	MDPV	1.10	1.46	1.45
Excise Tax				
	MVA	0.60	1.30	0.81

Notes:

N.A.GDP = Non Agricultural GDP
MVA = Value Added in Manufacturing Sector
MV = Import Value
MDV = Dutiable value of Import
MDPV = Duty-paid value of Import
XDV = Dutiable Value of Export
1. Elasticity of alternative bases to GDP
2. Elasticity of taxes to GDP

Source: Calculated on the basis of data and methodology explained in the text.

The bases of these taxes are, however, all income-elastic. This shows that the legal/proxy bases are growing at a faster rate than the taxes to which the bases are related. Particularly in the case of excise tax, lower tax-to-base relative to base-to-income elasticity is responsible for the low elasticity with respect to income. The best prospect of increasing the overall income-elasticy for these taxes is, therefore, likely to be the actions, such as the replacement of specific by ad valorem taxes and/or broadening and deepening of the bases of the taxes to increase their effective progressivity, which should raise the tax-to-base elasticities.

3.4 Comparison of the Buoyancy and Elasticity Results with the Results of Other Studies of Buoyancy and Elasticity in Bangladesh.

The regression results of buoyancy and elasticity of taxes in Bangladesh for a period of fifteen years from 1972-73 to 1986-87 reported in this thesis are different from the results of similar studies made by others in Bangladesh (Table 3). The Bangladesh Planning Commission estimates buoyancy and elasticity of taxes in Bangladesh for different periods. Chowdhury and Hossain also made an estimate of buoyancy and elasticity for a period of 10 years from 1975-76 to 1984-85. Both these studies show lower elasticity of direct taxes and of major indirect taxes (i.e. import duty and excise tax) compared to our findings. Total direct tax and total indirect tax are found to be income inelastic by Chowdhury and Hossain. The results of the two studies are, however, different from one another for some taxes. Thus sales tax was found to be elastic by Chowdhury and Hossain but all the Planning Commission studies found sales tax as inelastic. Chowdhury and Hossain estimated income elasticity of sales tax, but Planning Commission studies related sales tax to its legal base, which is tax-to-base elasticity and not income-elasticity of sales tax. The decomposition of elasticity results of Chowdhury and Hossain show that all the indirect taxes are inelastic with respect to their legal/proxy bases. The bases of the taxes are however reported to be income-elastic. The Planning Commission did not make any decomposition of elasticities, except only relating import duty, sales tax and income tax to their legal/proxy bases.

Regression equations of log-linear form similar to ours have been used to estimate buoyancy and elasticity by both the studies. Gross tax series have been adjusted by using proportional adjustment method by both these studies also. A comparative picture of the results of buoyancy and elasticity can be seen in Table 3.

The estimates are, however, not strictly comparable with each other as the sources of some of the data are different and the number of observations are also different. However, they are not totally out of line with one another so far as Chowdhury and Hossain, and Planning Commission's studies are concerned.

The estimates of elasticity and buoyancy of taxes reported in this thesis are also not strictly comparable with the other estimates due to the same reasons. The results are different and the differences are striking. The results of our estimates are different in two major respects from other studies: (i) All the taxes, except excise are found to have built-in elasticity greater than one. (ii) Income tax is found to be more elastic than all the indirect taxes both with respect to GDP and with respect to alternative bases in our study.

The comparative picture in Table 3 shows that the estimates of the Planning Commission and of Chowdhury and Hossain are opposite to our findings: (i) All the taxes, except total tax to

TABLE 3

Elasticity & Buoyancy Estimates of our study and other studies.

Tax Heads	A		B		C	
	1972-73 to 1986-87		1972-73 to 1984-85		1972-73 to 1988-89	
	Elasticity	Buoyancy	Elasticity	Buoyancy	Elasticity	Buoyancy
Total Tax To GDP	1.07	1.37	1.04	1.22	0.91	1.21
Import Tax						
to GDP	1.33	1.45	-	-	-	-
to MDV	0.92	0.99	0.81	0.89	0.86	1.04
Import Sales Tax						
to GDP	1.45	1.58	-	-	-	-
to MDPV	1.10	1.11	0.93	0.91	0.87	0.83
Excise Tax						
to GDP	0.81	1.26	0.86	1.23	0.80	1.29
to MVA	0.60	0.92	-	-	-	-
Income Tax						
to GDP	1.61	1.76	-	-	-	-
to GDP_{NA}	1.40	1.49	0.92	1.04	0.84	1.09

Tax Heads	D		E	
	1975-76 to 1984-85		1975-76 to 1984-85	
	Elasticity	Buoyancy	Elasticity	Buoyancy
Total Tax to GDP	0.91	1.10	0.85	1.03
Import Tax to MDV	0.72	0.84	0.85 0.97 (GDP)	1.11
Import Sales Tax to MDPV	0.83	0.81	1.06 1.14 (GDP)	1.10
Excise Tax to GDP	0.76	1.18	0.66 0.62 (MVA)	0.99
Income Tax to GDP_{NA}	0.75	0.90	0.95 0.94 (GDP)	1.09

Notes:

(i) A shows estimates of our study; B, C, D, show the estimates of Planning Commission and E shows estimates of Chowdhury and Hossain.

(ii) GDP series in A and E are at constant factor cost and are based on old GDP estimates.

(iii) GDP series in B and D are at current market prices and are based on old GDP estimates.

(iv) GDP series in C are at current market prices and are based on new GDP estimates.

Sources:

(i) Fiscal Statistics. Planning Commission, GOB. 1987. pp.4-5

(ii) Fourth Five Year Plan (1990-95). Planning Commission, GOB. pp.111-5.

(iii) Tax Structure of Bangladesh. Chowdhury and Hossain. 1987. pp. 71-73.

GDP in B, are found to have elasticity less than one by the Planning Commission, and except for import sales tax, also by Chowdhury and Hossain. (ii) The elasticity of income tax is less than most of indirect taxes (except of excise tax) with respect to proxy bases for the period 1972-73 to 1988-89 in the Planning Commission's study and for the period 1975-76 to 1984-85 in Chowdhury and Hossain study. Given the proportionate changes in GDP, in non-agricultural GDP and in tax revenue during the whole period, such low elasticity estimates of income tax do not seem to be appropriate. Such differences in the results cast some doubts about their reliability. Our data sources are, however, reliable and data preparation have been checked. The computations have been carried out in Opus Technology, 486, University of Manchester. Some explanations of the differences in the results may be found in the following facts:

(1) Inclusion of initial three years income and tax figures in the time series may have made some differences in the results of our's and Chowdhury and Hossain's since those were the periods immediately after Independence of Bangladesh and percentage annual changes were high due to starting from a small base. The changes in the

subsequent years were more gradual.

(2) In the case of tax-yield, income tax revenue increased two and a half times annually between 1972-73 to 1974-75. The yields from other taxes also increased substantially during that period, but the rate of change was different. For the later years, the rate of change in tax-yields was moderate.

(3) Various administrative and tax rationalization programs introduced in the 80's as part of structural adjustment programme may have had their impact on tax revenue growth and the responsiveness of the taxes with respect to GDP till 1986-87. Afterwards, natural disasters, political instability and administrative slackness in implementing tax rationalization programs may have had adverse effects on tax revenue growth and responsiveness of taxes. The lower values of elasticity and buoyancy with respect to GDP and legal/proxy bases estimated in the Fourth Five Year Plan of Bangladesh, extending the period from 1986-87 to 1988-89, may be the outcome of these factors.

(4) The DFFYP (1990-95) estimates are made with revised GDP estimates and at current market prices. These estimates are, therefore, not strictly comparable with our estimates which are based on earlier GDP series. The results are however in line with the earlier estimates of Planning Commission and of Chowdhury and Hossain, showing similar trend of responsiveness of the taxes.

(5) The results of our estimates and the estimates of the Planning Commission and of Chowdhury and Hossain show that the estimates are sensitive to data for different periods for different sets. This is evident from the results in D and E for the same data period and from the results in B and D, including and excluding first three years (1972-75) period, by the Planning Commission.

3.5 Multiple Regression Results of Buoyancy Estimates of Total Taxes for Major Policy Changes in Bangladesh.

All the studies compared above, including our own, have treated the period of study as homogeneous in terms of the relationship between revenue and GDP. As explained in the methodology section, however, it is possible also to take explicit account of major shifts in policy variables due to changes in two political regimes during the period, one in 1975-76 and the other in 1981-82. The results of our empirical work using this approach are presented in Table 4.

TABLE 4
Results of Multiple Regression for Major Policy Changes

	Constant	GDP	ADM1	ADM2	R_2	D.W.
Total Tax	-2.087	1.18 (0.053)	0.22 (0.024)	-0.031 (0.023)	0.99	1.30

Note: Figures in the parentheses show standard errors.

As will be seen, the results do suggest that there was a significant upward shift in the tax income relationship after 1975-76. The co-efficient of c variable relating to this period is positive and significant. (The estimation gives a negative value for the d co-efficient of the dummy variable relating to the period 1982-86, but it is small and clearly not statistically significant). The effect of making explicit allowance for the shift is to reduce the estimate of the buoyancy of tax revenue for the period as a whole, from 1.37 to 1.18, suggesting that in the simple regression model, the co-efficient of the income variable may have been reflecting in part the influence of the excluded variable of policy regimes. The inclusion of the policy dummy also reduces, as might be expected, the correlation of residuals as measured by the D.W. statistics.

4. Reasons for the differences in Elasticity among different Taxes in Bangladesh.

The responsiveness of a tax depends on the growth of the tax revenue relative to its base. The reasons for the differences in the magnitude of elasticity may therefore be found in the factors that determine the growth of tax revenues and the growth of the bases. The factors such as the rate and the base structure of the taxes, changes in the structure and the growth of the economy, administrative efficiency, income distribution pattern and many other national and international factors may have their influence on the growth of tax revenues and of the bases of the taxes. It is not possible to isolate the influences of all of these factors separately. However, a decomposition of the tax elasticities is made to examine/show the influences of some of the factors on the growth of tax revenue relative to the growth of the bases.

In the discussion which follows, some factors which are relevant to the collection of revenue from direct and indirect taxes are considered. It will be appreciated that say, weakness in administration, or limited coverage or factors such as natural disaster, may affect tax revenue without affecting elasticity : however, they will affect elasticity (positively or negatively) if, over the period studied, their proportionate effect on tax revenue is correlated (positively or negatively) with income.

4.1 Direct Tax: Income Tax

Income tax is expected to have higher elasticity in Bangladesh as it is progressive in principle and covers a wide range of income.[4] But the taxable base gets narrowed down considerably owing to the liberal provisions of exclusions, deductions, exemptions and concessions that are incorporated into the tax law for equity, incentive and allocative purposes.(Ibid.). Besides a low population coverage,[5] weak tax administration and virtual exemption of agricultural income tax[6] made the tax less progressive in effect and contributed to low responsiveness of income tax. There were, therefore, continuous efforts on the part of the government to increase the tax yield from this source through various policy measures.

The results of our estimates show that income-elasticity and tax- to-base elasticity of income tax are all found to be greater than one. The plausible explanation of higher responsiveness of income tax with respect to its bases may be the following ones:

A. Changes in Government Policy.

Various changes in government policy inherited since the later half of the 70's and carried through to the first half of 1980 to liberalize the economy (in order to ease pressure on the government and to have better macroeconomic management) increased the scope of private

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[4]. According to Income Tax Ordinance, 1984, promulgated by the President of Bangladesh (which has superseded the Income Tax Act of 1922), all income has been classified under seven broad heads for the charge of income tax (i) services; (ii) interest on securities; (iii) income from property; (iv) agricultural income; (v) income from business and profession; (vi) capital gains and (vii) income from all other sources.

[5]. The number of total income tax assessee was only 3,32,368 in 1982-83. It increased to 3,41,462 in a population of 9.5 crore in 1983-84. It was 4,96,000 in 1987.
Source: (a) National Board of Revenue, GOB, (b) Annual Report, Bangladesh Bank, 1983-84. (c) Mid-term Review of the Third Five Year Plan, P 32.

[6]. Agricultural sector contributes about 50% of the GDP, but the contribution of this sector to total income tax is very little.

investments in various fields. The introduction of New Industrial Policy (NIP)[7] in 1982 was an important development in the management of the economy. It expanded the scope of private investment and the process was continued by the introduction of Revised Industrial Policy (RIP) in 1986. Foreign private investment was also encouraged either directly, or in joint collaboration specially in the Export Processing Zone (EPZ). As a result of improvement in policy environment, private investment began to pick-up in quantitative terms.[8]

Since major part of income tax comes from company taxes (as mentioned in Chapter 1), the growth of private investment may have had a positive impact on the growth of income tax through increased corporate tax (since private investment increased in industrial trading, transport and service companies) as well as increased personal income tax.

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[7]. The main features of NIP 1982 are:
(a) denationalization of jute and cotton mills. More than 600 enterprises were transferred to the private sector by 1985 and the process continued in RIP 1986. From 1986, emphasis was, however, on the formation of mixed corporations of public and private bodies (with 51% public share) than on disinvestment.
(b) expansion of free list industries. Only 6 sectors (basic, heavy and strategic) were classified as the Reserve Area and were kept for the public sector, e.g., (i) arms, ammunition and allied defence equipment; (ii) atomic energy; (iii) air transport; (iv) telecommunications; (v) generation and distribution of electricity (excluding rural electrification); (vi) mechanized forest extraction.
(c) simplification and decentralization of investment approval, loans disbursement procedures, including reduction of administrative layers.
(d) ban on import of some industrial goods to protect and promote local industries (PVC compound, electric bulb, 15-100 w, electric ceiling fans, dry cell batteries, locks upto 2.25 size etc.)

[8]. During 1985-90, private investment achieved 73% of the Third Five Year Plan target in 1984-85 prices. The percentage of the target achievements (in 1984-85 prices) was, however, lowest in industries, and highest in trade and other services as can be seen below: Agriculture 53%, Manufacturing 41%, Physical Planning and Housing 55%, Transport and communications 143%, trade and other services 250%.
Source: Memorandum for Bangladesh Aid Group, 1990-91, Government of Bangladesh, Mar 1990, P31.

B. Changes in Fiscal Policy.

The fiscal structure was rationalized and the incentive structure was expanded in support of the changed government policy over the period. Personal and company income tax rates were reduced and exceptions, deductions were increased for specific cases along with decreases in the rates of duties on machines and raw materials and increased rebates in exports to provide greater incentive for private investments.[9] Personal income tax rates were reduced several times across the board to have higher tax reporting. The highest marginal tax rate for the registered firms was also reduced from 35% to 25%. The slab structure was rationalized for personal income tax and for taxation of the registered firms.[10] The exemption limit was adjusted upwards with the changes in inflation rate.[11] From 1980-81, super tax was abolished and the industrial undertakings in the corporate sector have had to bear only income tax at a flat rate of 50%.[12] Tax holiday system was under reviews to find its

[9]. Under Income Tax Ordinance, 1982, one third of taxable income can be exempted from taxation due to investment allowances, allowances for housing, transport, entertainment. Certain amount of income can get the benefit of double exemptions, e.g., exemption of income from certain type of investment and exemption of capital gains/ dividends arising from that investment income. In addition to these allowances for personal income,company income is also given exemption through tax holiday.The companies can get tax holiday for three sets of time periods (5,9 and 12) for investment in specific locations.

[10]. Income tax slabs have been consolidated into 5 broad brackets from 9 to simplify assessment and make the tax progressive in effect.. The first bracket starts at 10% with Tk 55,000 taxable income, 20% for the second Tk 55,000 and ending with 50% as the highest rate.

[11]. The minimum exemption limit is raised from Tk 24,000 to Tk. 36,000 in 1984 to have better tax compliance. The concept of exemption limit is, however, difficult than the conventional one in that the global income becomes subject to tax as soon as it crosses Tk.36,000 per annum.

[12]. Finance Act of 1980. Government of Bangladesh.

justification as an incentive devise and tariff rationalization program intended to reduce effective protection (by reducing import tariff and quota restriction) may have resulted into increased industrial efficiency, increasing the prospect of higher income tax return. Such tax rationalization move was expected to produce better tax compliance and greater revenue return to the government gradually.

C. Legislative Changes.

There were some changes in the income tax laws to improve the tax performance. Thus:

(i) Agriculture income tax was merged with general income tax from 1976-77;

(ii) Presumptive income tax system was introduced for taxing self-employed people in small trade and businesses, professionals who escape tax net and also new entrants to business with capital up to Tk. 100,000 per annum) from 1980-81;

(iii) Special exemption of Tk. 3,600 per annum for agricultural income was withdrawn from 1980-81 in view of enhancement of general exemption limit of income tax.

D. Administrative Changes.

Several new methods of tax collection and procedural changes were introduced from time to time during the period, such as:

(i) Self-assessment of taxable income and income tax to be paid from 1980-81;[13]

(ii) Tax-withholding at the source from 1980-81, for salaried and company income.

[13]. Contractors, suppliers, indentors, businessmen, professionals whose income mostly remained untapped by income tax, was encouraged to pay under this system.

Deductions of income tax at the source increased income tax yield from personal income tax. (Finance Minister's Budget Speech, 1980-81, pp.61);

(iii) Deduction of advance tax on interest income at the rate of 10% from interest payable on fixed deposits in the banks exceeding Tk. 40,000 per annum. The tax would be adjusted against tax liability of the assessee after completion of his assessment.

(iv) A special two year program was introduced in 1984 to augment tax collection and it increased the number of assessees by bringing many new assessees within the tax net. (Finance Minister's Budget Speech. 1985-86, pp.16)

(v) Tax collection procedure was simplified.

E. Institutional Changes.

A number of institutional changes took place during the period, specially during 1980-85. With denationalization of industries and expansion of free list industries for private participation, establishment of private banking and insurance companies were allowed from 1980 to encourage private sector activities. The banks and insurance companies were all nationalized in 1972. Besides, other institutions like Industrial Development Leasing Company (for procurement and leasing of equipment to potential investors), Saudi-Bangladesh Industrial and Agricultural Company, etc. were established in 1980 (TFYP. pp I-23).The changes are expected to have positive impact on corporate tax revenue.

F. Income Redistribution.

During 1970s and 1980s, per capita income increased slowly but there has not been any significant redistribution of income in favor of the poorer section of the people. If income redistribution takes place in favor of low income brackets within the tax-paying group or non-tax payers in general, then tax yield would not increase under progressive tax-rate structure. It is expected that with a shift of tax payers in the upper brackets of income, a progressive income tax would yield increased tax revenue. Studies on income distribution pattern in Bangladesh, (Osmani, 1984 pp.67, World Bank Report 1983 pp.iii & 1988 pp.i) indicates that inequality in land and income distribution has increased during the 1980's from the 70's. This is expected to result in an increase in the number of assessees and with improved tax administration, in an increase in income tax yield.

The expected increase in income tax revenue due to all these factors may have been proportinately more than the increase in income (App.4) to lead to higher elasticity. Higher elasticity of income tax points to the greater scope of increasing income tax revenues through further rationalization and improvement in tax administration in checking evasion and collecting arrears quickly. It also points to the important role that direct tax can play in bringing in sufficient flexibility in the tax system. Since import tax rates are being reduced now, direct taxes need to be further strengthened to impart greater overall elasticity to the tax system as well as making it more equitable.

4.2 Indirect Tax

Though indirect taxes contribute largest amount of revenue to the government of Bangladesh, they are not found to be elastic with respect to their legal/proxy bases, except import sales tax. The taxes are found to be income-elastic, but this is due to higher base-to-income elasticity rather than tax-to-base elasticity. Tax-to-base elasticity of all the indirect taxes (except import sales tax) is less than one. These results of indirect tax elasticity are not much different than the results of other studies mentioned earlier.

The rates and bases of individual taxes have changed considerably with changes in government policy and economic situations over the period in Bangladesh. These and the other factors, e.g., administrative efficiency, international environment, have affected the growth of revenues from different indirect taxes differently, resulting in different responsiveness of the taxes and the bases. There has been substantial policy shifts in the 80's relative to the 70's in Bangladesh. The changes are prominent in the case of trade, industrial and fiscal policies. Monetary and exchange rate policy also changed considerably to have more flexibility conducive to the operation of market mechanism. Such policy changes have affected the tax yield from import duty, sales tax on duty-paid value of import and excise tax.

A. Import Duty.

The income-elasticity of import duty is found to be 1.33, but tax-to-base elasticity with respect to its legal base (import value: MV) and proxy base (dutiable value of import: MDV) are found to be 0.92 and 0.89 respectively. The base-to-income elasticity is, however, 1.47 with respect to MV and 1.51 with respect to MDV. The results show that import tax has been growing at a faster rate relative to GDP, but it was growing at a slower rate with respect to the legal/proxy bases. The bases, on the other hand, have been growing at a faster rate than GDP, hence at a faster rate relative to the import tax.

Higher growth rate of the bases relative to GDP is the reason for income-elasticity of import-duty being little more than 1. Import duty has been growing at the rate of 8.0% relative to GDP growth rate of 5.9%, while the growth rates of MV and MDV have been 9.2% and 8.94% respectively during the period 1972-73 to 1986-87. Import duty could have higher elasticity if the tax-to-base elasticity had been higher.

The growth rates of the taxes and the bases are estimated by fitting a regression equation of the form:

$$\log Y = a + bt$$

where:

t = time
y = income/base.

The equation is derived from the exponential function of the form:

$$Y = e^{a+bt}$$

where:
e = exponential
b = coefficient of time (t=15 years, 1972-1986)

The results of the estimated growth rates are presented in the Appendix 3.

The reasons for higher base-to-income elasticity and lower tax-to-base elasticity may lie in various changes and developments that took place during the period. The built-in- structure of the tax system itself, however, tends to have the most important influence on the tax-to-base elasticity.

(i) Policy Changes.

During the first half of the 70/s, high protective policy was followed by the government of Bangladesh in accordance with the import-substitution philosophy that the country inherited in 1971 from its past. This policy was suitable for revenue purpose also, since the bulk of the revenue was raised from import taxes (because of high import contents of development and revenue expenditures of the government). High import taxes along with quantitative restrictions resulted in too high rate of effective protection to most domestic industries and protecting mostly inefficiency at home. (TIP; 1985, 1986 and HIID studies; 1989, 1990.) There were therefore efforts to reduce this element of protection from 1980-81 as a part of policy shift from import substitution to export promotion and shift of trade taxes to consumption taxes. There has been substantial tariff rationalization and relaxation in the quantitative restrictions since then. Import duties have been reduced on a number of items (exposing domestic industries to greater competition, e.g. cotton textile, paper, chemicals, iron and steel, etc.). Import bans in many items also have been either withdrawn or replaced with tariff to create a competitive market and increase private participation. It was expected that the shortfall in import revenue resulting from import liberalization would be more than made-up by increased revenue from excise taxes arising from greater expansion of domestic industries and from more rigorous collection of direct taxes.

(ii). Legal Base.

Import increased due to policy changes, but the flow of increase was disturbed at times due to other factors, e.g., foreign exchange position, domestic investment requirements, growth of the agricultural sector, natural disasters, etc. Import is the base of import tax, but all of it is not taxed due to various reasons. Certain imports are duty-free - like food-grain imports. Large quantities of food grains are imported after crop failure and food shortage due to floods, droughts or cyclones which occur repeatedly in Bangladesh. Import of lesser proportion of non-food items reduce the taxable base. There is, therefore, discrepancy between the growth of import value and the growth of dutiable-value of import, which is the legal base of import duty. This is also reflected in the higher MV-to-income elasticity (1.51) relative to MDV-to-income elasticity (1.47). It shows lower demand for taxable imports relative to total import.

(iii). Incentive Structure.

The taxable base gets further eroded due to various provisions of tax exemptions, rebates and duty-drawbacks to encourage imports for industrial expansion. Tax concessions are made at various rates for different sectors and for different regions. This has made the incentive structure very complicated and easier to avoid in the absence of a very efficient tax administration.

(iv). Tax-Rate Structure.

Import duties are imposed to serve three different purposes: protection, incentive, and control of consumption. The objectives are, to some extent, contradictory and have made the import duty structure cumbersome, increasing the scope of tax avoidance and evasion. While certain big industrial sectors like steel engineering, jute, fertilizer deserve protection to reduce import dependance, many others also manage to get protection from such a system. High tariff on finished products and low tariffs on inputs are providing double benefits to a large number of industries, even though they may not be deserving them from the point of view of comparative advantage (TIP studies 1985, 1987). The cost of such benefits are higher to the government in terms of revenue loss from reduced import tax earnings. The effective coverage rate of import base turns out to be different from what is expected due to such variety of concessionary duty rates.

(v). Effective Coverage Rate of Tax.

The import duty rate structure varies according to the classification of imported goods by end-use. Imported goods can be broadly classified into three major categories: capital goods, intermediate good and consumer goods. The consumer goods are taxed at the highest rates but the consumers goods category is the smallest of the three as a proportion of total import. The import of raw materials and intermediate goods form largest proportion to total imports, but their tax-rate is the lowest. The relative proportion of these three categories of imports to total imported goods are on the average 17.25, 53.04 and 28.7 respectively for 1979-80 to 1986-87. Since the tax rates on the three categories differ, however, the proprotions of import tax revenue derived from the three categories differ from these percentages as can be seen in Table 5.

The overall average effective coverage rate of the tax for the whole period comes to 28%, though the rates are 37.43% for the consumer goods, 27% for the raw materials and 25.28% for the capital goods.

TABLE 5

Effective Coverage Rate of Import Duty

Years	Categories of Importd Goods	Total Import Value (Taka Crore)	Import Duty (Tk. Crore)	Effective Coverage Rate of Tax (%)
1979-1980	Consumer Goods	363.82 (17.00%)	117.36	32.16
	Raw Materials	1074.91 (50.00%)	286.44	26.65
	Capital Goods	710.73 (30.00%)	178.76	25.15
	Total	2149.46 (100.00%)	582.56	27.10
1982-1983	Consumer Goods	454.57 (15.58%)	195.16	42.93
	Raw Materials	1543.17 (53%)	446.70	28.95
	Capital Goods	919.45 (32.52)	208.41	22.67
	Total	2917.19 (100.00)	850.27	29.15
1986-1987	Consumer Goods	1041.47 (19.19%)	387.48	37.21
	Raw Materials	3051.33 (56.23)	779.36	25.54
	Capital Goods	1333.62 (24.58)	373.84	28.03
	Total	5426.42 (100%)	1540.68	28.39

Source: Fiscal Statistics. Planning Commission. 1987.pp 52-53

The tax-to-base elasticity of import tax relative to dutiable value of import is a little higher (0.92) than that relative to import value (0.89), since the growth rate of dutiable imported goods was less (8.94) than that of imported goods (9.2).

(vi) Foreign Exchange Position.

Since the major part of Bangladesh's import is financed from foreign assistance, growth of total import depends on the availability and flow of foreign exchange from the donor countries/agencies. During 1980-82, aid inflow was 23% below the projected level, affecting imports and hence import tax. World recessionary conditions again reduced export earnings, causing less imports. Increased remittances by Bangladeshi nationalists working abroad helped to offset the situation to some extent. From 1982, aid inflow started increasing gradually and tariff rationalization helped increasing imports and exports, contributing to increased import tax later on. Changes in the structure of foreign aid also affected the growth of import and export tax. During the 80s, the proportion of commodity aid gradually decreased and aid increased mostly for specific projects having low duty rates.

(vii) Exchange Rate.

As aid inflow and foreign exchange position fluctuated, the government had to take recourse to depreciation several times to increase the value of import expressed in domestic currency. To stimulate exports and make imports less attractive against domestic production, a flexible exchange rate policy was followed from mid 1979, pegging the Taka value with a basket of foreign currencies of the major trading partners. The reference currency was the pound sterling for intervening in exchange rate, but since early 1983, because of relative trade weight and international trade practices, the dollar was introduced as the intervening currency. This provided a mechanism for gradual adjustment of nominal exchange rate of the taka with fluctuations in the currencies of Bangladesh's major trading partners in relation to the reference currency. Between 1972 to 1985, taka depreciated by over 450%.[14] The annual rate of depreciation of Taka was 10.9% from 1979-80 to 1984-85.[15] In 1984-85, $1 was equal to Tk.26. Since the Taka depreciated by 67.7% over the SFYP period (1980-85), and the dollar value of dutiable imports increased at less than half of this rate (23%), depreciation of Taka became an important source of revenue collection from imports.[16]

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[14]. Third Five Year Plan of Bangladesh, P 1-2

[15]. Third Five Year Plan of Bangladesh, P III-5

[16].

Imports and Dutiable Imports 1980-89

	Total Import $m	Dutiable Import $m	Dutiable Import Tk Crore	Import Duty(D) Tk.Crore	Effective Coverge D Rate(%)
1979-80	2372	1389	2150	583	27
1980-81	2583	1651	2698	703	26
1981-82	2573	1370	2747	758	28
1982-83	2309	1228	2917	850	29
1983-84	2353	1300	3242	919	28
1984-85	2649	1613	4188	1175	28
1985-86	2365	1452	4348	1335	31
1986-87	2614	1601	4906	1541	31
1987-88	2992	1602	5028	1645	33
1988-89	3375	1824	5861	1848	32

Source (I) TFYP Nov. 1985 pp. III-5 (2) FFYP Jun. 1990 pp. III-4.

The effect of depreciation on export and hence on foreign exchange earnings was partly neutralized by domestic inflation. In 1983-84, though $1 = Tk.24.90, the price- deflated and trade-weighted real exchange rate was only Tk.15.70 per $1.

Yet, under the impetus of tax incentives, exports increased and imports also increased. As the average effective coverage rate of import duty increased gradually, it provided another source of growth of import duty collection.

(ix) Natural Phenomena.

Bangladesh economy is susceptible to natural calamities and these phenomena affect the growth rates of different sectors of the economy as well as domestic resource mobilization. Natural disasters like floods and cyclones affect agricultural output and income and retard the growth rate of the agricultural sector. The slow growth of agricultural sector depresses demand for manufactures as well as imports. The need for higher food import from cash foreign exchange as a result of crop failure limits other imports, specifically taxable imports. Thus, in 1981-82, harvest failure not only led to negative growth of agriculture, but also reduced industrial growth from 8.8% in 1980-81 to 2.9% in 1981-82. Overall annual economic growth was about 3.5% on the average during 1980-85 against the target rate of 5.4% and this affected internal revenue collection adversely.[17]

[17]. There was 3.5% shortfall in customs, 12% shortfall in excise and 19.8% shortfall in sales tax collection during 1980-85 from projection. (TFYP, pp. I-15).

(x) Budgetary Management.

Government stabilization programmes in the early 1980s (to overcome sharp deterioration in terms of trade and anticipated decline in aid inflow) improved balance of payments position, but had adverse effects on internal revenue collection. When public expenditures were streamlined to reduce budget deficits, the reduction was made in the development budget (ADP), while current expenditure increased. The cutting down of ADP reduced import demand and hence import revenues.

(xi) Tax Administration.

Weak tax administration is responsible to a large extent for lower collection of internal revenues, particularly from import tax and excise tax, which are very difficult to handle efficiently without sufficient manpower and logistic facilities. Government revenue can be increased substantially by strengthening tax administration.

B. Sales Tax.

Sales tax was raised from three different sources in Bangladesh: imports, exports and domestic goods & services. About 90% of the tax was, however, collected from import sales tax. Domestic sales tax was contributing about 8 to 10% of the tax, while export sales tax was almost negligible. Domestic sales tax was therefore abolished from 1980-81 and completely merged with excise tax by 1982-83. Since export sales tax is almost negligible, total sales tax can be regarded as contributed by import sales tax.

Total sales tax is found to be income-elastic (1.44), but the tax is found to change no more than in proportion to changes in its legal base, dutiable-value of import (MDPV). The tax-to-base elasticity is just 1.00. The base-to-income elasticity of the tax is, however, greater than one (1.46) and this has resulted in a fairly high built-in-income elasticity of sales tax. Sales tax is imposed to control consumption mainly but it is also used to serve revenue purposes. The standard rate of sales tax is 20%, but there are some concessionary rates also ranging from 0 to 10%. There are also some penal rates in luxury consumption, which goes as high as 300%. The majority of goods are, however, taxed at the standard rate.

Since sales tax is imposed to control consumption, a large part of the tax-base remains outside the tax-net, narrowing the tax-base. The narrow tax-base gets further eroded with the application of concessionary tax rates. But since the tax is imposed on the duty-paid value of import, sales tax collection becomes automatic, once import tax is realized. The tax therefore, grows in proportion to the growth of its base as its avoidance becomes difficult.

Since sales tax is collected from duty-paid value of imports, the lower tax-to-base elasticity relative to base-to-income elasticity would be for the same reasons as for lower import tax-to-base elasticities.

C. Excise Tax.

Excise tax is found to be inelastic, both with respect to GDP (0.81) and its proxy base (0.60). The base-to-income elasticity is, however, found to be higher (1.30) - which indicated that the tax could be made more elastic by having a broader and effective coverage of the tax-base. The discretionary effect is largest in the case of excise tax (35.72%) to make up the loss of revenue from automatic growth of the tax.

The low elasticity of excise tax may be due to the following reasons:

(1) The base of excise tax is the narrow formal industrial sector of the economy. Within the manufacturing sector, the products of cottage industries are exempt from tax. The small and medium scale industrial products are lightly taxed. The large-scale industrial products bear the major part of the tax.

(2) The tax is imposed on the ex-factory value of the manufacturing goods and some services. Though most of the domestically produced goods are taxable (except cottage industrial products), numerous provisions of exemptions and concessions provided on incentive and on equity grounds have eroded the tax base.

(3) Though excise tax contributed about 25% of the total tax, the major part of the tax (about 75%) is collected from a few commodities (tobacco, gas, POL products, sugar, cement, paper, jute manufactures, narcotics and liquor), of which again only tobacco contributes about 50% of the total excise tax. Such dependency of the tax on few commodities narrows down the taxable base further and also shows that other products are lightly taxed.

(4) Tobacco products are contributing about 50% of excise tax, but the production of tobacco industries are being affected by large-scale smuggling of foreign cigarettes, specially

the top brand ones (due to high protective tariff). Smuggling of imported cigarettes affects demand for domestic cigarettes while escaping the excise tax. Low elasticity of excise tax is partly the result of such smuggling of foreign products within the country.

(5) The rate structure of excise tax is extremely complicated. The tax rate varies according to quantity, value and weight. The rates vary in degree within the same range of commodities also. Such varieties of tax rates make their administration difficult and evasion easier.

(6) Most of the excise taxes are specific in nature - which deprives the government of collecting larger amounts of revenue in a state of rising prices. This is an important reason for less than proportionate growth of tax revenue with the growth of income or value-added in the manufacturing sector.

(7) Self-clearance system was introduced in 1984 for manufactured goods. Under the system, industrialists would render account themselves and duty themselves. The system proved to be productive initially and was therefore extended to almost all items. But such extension may be counter-productive in the absence of efficient tax administration to check evasion. Refund of customs duty for the imported inputs of excisable products may be one way to check evasion of excise duty.

(8) Turnover tax at the rate of 2% was introduced from 1st October 1983 on self-assessment basis on some industry and business establishments (sweetmeat producers and dealers, steel furniture manufacturers & dealers, wooden furniture producers and dealers, auto-garages &

workshops, shipyard & dockyard, wood-treatment plant & saw mills, printing presses, etc.).[18] The collection of duties from large number of such small establishments is, however, difficult to handle with given administrative capacity. Similarly, the collection of capacity tax (introduced in 1984) from cinema halls is becoming difficult to handle, particularly due to non-cooperative attitudes of the owners.

(9) The decline in agricultural income - particularly due to unfavorable weather conditions - depresses demand for industrial products and adversely affects excise tax collection. A sustained growth of agricultural sector is therefore crucial for stable growth of industrial sector and of domestic indirect tax revenues.

In analysing the reasons for the differences in the elasticities of different taxes, we have tried to pin point some factors which affect the growth of tax revenue from different taxes in Bangladesh. To know quantitatively whether the increases in revenue from different taxes caused by the factors analysed are also related to the increases in income would require detailed study, with all the factors appropriately modelled in the revenue equation. Such a study would need far more information than is currently available. The factual information however does help in explaining the reasons for the differences in elasticities of different taxes, since the factors analysed are expected to increase revenue more than or less than in proportion to the increases in income for different taxes.

The elasticity estimates of direct and indirect taxes in Bangladesh show the responsiveness of different taxes. The income elasticity of total tax is lower than its buoyancy, implying that

[18]. Finance Minister's Budget Speech, 1983. P 9.

there was need to raise the level of tax revenue through discretionary tax measures. As can be seen in Table 1, the contribution of discretionary tax measures to the growth of total tax revenue was 21.3%. The discretionary tax measures were low for income tax, import duty and import sales tax. Trade taxes had lowest discretionary tax measures while import sales tax had negative impact from discretionery tax measures. Excise taxes had highest discretionary measures. Frequent tempering of the taxes with discretionary tax measures may have resulted into lower tax yield of excise taxes. This information can be useful in predicting the consequences of a change in the pattern of taxation for the future flow of tax revenue to the government as national income increases.

5. Summary and Conclusion

The results of buoyancy and elasticity estimates in Bangladesh show that all the major taxes are moderately income-elastic, except excise tax. The buoyancy of the taxes are generally higher than the elasticity. The total tax is, however, not income-elastic. It reflects slackness in administration in checking evasion and smuggling, besides narrowness of the bases. The revenue needs of the government are therefore met by introducing discretionary tax measures.

The study shows that the total direct taxes are more buoyant than the indirect taxes (except import sales tax). Income tax, the most important single component of direct tax, is the most buoyant and also the most elastic tax of all the taxes. This shows the prospect that substantial increases of revenues from this source may be looked for as development proceeds.

Of the indirect taxes, trade taxes are more buoyant than domestic indirect taxes. Import sales tax is the most buoyant among all the indirect taxes. But the buoyancy of total sales tax is less than its elasticity which shows negative impact of discretionary measures on this tax. The negative impact of discretionary tax measures is also evident on export duty, where buoyancy is less than elasticity. Excise tax is least buoyant. The observation that discretionary changes have involved a sacrifice of revenue is not sufficient in itself to establish that the these measures were ill considered. However, frequent discretionary changes are likely to impair the effectiveness of a tax and impinge upon its elasticity as well. It is necessary to look into this problem by rationalising changes in rate and base structure of import sales tax, in order to avoid revenue loss and other undesirable effects.

Excise tax is the least buoyant and also least elastic of all the taxes in Bangladesh. The growth of excise tax is much less than the growth of GDP and MVA. This may be due to greater difficulty of handling the tax from various collecting points compared to trade taxes which are handled mainly from one single point of entry - the Chittagong sea port. It may also, however, reflect the particular structure of current excise tax rates. Excise is heavily concentrated on a single product - cigarette - and beyond that, on a small number of other products. Since these are not products of particularly high income-elasticity of demand, it can not be expected that excise tax would be highly responsive to income. Thus there is a case for recasting the system of excise taxation to impose higher rates on goods with relatively high income-elasticity of demand. Such a policy would also be in conformity with distributional objective, a topic which will be discussed in Chapter 6. Of course, the recasting of excise tax rates towards goods which have high income-elasticity implies some increases in the burden of taxation on marginal efforts. Thus, this could not be regarded as an unambiguous recommendation, unless there is evidence that the incentive effect would be very small.

All the taxes, except income tax-to-GDP_{NA}, show higher base-to-income elasticity than tax-to-base elasticity. The analysis of tax-to-base and base-to-income elasticity show that the modest overall income-elasticity of major taxes (except excise tax) is not due to a fairly high tax-to-base elasticity but due to a fairly high base-to-income elascity. A low tax-to-base elasticity may be an indication of poor administration in tax collection, so that as the base rises, tax actually collected rises more slowly than legal tax liability. Alternatively, it may be the product of a rate structure which concentrates taxation on items which increase relatively slowly as the base as a whole increases. Either way, the type of measure required to raise a low tax-to-base elasticity is evident. For instance, too many exemptions, too many tax rates and different tax rates even for the same category of goods make tax administration difficult, and provide scope for tax avoidance/evasion. A large number of exemptions narrow down the tax base significantly. For income taxes, on the other hand, the tax-to-base elasticity is relatively high. This may reflect efficient tax collection, but it may also reflect the fact that these taxes are better designed to give an automatic response of revenue to increased income than the indirect taxes. The higher tax-to-base relative to the base-to-income elasticity of the direct taxes compared to the indirect taxes may also imply that it is easier to impose a progressive rate structure for direct than for indirect taxes.

The major determinant of low tax revenue responsiveness is therefore low tax-to-base elasticity. From the analysis of various factors that affect the tax revenue and the bases of direct and indirect taxes, and hence affect the elasticity of various taxes, (if increase in tax revenue from different bases are related to the increases in income), it seems that the income-elasticity of the tax system can be increased, provided appropriate measures are taken to increase the tax-to-base elasticity of the taxes in Bangladesh and to increase the relative importance of taxes shown to have high income-elasticities. The exemptions and allowances need to be rationalised to broaden the tax base. The tax rate structure also needs to be simplified to help efficient tax collection.

Though higher elasticity of direct taxes may point to the greater scope for raising increased revenues from these sources, such a policy may not be successful in producing a sufficiently large amount of revenue until the base is broadened enough by introducing appropriate tax rationalisation and reform measures. In the meantime, therefore, the proportion of direct tax revenue to total tax revenue is likely to remain small compared to indirect tax revenues.

The changes of government policy to shift emphasis from trade taxes to domestic indirect taxes may not be very successful under the present circumstances. In discussing ways of easing the policy dilemma, it is important to understand the main reasons for the low observed elasticity of excise taxation. This will enable us to judge whether appropriate policy changes could offset the fall in the elasticity of indirect tax revenue apparently involved in a shift away from trade taxes. In the short run, there is need to have trade-offs between the imperatives of encouraging private investment through incentives and at the same time to generate larger resources for the public sector. It is difficult to have a judicious balance between the two under the exigencies of a situation.

These difficulties have been evident during the government's recent attempts to shift the balance away from trade taxation. The loss of revenue due to import tax rate reduction could not be offset by increased revenue from domestic indirect taxes. Even though direct taxes are elastic, due to the very small base, the taxes could not produce enough to compensate the revenue losses from trade taxes. It was, therefore, necessary on the part of the government to take recourse to discretionary measures and frequent changes in foreign exchange rates to increase revenues - neither of which are sound economic policies for macro-economic management. This need for discretionery measures confirms the general conclusion of this Chapter that the trade taxes tend to have higher elasticity than the domestic indirect taxes, so that a liberalisation policy which increases the weight of domestic taxes will tend to reduce the income elasticity of indirect tax revenue as a whole. Of course, if it were possible to balance reduced trade taxation with increased direct taxation, this effect on the elasticity of tax revenue would be absent, but the low share of direct taxation in the total tax revenue makes such a policy unfeasible, at least in the short run.

In any case, the apparently high income-elasticity of import-taxation may be a peculiarity of recent history. It has in large part been accounted for by the relatively rapid growth of imports, financed by foreign aid. The dependency on foreign aid however has created the risk of instability in the event of fluctuations in foreign aid. If aid flow decreases, or increases less rapidly than before, revenue from import taxation would be affected. There is therefore a need to explore the alternative possibilities to raise larger revenue with greater efforts.

The non-tax revenues are alternative sources of revenue to the government, whose growth has been quite rapid lately due to changed government policy for the public sector enterprises. More important steps are, however, needed in budgetary management so that public funds are directed towards priority development areas while containing the growth of government current revenue expenditures.

The tax-policy of the government of Bangladesh has started becoming more development-oriented than revenue-oriented from the 1980's. But the present tax structure lacks built-in-flexibility. The development of a flexible tax-structure is, however, only gradually possible. The tax-reform measures need to be introduced after careful consideration of all the possible impacts of such measures throughout the economy and should be introduced first on an experimental basis. In the short run, however, there is a need to have rationalization in the tax system to realize maximum possible revenues with the growth of national income.

APPENDIX 1

Buoyancy and Elasticity of Taxes in Bangladesh - 1972/73 to 1986/87

			Buoyancy (b)			Elasticity (ϵ)		
	Dependent Variables	Regressed On	Coefficient	R^2	D.W.Statistic	Coefficient	R^2	D.W.Statistic
1.	Total Tax	GDP	1.369* (0.074)	0.96	1.00	1.074 (0.069)	0.95	1.17
2.	Import Tax	GDP	1.45* (0.112)	0.93	1.65	1.33* (0.12)	0.90	1.17
		MDV	0.99 (0.034)	0.98	2.04	0.92 (0.036)	0.98	1.84
		MDPV	1.001 (0.034)	0.98	2.03	0.92 (0.036)	0.98	1.80
		MVA	1.11 (0.063)	0.95	1.88	1.02 (0.06)	0.90	1.75
		MV	0.99 (0.031)	0.98	2.05	0.89 (0.031)	0.98	2.05
3.	Export Tax	GDP	1.03 (0.591)	0.19	1.07	1.24 (0.53)	0.30	1.35
		XDV	0.77 (0.259)	0.38	0.83	0.83 (0.22)	0.55	1.14
		MVA	0.94 (0.41)	0.286	1.18	1.05 (0.37)	0.38	1.47
4.	Excise Tax	GDP	1.26* (0.052)	0.97	1.37	0.81* (0.055)	0.94	0.98
		MVA	0.92 (0.056)	0.95	1.68	0.60* (0.037)	0.95	2.18
5.	Import Sales Tax	GDP	1.58* (0.189)	0.84	0.94	1.60* (0.19)	0.90	1.14
		MDPV	1.11 (0.070)	0.95	1.23	1.12 (0.08)	0.98	1.13
		MDV	1.11 (0.07)	0.95	1.30	1.12 (0.09)	0.98	1.32
6.	Export Sales Tax	GDP	0.74 (0.383)	0.22	2.42			
7.	Total Sales Tax	GDP	1.43* (0.14)	0.89	0.77	1.44* (0.137)	0.89	0.78
		MDPV	0.99 (0.03)	0.98	0.39	1.00 (0.035)	0.98	0.47
		MVA	1.10 (0.07)	0.94	1.24			
8.	Total Trade Tax	GDP	1.46* (0.111)	0.92	1.33	1.43* (0.07)	.97	1.30
		MV	0.97 (0.018)	0.99	1.80			
		MDV	0.99 (0.017)	0.99	1.92			

9.	CustomsDuty	GDP MV MDV	1.42* (0.10)	0.94	1.42	0.99 (0.117) 0.64 (0.051) 0.68 (0.05)	0.84 0.92 0.91	2.08 1.64 1.51
10	Income Tax	GDP MVA	1.76* (0.143) 1.24* (0.084)	0.92 0.95	0.62 1.60	1.61 (0.15) 1.23 (0.087)	0.89 094	0.519 1.34
11	PropertyTax	GDP	1.24 (0.05)	0.98	1.58	1.30 (0.06)	0.96	1.79
			Buoyancy					
	Multiple Regression Results	Regressed on	Constant	Coefficient	R^2	D.W.		
	Total Tax (T)	GDP ADM1 ADM2	-2.087	1.18 (0.053) 0.21 (0.024) -0.031 (0.023)	0.99	1.30		

Note: Standard errors in the parentheses

* significantly different from 1 at the 5% level.

APPENDIX 2

Tax-to-Base Elasticity of Taxes in Bangladesh, 1972-73 to 1986-87

	15 Obs.	Coefficients	R^2	T.S.	D.W.S.
1	Income Taxes to N.A. GDP (13 Obs.)	1.40 (0.134)	0.90	10.45	0.56
1.2	Income Tax to MVA	1.24 (0.105)	0.92	11.81	1.33
2	Import Duty				
2.1	to MV	0.92 (0.036)	0.98	24.82	1.80
2.2	to MDV	0.92 (0.034)	0.98		2.043
2.3	to MVA	1.02 (0.06)	0.95	17.00	1.75
3	Export Tax				
3.1	to XDV	0.83 (0.22)	0.55	3.84	1.14
3.2	to XDPV	0.75 (0.255)	0.40	2.04	0.85
4	Excise Tax to MVA	0.60 (0.037)	0.95	16.34	2.18
5	Import Sales Tax to MDPV	1.12 (0.08)	0.98	14.50	1.30
6	Total Sales Tax to MDPV	1.00 (0.035)	0.98	27.93	0.47

Note: Standard error in the parentheses.

APPENDIX 3

Base-to-Income Elasticity of Taxes in Bangladesh, 1972-73 to 1986-87

	15 Obs.	Coefficient	R2	T.S.	D.W.S.
1	MV to GDP	1.51 (0.107)	0.93	14.11	1.53
2	MDV to GDP	1.47 (0.103)	0.93	14.18	1.42
3	MDPV to GDP	1.46 (0.102)	0.94	14.29	1.43
4	XDV to GDP	1.84 (0.219)	0.84	8.39	2.45
5	MVA to GDP	1.30 (0.082)	0.95	15.78	1.55
6	MVA to Non-Agri. GDP (13 Obs.)	1.12 (0.059)	0.97	18.90	2.13
7	Non-Agri GDP to GDP (13 Obs.)	1.25 (0.034)	0.99	36.41	1.22

Note: standard errors in the parentheses

APPENDIX 4

Growth Rates of Dependent & Independent Variables and of Adjusted Taxes.'72-'86.

Dependent Variables:	Growth Rates	Independent Variables	Growth Rates
Total Tax	0.083	GDP	0.059
Total Direct Tax	0.091	GDP NA (13 Obs.)	0.078
Total Indirect Tax	0.081	MV	0.092
		MDV	0.089
Direct Taxes:		MDPV	0.089
Income Tax	0.105	XDV	0.1171
Property Tax	0.075	MVA	0.078
Direct Tax (13 Obs.)	0.097		
Income Tax (13 Obs.)			
Indirect Taxes			
Total Trade Tax	0.089		
Customs Duty	0.09		
Import Tax	0.088		
Export Tax	0.076		
Excise Tax	0.076		
Total Sales Tax	0.085		
Import Sales Tax	0.095		
Adjusted Taxes:			
AT (Total)	0.065		
ACT (Customs)	0.063		
ATM (Import)	0.08		
ATX (Export)	0.09		
ATE (Excise)	0.049		
ATS (Sales)	0.086		
ATY (Income)	0.106		

CHAPTER 4

REVENUE EFFECT OF TAX RATE CHANGE: SOME CASE STUDIES.

1. Introduction.

The present policy shift of the Government of Bangladesh to reduce dependence on trade taxes and rely more on domestic taxes for revenue purpose has led to the formulation of various policy measures during the 1980's. Since tax revenue is as much a function of tax effort as it is of tax structure, attempts are being made to raise the level of tax revenue by increasing tax effort, and measures are also being taken to increase the growth of tax revenue within the given tax structure. But as the tax structure of Bangladesh is not very elastic (vide chapter 3) revenue tends to grow at a slower rate with the growth of income. There are therefore attempts to have tax reforms along with tax rationalization to make the tax system more elastic.

While making the tax system elastic by introducing various tax reform measures is a long run strategy, short and medium term measures are being taken to rationalize the tax system by changing the tax rates and slabs and improving tax administration to impart greater elasticity and efficiency into the tax system. The revenue objective is the focal point of such moves though considerations of incentives and equity are also given importance.

The analysis of various changes in the tax measures in Bangladesh points to several aspects that are being stressed by the tax rationalization move of the government. These are mainly:

(i) To reduce protection to domestic industry in general.

(ii) To raise protection to some selected domestic industries/sectors.

(iii) To raise increased revenue from domestic taxes;

(iv) To move towards taxation of final good and reduce input taxation in order to avoid cascading effects.

(v) To increase progressivity of the taxes.

It is difficult to fulfil all these conflicting criteria by a single tax change move . The selection of appropriate tax rates to satisfy all these criteria therefore becomes difficult, particularly in the absence of investigation of the various effects of tax rate changes on the economy. Any change in the tax rate can create distortion in the product and in the factor market and produce results contrary to the ones intended initially from such measures. Sometimes, however, goal trade-offs are made, by which revenue is sacrificed in the short run with the expectation of greater revenue loss-offset in the future, for the following reasons:

(i) To provide incentives / protection to the deserving industries or to the export industries.

(ii) To foster backward linkages of the export industries.

(iii) To have greater stabilization by reducing balance of payment gap.

(iv) To reduce the savings investment gap.

Such fiscal changes again need to be coordinated with other policy variables to reach the goals. To formulate an optimum tax policy it is necessary to have in principle a clear objective function and a full economic model which measures the effect of changes in tax policy on variables which enter into the objective function.

In the absence of the informations required to costruct a complete model, it is desirable at least to recognize that an important consideration in tax reform measures is their likely effects on revenue, and to use past experience with particular taxes in Bangladesh to assess this.

In this chapter therefore we intend to estimate the relationship between tax rates and revenue in a number of selected cases. All are from the field of indirect taxation, since that is the major contributor to revenue in Bangladesh, and is the primary focus of this thesis.

2. The Approach.

Indirect taxes contribute the largest proportion of revenue to the Government of Bangladesh. Changes in the tax rates of the major indirect taxes are expected to have significant revenue implications. It is therefore important to assess the impact of the tax rate changes on various commodities. It is necessary to measure the changes in tax revenue from tax rate changes for the purpose. An estimate of the elasticity of the tax revenue with respect to tax rate changes would help in such quantification.

The Government of Bangladesh has already introduced changes in the tax rates on some imported items to increase competitiveness of the domestic industries, e.g., machineries, textiles, steel and engineering (TIP Report.March 1986, PP.11-31). On the other hand, nominal customs and sales tax rates are still higher on some other imported items compared to excise taxes on similar domestic products to continue to give protection to those domestic industries/sectors, e.g., sugar, edible oil, cotton yarn, chemicals, basic metals (TIP Report 1985, pp. 12-24). There were some upward adjustments in import tax rates also during 1984-86 on some selected import items, e.g., petroleum products, palm oil, coconut oil. Such measures are going to affect government revenue as well as growth of different sectors of the economy, specially those which contribute a good proportion of value added in the manufacturing sector like textiles and engineering (about 35%). Similarly excise tax rates are also changed several times for different commodities. For incentive purposes and also out of concern for consumer's welfare, excise tax rates have been kept moderate, except on a few items, like tobacco products and gas. But even then there have been occasional ups and downs in the tax rates to meet the revenue gaps. Besides, changes occur with changes in the political regimes and also with the changes in the different sectors of the economy. (Annual Budget Speeches of Finance Minister for different years, Government. of Bangladesh).

Selection of imported items for the study of revenue effect is a difficult task. There is a list of imported commodities in the tariff schedule of the Government of Bangladesh which has twenty one sections, each section having Chapters (a total of 99 Chapter headings under which the National Board of Revenue maintains import tax figures). Each chapter again contains groups of 5 to 15 commodities which are quite diverse in character. It is therefore not possible to take any section or any chapter as representing the case of a single item. Import items therefore need to be selected from homogeneous sub-chapter categories. Similar problems arise in selecting excisable items also, since there are 66 chapters under which large number of commodities are grouped under chapter headings and sub-groups in each chapter.

Selection of items for studying the effect of tax rate changes therefore is based mainly on the revenue contribution of the individual items to the total tax revenue. A second criterion for the selection of commodity for the study is to examine the items likely to be affected by the policy shift of the Government to put greater emphasis on domestic taxes, away from import taxes.

Since only few commodities are to be considered, we first estimated the revenue importance of the items contributing at least 1 percent of the total import or excise tax for the period 1972-73 to 1986-87. The list of important import items can be seen in Appendix 1 and the broad group of excisable commodities can be seen in Appendix 2. Of these listed commodities however we had to make selection of items finally on the basis of availability of relevant data for regression analysis. The number of selected items for the study of revenue effect of tax rate changes came down to five for which the major information could be obtained with great difficulties. These commodities are cigarette, cement, sugar and gas for excise tax and imported cement for import tax rate change study. Cigarette contributes largest amount of excise tax revenue to the Government, (about 50%). Sugar, cement and gas are also very important contributor of excise tax revenue. In the case of import tax revenue, complete time series data for pertinent variable like tax rates and prices could not be obtained for single items which contribute significant amount of tax revenue. The only item for which relevant information could be obtained is imported cement, which contributes more than 1% of tax revenue to the Government. (vide Appendix 1).

The revenue effect of tax rate change would work through changes in the variable that affect the demand for the good. The quantity demanded or sold would change when price changes due to changes in tax rates, besides the effects of changes in other variables like income. To estimate the impact of tax rate changes on revenue, it is therefore necessary to specify the appropriate revenue function relating demand function for the good on which taxes are imposed.

The literature on the subject is very limited. Most of the studies are done at an aggregate level. Disaggregated studies are few and are done mainly for developed counties like USA, Canada, Australia where refined time series data for larger number of years are available to compute elasticities. (Orcut, 1950; Harberger, 1951; Houthakhar and Magee, 1969; Price and Thornblade, 1972; Baldwin and Murray, 1979; Roy Adams, 1981, etc.). Most of these studies have attempted to estimate the effect of import tax rate changes on Government revenue indirectly by using price elasticities of demand for imported taxed good, on the assumption of full shiftability of the tax in the from of higher price of the commodities.

Lack of relevant data and time series are the major problems in carrying out such studies in LDCs. In Bangladesh, Huda (1987) attempted to estimate import demand elasticity for imported commodities by taking several variables like import prices, total import tax and domestic prices of imported good. He found insignificant value of the coefficient of border price as the determinant of import demand and therefore discarded the model and tried an alternative method. Since he could not estimate elasticity of demand for imports of Bangladesh, he borrowed a reasonable range of elasticities from other countries to estimate new tax revenues by using an arc elasticity formula. Similarly, the Trade and Industrial Policy (TIP 1987. pp. 37) Reform programme, Government of Bangladesh, also estimated changes in tax revenues from changes in tax rate by assuming elasticities from 0.5 to 1.5 to represent elasticities of demand for import in respect of various imported goods.

Using borrowed elasticities from developed countries to estimate tax revenue changes in developing countries like Bangladesh is questionable, as is also assuming elasticities for different imported commodities. The result of such exercise would be highly approximate because of the uniform assumed value of price elasticity used for a variety of imported commodities. Besides, the estimates are based on two years period only, the pre-tax and post-tax period, which might give biased result on account of wide fluctuations observed in import values arising from several other variables not considered at all in these exercises.

Instead of using indirect methods, it may be better to estimate a revenue equation directly, in which tax revenue is related to the tax rate and other pertinent variables. One advantage of this procedure is that it is possible to test empirically propositions which are taken for granted in the procedure using borrowed elasticities. For example, it is possible, by relating revenue (R) to tax rate (t), to test whether increases in the statutory rates of taxes are fully affective in raising the ratio of revenue to the value of sales, as the borrowed / assumed elasticity procedure takes for granted. It would be necessary to specify the equation correctly by identifying the critical variables. There may be several alternative specifications of the equation on the basis of which attempts may be made to estimate the revenue effects. Data availability and the specification with best fit may determine the solution of the equations for tax revenue estimation. The technique of simple ordinary least square method of regression can be used to estimate the revenue effect and the equations can be specified in linear, non-linear or log linear forms.

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3. Data and Methodology.

The study of revenue effect of tax rate changes involves time series data from 1972-73 to 1989-90 for relevant variables for different commodities. Since Bangladesh became an Independent Country in 1971, the time series data could be for twenty years at the most. Data for the initial year 1972-73 is very difficult to obtain. The latest data are also not readily available from published documents for all the items. It was necessary to approach different sector Corporations, Ministries, Bangladesh Planning Commission, National Board of Revenue and Chittagong Customs Department for obtaining relevant informations. Various published documents from different sources, e.g., Bangladesh Bureau of Statistics (BBS), Sector Corporation, Bangladesh Planning Commission, Bangladesh Bank, Ministry of Finance, National Board of Revenue (NBR) were also used for the study. Itemwise tax revenue series for 1972-73 to 1990-91 were obtained from the library register of National Board of Revenue. It was however very difficult to obtain the tax rate and price series for all the five commodities that we intended to study.

The data obtained needed to be compiled for time series study for two commodities, cigarettes and gas, for which there are different groups. For cigarettes, there are five different categories: premium, high, medium, low and very low. In the case of gas, there are five different end-uses, e.g., power, fertilizer, industrial, commercial and domestic. The tax rates and prices are different for these five different categories. Therefore weighted average tax rate and price for these two goods had to be estimated by using the average of the consumption/sale weights of each group for different years. The data preparation was not difficult for sugar and cement as they do not have various sub-groups like cigarette and gas.

The tax rates on cigarettes are very complicated. It is a combination of specific and ad valorem tax rate. The tax is on the value of cigarettes per thousand stick. The tax rate rises with the rise in the value of cigarette according to different categories. The ad-valorem tax rate, again, is imposed on the price of the cigarette. The tax rate for each category therefore had to be estimated as an ad-valorem rate and the weighted average rate for the whole year was taken as the tax rate of one particular year. Thus, for example, for the year 1972-73, the ad-valorem tax rate of cigarette is estimated as shown below, where we observe that average tax rate for 1972-73 is estimated to be 44.49 percent, while the weighted average tax rate for the same year is estimated to be 30.67 percent, the weight applied being the sale of cigarettes of each category.

Value of 1000 Cig. in Taka Range ≤ P ≥	Mid-Price P (Taka)	Tax Rates/'000 Cigarettes: Tax rates in Taka and Advalorem rate (%)	
1. ≤ 15 ≥	15	1.50	1.50
2. 15 ≤P≥20	17.5	3 + 50% on MRP exceeding Tk. 15	3+.5(P-15)
3. 20 ≤P≥35	27.5	8+50% on MRP > Tk.20	8+.5(P-20)
4. 35 ≤P≥55	45	16+65% on MRP > Tk. 35	16+.65(P-35)
5. 55 ≤P≥85	70	21+65% on MRP > Tk. 40	21+.65(P-40)
6. 85 ≤P≥115	100	26+65% on MRP > Tk. 45	26+.65(P-45)
7. >115	150	29+65% on MRP > Tk. 45	29+.65(P-45)

Value of 1000 Cig. in Taka Range ≤ P ≥	Mid-Price P (Taka)	Ad Valorem Tax Rate per '000 Cigarettes (%)		Average Tax Rate (%)
≤ 15≥	15	1.50	(1.50/15.0)*100 = 10.00	10 for very low group
15 ≤P≥20	17.5	3+0.50(2.5) = 4.25	(4.25/17.5)*100 = 24.29	33.51 is mean rate for low group
20 ≤P≥35	27.5	8+0.50(9.5) = 11.75	(11.75/27.5)*100 = 42.73	
35 ≤P≥55	45	16+0.65(10) = 22.50	(22.50/45.0)*100 = 50.00	50.00 for medium grp.
55 ≤P≥85	70	21+0.65(30) = 40.50	(40.50/70.0)*100 = 57.86	59.80 mean rate for high group.
85 ≤P≥115	100	26+0.65(55) = 61.75	(61.75/100)*100 = 61.75	
>115	150	29+0.65(105) = 97.25	(97.25/150)*100 = 64.83	64.83 for premium grp.

Note:MRP=Maximum Retail Ptice.

The method is similar to Passche's method of estimating weighted average tax rate. It is more appropriate to use this method than Laspeyre's method to take into account the variations in the rates and sales of cigarettes of different categories for different years. The method can be expressed as follows:

If the estimated ad valorem rates for categories 1 to 5 in the year Y are:

$$[t_1^y, t_2^y, \ldots\ldots t_5^y]$$

and the value of sales for categories 1 to 5 are:

$$s_1^y, s_2^y, \ldots s_5^y$$

The Passche's index would be:

$$\sum ([t_1^y s_1^y + \ldots + t_5^y s_5^y] / [s^y (= s_1^y + \ldots + s_5^y)])$$

i.e., the method use weights s_i^y / s_y which depend on the period y. The Laspeyre's tax index, on the other hand, for year y, would be:

$$[t_1^y s_1^0 + t_2^y s_2^o + \ldots t_5^y s_5^o] / [s^0 (= s_1^0 + s_2^0 + \ldots + s_5^0)]$$

i.e., this method uses unchanging weights s_i^0 / s^0 to apply to the tax rates t_i^y of the period y.

The tax rate for different end-use of gas is not complicated like cigarette tax rate. They are obtained as ad-valorem tax rates for different years. However it was necessary to compile a weighted average tax rate by using the weights of sale of each end-use of gas.

The tax rates of sugar and cement had to be converted into ad-valorem rates from specific rates by using the price series of the products. Thus:

$$t^v = t^s / p$$

where:

t^v = ad valorem tax rate,

t^s = specific tax rate,

p = price of the product.

The specific tax series could also be used for estimating the revenue effect. In that case the specific tax would be related to the tax inclusive price in the revenue equation.

4. Theoretical Framework

We intend to study the revenue effect of tax rate changes under partial equilibrium analysis, assuming perfect competition and full shiftability of tax on the consumers. Given the assumptions, the research problem is to measure the revenue effect of tax rate changes of various products in order to know: (1) How much revenue would be raised by changing the rates of taxes by one percent, meaning what are the elasticities of tax revenue with respect to their rate at various ranges of these rates ? (2) If the elasticities are low, what are the reasons for such low elasticities?

The changes in tax rates would change tax revenue not only directly but also through post tax changes in the quantity demanded or quantity sold. The tax rate change would affect the price of the commodity directly affecting the quantity demanded. There may be some other factors affecting the demand, e.g., changes in consumption pattern, tastes, habits, availability of close substitutes, etc. It is, however, not possible to consider all the factors that might affect demand, and it may not be necessary either to take into account the factors which might be remotely related to the subject of the study. Under partial equilibrium framework and with limited degrees of freedom, we are restricted to consider only the most important variables for the equation of the demand function.

Changes in tax rates would change the price of the commodity and would change real income. The revenue implication of the tax rate change would be through the changes in demand resulting from changes in price and income. It is therefore necessary to know the mechanism through which revenue effect would work. Tax revenue would be expected to change in proportion to the changes in tax rates, if all the determinants of demand, including market price, remain unchanged and the administration is effective in implementing the collection rate fully. In practice, however, it would be expected that at least price would change in response to changes in tax rate so that the demand would not remain unaffected. Besides, there may be many other factors that may enter between the statutory tax rate changes and their implementation so that revenue may not rise in proportion to the rise in tax rate. The presence of untaxed or low taxed substitutes, smuggling, inefficiency of tax administration etc., may cause the rise in tax revenue in response to an increase in tax rate to be less than what might have been expected. The type of the commodity i.e., whether it is necessity or luxury good, would also affect tax revenue changes. Given these factors, if the change in the revenue is found to be reasonably close to the expected level, we can accept the hypothesis that there is a close correlation between tax revenue and tax rate changes, other things remaining same. The sensitivity of changes in tax revenue to changes in the statutory tax rate would be given by the value of the tax parameter.

Thus, taking tax revenue as a dependent variable and tax and other factors affecting revenue as independent variables, we can specify the model of regression, i.e., the number of equations and their precise mathematical form and the apriori expectation regarding the sign and size of the parameters of the observed variables.

It will be noted that the approach given here relates revenue from taxes on a particular commodity to the rate of taxes on that commodity and other variables. One obvious problem with this approach is that it confines itself to a single market - that for the taxed good. In principle, a change in the tax on a particular product or factor will have repercussions throughout the economy, but a partial equilibrium analysis ignores these. General equilibrium models can be and have been constructed, in which these repercussions are formally allowed for. However these models present problems of their own, which are further taken up in Chapter 5: they rely on assumptions, about the forms of production possibilities and consumer preferences and about the working of the particular economy, to which the predictions of the models may be highly sensitive, and which are often not derived from observation of the economy concerned.

The partial equilibrium approach has a one clear drawback if the computed revenue equations are to be used to predict the effects on government revenue of tax rate changes on a particular commodity. Even if a change in the tax on a commodity is assumed to have no effect on pre-tax factor incomes, the budget constraint ensures that reactions to the change will, in general, affect markets other than that for the commodity and so will affect tax receipts from these other markets. Of course, complete knowledge of demand relationships would enable these spillover effects to be calculated directly. Lacking such detailed knowledge, it is still possible, within the partial equilibrium approach, to make some approximate allowance for spillover effects, and this is discussed later in this Chapter.

5. The Model

If the tax rate were defined as the ratio of revenue to the value of sales at factor cost, we could express the relationship between tax revenue, tax rate, quantity and pre-tax price in the form of an identity as:

$$R \equiv tQP_o \qquad (1)$$

where:

R = Revenue from tax.

t = Advalorem tax rate.

Q = quantity demanded.

P_o = Pre tax price.

In the case of ad-valorem tax being applied to pre-tax price, revenue would be a function of ad-valorem tax rate t and the value of the product QP_o. A certain percentage rate of tax applied to this value of the product would give revenue in proportion to the tax rate. But as we have mentioned earlier, an increase in the tax rate may well not increase revenue proportionately for two reasons. The first is that the statutory tax rates may not be fully reflected in actual collection as a proportion of expenditures. The second is that the expenditure (calculated at factor price) itself is likely to fall as a result of the response of demand to increased price. Our estimating procedure deals with the first issue by replacing t in the revenue identity by $t^{\alpha o}$ and P_o by ${P_o}^{\alpha 3}$, where t is now a variable representing statutory ad-valorem tax rates and P_0, an observed pre-tax price; in dealing with the second issue, it is necessary to consider the determinants of demand.

As discussed before, demand may be affected by many factors in the market besides price changes. However, taking prices and income or gross domestic product as the most important variables, we specify the demand equation as:

$$Q = e^{\alpha_{oo}}\left[\frac{P}{\bar{P}}\right]^{\alpha_1}.\left[\frac{y}{\bar{P}}\right]^{\alpha_2} \tag{2}$$

where:

P = market price of the product, i.e., tax inclusive price,

y = gross domestic product (GDP) or its component,

$\bar{P}$ = GDP deflator.

We can now specify our revenue equation R, incorporating demand equation Q, and allowing the coefficient on statutory tax rate t and pre-tax price P_0 to vary from one, as:

$$R=e^{\alpha_{oo}}t^{\alpha_o}\left[\frac{P}{\bar{P}}\right]^{\alpha_1}\left[\frac{y}{\bar{P}}\right]^{\alpha_2}[P_o]^{\alpha_3} \tag{3}$$

The equation shows that changes in tax rate would affect the revenue both through the direct effect of t and through the dependence of P on t. Gross domestic product would affect the revenue through the demand for the commodity, but the tax rate changes of a single commodity would have negligible effect on GDP. P_0 remains constant as it is pre-tax price and is unaffected by tax rate changes. If real price also remains constant, then revenue would vary with variations in tax rate.

Thus if we take the partial derivative of ln R with respect to ln t in the double log version (equation 5) of our model in equation (3) above, then:

$$\frac{\delta \ln R}{\delta \ln t} = \alpha_o$$

But since we have P as the tax-inclusive price in our model which changes with changes in the tax rate, we have to take total derivative of R with respect to t. Thus:

$$\frac{d\ln R}{d\ln t} = [\frac{\delta \ln R}{\delta \ln t}] + [\frac{\delta \ln R}{\delta \ln P}] \cdot [\frac{\delta \ln P}{\delta \ln t}]$$

$$= \alpha_o + \alpha_1 \left[\frac{t}{1+t}\right]$$

α_0 shows elasticity of tax revenue with respect to tax rate change, α_1 shows price elasticity and $t/(1+t)$ shows the share of tax in the tax-inclusive price of the commodity.

It can be seen from the above equation that if tax rate changes are assumed to be fully effective (α_0 is constrained to be 1) an increase in tax rate will increase tax revenue as long as the elasticity of demand (α_1) is numerically less than the critical value $(1+t)/t$.

The equation (3) is specified in double logarithmic form below, which incorporates the demand equation (2) specified in double logarithmic form:

$$\ln Q = \alpha_{oo} + \alpha_1 \ln\left[\frac{p}{\bar{p}}\right] + \alpha_2 \ln\left[\frac{y}{\bar{p}}\right] \tag{4}$$

$$\ln R = \alpha_{oo} + \alpha_o \ln t + \alpha_1 \ln\left[\frac{p}{\bar{p}}\right] + \alpha_2 \ln\left[\frac{y}{\bar{p}}\right] + \alpha_3 \ln[p_o] \tag{5}$$

As explained before, the parameter α_0 shows the elasticity of tax revenue with respect to tax rate change and α_1 shows price elasticity, α_2 shows income elasticity. We should expect α_0 to have positive sign, but not necessarily to have a value equal to one, which would imply that actual changes in tax collection fully reflect changes in statutory rates. α_1 is expected to have negative sign, α_2 to have positive sign and, α_3 to have positive sign and not be greatly different from one, since P_0 represents the price base to which ad-valorem rates of tax are applied, and if P_0 goes up while the tax rate and quantity remain the same, revenue should rise more or less in the same proportion. However, there is a problem with these predictions, because there is a functional relationship among the independent variables:

$$P_o \quad , \quad t \quad , \quad \frac{P}{\bar{P}}$$

which means that they are not uncorrelated. The standard errors of the regression coefficients are thus likely to be relatively large and the estimated values of the coefficients are subject to a correspondingly large measure of uncertainty. This also underlines the need for caution in basing policy on the precise estimates of α_0, α_1, α_2 and α_3 which the empirical work provides.

It is also possible that the level of the general price level:

$$\bar{P}$$

and the level of the pre-tax price of the commodity being studied, P_0, may be affected by the overall level of activity represented by the GDP variable:

$$\frac{GDP}{\overline{P}}$$

However, the existence of such an association, while it would be relevant in considering, for example, the effect of changes in real GDP on money tax revenue, is not of particular concern for the primary purpose of this chapter, which is to examine the effect on tax revenue of changes in tax rates at a given level of real GDP.

On the basis of the hypothesized demand and revenue function, we can try to estimate the revenue response of tax rate changes. The estimation of the equation would depend on the availability of an appropriate set of data. Alternative specifications of the equation can be tried, given the data set. The aim is to find a specification which gives statistically significant results, provides good fit and is satisfactory on economic grounds.

6. Estimates of Revenue Effect of Tax Rate Change

Using the general specification of the revenue response model, we tried to estimate the revenue effects of tax rate changes of five commodities as mentioned before. The regression results of the estimates are presented below for each of the five case studies separately.

Case 1. Cigarettes.

We specify the revenue equation incorporating demand equation in log linear form as:

$$\ln R = \alpha oo + \alpha_o \ln t + \alpha_1 \ln[\frac{P}{\bar{P}}] + \alpha_2 \ln[\frac{Y}{\bar{P}}] + \alpha_3 [P_o] + u$$

where

R	=	Revenue from cigarettes (weighted average)
t	=	Weighted average ad-valorem tax rate of cigarette.
P	=	Tax inclusive price of cigarette
P_o	=	Tax exclusive price of cigarette
$\bar{P}$	=	GDP deflator
Y	=	Gross Domestic Product (GDP)
U	=	Error term.

The regression results of the revenue equation of cigarette are presented below:

TABLE 1
Regression Result of Cigarette Revenue Equation

	ß	S.E. ß	BETA	T	Sig T
ln P_o	0.982864	0.345877	0.480980	2.842	0.0139
ln t	0.610873	0.140145	0.379347	4.359	0.0008
ln $(P/\bar{P})$	-0.353909	0.320171	-0.051566	-1.105	0.2890
ln $(Y/\bar{P})$	1.376066	0.784015	0.347421	1.755	0.1008
Constant	-10.424590	5.497731		-1.896	0.0804

Multiple R	.99	
R^2	.98	
Adjusted R^2	.976	
S.E.	.13354	
F 176.41804		Sig F = 0.0000
D.W. Test	1.20	
Total Cases	18	

The results show that:

i. The coefficient of pre-tax price (P_o), α_3, is 0.98. It is not significantly different from one. However, it is significantly different from zero at the 5% level and has the expected sign.

ii. The coefficient of tax rate (t), α_o , has the expected sign and is greater than zero at 1% level of significance. The t-test of the hypothesis of perfect tax collection is rejected at 5% level of significance, i.e., evidence is consistent with imperfect tax collection.

iii. The $p/\bar{p}$ coefficient, (α_1), has the expected sign but it is not significantly different from zero, (0.35), implying unresponsive cigarette demand to price.

iv. The $y/\bar{p}$ coefficient, (α_2), shows income elasticity greater than one and has the expected sign.It is, however,not significantly different from zero at the 5% level, but is different from zero at just over the 10% level.

v. R_2 shows that the regression line gives a good fit to the observed data.

vi. F statistic conclusively rejects the hypothesis of no significant relationship between the dependent and explanatory variables.

vii. D.W. statistic (1.20) lies within the indeterminate range for a case with 18 observations and four variables (0.82 to 1.87, for 5% level of significance. Savin and White. 1977.). The test result is therefore inconclusive and formally can not say whether there is evidence of positive autocorrelations. However, it is towards the lower bound of the range, suggesing that there may be some problem of 'general' misspecification of the estimating equation due to omitting certain variables, e.g. the price of hand-made cigarette, the level of smuggling,etc.

Interpretation of the Regression Results

In interpreting the results, we have to compare them with the theoretically expected results of the model. We expect that the explanatory variables in the equation would have significant relations with the tax revenue.

The value of P_0 coefficient, α_3, is 0.98, which is close to one. This shows an approximately proportionate relationship between the pre-tax price and the tax revenue. It shows that pre-tax price is a good indicator of the price on which ad-valorem tax rate was applied in practice during the period.

The value of tax rate (t) coefficient, α_0 ,is 0.61 and is different from the value of unity, which would be expected in a tax system in which statutory tax rates were fully implemented, without avoidance or evasion. The value of α_0 being significantly less than one suggests that there may be increasing problems in collecting tax revenues from cigarettes as the tax rate increases, however it is possible that the influence of other variables in the equation has biased the estimates of a_0 downwards, and also leading to less than proportionate change in tax revenue. In view of the importance of cigarette taxation in indirect tax system of Bangladesh, this observation requires further research and examination.

The demand for cigarette may be regarded as more or less inelastic, i.e., price elasticity of demand for cigarette may be considered as near to zero. And this fact is perhaps shown by the low numerical value of post-tax price (P) coefficient, α_1, (-0.35). The price effect of tax rate change therefore can be taken as small, given the behavioral pattern of the consumers of this particular type of commodity (for which people are more or less addicted). Another factor which may have worked in not exhibiting significant price effect of the good is that the price as a variable is the average weighted price. As weighted price is an average price of five different categories of cigarettes, the substitution of cigarettes among different categories as a result of changes in prices of different categories at different tax rates may have averaged out, so that on balance, the net effect is small, exhibiting small price elasticity.

The value of P_0 coefficient is not significantly different from zero. The insgnificance of the coefficient may be due to correlation between explanatory variables. Changes in tax revenue is found to be significantly correlated with changes in tax rates. Again, tax rate change is considered as an explanatory variable of post-tax price change in the demand equation. This may have resulted into some problem of multicollinearity which causes high standard error of the estimated coefficient and reduces the t-value. This may be the reason for the coefficient to be insgnificant.

The fact of price elasticity of the commodity is taken care of by P coefficient. So t coefficient is expected to reflect the response of tax revenue to tax rate changes. But since t also appears in P with post-tax price, the full effect of tax on revenue could not be represented by t coefficient alone. As already shown, the full effect is given by the elasticity formula:

$$\frac{d \ln R}{d \ln t} = \alpha_o + \alpha_1 \frac{t}{1+t}.$$

Substituting the estimated values of the coefficients and taking t/(1+t) for cigarettes as .375, this formula indicates an elasticity of revenue with respect to the tax rate on cigarettes as 0.478. In other words, despite the relatively low value of α_0 and the presence of some degree of demand responsiveness to price, an increase in the rate of taxation on cigarettes would clearly increase rather than decrease revenue from cigarettes.

Overall result is that all the coefficients have the expected signs, though the coefficients of post-tax price and income are imprecisely estimated. R^2 and R^2 are very high which shows that 99% of the variations in the tax revenue are explained by the explanatory varables. The test of perfect tax collection is conclusively rejected. Low D.W. statistic, however, points to the possibility of some specification error. Given the inter-relationships among the variables and a limited number of observations (18) with low degrees of freedom, the results seem to be reasonable on the whole in explaining the relationship between tax revenue and tax-rate changes.

Case 2: Local Cement.

The effect of tax rate changes on tax revenue of locally produced cement is estimated by using the same form of log-linear regression equation. As cement is not a consumer good but an investment good, we replaced the GDP variable by the activity variable, construction, on the expectation that the demand for cement would have a good relation with the level of construction activity. The revenue function is therefore specified incorporating a demand function with price and construction activity variables.

We specify the revenue equation for local cement incorporating demand equation in log linear form as:

$$\ln R = \alpha_{oo} + \alpha_o \ln t + \alpha_1 \ln\left[\frac{p}{\bar{p}}\right] + \alpha_2 \ln\left[\frac{c}{\bar{p}}\right] + \alpha_3 \ln\,[p_o] + u$$

where:

R = Revenue from local cement;

t = Ad valorem tax rate of cement;

P = Tax inclusive price of local cement;

P_o = Tax exclusive price of local cement;

$\bar{P}$ = GDP deflator

C = Construction activity;

U = Error term.

The result of regression of revenue equation of local cement are presented below in table 2.

TABLE 2
Regression Result of Revenue Equation of Local Cement

	ß	S.E. ß	BETA	T	Sig T
ln P_o	1.97	0.4630	0.3755	4.247	0.0010
ln t	1.24	0.1443	0.6372	8.568	0.0000
ln $(P/\bar{P})$	-1.02	0.4836	-0.3724	-2.115	0.0543
ln $(C/\bar{P})$	0.996	0.5333	0.3552	1.869	0.0844
Constant	-25.514	2.5224			0.0000

Multiple R		.97	
R^2		.94	
Adjusted R^2		.92	
S.E.		.3574	
F	49.1248		Sig F = 0.0000
D.W. Test		0.91	
Total Cases		18	

The results show that:

i. The value of pre-tax price (P_o) coefficient α_3 is greater than one (1.97) at the 10% level of significance.It is also greater than zero at the 1% level of significance and has the expected sign.

ii. The tax rate (t) coefficient α_0 is greater than one (1.24), though the difference is not significant at the 10% level. It is however significantly differant from zero at the 1% level and has expected sign.

iii. The post-tax price (P) coefficient α_1 is - 1.02. It is different from zero at the 10% level of significance and has expected sign.

iv. The GDP component (construction) coefficient α_2 is almost equal to one (0.996).It is significantly different from zero at the 10% level of significance and has the expected sign.

v. R^2 is 0.94 and shows good fit of the regression line to the observed values.

vi. D.W. statistic is low (0.91), though it is within the indeterminate range. The test is still inconclusive. It is however close to the lower bound of the range. It may be due to misspecification of the equation. Autocorrelation can cause instability in the value of coefficients, so that confidence intervals based on the calculated standard errors may overestimate the precision with which these coefficients can be estimated.

vii. F statistic shows significant relationship between the dependent and explanatory variables.

<u>**Interpretation of the Results**</u>

The value of the coefficients do not contradict apriori expectation about their sign and values, except, to some extent, in the case of P_o, which has a value greater than one.

The P_0 coefficient is significantly different from zero at 1% level and has the expected sign. But its value is greater than the expected value of one, though the difference is not significant at the 5% level. P_0 coefficient is expected to have a value of one because if pre-tax price (P_0) changes, but ad-valorem tax rate and the demand for the commodity remains same, then we would expect tax collection to change in proportion to P_0. However , the observed pre-tax price may be a poor indicator of the price base on which ad-valorem taxation is imposed in practice, so that a value of the coefficient appreciably different from one does not invalidate the results.

GDP coefficient (construction component) has a value of almost equal to one, showing unit elasticity of demand for cement with increase in construction activity. Of course, if increases in construction activity are associated with increases in the pre-tax price of construction, P_0, they will be associated with an indirect effect on cement tax revenue through the effect of ad valorem taxation, as well as the direct effect through the demand for cement.

Post-tax price (P) coefficient has a value of minus unity, implying a proportionate change in the demand for local cement with changes in its prices. This price effect does not seem to be plausible, because once the construction work is started, people would not normally stop it with rise in the price of cement, unless it is too high to be managed by the budget constraint. Local cement, however, has its substitute in imported cement. Availability of such substitute could make local cement demand some what elastic. Caution, however, is needed in accepting the estimate of unitary price elasticity as it is significant only at the 10% level, and not at 5% level.

The tax rate coefficient (t) shows the effect of tax rate change on tax revenue given the level of pre-tax price and demand. It would therefore be expected a priori that the value of t coefficient should be equal to one. The results, (e.g. the value of α_0 is around one), show that the hypothesis of perfect tax collection cannot be rejected at the 5% level of significsnce, implying that the changes in tax rate would lead approximately to a proportionate change in tax revenue. The value of t coefficient therefore shows that the response of tax revenue to tax rate changes is as expected a priori. It suggests efficient tax collection with changes in tax rate. The regression result thus shows that the tax revenue from cement is well correlated with tax rate change.

The overall result shows that all the coefficients have the expected signs and are significant at least at the 10% level. Both R_2 and adjusted R_2 are high which shows that more than 90% of the varations in the tax revenue are explained by the explanatory variables. Thus inspite of there being some problem of functional influence of one coefficient on another and a low D.W. statistic, the regression results seem to explain the revenue effect of tax rate change in a reasonable manner, given the small number of observation and low degrees of freedom.

Case 3: Imported Cement.

Using the same form of linear regression equation, we estimated the revenue effect of tax rate change of imported cement. We tried many regressions, but results were not satisfactory. We tried regressions changing post-tax price and construction variables. In place of domestic price of imported cement (P), we tried with relative domestic price of imported cement to the price of local cement, and in place of construction (C), we tried with gross domestic products (Y). Most regression results were giving either implausible or insignificant results. Of the results which came out with proper signs and with economic and statistical significance, we considered the one which seemed plausible.

We specify our revenue equation for imported cement in log-linear form as :

$$\ln R = \alpha_{oo} + \alpha_o \ln t + \alpha_1 \ln[P] + \alpha_2 \ln\left[\frac{C}{\bar{P}}\right] + \alpha_3 \ln[P_o] + u$$

where,

R = Revenue from imported cement;

P_o = Border price of cement;

P = Ratio of import price of cement to the price of local cement;

$\bar{P}$ = GDP deflator;

t = Ad valorem import tax rate of cement;

C = construction activity

U = error term

The results of the regression are presented below in table 3.

TABLE 3
Regression Result of the Revenue Equation of Imported Cement

	ß	S.E. ß	BETA	T	Sig T
$\ln P_o$	1.05	0.37	0.40	2.83	0.0143
ln t	0.49	0.24	0.22	2.07	0.0586
$\ln P/\bar{p}$	-0.98	0.62	-0.11	-1.58	0.1381
$\ln C/\bar{P}$	2.54	0.91	0.53	2.80	0.0151
Constant	-29.27			-5.213	0.0002

Multiple R	.98	
R^2	.96	
Adjusted R^2	.94	
S.E.	.36	
F	72.35	Sig F = 0.0000
D.W. Test	1.28	
Total Cases	18	

The regression results show that:

i. The pre-tax price (P_o) coefficient (α_3) is 1.05, which is close to the expected size. It is significantly different from zero at the 5% level and has the expected sign.

ii. The tax rate (t) coefficient is less than one (0.49), and is significantly different from one at the 5% level. It is also significantly different from zero at the 5% level. It has the the expected sign.

iii. The post-tax price (P) coefficient α_1 is - 0.98, which is close to one. It has the expected sign, but is not significantly different from zero even at the 10% level.

iv. The C coefficient α_2 is 2.54. It is significantly different from zero at the 5% level and has the expected sign.

v. R^2 shows good fit of the regression line to the observed data.

vi. D.W. statistic is 1.28. It is in the middle of the indeterminate range, implying that evidence is not conclusive of auto-correlation.

vii. F statistic shows significant relation between the dependent and the explanatory variables.

Interpretation of the Results

The reliability of the parameter estimates is to be considered in terms of standard error, and expected signs and sizes of the coefficients. We therefore can interpret the results taking these into account.

The value of border price coefficient (α_3) of imported cement shows that the tax base is a good indicator of raising tax revenue. P_o coefficient (α_3) is 1.05, which shows proportionate change in tax revenue with changes in P_o, given other variables as constant.

The value of post-tax price (P) coefficient (α_0) is -0.98. It shows that the demand for imported cement has a price elasticity very close to unity.The result is at variance with the general belief that the demand for import in the developing countries is inelastic.However we can not put much confidence on this result as it is not significant even at the 10% level. The insignificance of the coefficient may be due to the fact that price effects are not crucial determinant of import demand in the presence of import restrictions and other control measures. The relaxation of the restrictions, among others, are more important factors in affecting quantity demanded in Bangladesh.

Tax rate (t) coefficient α_0 has a value of 0.49, which is less than one. The difference is significant at the 5% level with the expected sign. It shows inelasticity of tax revenue with respect to import tax rate changes, i.e. with a 10 % increase in tax rate, tax revenue would increase by about 5 %. Since import demand shows almost unit elasticity, quantity demanded would have decreased by same proportion as the increase in price, and the proportionate increase in prices would be equal to the prortionate increase in tax rate multiplied by the ratio of tax to tax inclusive price. But the effect of P coefficient on revenue would arise indirectly through demand function, whereas t coefficient would have direct effect on tax revenue.

Using the same procedure as for cigarettes and assuming a ratio of tax to tax inclusive price of 0.1, total elasticity of tax revenue with respect to the tax rate is given by dlnR/dlnt=0.39.

The value of C coefficient (α_2) is 2.45 which is significantly different from zoro at the 5% level and has positive sign, though the size appears to be higher than expected. It implies that a 10% increase in construction activity would raise the demand for cement by a quarter. It does not seem to be a very plausible situation, but it may be reflecting the effect of relaxation of restriction on import. Construction activity increased considerably both in the public and in the private sector during the later half of the period of study showing considerable increase in demand for cement. Though there were quantitative restrictions on imported cement during first half of the period under study, there was import liberalization during the later half of the period. With reduction in the tariff rates on imported cement for some years to an extent, the demand for imported cement went up for luxury construction in the private sector and also for other construction, when domestic supply was not enough. This might be an explanation for C coefficient to have a high value, as the relaxation of restriction or fluctuation in the control regime is not included as a variable in the equation explicitly, and as ease of importation was, over the observed period, positively correlated with C.

Thus the GDP (constrution) coefficient may be biased due to correlation between activity variable and quantitative restrictions. There may therefore be specification error due to an omitted variable (Khan, 1974 pp. 680). We could try to correct the specification error by introducing a proxy variable of net foreign asset for quantitative restrictions, but that would reduce the degree of freedom further and might lead to inconsistencies in the value of other coefficients. The high value of C coefficient could also be due to the fact that static equations do not capture the true dynamics of demand (Khan, 1974. pp. 687).

The overall result shows that all the coefficients have the expected signs and are significant at least at the 10% level , except the post-tax price coefficient. Both R_2 and adjusted R_2 show that more than 94% variations in the tax revenue are explained by the explanatory varables. The D.W.statistic gives an inconclusive result and there may be a problem of specification error in the equation. Other diagnostic tests show significant relation between changes in tax revenue and the explanatory variables. Given the fact that we have a short period of study with 19 observations and four variables in the equation, the regressions cannot be expected to produce much better results than what we have. On the whole the results show somewhat plausible picture of revenue effect of import tax rate change of cement.

Case 4. Sugar.

In the case of sugar also we tried many regressions with the same general type of specification of equations, but the results were not satisfactory. We therefore respecified the revenue equation with specific tax as a variable in place of ad valorem tax and the equation produced somewhat better results than before. We report the results below. Since specific tax is imposed in monetary terms per physical quantity, we do not have to include pre-tax price (P_0) in the revenue equation as we did in the case of ad-valorem tax.

Thus the revenue identity becomes $R = t.Q$ rather than $R = t.Q\ P_0$, and P_0 accordingly does not appear in the revenue equation. We then specify our revenue equation as:

$$\ln R = \alpha oo + \alpha_o \ln t + \alpha_1 \ln \left[\frac{p}{\bar{p}}\right] + \alpha_2 \ln \left[\frac{y}{\bar{p}}\right] + u$$

which incorporates demand equation:

$$\ln Q = \alpha_{oo} + \alpha_1 \ln\left[\frac{P}{\bar{p}}\right] + \alpha_2 \ln\left[\frac{y}{\bar{P}}\right]$$

where:

R = Revenue from Sugar;

t = Specific Tax on Sugar;

Y = Gross Domestic Product;

$\bar{P}$ = GDP Deflator;

Q = Quantity demanded / sold;

U = Error Term.

The regression results are reported below in table 4.

TABLE 4
Regression Result of Revenue Equation of Sugar

	ß	S.E. ß	BETA	T	Sig T
lnt	1.15	0.2136	0.6201	5.377	0.0001
$\ln(P/\bar{p})$	-0.41	0.2924	0.1107	-1.404	0.1808
$\ln(Y/\bar{P})$	0.46	0.1366	0.3749	3.407	0.0039
Constant	-8.677	2.4127		-3.596	0.0026

Multiple R	.96		
R^2	.92		
Adjusted R^2	.91		
S.E.	.31		
F	58.8628	Sig F = 0.0000	
D.W. Test	1.90	Total Cases	19

The results show that:

i. Post-tax price (P) coefficient α_1 is -0.41. It has the expected sign, although it is not significantly different from zero even at the 10% level.

ii. Tax rate (t) coefficient α_0 is 1.15. It is significantly different from zero at the 1% level and has proper sign. It is greater than one, but the difference is not significant even at the 10% level.

iii. GDP coefficient α_2 is 0.46. It is significant at the 5% level and has the expected sign.

iv. R^2 is 0.96. It shows good fit of the regression equation.

v. D.W. statistic is 1.90. It is above the upper bound of the indterminate range of the test of positive autocorrelation and therefore can accept the H_0 of no autocorrelation.

vi. F statistic shows significant relation between the tax revenue and the explanatory variables.

Interpretation of the Results

The value of post-tax price coefficient α_1 shows that the price elasticity of sugar (-0.41) is not significantly different from zero, implying less responsive demand for sugar with changes in its price. The estimated price elasticy shows that with 10% increase price, demand would fall by 4.1% and vice versa. Casual observation suggests that - 0.41 may be unduly low, at least as far as household consumption is concerned, as substitutes such as molasses (gur) are available. Molasses or gur, however, is an inferior substitute and people prefer to use sugar even with a moderate price increase. There is again high demand for sugar for confectioneries, ice cream, biscuits and beverages, which (except ordinary biscuits) are however regarded as non-necessities by the common people. These facts suggest that the demand for sugar is inelastic in Bangladesh, but not so much, as it is in the developed countries (T. Barna. 1937. pp. 141).

Tax-rate coefficient α_0 is 1.15 and shows approximately unitary elasticity of tax revenue with respect to tax rate changes. It implies efficient tax collection with increases in tax rates of sugar.

GDP coefficient α_2 is 0.47. It shows that the demand for sugar would increase by about 5 percent with 10 percent increase in income. This seems to be a plausible situation given the inelastic nature of demand for the product.

The D.W. test result shows that there is no problem of autocorrelation to cause instability among the coefficients. However, this does not imply that the coefficients are precisely estimated. In particular, the large standard error of the price coefficient, which causes the estimated value to be insignificantly different from zero, is a cause of concern.

The overall result shows that all the coefficients have the expected signs, though the post tax price coefficient is imprecisely estimated. Both R_2 and adjusted R_2 show that more than 90% of the variations in tax revenue are explained by the explanatory variables. On the whole, the regression results seem to explain the revenue effect of tax rate change on sugar in more or less plausible way.

Case 5. Gas.

For gas also we tried many regressions with the general specification of the equation, but the results were not satisfactory. We then respecified the equation with specific tax instead of ad-valorem tax as a variable. But even then, the results were not up to the expectation. We report the results of both the regressions below.

(a). We specify our revenue equation (with ad valorem tax) incorporating demand equation as:

$$\ln R = \alpha_{oo} + \alpha_o \ln t + \alpha_1 \ln\left[\frac{p}{\bar{p}}\right] + \alpha_2 \ln\left[\frac{y}{\bar{p}}\right] + \alpha_3 \ln[p_o] + u$$

The regression results of the equation are presented in Table 5 (a) below:

TABLE 5(a)
Regression Result of the Revenue Equation of Gas

	ß	S.E. ß	BETA	T	Sig T
ln P_o	0.7193	0.9279	0.3419	0.775	0.4511
ln t	1.1876	0.4661	0.2469	2.549	0.0232
ln $(P/\bar{P})$	-1.3803	1.1454	0.8055	-1.205	0.2482
ln $(Y/\bar{P})$	4.6496	1.6978	0.3697	2.739	0.0160
Constant	-38.3551	15.0060		-2.556	0.0229

Multiple R		.98
R^2		.97
Adjusted R^2		.96
S.E.		.37
F	111.4874	Sig F = 0.0000
D.W. Test		1.43
Total Cases		19

The results show that:

i. Pre-tax price (P_0) coefficient α_3 is 0.71. It is less than one, but the difference is not significant. It is not significantly different from zero either at the 10% level.It has, however, the expected sign.

ii. Tax rate (t) coefficient α_0 is greater than one (1.19), but the difference is not significant.It is, however, significantly different from zero at the 5% level and has the expected sign.

iii. Post tax price coefficient (α_1) shows greater than unit elasticity (- 1.38), but owing to a very large standard error, is not significant statistically. It has, however, the expected sign.

iv. GDP coefficient α_2 is 4.65. It is significantly different from zero at the 5% level and has the expected sign.

v. R^2 is 0.97. It shows that the regression line is a good fit to the observed value.

vi. F statistic shows significant relation between tax revenue and the explanatory variables.

vii. D.W. statistic is 1.43. It is near the upper bound of the indeterminate region, suggesting that the presence of autocorrelation is not confirmed.

Interpretation of The Results

The value of pre-tax price (P_0) coefficient α_3 is less than the expected value of one (0.71). It implies that tax revenue would not increase in proportion to the changes in pre-tax price, other things remaining same. This would imply that P_0 is not a good indicator of the price on which ad-valorem tax was applied to raise revenue from the tax base P_0Q. However we cannot put confidence on this result since the coefficient of P_0 has a high standard error and is not significantly different either from zero or from one, even at the 10% level.

Post tax price coefficient (α_1) shows a price elasticity of -1.38 which is higher than expected, as it means that a 10% increase in price would reduce the demand for gas by 14%. This does not seem to be a plausible situation with respect to the demand for gas in Bangladesh. However, price elasticity of gas is also not a reliable indicator of demand behavior, as the value of P coefficient also has a large standard error and is not significantly different from zero even at the 10% level.

The value of tax rate (t) coefficient α_0 is greater than one (1.18), but the difference is not significant and thus in this case the hypothesis of prefect tax collection is not rejected. It shows that tax revenue would increase more or less in proportion to the increase in tax rate. This may not be an implausible situation, since imposing tax on gas supply involves relatively few administrative problems. The t coefficient is significantly different from zero at the 5% level also.

GDP coefficient α_2 has a high value which is difficult to explain. It shows that with a 10% increase in income, demand would increase by 46%, which seems implausible. One explanation may lie in the diversified uses of gas in Bangladesh. There are five major uses of gas: for fertilizer production, for industrial production, for commercial purposes, for power generation and for domestic uses as fuel. All these uses are highly demanding. And since domestic use is only a fraction of the total use of gas, higher income generation in other sectors may have much greater impact on demand for gas to increase much more than proportionately than expected. An alternative explanation is that there has been a substantial increase over time in the availability of gas to the consumers, which is not explicitly recognized in the demand equation: since this increasing availability is correlated with a rising GDP, the coefficient on the latter variable may be reflecting the combined effect of income and supply availability, rather than of income alone. The GDP coefficient may thus be justified in this way. The coefficient is significant also at the 5% level.

The coefficients of P_0 and P are imprecisely estimated. The estimates of tax rate and GDP coefficients are, however, significant. But the size of the GDP coefficient is implausively high. This may be due to specification error, shown by low D.W. statistic which, though lying within the indeterminate range, is not close to the upper bound of the range. The interdependence of the variables may also have contributed to the imprecision in estimates. We needed a more disaggregative approach to estimate the revenue effect of tax rate change of gas which has such diversified uses. But in the absence of further disaggregative information, we had to take the averages of sectorwise price and tax rates though weighted by the respective sectorwise sale/consumption of gas.

The overall result shows that all the coefficients have the expected signs, though the size of GDP coefficient is rather high, and pre-tax and post-tax price coefficients have insignificant values. Both R_2 and adjusted R_2 show that more than 95% of the variations in the tax revenue are explained by the explanatory variables. In other respects, notably the high GDP coefficient and the lack of significance of P_0 and P coefficients, the results are not satisfactory. Working with data which aggregate different prices, tax rates and quantities for different uses of gas into a single figure in each case, we could not get better results. Given the aggregative approach and constraints of data, the results of the regression analysis are not very unsatisfactory in explaining the revenue effects of tax rate changes on gas.

(b). We re-specify our revenue equation for gas, with specific tax in log linear form, incorporating demand equation, as:

$$\ln R = \alpha_{oo} + \alpha_o \ln t + \alpha_1 \ln \frac{P}{\bar{P}} + \alpha_2 \ln \frac{Y}{\bar{P}} + u$$

Where:

R = Revenue for gas;

t = Specific tax on gas;

P = Sale price of gas;

$\bar{P}$ = GDP deflator;

Y = gross domestic product (GDP);

U = Error Term.

The regression results of the re-specified revenue equation are presented in table 5 (b):

TABLE 5(b)

Regression Result of the Revenue Equation of Gas

	ß	S.E. ß	BETA	T	Sig T
In P	-1.51	0.9469	-0.4038	-1.592	0.1322
In t	0.90	0.2636	0.6490	3.423	0.0038
In (Y/)$\bar{P}$	4.33	1.0353	0.7508	4.186	0.0008
Constant	-30.7930	8.5823		-3.588	0.0027

Multiple R	.98	
R^2	.97	
Adjusted R^2	.96	
S.E.	.35	
F	165.90	Sig F = 0.0000
D.W. Test	1.48	Total Cases: 19

The results show that:

i. The post tax price coefficient is -1.51. It has the expected sign, but is not significantly different from zero at even the 10% level.

ii. The tax rate coefficient α_0 is 0.90. It is different from one, but the difference is not significant even at the 10% level. It is, however, significantly different from zero at the 5% level and has the expected sign.

iii. The GDP coefficient α_2 is 4.33. It is significantly different from zero at the 1% level and has the expected sign.

iv. R^2 is 0.98. It shows good fit of regression line to the observed values.

v. D.W. statistic is 1.48. It lies within the indeterminate range, therefore the presence of autocorrelation is neither confirmed nor rejected.

vi. F statistic shows significant relation between tax revenue and the explanatory variables.

Interpretation of the Results

The regression of re-specified revenue equation shows slightly better results than the previous regression results.

The post tax price coefficient has a value of -1.51 which is similar as the previous regression result, but it is less insignificant than the previous value of P coefficient. However as explained before, this does not seem to be a reasonable estimate of price-elasticity of gas as there are only limited possibilities of substitution between gas and competing fuels such as electricity in Bangladesh.

The tax rate coefficient α_0 (0.90) is less than one, but the difference is not significant. It shows that a 10% increase in tax rate would raise revenue by 9%. This changing of tax revenue approximately in proportion to the changes in tax rate seems to be a reasonable result. The coefficient is significantly different from zero at the 5% level.

The GDP coefficient α_2 is 4.33 which is quite high. The result is similar to the previous result and the possible explanations for such a high value of GDP coefficient are also the same.

The R^2, D.W. statistic and F statistic, all have more or less same value as the previous regression results. Except t coefficient, P and GDP coefficients have similar value as the previous regression results. On the whole, these results appear to be better, though not fully satisfactory in explaining the total situation. The reason may be that some explanatory variables were not included in the equation or that more disaggregative approach was necessary. However given the data limitation and small number of observations, it was not possible to include more variables in the equation. Inclusion of more variables might have caused other problems due to fewer degrees of freedom.

Given the limitations, it was not possible to get better regression results in explaining the relation between the changes in tax revenue with the changes in tax rate of gas in a more satisfactory way. With more refined data and larger number of observations, the results could be improved.

7. Estimating Tax Revenue Changes

Using the revenue equation, we can estimate the actual changes in tax revenue with a percentage change in tax rate.

Thus we take the log of the revenue function:

$$R = e^{\alpha_{oo}} t^{\alpha_o} \left[\frac{P}{\overline{P}}\right]^{\alpha_1} \left[\frac{Y}{\overline{P}}\right]^{\alpha_2} [P_o]^{\alpha_3}$$

as:

$$\ln R = \alpha_{oo} + \alpha_o \ln t + \alpha_1 \ln \frac{P}{\overline{P}} + \alpha_2 \ln \frac{Y}{\overline{P}} + \alpha_3 \ln P_o$$

In the equation:

$$P = P_0 \ (1+t)$$

Therefore,

$$\ln P = \ln P_0 + \ln (1+t)$$

or,

$$\frac{d \ln P}{d \ln t} = \frac{d \ln P}{d\, t} \Big/ \frac{d \ln t}{d\, t}$$

$$= \frac{1}{1+t} \Big/ \frac{1}{t}$$

$$= \frac{t}{1+t}$$

From total differentiation of the log revenue function, we get:

$$\frac{d \ln R}{d \ln t} = \alpha_o + \alpha_1 \left[\frac{t}{(1+t)} \right]$$

Using this equation, we can calculate, for the commodities studied in this chapter, the elasticity of tax revenue with respect to the tax rate. The results are presented in the table below.

TABLE 6

Revenue Effect of Tax Rate Change

	α_o	α_1	Rate of t Range 1972-90	Representative t (%)	t/(1+t)	$\alpha_o + \alpha_1[t/(1+t)]$
	1	2	3	4	5	6
1. Cigarettes	0.611	-0.354	29.5-69.7	60	0.375	0.478
2. Local Cement	1.24	-1.02	6.6-49.0	25	0.2	1.04
3. Imported Cement	0.49	-0.98	2.9-20.0 (a)	20	0.167	0.33
4. Sugar	1.15	-0.41	6.5-13.5 (i)	10	0.091	1.11
5. Gas	1.19	-1.38	22.7-79.7	60	0.375	0.67

Note: (a) Column C3 rates of table 3
(i) Excluding 33.3% in 1974

It will be noted that in all the cases, even where the direct elasticity of revenue with respect to the tax rate is low (as particularly in the case of imported cement), the elasticity of tax revenue to tax rate is substantially positive.

8. Spillover Effects of Taxation

The effect on revenue of changes in the tax rate of one commodity X does not remain confined to that commodity only. The adjustments of consumption to changes in t_x will normally affect goods other than X also and will have revenue implications. In the absence of a completely specified model for consumption responses, it is better to make crude adjustment for these spillover effect than to ignore them altogether.

If we assume that there is one commodity X and all other commodities are aggregated into a single commodity Y, then we can define the budget constraints as:

$$E = P_x Q_x + P_y Q_y$$

where

E = constant

and $P_x = P_x^o (1+t_x)$

$Py = P_y^o (1+t_y)$

Taking:

$$R = R_x + R_y$$

$$= P_x^o t_x Q_x + P_y^o t_y Q_y$$

where:

R = Total revenue from X and Y

P_x^o and P_y^o = pre-tax prices of X and Y

The total revenue effect of a change in t_x is given by:

$$\frac{d\,R}{d\,t_x} = \frac{d\,R_x}{d\,t_x} + \frac{d\,R_y}{d\,t_x}$$

As before,

$$\frac{d\,R_x}{d\,t_x} = P_x^o\,Q_x\left[1 + \frac{t_x}{(1 + t_x)}\eta_x\right]$$

and from the budget constraint,

$$\frac{d\,R_y}{d\,t_x} = P_x^o\,Q_x\left[-\left(\frac{t_y}{1+t_y}\right)(1+\eta_x)\right]$$

Some qualitative results are now apparent:

(i) The spillover effect dRy/dtx is positive or negative, as:

$$|\eta| \succ else \prec 1$$

(ii) If,

$$|\eta_x| \prec 1,$$

the maximum size of the adverse spillover effect is:

$$-P_x^o\,Q_x\,(1+\eta_x), \qquad since\left(\frac{t_y}{1+t_y}\right) \prec 1$$

In this case,

$$\frac{dR}{dt_x} \succ P_x^o\,Q_x\left[1 + \frac{t_x}{1 + t_x}\eta_x - 1 - \eta_x\right] \succ o$$

So the spill over effect, though negative, does not fully offset the gain in revenue from R_x

(iii) If,

$$|\eta| \succ 1$$

the spillover effect is positive. In this case, a tax increase which is revenue increasing for R_x must be revenue increasing for R, and one which is revenue decreasing for R_x may nonetheless be increasing for R.

The conclusion reached for this chapter, that tax rate increases would increase tax revenue in the case of all commodities studied, was reached on the basis of ignoring spillover effects: but the above result indicates that the conclusion would be strengthened, not weakened, if the effect of tax rate changes on total tax revenue, rather than on revenue from the individual taxed commodity, were to be analyzed.

9. Conclusion

Changes in indirect taxation on particular commodities may affect the purchases of these commodities, purchases of other commodities, factor incomes and, through changes in saving and investment, the future course of the economy. To trace these effects fully would have required a dynamic general equilibrium framework. But in the absence of sufficient data on behavior and technology and changes in these over time, such approach could not be adopted for the study of the revenue effect of tax rate changes in the case of Bangladesh. The difficulties of pursuing a full model analysis, however, would not justify assuming that the changes in the tax rates are fully effective and that there are no behavioural responses to them which need to be taken into account in predicting revenue consequences.

The approach followed in this chapter has been to build a partial equilibrium model, allowing for the possibility that avoidance / evasion etc., may limit the effectiveness of high rates of tax, and allowing for adjustments in the consumption of a taxed commodity when the tax rate changes.

The main purpose of our study has been to focus on the implications of tax rate changes on tax revenue collection for individual goods. The results of our research suggest that there is a predictive relationship between the changes in the tax rates and the changes in tax revenue for domestic as well as imported goods, though the relationship, expressed in terms of elasticities of revenue with respect to tax rate, may not be uniform across all commodities, depending on factors such as prices, degree of competitiveness (regulations and controls), supply factors including smuggling, etc. Of course, there are other factors which affect absolute size of tax revenue, like pre-tax price and the level of GDP, but these factors are unlikely to be significantly affected by changes in a single tax rate.

In the case of import tax, the period under study has been a period of considerable fluctuation in the control regime. The state of quantitative restrictions may be a more important determinant of the value of import and of tax revenue than import prices and tax rates under such circumstances. Nevertheless, the estimated revenue function of imported cement in our study clearly confirms the intuitively expected positive relationship between the import tax revenue and import tax rates. The GDP component coefficient, however, shows an implausible result. This may be due to bias caused by the specification error of omitting the variable representing quantitative restrictions or may be due to the fact that the true dynamics of demand could not be reflected in the static framework. Broadly speaking, the results are reasonably good in explaining the import demand and the tax revenue relationships, though it is probable that they could possibly be significantly improved if variations in the degree of quantitative restriction could be appropriately modelled in the specification of the revenue equation.

In the case of excise tax, the results of tobacco, local cement and sugar are promising, showing predictable relationship between the tax revenue and the tax rate changes. In the case of gas, however, the results are not very satisfactory in helping the prediction of revenue effect of tax rate changes. Besides showing a high price elasticity, the revenue equation of gas tend to show an implausibly high responsiveness of GDP. It is at least possible that the GDP variable is representing, in part, factors such as the growth of the gas supply net work or technological changes, tilting demand towards gas during the period of our study, since the availability of supply over the period was positively correlated with the growth of GDP.

The results give no support to the view that the increases in the tax rates are ineffective because of increasing incentives they give to evasion/avoidance, etc. This would require a zero direct elasticity of revenue with respect to tax rate. There are cases in which the direct elasticity of tax revenue with respect to the tax rate is significantly less than one, which may point to some "slippage" as the tax rates rise; but in all these cases, the elasticity is substantially positive and the difference from zero is statistically significant. In other cases, the estimated elasticity is close to or even greater than unity, though in these later cases, the excess over unity is not statistically significant. We can therefore reject the view referred to above namely that evasion/avoidance make tax rate increases ineffective.

The price elasticities in all the equations show values which are somewhat different from the expected a priori values for the specific goods. This seems to be due to the interplay and functional influence of one variable over the other which did not allow them to have their full play in getting the own expected values of the coefficient. Some of the coefficients show significant responsiveness of demand to tax inclusive prices (e.g., in the case of local cement and gas), but in no case is the estimated price elasticity of demand so high, even when combined with the evidence of possible "slippage" as rates increase, as to predict that an increase in tax rate would decrease tax revenue.

If the tax rate is defined as the ratio of tax revenue to expenditure and if expenditure is made equal by definition to price times quantity, then the equation $R = tQP_0$ must hold as a tautology. The approach adopted in our study indicates that this by no means implies that such a relationship exists when tax rates are taken as statutory rates and prices and quantities are measured independently.

On the basis of the revenue equations, it is tempting to argue for a policy of increasing tax rates on the commodities studied. The overall ratio of tax to GDP in Bangladesh is low, as has already been pointed out in Chapter 1, even by comparision with the ratio in other countries with a low level of GDP per capita; and in all the cases studided, revenue will appreciably increase in response to tax rate increases. However, the capacity to raise revenue is only one factor to be taken into account in considering the case for tax rate increases. There are at least two other important factors to be considered. As will be outlined below, the information provided by the revenue equations provides some guidence but is insufficient in itself to allow these factors to be fully assessed.

The first of these factors is the distributional characteristics of the taxes under consideration: a tax on goods with low cross-section income elasticity of demand will tend, at least on the uses side, to fall disproportionately on the poorer members of the community. The high income elasticities of demand found in some of the revenue equations cannot be taken as evidence that an increase in the tax on those commodities would increase the progressivity of the tax system: first, because the distributional impact of the tax on the uses side depends on cross-section income elasticity, not on time series elasticity for aggregate consumption which is estimated in the revenue equations; second, because these high time series income elasticities, as pointed out in the discussion of the individual equations, may be reflecting in part special factors correlated with income, sich as the relaxation of import restrictions in the case of imported cement or the extension of gas supply network in the case of gas, rather than the effect of income alone.

The second factor that needs to be taken into account in tax reform decisions is the effect of taxation on efficient resource allocation. The present patchwork of different rates in the Bangladesh tax system is due in part to the practice, in the past, of simply seeking additional revenue where it was to be found: so it can be expected that appropriate tax reform would bring efficiency gains. Information about the own price elasticities of demand, available from the revenue equations (though subject in most cases to large standard errors), would be sufficient for assessing the efficiency effect of increases in individual tax rates only in special cases. It has to be said, though, that information about cross-elasticities of demand, which is normally required for assessing efficiency effects, is not reliably available from other sources either.

However, it is not necessery to be wholly negative about the role of the revenue studies in an efficiency-motivated reform. In the process of rationalising the tax system towards greater efficiency, the revenue equations have a part to play: in quantifying the link between tax rates on individual commodoties and the resulting revenue; in drawing attention to cases where increased tax rates may cause increasing problems of administration and enforcement; and, in principle, in identifying the commodities where an increase in rates would be associated with an actual reduction of revenue (though this did not appear to apply to any of the commodities studied in this thesis).

Inspite of some deficiencies in the results, the revenue response model seems to be helpful in estimating the changes in the tax revenue with changes in the tax rates. It is true that the method adopted relates changes in the tax rates of a particular commodity to changes in the tax revenue raised from that commodity rather than to changes in the total tax revenue, but as shown in this chapter, it is possible to make an adjustment to allow for "spill over" effects on revenue from other commodities, and such an adjustment would almost certainly strengthen rather than weaken the proposition that an increase in tax rates would increase tax revenue in the case of all the commodities studied.

The methodology used may thus be helpful for a reasonably good analysis of the revenue effect of tax rate changes even under partial equilibrium framework. There is however clearly need for further research in estimating the revenue functions using more data and more refined data.

APPENDIX 1: Items as percentage of total import duty

IMPORT DUTY	Items as % of total import duty	
Items as % of Total Import Duty Collection	8 yr. ave. 1972/73 1979/80	5 yr.ave. 1980/81-1986-87
1. Sugar	0.77 *	2.27 #
2. Raw Tobacco & Tobacco Manufactured	2.48	0.34
3. Chemicals	4.99 *	4.18 #
4. Dyes, Colors, Paints, Varnishes	2.14 *	2.09 #
5. Cotton Yarn & Cotton Fabrics	6.70 *	3.56 #
6. Iron & Steel Products	10.10 *	12.21 #
7. Machinery, Appliances & Parts	13.70 *	19.08 #
8. Motor & Other Vehicles	6.01 *	4.20 #
9. Electric Machinery	6.88 *	
10. Mineral Fats / Oils		
11. Rubber Articles	2.51 *	2.73 #
12. Wood, Pulp, Paper, Paper Board	3.21 *	3.23 #
13. Animal / Vegetable Oil	4.82 *	4.86 #
14. Cement	0.60 *	1.22 Φ
15. Cotton Fabric	1.97	2.08
16. Milk	0.23	0.86
17. Petroleum Products	1.91 * §	2.63 #
18. Plastic Material	3.29 * §	3.09 #
19. Man-Made Fibre, Yarn and Man-Made Fabric	7.14 * §	5.93 #
20. Metals	1.77	1.83
21. Ships, Boats	0.35	0.82
22. Kerosene	2.22 * §	0.13 # Φ
23. H.S.Diesel	1.88 * §	0.55 #
24. Second-Hand Clothing	2.19 §	1.74

* Revenue from 17 items = 76% of Total Import Revenue ; Φ (8 yrs);
# Revenue from 17 items = 62% of Total Import Revenue ; § (3 yrs.)

APPENDIX 2: **Commodity Groupwise Contribution of Excise Tax Revenue.**

EXCISE TAX	Items as % of total	
Items:	8 yrs. ave. 1972-73 to 1979-80	8 years ave. 1980-81 to 1987-88
1. Cigarettes	47.65	44.18
2. Bidi	5.94	6.49
3. Sugar	5.55	3.35
4. P.O.L.	15.49	5.70
5. Motor Spirit	4.22	1.25
6. Lubricating Oil	0.54	0.42
7. Kerosene	2.20	0.97
8. H.S. Diesel	2.02	1.03
9. Gas	3.02	19.92
10. Cement	1.88	1.48
11. Soap	3.09	1.52
12. Matches	1.13	0.64
13. Cotton Yarn	1.13	0.98
14. Man-Made Fabric and Yarn	1.11	0.21
15. Jute Manufacture	0.51	2.17
16. Paper	0.29	1.23
17. Beverages	0.36	0.41
18. M.S. Products	1.03	1.51
19. Wires and Cables	0.47	1.07
20. Electric batteries	0.72	0.73
21. Electric Goods	0.92	0.70
22. Hotels and Restaurants	0.71	1.02
23. Plastic Products	0.26	0.30
24. Cosmetics	0.80	0.59
25. Cinema		2.71
26. Shoes	0.23	0.35
27. Tea	0.65	0.58
28. Mechnized Vehhicles	0.23	0.44
29. Paints and Varnishes	0.80	0.62
30. Liquor and Narcotics	1.98	2.30

CHAPTER 5

EFFECTIVE TAXES IN BANGLADESH - 1986-87

1. Introduction.

In Bangladesh indirect taxes contribute the largest amount of revenue to the Government, as mentioned earlier. In 1986 indirect taxes contributed 78.36% in total revenue (Tk.3031.22 crores out of a total tax of Tk. 3868.50 crores). Of the individual taxes, import tax and import sales tax were Tk. 1540.68 crores and Tk 551.33 crore respectively and excise tax was Tk. 914.30 crores. Import of raw material and intermediate goods were the largest part (about 50%) of total imports. Many excise and import duties fall on both final products and inputs used to produce final domestic products. The effects of these taxes are not always obvious. Taxes originally imposed somewhere may be distributed somewhere else owing to the process of shifting of the tax burden. The distribution of the tax burden may consequently be different from that which was intended by the Government.

The prices of the final goods may change with changes in taxes on final output and inputs. In order to produce one unit of an output a long chain of production starts since each of the products needed as inputs by one sector in turn requires inputs from other sectors. The taxes that fall on the inputs which directly and indirectly are used to produce the final output need to be added with the taxes on final output itself in estimating the total tax element in the prices of the final output. The cascading effect of the taxes working through the inputs to the prices of the final products are not transperent. It is important to trace out these effects to estimate the change in Government revenue in response to changes in demand following changes in these taxes. The effective tax shows the rise in the Government revenue when final output rises by one unit (Ahmed and Stern, 1986, pp. 44-73). The tax element in the price of final goods is defined as effective tax.

2. Input Taxation and different types of Indirect Tax System.

Input taxation is regarded as undesirable from the point of view of production efficiency since it leads to different relative prices for different industries (Ahmed and Stern, 1987, pp. 283). Different types of indirect tax systems deal with input taxation differently. The main types of tax systems most commonly used to avoid input taxation are single stage tax system or purchase tax and value-added tax system.

Single stage tax system is on final sales of the goods. The sales could be by manufacturers / wholesalers to retailers or from retailers to final buyers. The tax is not on the production but on the use of the goods. There is no intermediate tax here because the final product is taxed when it is sold to somebody for final consumption. If it is used for further production, then it is not taxed, but the product for which it is used is taxed. And the revenue effect of a change in the consumption of the good would be fully represented by the nominal taxes on that good. The nominal tax and the effective tax would be same here and revenue would remain the same. The rate of tax would vary according to the elasticity of demand and other consideration, e.g. equity. There are problems of identifying the final consumers under this tax system because every seller would try to prove himself as the intermediate seller, to avoid tax payment. Inspite of this disadvantage, single stage tax system is successfully operating in some places in India, e.g., Karnataka (Ibid, pp.224). It is, however, difficult to implement in places where there are large numbers of retail sellers and wholesalers and the accounting system is poor, as in Bangladesh.

If a tax is levied at different stages of production, a current issue is the allowance, if any, given for taxes paid at earlier stages of production. There are two polar cases - a value added tax (VAT) in which, in principle, rebates are given for taxes paid on all inputs of purchased goods and services and a pure multi-stage tax, where no rebates are given.

Under the value added tax (VAT) rebates are made of the taxes that are paid on intermediate goods. The taxes that are paid on the non-primary inputs are refunded when claimed with legal proofs. Since tax paid on inputs are subtracted at all stages of production / distribution, from tax liable on sales, there remains only one tax on the final product i.e., the tax on value-added. This tax, therefore, falls on consumption spending, but it is free from cascading effects due to the rebates paid, with the advantage of collection in fraction equivalent to single stage tax on the value of final product (George, E. Lent et. al., 1973. pp. 320). In over-all effect, VAT can be thought of as a single stage tax with multiple collection.

Under the tax system, however, there is no need to identify the final consumers since they would not get any refund of the taxes paid. The purchasers of inputs would get the refunds of the taxes paid on intermediate products and would want to have proof of payments of taxes from the sellers. The sellers on the other hand would like to hide the tax collection from their sales in order to avoid paying them to the Government. This conflicting interest of buyers and sellers of intermediate products act as a cross check and aids to tax administration. To cover the loss of the revenue due to payment of rebates on input, VAT can be raised on final product by the same amount to maintain revenue neutrality. The nominal and effective tax would be the same in this case. It may, however, be difficult to manage the system administratively when all the producers, wholesalers and the retailers are brought under the network of VAT. The problem is all the more pronounced when the establishments are small and the number is numerous.

Under the multi-stage tax system, tax is payable cumulatively on the full price every time a good change hands. This tax system, therefore, is a powerful producer of revenue. But it has the distortive effect on domestic consumption, since intermediate inputs are taxed without rebates of tax being available at later stage or with only limited rebates of the tax for certain categories of goods. Under such tax system, nominal tax diverges from effective tax.[19] This tax system corresponds more or less to the situation in Bangladesh - taxes are imposed on the final output as well as on the inputs, owing to revenue and other considerations. The system of rebate is present but it does not cover all the goods.[20] The procedure to get the duty drawback is cumbersome and quite lengthy. The effects of input taxation, therefore, works through the prices of goods by the time the rebates are finally made. The nominal tax on final sales of a good may thus be a poor indicator of the effects of tax system on the price of that good or equivalently may be a poor indicator of the extent to which additional

[19]. Effective taxes are defined and discussed later in the Chapter.

[20] The significance of rebate, though small, has been somewhat increased in recent years. Thus, for example, in 1982-83, rebates amounted to only 1% of custom duty collected, whereas in 1986-87 to 1987-88, rebates amounted to about 2.5% of custom duty. (Fiscal Statistics, 1987.P.26)

sales of that good would increase total revenue under this system. Besides, multi-stage taxes may give an artificial stimulus to vertical integration (Government of India, 1977, Part 1)

3. Need to Measure Effective Tax.

The need to make a distinction between nominal and effective tax is important for the third type of tax system. The estimate of effective tax would help in bringing to the surface the various cascading effects of the taxes on the prices of final products. There may be many products which are not directly taxed by the Government but for which, owing to the interindustrial relationship a unit increase in final output may lead to an increase in tax revenue through the taxation of intermediate goods. There may therefore be divergence between the statutory or nominal taxes on domestically produced goods and the effective taxes on them. The difference between the taxes would reveal the cascading effects and measure the extent of input taxation of domestic output.

This information is important for assessing different Government policies. Knowledge about the magnitude of input taxation would help in focusing attention on the effectiveness of Government policy in encouraging or discouraging certain sectors of the economy, and on the possibility of realizing the objectives of taxation. This would contribute positively to the reform measures and policy changes of the Government.

4. The Model.

In order to estimate the changes in Government revenue with changes in taxes when output goes up by one unit, it is necessary to know production conditions and price formations. The producers' price has to be distinguished from the consumers' price. The producers' price is the tax-exclusive price received by the sellers of the product under full forward shifting assumption. The consumers' price of a good is the market price which includes taxes that go to the Government as revenue and also factor payments which go to the factors as their income. The tax enters as a wedge between the producers' price and the consumers' price. In equilibrium, market price of the product equals to the producers' price plus tax under perfect competition and constant returns to scale.

In the approach followed in this Chapter, it will be assumed that the quantity requirement for primary inputs, and the prices of those inputs, are fixed. The value added per unit of gross output is therefore unaffected by taxation in all cases, and the only reason for differences between nominal and effective tax rates is the cascading effect of taxes on intermediate inputs.

These are very simplifying assumptions, and it is desirable to consider alternatives which might be followed. In principle, the value added per unit output may not be invariant to indirect taxation. Even if there are fixed technical requirements for primary inputs, changes in the pattern of demand for different goods may affect the demand for those inputs and hence their relative prices. Further, the technology may allow some substitution among primary inputs, or between them and intermediate inputs (the Rvenue Estimation Model in

General Equilibrium Framework for Bangladesh by World Bank, for example, allows for a Cobb-Douglas, (CD), production function between intermediate inputs as an aggregate and primary inputs as an aggregate. W.B. 1989)

Given sufficient information about the characteristics and behaviour of the economy, it would be possible in principle to predict the full consequences of any tax change. Alternatively it is possible to construct a stylised model which is supposed to incorporate the most important features of the economy in a simplified way, and use this in simulation. This is the approach of Computable General Equilibrium (CGE) systems: the central assumptions are of market clearing (usually, though not always, in terms of static equilibrium) and price-taking behaviour by producers and consumers, and convenient forms (such as Cobb-Douglas, and Constant Elasticity of Supply, CES) for utility and production functions.

The advantages and the limitations of this procedure have been well surveyed by Shoven and Whalley (1984). On the credit side ,the procedure can measure, or at least draw attention to, effects of taxation beyond the most obvious impact. Thus, for example, it permits the analysis of the possibility that taxation, one-sidedly directed against goods which are land intensive in production, may depress the equilibrium price of land and hence affect the price of, and the demand for, other goods which are land-intensive. It also allows distributional effects of indirect tax changes to be studied on the "sources" side (effects on the distribution of factor income) as well as the "uses" side (distributional effects of changes in consumer good prices).

On the other hand , the confidence with which CGE simulations can be regarded as closely approximating the effects of tax changes depends on the realism of the model of the economy employed. Data limitations, particularly in the Developing Countries , make it impracticable to base aspects such as substitutability in production or consumption on actual observation of the economy concerned: instead, production and consumption relationships in the model are imposed, using simple functional forms in the interest of computational tractability. The effects of changes in the indirect taxation on final commodity prices may be conceptually divided into two components - the change in the prices on the basis of fixed primary input prices, and the difference made by allowing primary input prices to vary so as to clear the markets for those inputs. Of these, the first component may be computed on the lines followed in this Chapter, using only the assumption of constant returns to scale in the production with fixed intermediate input/output coefficients, competitive markets and cost-minimising use of primary inputs by the producers. The second component, which is added by a CGE approach, is much more speculative, because it will depend on the functional forms and parameter values imposed by the CGE model, which may be inappropriate to the economy being studied. A further point, suggested by simulations carried out in a different context by Johnson (1966), is that the relative pre-tax price of different goods may be relatively insensitive to quantity shifts except in extreme cases. If so, the effective taxes calculated on the basis of the procedures followed in this Chapter should give a good approximation to the effect of relative prices calculated from a CGE model.

Returning to the 100% forward shifting approach outlined at the beginning of this section, the theoretical framework for estimating effective tax can be presented by means of a simple input output model of production with fixed technical co-efficient of Leontief type implying constant returns to scale.

4.1 Closed Economy Case.

In a pre-taxed closed economy, the equilibrium price of a product to the consumer is given by:

$$q_j^d = \sum_i q_i^d a_{ij} + Y_j \tag{1}$$

where,

$$i , j = 1, 2, \ldots . n$$

$$q_j^d = \textit{price of the jth product}$$

$$q_i^d = \textit{price of the ith product}$$

$$Y_j = \textit{factor payment per unit of producing jth product}$$

$$\sum_i q_i^d a_{ij} = \textit{Input cost of jth product}$$

In Matrix notation:

$$q^{d\prime} = q^\prime A + Y^\prime$$

or,

$$q^{d\prime} = Y^\prime [I-A]^{-1}$$

If tax is imposed per unit of the domestic output, the producer's price is:

$$P_j^d = q_j^d - t_j^d \tag{2}$$

where,

$$P_j^d = Producers' price$$

$$t_j^d = tax\ per\ unit\ of\ output\ j$$

In equilibrium,

$$P_j^d = \sum_i q_i^d a_{ij} + Y_j \tag{3}$$

Taking equation (2) and adding t^d on both sides we have:

$$q_j^d = \sum_i q_i^d a_{ij} + Y_j + t_j^d \tag{4}$$

In matrix notation, equation (4) can be written as:

$$q^{d'} = q^{d'}A + t^{d'} + Y' \tag{5}$$

Where:

$$q^{d'} = Vector\ of\ market\ prices\ to\ the\ consumer$$

$$A = Input\ Output\ Matrix$$

$$Y' = Vector\ of\ per\ unit\ factor\ payment\ (prime = row\ vector)$$

From equation (5) we get the model

$$q^{d'} = t^{d'}(I-A)^{-1} + Y'(I-A)^{-1} \tag{6}$$

Here: $t^{d'}(I-A)^{-1}$ = effective tax

and $Y'(I-A)^{-1}$ = basic price where there is no tax.

Effective tax is then defined as

$$t^{de'} = t^{d'}(I-A)^{-1} \tag{7}$$

This identification of effective tax is based on the assumption that the vector Y' of factor payment per unit of output is unchanged by taxation. This assumption is discussed later on.

4.2 Open Economy Case

In an open economy, imported goods can be used as inputs for domestic production. Assuming complementarities of imported inputs (i.e., there are separate fixed requirement for imported input for domestic production in each category for each type of domestic goods), to produce one unit of good j require a_{ij}^d unit of domestically produced goods i and a_{ij}^m unit of imported goods i. Also assuming import of foreign inputs at c.i.f price, we have in equilibrium:

$$p_j^d = \sum_i [q_i^d a_{ij}^d + q_i^m a_{ij}^m] + Y_j \tag{8}$$

In matrix notation, equation (8) can be written as

$$p^{d'} = [q^{d'}A^d + q^{m'}A^m] + Y' \tag{9a}$$

$$p^{d'} = [q^{d'}A^d + (p^{m'} + t^{m'})A^m] + Y' \tag{9b}$$

Where,

$P^{m'} + t^{m'} = \quad q^{m'}$,

$p^{m'}$ = vector of import price including c.i.f. price and trade and transport margin,

$t^{m'}$ = vector of per unit taxes (import and sales) on imported goods.

A^d = the matrix of domestic inputs per unit of domestic output.

A^m = the matrix of imported inputs per unit of domestic output.

Again, adding t on both sides of the equation (2) we get from:

$$p^{d'} = q^{d'} - t^{d'}$$

$$q^{d'} = p^{d'} + t^{d'}$$

$$= q^{d'}A^d + (p^{m'} + t^{m'})\ A^m \ + Y' + t^d$$

or,

$$q^{d'} = t^d(I-A^d)^{-1} + p^{m'}A^m(I-A^d)^{-1} + t^{m'}A^m(I-A^d)^{-1} + Y'(I-A^d)^{-1} \quad ..(10)$$

Equation (10) gives the decomposition of the market price where t^d is the domestic per unit tax vector, Y' $(I-A^d)^{-1}$ is the element of domestic factor payments, $P^{m'}A^m\ (I-A^d)^{-1}$ is the foreign exchange element in the price. The tax elements in the price are:

$t^{d'}(I - A^d)^{-1}$ and $t^{m'}\ A^m(I - A^d)^{-1}$.

The effective domestic tax is then defined as:

$$t^{de'} = t^{d'}(I-A^{d})^{-1} \tag{11}$$

And effective import tax is defined as:

$$t^{me'} = t^{m'}A^{m}(I-A^{d})^{-1} \tag{12}$$

The total effective tax is then

$$t^{e'} = t^{d'}(I-A^{d})^{-1} + t^{m'}A^{m}(I-A^{d})^{-1} \tag{13}$$

The equation shows that for each unit of good produced the sum of effective domestic and import taxes would give the actual amount of taxes passed on to the consumers, taking both direct consumption of all domestically produced goods and indirect consumption of all domestically produced and imported goods into account.

4.3 Capital Goods.

In the above model, taxation of goods requiring capital stock is not considered. This can be incorporated by adding rB with A matrix in equation (11) and (12), where r is the real rate of interest and B is the matrix of capital stock requirements (bifurcated into domestic and imported components as B^d and B^m). Equation (11) and (12) can then be written as:

$$\hat{t}^{de'} = t^{d'}[I-(A^{d} + rB^{d})]^{-1} \tag{14}$$

$$\hat{t}^{me'} = t^{m'}(A^{m} + rB^{m})[I-(A^{d} + rB^{d})]^{-1} \tag{15}$$

The total effective tax would be

$$\hat{t}^{e} = \hat{t}^{de} + \hat{t}^{me} \tag{16}$$

5. Assumptions.

The theoretical framework for the calculation of effective tax is based on the assumptions of perfect competition, fixed technical co-efficient, only one factor of production, full forward shifting and non-competitiveness of imports. The assumptions are made to keep the analysis simple. Given these assumptions, the factor cost of goods remains unaffected by the tax system. The assumptions can however be relaxed, in which case the factor cost of goods no longer remains unaffected by the tax system, but the distinction between the nominal and the effective tax rates remains important.

The assumption of perfect competition is a standard one for input -output matrix applied to taxation. It enables us, in models which do not allow explicitly capital inputs, to require that prices be equal to costs including taxes, and in models allowing for capital inputs, to assume that the rate of profit on those inputs is constant across the industries. Of course it would be possible to replace the uniform rate of profit assumption by one in which profit rates are fixed but differ across industries.

The assumption of fixed technical coefficients is a convenient one because it excludes the possibility that products can be produced with different combinations of inputs and that the choices between alternative combinations might be affected by taxation. The assumption is thus made to focus attention on the effects of taxation on the consumption side. It should however be noticed that the disregard of possibilities of substitution in production - if it corresponds to technological reality - eliminate one of the objections which are often raised in principle against taxation of intermediate inputs, namely, that such taxation can lead to the adaption of inefficient production methods.

Only one factor is considered with fixed price W to avoid the problem of factor substitution and factor income changes with changes in the tax. If there are two factors, a full general equilibrium analysis of tax changes would have to allow for the possibility of changes in relative factor prices. Such changes would change the relative pre-tax prices of different goods. For example, if tax changes were biased towards increasing the demand for labour-intensive relative to land-intensive goods, we would expect an increase in the prices of labour relative to land. The producer prices would therefore vary with changes in factor prices when tax changes. Nevertheless, the cost of ignoring the effects of taxes on relative factor prices may be minor for two reasons: (i) the tax induced changes in final demand will not change factor prices much unless they are weighed towards goods where the relative primary-factor intensities are substantially different from those of production as a whole; (ii) the empirical evidence for neighbouring countries supports the view that taxes are shifted forward more or less 100% (Irfan, 1974, P 67; Jeetun, 1978). Fixed technical coefficient and fixed primary input prices are equivalent, under perfect competition, to a perfectly elastic supply curve implying 100% shifting. The assumption may be questionable, but it is not a polar case. It is assumed to avoid complications.

Shifting of taxes on imported goods is expected to pose no problem as these goods are treated as complementary inputs into domestic production implying full forward shifting. If inputs are competitive, taxes on competitive domestic goods may be shifted backward on the factor income, since the market prices of imported commodities would be given internationally. In the intermediate case, shifting would take place according to the elasticities of substitution.

In Bangladesh, the presence of restrictive import policies imply that imports are allowed to complement domestic production. There are, however, competitive imports against which protection is given to the domestic industries in most cases, but in the absence of detailed breakdown of import into competitive and non-competitive ones, complementarity is assumed to work out the model.

Inspite of the restrictive assumptions, the model can be used to determine the sectors having greater input taxation compared to others and can help in asseessing different Government policies in the light of the findings. There is one point which needs to be mentioned relating to imports subject to quantitative restrictions. The presence of these restrictions create a scarcity premium when market value of the good exceeds the sum of c.i.f. prices, customs duty and sales tax, trade and transport margins. We have therefore considered market price including scarcity premium where applicable, in estimating tax coefficients and effective taxes.

While this is appropriate for the pricing equations, since any firm using inputs has to pay the going price for them, including the scarcity premium, the resulting estimates of effective taxes require care in their interpretation. First, in models with perfectly elastic supply of all goods, an increase in tax rates will cause a corresponding increase in prices. However when there are quantitative restrictions on the supply of certain goods - which, as a result, command a scarcity premium - the effect of an increase in the rate of tax on such goods may be, in whole or in part, to reduce the premium rather than to increase the price. Second, the effective tax rate on a good has the interpretation, in a model without quantitative restriction, of the extra tax which would be collected as the result of an extra unit of final demand for the good. If the good requires directly or indirectly, inputs which are subject to rigid quantity restrictions, an extra unit of final demand can not be satisfied without a decline in some other uses of these inputs. Thus the extra tax collection interpretation can be sustained only if it is understood that the extra demand is accompanied by a relaxation of quantitative controls to admit the extra imported inputs required.

6. Data and Methodology.

To estimate effective taxes we need an economy wide input output table (I-O table) and its break down into domestic and import matrices (for absorption of domestic and imported goods and services), data on the tax revenue for the major indirect taxes classified by commodities according to input categories and gross output and imports matching with I-O sector categories.

(i). Input Output Table.

For the study of effective taxes in Bangladesh, a 53 sector input output table for 1986-87 at purchaser prices prepared by the Planning Commission, Government of Bangladesh is used. The 1986-87 I-O table is an updated version of the 47 sector 1981-82 I-O table, also prepared by the Planning Commission. The I-O table, however, is not broken down into domestic and imported input-use matrices since the flow of imports of i-sector goods into j-sector is not known to / prepared by the Planning Commission.

In preparing the I-O table, all imports are classified into 53 sectors and added with corresponding domestic production. The total output thus available is then allocated to various production sectors and final demand categories without specifying the origins.

(ii). Import Matrix.

In the absence of an import matrix or detailed statistics of imports by type by the using sectors, the following methodology is used to construct the import matrix from I-O table or A matrix of 1986-87.

First, an import ratio for each sector is estimated as proportion of import to total availability:

$$m_i = \frac{M_i}{D_i + M_i}$$

Where:

m_i = New import coefficient or the import demand of sector i corresponding to one unit total sales/output of sector i.

M_i = Imports of goods belonging to sector i,

D_i = Domestic output of goods belonging to sector i,

D_i+M_i = Total availability of output i

$= S_i$

The new import coefficient is different from the import coefficient which is import demand of each sector i corresponding to one unit domestic production only of sector i. It is estimated as:

$$\frac{M^i}{D_i}$$

Second, assuming M_i/S_i to be same for all j, that is, uniform share of import deliveries within each supplying sector, imported inputs in each cell is estimated by multiplying each cell in the same row of A matrix by that row's new import coefficient. This can be written as:

$$\frac{M_i}{S_i} \cdot a_{ij} = a_{ij}^m$$

$$m_i \cdot a_{ij} = a_{ij}^m$$

By diagonalizing the column vector of m_i coefficient and multiplying with a_{ij} coefficient, we get the import matrix a_{ij}^m or A^m.

The assumption that the ratio m_i applies equally to all sectors in which i is used is a possible source of error, as different industries usually need different proportion of domestic inputs and hence the proportion would be different for different sectors of I-O table. The assumption of a single ratio is therefore unlikely to hold precisely for each sector, but information is lacking to indicate how the ratio should be adjusted upwards and downwards from the average ratio for particular sectors. In default of such information, we could not do any better.

Once we derive the import matrix, the derivation of domestic matrix is simple. We derive the domestic matrix by subtracting each cell of each row of import matrix from each cell of each row of A matrix. This can be written as:[21]

[21] The operation of bifurcating A matrix into domestic and import matrix, matrix inverse, matrix multiplications, etc., are all done in Opus 486 Computer in the University of Manchester.

$$a_{ij} - a_{ij}^{m} = a_{ij}^{d}$$

Therefore,

$$a_{ij^d} + a_{ij^m} = a_{ij}$$

(iii). Gross Output and Imports.

Gross output and imports at purchaser price matching with I-O sector categories are obtained from Bangladesh Planning Commission. The market price of import is higher than c.i.f. price of import by the amount of import duty, import sales tax, trade and transport margin and scarcity margin where applicable. The import at market price is therefore estimated by using an import conversion factor by the Planning Commission through special studies on domestic prices of imports in Bangladesh.

(iv). Indirect Taxes.

The major indirect taxes are import duties, import sales tax and excise taxes in Bangladesh. The import, import sales and excise tax revenues for broad commodity groups for the year 1986-87 are taken from Bangladesh Planning Commission, National Board of Revenue and Foreign Trade Statistics of Bangladesh, 1985-86 to 1987-88. The taxed commodities are mapped with 53 sector commodity classification matching the I-O table 1986-87 and are reported in Appendix tables 1 and 2. The taxed commodities are matched with I-O sector classification following the list of I-O sector commodity classification made by the Planning Commission (The Input-Output Table 1981-82,1988, Pp 121-123).

(v). The Tax Rates.

The tax rates used for the study are the nominal and not the statutory tax rates. In order to calculate the nominal tax rates, tax revenue in each category is divided by the total value of output in the corresponding sector. Thus to calculate the rate of excise duty t^d_j for the output of the jth sector, excise tax revenue from this good is divided by its production (gross domestic output). Similarly, rates of import duty and sales taxes are calculated by dividing the respective duty collections by their corresponding import values. The actual collections are usually net of refunds. The implicit rate, therefore, is not expected to overstate the tax allocated to a commodity group. In Bangladesh, the refunds are, however, not of substantial magnitude and in 1986-87, the amount was nominal, about 2% of the total indirect tax collection (Fiscal Statistics, 1987. P26).

The use of nominal tax rates has some merit over statutory tax rates:

- Some part of the tax revenue from import and excise taxes are raised on ad-valorem basis and other parts, on specific tax rate basis. This problem is solved by having commodity-wise collection rates which may be treated as specific tax equivalents.

- When taxed commodities are grouped and matched with I-O sector classification, these may have multiplicity of tax rates. If actual collection rates are taken instead of statutory tax rates, then these may work as weighted average of the implicit tax rates for any commodity group.

- The tax collection rates also take care of the problem of evasion, since announced statutory rates are evaded in many cases of tax payment. The collection rate, therefore, shows the tax collection effort and the administrative efficiency also in realizing the revenues at statutory rates. The level of aggregation made in classifying the taxed commodities according to I-O sector categories may be a disadvantage for detailed sectoral analysis. The estimates of aggregate analysis, however, can be used as an input into the detailed sectoral work.

(vi). Capital Goods.

To estimate the taxation of fixed assets used to produce capital goods, the capital stock matrix B is needed. B Matrix for 1986-87 is obtained from I-O table 1986-87.

The B matrix is also divided into domestic and imported input use matrix using the same method as in bifurcating the A matrix, i.e., using the proportion of absorption of imports and domestic goods in 1986-87. Taking the ratio of import to total availability,

$$\frac{M_i}{D_i + M_i} = m_i$$

as the import demand of sector i corresponding to one unit total sales/output of sector i, B^m matrix is constructed by multiplying each cell in the same row of B matrix by that row's new import coefficient:

$$m_i \; . \; B_{ij} = B_{ij}^m$$

B^m is the matrix of stocks of imported capital goods required for the production of domestic goods. Similarly we estimate the B^d matrix which is the stock of domestic goods required as capital for domestic production, by subtracting each cell in the B^m matrix from corresponding cell in the B matrix. This can be written as:

$$B_{ij} - B_{ij}^m = B_{ij}^d$$

To consider taxation of capital goods, equation (14) is modified by replacing A^d and A^m by $(A^d + r\ B^d)$ and $(A^m + r\ B^m)$ under steady state assumption. This assumption is made to avoid the problem associated with time pattern of accumulation, taxes and rates of interest in price determination. It is the simplest way to introduce capital into the analysis.

For r the rate of interest is assumed to be between 1 to 10 %. If the assets depreciate at a certain percentage rate (assuming between 1 to 10 %) and current investment is made totally for replacement, the same percentage rate of interest for r would mean that rB is equal to current gross investment.

7. The Estimates of Effective Taxes.

The effective indirect taxes in Bangladesh are calculated by using equations (11),12) and (13) as explained in the model under competitive conditions.[22] The effective tax, including taxes on capital assets, are estimated by using equation (14), (15) and (16). The results of the estimates are presented in the tables 1,2,3,5,6. The tables show total effective taxes on domestic goods composed of effective domestic taxes and effective import taxes on inputs going into domestic production, the differences between effective and the nominal taxes and the extent of input taxation - excluding and including the taxation of capital goods.

The tables show the all-pervasive effects of input taxation throughout the economy, though it varies from sector to sector. This comes out clearly if we compare the effective domestic taxes with the nominal domestic taxes in Table 1. Out of the 53 categories of commodities, only 23 have nominal taxes. All the agricultural products from 1 to 17, except tea, are exempted from nominal taxes as also are housing, construction and services. Nominal tax is mainly on the manufacturing sector and the highest rate is on tobacco products (52%) and on gas (50%) which is an important input for electricity and fertilizer production. All

[22] Ahmed and Stern used a similar method of estimating effective taxes in Pakistan (Ahmed and Stern, 1986 P 43-72), Jha and Srinivashan calculated effective taxes for India including profit margin π. But their definition of w (non-profit income) and (π) (profit income) seems a little confusing. While the model takes labour as the sole factor and wages as the fixed factor income, the definition of w shows inclusion of wages, distributed profits and interest income. π is defined to be the profit income including retained profits, tax on profit and depreciation, etc. If π is to represent profit income, it is supposed to include distributed and undistributed profit, when w is assumed to be fixed income. It could be better to define w as the wage income and π the non-wage income (Jha and Srinivashan, 1989 P8-11). Chowdhury (1988.PP.57-59) made an estimate of effective taxes for Bangladesh for 1984-85. He used the input-output table of 1976-77 for calculating effective taxes for 1984-85, assuming that during the eight years period the structure of Bangladesh economy remained the same. He based his calculation on input-output coefficient matrix A but without bifurcating it into domestic and import components. He used the methodology similar to the one used by Ahmed and Stern, but his results are different from the results of the present study for 1986-87, which is based on the input-output coefficient matrix of 1986-87, bifurcated into domestic and imported components.

the other inputs, e.g., cement, machinery, petroleum products, paper, steel and base metals, chemicals also bear tax, with a rate of 5.26% on the average. Pharmaceutical bear 3.5% nominal domestic tax, while manufactured food and textile products are lightly taxed.

As against this pattern of nominal taxation, if we look at the effective domestic taxes, we can see that all the domestic goods and services are affected by input taxation, even the ones with zero nominal taxes. The agricultural sector which has zero nominal tax, has positive effective tax owing to input taxation, though the tax rate is well below 1% in all cases, except tobacco (1.58%) and tea (1.44%). Similarly, other tax exempted sectors e.g., housing , construction and services , also have effective taxes (1.15, 1.4 and 0.47% respectively) via input taxation, though the taxes are quite low. Readymade garments and electricity have zero nominal taxes but nominal taxes on yarn and chemicals have increased the effective taxes, while the high nominal tax on gas has increased the effective tax on electricity. Tobacco product and gas have highest effective taxes due to high nominal taxes. Thus high effective domestic taxes are caused by high nominal domestic taxes, while input taxation causes differences between effective and nominal domestic taxes in general.

The extent of domestic input taxation and its impact on purchaser prices of domestic goods and services are shown by T-diff in column 3 of Table 1. Input taxation accounts for less than 1% of purchaser price of agricultural goods and services (though they are tax exempt as mentioned earlier), about 1% of purchaser price of textile goods and for 2% of purchaser price of inputs like chemicals, petroleum products, steel and basic metals, machineries etc. Input taxation, however, accounts for 4.9% and 5.5% of purchaser price in the case of chemical fertilizer and electricity respectively, though both of them have zero nominal taxes.

TABLE 1
NOMINAL AND EFFECTIVE TAXES ON DOMESTIC PRODUCTION, 1986-87

Commodities	t^d	t^{dc}	t-diff
01-Rice	0.0000	0.0019	0.0019
02-Wheat	0.0000	0.0032	0.0032
03-Coarse Grain	0.0000	0.0007	0.0007
04-Jute	0.0000	0.0025	0.0025
05-Sugar Cane	0.0000	0.0042	0.0042
06-Cotton	0.0000	0.0011	0.0011
07-Tobacco	0.0000	0.0158	0.0158
08-Potato	0.0000	0.0010	0.0010
09-Vegetables	0.0000	0.0021	0.0021
10-Pulses	0.0000	0.0015	0.0015
11-Oil Seeds	0.0000	0.0027	0.0027
12-Fruits	0.0000	0.0011	0.0011
13-Tea	0.0091	0.0145	0.0054
14-Other Crops	0.0000	0.0022	0.0022
15-Livestock	0.0000	0.0025	0.0025
16-Fish	0.0000	0.0031	0.0031
17-Forestry	0.0000	0.0011	0.0011
18-Other Food	0.0136	0.0210	0.0074
19-Edible Oil	0.0000	0.0031	0.0031
20-Sugar and Gur	0.0198	0.0241	0.0043
21-Salt	0.0000	0.0051	0.0051
22-Yarn	0.0144	0.0154	0.0010
23-Cloth:Millmade	0.0165	0.0263	0.0098
24-Cloth:Handloom	0.0007	0.0083	0.0076
25-Readymade Garments	0.0000	0.0059	0.0059
26-Jute Textiles	0.0182	0.0263	0.0081
27-Paper	0.0423	0.0587	0.0164
28-Leather & L. Products	0.0051	0.0101	0.0050
29-Chemical Fertilizer	0.0000	0.0494	0.0494
30-Pharmaceutical	0.0352	0.0485	0.0133
31-Chemicals	0.0176	0.0276	0.0100
32-Petroleum Products	0.0523	0.0679	0.0156

33-Cement	0.0961	0.1211	0.0250
34-Steel & Basic Metals	0.0216	0.0450	0.0234
35-Metal Products	0.0103	0.0246	0.0143
36-Machinery	0.0859	0.0937	0.0078
37-Transport Equipments	0.0147	0.0235	0.0088
38-Wood & Wood Products	0.0037	0.0085	0.0048
39-Tobacco Products	0.5204	0.5266	0.0063
40-Other Industries	0.0086	0.0291	0.0205
41-Urban House Building	0.0000	0.0172	0.0172
42-Rural House Building	0.0000	0.0064	0.0064
43-Other Construction	0.0000	0.0140	0.0140
44-Electricity	0.0000	0.0549	0.0549
45-Gas	0.5016	0.5023	0.0007
46-Trade Service	0.0046	0.0054	0.0009
47-Transport Service	0.0000	0.0085	0.0085
48-Housing Service	0.0000	0.0015	0.0015
49-Health Service	0.0000	0.0071	0.0071
50-Education Service	0.0000	0.0005	0.0005
51-Public Admin. Service	0.0000	0.0043	0.0043
52-Banking & Insurance	0.0000	0.0027	0.0027
53-Professional & Other Services	0.0059	0.0073	0.0014

Notes:
t^d = nominal domestic taxes which includes excise taxes on goods and services,
t^{de} = effective domestic taxes = $t^d[I-A^d]^{-1}$
t-diff= $t^{de} - t^d$

The reasons for these differences between effective and nominal domestic taxes are the use of inputs having differential taxes and their relative proportions. High nominal taxes on gas (50%), petroleum products (5%), machinery (8.6%) have increased the effective taxes on chemical fertilizer and electricity which use these inputs. Chemical fertilizer and electricity are again widely used as inputs for agricultural and industrial production (respectively) with the consequential impact on the prices of their production. Such differences between the effective and nominal taxes may be the unintended consequences of the tax policy.

Table 2 shows the effective import taxes arising from the taxation of imported inputs into domestic production. As can be seen from the table, the taxation of imported inputs affects all the sectors of the economy, like the taxation of domestic inputs. The effects are

TABLE 2

EFFECTIVE TAXES ON IMPORTS GOING TO DOMESTIC PRODUCTION

Commodities	t^d	t^{mc}
01-Rice	0.0000	0.0045
02-Wheat	0.0000	0.0038
03-Coarse Grain	0.0000	0.0019
04-Jute	0.0000	0.0047
05-Sugar Cane	0.0000	0.0078
06-Cotton	0.0000	0.0017
07-Tobacco	0.0000	0.0088
08-Potato	0.0000	0.0019
09-Vegetables	0.0000	0.0035
10-Pulses	0.0000	0.0021
11-Oil Seeds	0.0000	0.0026
12-Fruits	0.0000	0.0013
13-Tea	0.0091	0.0067
14-Other Crops	0.0000	0.0034
15-Livestock	0.0000	0.0052
16-Fish	0.0000	0.0102
17-Forestry	0.0000	0.0032
18-Other Food	0.0136	0.0440
19-Edible Oil	0.0000	0.0089
20-Sugar and Gur	0.0198	0.0078
21-Salt	0.0000	0.0127
22-Yarn	0.0144	0.0027
23-Cloth: Millmade	0.0165	0.0686
24-Cloth: Handloom	0.0007	0.0674

25-Readymade Garments	0.0000	0.0590
26-Jute Textiles	0.0182	0.0171
27-Paper	0.0423	0.0457
28-Leather & Leather Products	0.0051	0.0171
29-Chem. Fertilizer	0.0000	0.0277
30-Pharmaceutical	0.0352	0.0462
31-Chemicals	0.0176	0.0291
32-Petroleum Products	0.0523	0.0439
33-Cement	0.0961	0.0475
34-Steel & Basic Metals	0.0216	0.0770
35-Metal Products	0.0103	0.0508
36-Machinery	0.0859	0.0430
37-Transport Equipments	0.0147	0.0317
38-Wood & Wood Products	0.0037	0.0108
39-Tobacco Products	0.5204	0.0160
40-Other Industries	0.0086	0.0439
41-Urban House Building	0.0000	0.1002
42-Rural House Building	0.0000	0.0385
43-Other Construction	0.0000	0.0893
44-Electricity	0.0000	0.0370
45-Gas	0.5016	0.0024
46-Trade Service	0.0046	0.0015
47-Transport Service	0.0000	0.0218
48-Housing Service	0.0000	0.0081
49-Health Service	0.0000	0.0176
50-Education Service	0.0000	0.0018
51-Public Administration Service	0.0000	0.0195
52-Banking & Insurance	0.0000	0.0066
53-Professional & Other Services	0.0059	0.0039

Notes:
t^d = nominal domestic taxes
t^{me} = effective taxes on imports that go into domestic production = $t^m.A^m[I-A^d]^{-1}$

however, different for different sectors. Taxation of imported inputs accounts for, on the average, less than 1% of purchaser price in the case of agricultural goods and of services, 2.7% of other consumer goods, 4.6% of the pharmaceutical, 5.3% of domestic intermediate products, 6.7% for cloth and 7.7% for housing and construction. High effective import taxes of some sectors have increased the total effective taxes on these sectors. The estimates of effective import tax show the amount of duty collected from the use of imported inputs in the production of domestic goods and services. It is thus not comparable to the nominal rate of import taxes on imported products. The estimates of effective import taxes, when compared to that of the effective domestic taxes, give us the distribution of government revenue arising from two taxes from each of the domestic production sectors. The estimates show that the effective import taxes are substantially higher than the effective domestic taxes for more than 80% of the sectors, implying, as may be expected, that a major portion of the government revenue from the domestic production sector originates from import taxes.

Table 3 shows the total effective taxes t^e on domestic production, arising from both effective domestic taxes and effective import taxes. There are five columns for each commodity, showing nominal domestic taxes, total effective taxes, the difference between these two (t-diff), nominal import taxes, and the difference between nominal import tax and total effective tax. The results show that all the commodity groups are affected by the structure of indirect taxation.

It can be seen from the table that compared to the effective domestic taxes, the total effective taxes on all the domestic production groups have increased due to the inclusion of imported

TABLE 3
Total Effective Taxes on Domestic Production and Nominal Import Taxes, 1986-87

Commodities	t^d	t^e	t-diff.	t^m	t^m-t^e
01-Rice	0.000	0.006	0.006	0.000	-0.006
02-Wheat	0.000	0.007	0.007	0.000	-0.007
03-Coarse Grain	0.000	0.003	0.003	0.000	-0.003
04-Jute*	0.000	0.007	0.007	0.000	-0.007
05-Sugar Cane*	0.000	0.012	0.012	0.000	-0.012
06-Cotton	0.000	0.003	0.003	0.001	-0.001
07-Tobacco	0.000	0.025	0.025	0.082	0.058
08-Potato*	0.000	0.003	0.003	0.000	-0.003
09-Vegetables*	0.000	0.006	0.006	0.000	-0.005
10-Pulses*	0.000	0.004	0.004	0.000	-0.004
11-Oil Seeds	0.000	0.005	0.005	0.007	0.002
12-Fruits	0.000	0.002	0.002	0.231	0.228
13-Tea*	0.009	0.021	0.012	0.000	-0.021
14-Other Crops	0.000	0.006	0.006	0.431	0.425
15-Livestock	0.000	0.008	0.008	0.031	0.023
16-Fish*	0.000	0.013	0.013	0.000	-0.013
17-Forestry*	0.000	0.004	0.004	0.000	-0.004
18-Other Food	0.014	0.065	0.051	0.015	-0.050
19-Edible Oil	0.000	0.012	0.012	0.147	0.135
20-Sugar and Gur	0.020	0.032	0.012	0.352	0.320
21-Salt	0.000	0.018	0.018	0.118	0.100
22-Yarn	0.014	0.018	0.004	0.311	0.293
23-Cloth: Millmade	0.016	0.095	0.078	0.107	0.012
24-Cloth: Handloom*	0.001	0.076	0.075	0.000	-0.076
25-Readymade Garments	0.000	0.065	0.065	0.332	0.267
26-Jute Textiles*	0.018	0.043	0.025	0.000	-0.043
27-Paper	0.042	0.104	0.062	0.201	0.097
28-Leather & Leather Products	0.005	0.027	0.022	0.154	0.127
29-Chemical Fertilizer*	0.000	0.077	0.077	0.000	-0.077
30-Pharmaceutical	0.035	0.095	0.059	0.035	-0.060

31-Chemicals	0.018	0.057	0.039	0.243	0.186
32-Petroleum Products	0.052	0.112	0.060	0.084	-0.028
33-Cement	0.096	0.169	0.072	0.105	-0.063
34-Steel & Basic Metals	0.022	0.122	0.100	0.234	0.112
35-Metal Products	0.010	0.075	0.065	0.061	-0.015
36-Machinery	0.086	0.137	0.051	0.078	-0.058
37-Transport Equipments	0.015	0.055	0.040	0.096	0.041
38-Wood & Wood Products	0.004	0.019	0.016	0.036	0.016
39-Tobacco Products	0.520	0.543	0.022	0.049	-0.494
40-Other Industries	0.009	0.073	0.064	0.323	0.250
41-Urban House Building*	0.000	0.117	0.117	0.000	-0.117
42-Rural House Building*	0.000	0.045	0.045	0.000	-0.045
43-Other Construction.*	0.000	0.103	0.103	0.000	-0.103
44-Electricity *	0.000	0.092	0.092	0.000	-0.092
45-Gas*	0.502	0.505	0.003	0.000	-0.505
46-Trade Service*	0.005	0.007	0.002	0.000	-0.007
47-Transport Service*	0.000	0.030	0.030	0.000	-0.030
48-Housing Service*	0.000	0.010	0.010	0.000	-0.010
49-Health Service*	0.000	0.025	0.025	0.000	-0.025
50-Education Service*	0.000	0.002	0.002	0.000	-0.002
51-Pub Admn Service*	0.000	0.024	0.024	0.000	-0.024
52-Banking & Insurance*	0.000	0.009	0.009	0.000	-0.009
53-Prof & Other Serv.*	0.006	0.011	0.005	0.000	-0.011

Notes:
t^d = nominal domestic taxes
t^e = total effective taxes= $t^{de}+t^{me}$
t-diff = t^e-t^d
t^m = nominal import taxes which includes import taxes and sales taxes on imports.
* marked goods have no imports.

input taxation into domestic production. For some sectors, the increases are substantially higher, e.g., mill-made-cloth, handloom cloth, paper, pharmaceutical, petroleum products, steel and basic metals, machinery, housing and construction.

The differences between the total effective taxes t^e and the nominal taxes on domestic production t^d is striking for some commodities as can be seen from T-diff in column 3 of the table. The highest t-diff for total effective tax i.e., (t^e-t^d) is 12% of the purchaser price (urban house building) as compared to the highest T-diff for domestic effective tax i.e., (t^{de}-t^d) of 5.5% of purchaser price (electricity). Agricultural sector has, however, still below 1% effective taxation with zero nominal tax.

One important feature of this tax structure is the differential treatment of the substitutes, e.g. between mill-made cloth and handloom cloth and between electricity and gas. Both for handloom and mill-made cloth, the main component of effective tax rate is the tax on inputs. The nominal rate on handloom cloth is negligible (0.1 percent) and that on mill-made cloth is small (1.6 percent). Input taxation raises the effective rate on both categories by about the same amount (7.6 percent to 9.5 percent), leaving the tax differential little changed (1.9 percent instead of 1.5 percent). Some discrimination in favour of handloom cloth may be justified on distributional grounds, since its producers and consumers both tend to be rural and poor.

For electricity and gas, the gap between nominal rates is very striking, with electricity being exempt, while gas bears a rate of over 50 percent. This gap narrows somewhat (to 41 percent) when taxation of inputs is taken into account, but still remains very substantial.

The strong tax discrimination against gas is obviously a potential cause for concern, but its effects on choice among fuels are currently of limited importance. Gas is very much cheaper in the absence of tax. Therefore, it allows substantial revenue to be raised from gas without raising its price to the point at which substitution of electricity for gas could become serious problem.

The agricultural sector is very lightly taxed - because 50% of the inputs used are tax free and others have low taxes. The major taxed inputs are petroleum products and machinery having an average tax rate of 7% . Agriculture is not taxed heavily for equity reasons and because it is difficult to tax own consumption. Moreover it would discourage the production of marketable surplus. On the other hand, higher effective taxation of other sectors relative to nominal taxation is the result of high input taxation, a phenomenon not apparent from nominal taxation.

The gap between total effective tax and nominal tax on domestic production of J can be expressed as the sum of effective tax rate on domestic inputs and nominal tax rate on imported inputs weighted in each case by the amount of the inputs required per unit gross output of J:

$$t_j^e - t_j^d = \sum t_i^e a_{ij}^d + \sum t_i^m a_{ij}^m$$

Using this formula[23] we can see, for example, that of the 10 percent difference between t^e and t^d for steel and basic metals, 4.4 percent is explained by taxation on inputs from steel and basic metal sector itself, 1.1% by tax on 'other industries' inputs and 0.5 percent by the tax on machinery, making a total of 6 percent explained from these three sectors alone. The difference between total effective tax and nominal tax is, however, not very high for majority of the products in different sectors except some intermediate goods sectors, textile sector, urban house building and construction sector.

The difference between effective and nominal taxes are present in most developing countries like Bangladesh which depend heavily on indirect taxation of intermediate and other goods for revenue generation with the consequence of having the cascading effect throughout the economy. India and Pakistan, for example, have these problems of cascading effects arising from the difference between the effective tax and nominal tax as in the case of Bangladesh. The differences between these two taxes, given by T-diff, for Bangladesh are, however, low for most of the commodity groups compared to those of India and Pakistan, though for some

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23.

$$t^e - t^d = T - diff.$$

Multiplying by $[I - A^d]$, we get

$$t^e[I-A^d] = t^d + t^m A^m$$

or

$$t^e = t^e A^d + t^d + t^m A^m$$

or

$$t^e - t^d = t^e A^d + t^m A^m$$

or

$$t_j^e - t_j^d = \sum t_i^e . a_{ij}^d + \sum t_i^m . a_{ij}^m$$

sectors they are high. The table shows some example of major T-diffs.

Table T-diffs
T-diffs in Bangladesh, India and Pakistan.

	Bangladesh	India	Pakistan
	1986-87	1979-80	1975-56
Cotton	.003	.005	.0099
Sugar	.012	.038	.019
Tobacco	.022	.115	.061
Textile Cloth	.076	.067	.066
Chemicals	.039	.125	.085
Fertilizer	.077	.045	.115
Cement	.072	.079	.151
Basic Metal	.100	.244	.076
Electricity	.092	.073*	.22
Gas	.003	-	.141

* Includes gas, electricity, and water supply,
Source: Ahmed and Stern, 1986 P 63-65
Ahmed and Stern, 1987, P 294-296

The reason for high T-diffs in India and Pakistan are higher nominal taxes for most of the goods relative to those in Bangladesh. However, these estimates are not strictly comparable since the time periods are quite different, especially for Pakistan. The rates might have undergone substantial changes by 1986-87 in both India and Pakistan.

The estimates of effective and nominal taxes also help us to examine how the domestic producers are hedged against foreign competition. The effectiveness of protective policy can be analyzed by comparing nominal import taxes on final imports with effective taxes on domestic production and not with effective import taxes (since effective import taxes fall on the imports that enter into domestic production as inputs). Column 2 and Column 4 in table 3 show total effective taxes on domestic production and nominal import taxes respectively. The differences between these two taxes in Column 5 show that:

(1) Some agricultural products like rice and wheat are getting negative protection, but the element of differential taxation is very small, well below 1%.

(2) The pharmaceutical sector is getting negative protection (6.1%).

(3) Tobacco products get very high negative protection (with 5% nominal tax and 54% total effective tax) which seem anomalous. This startling result seems to be more plausibly explained by anomaly of statistics relating to tax collection on imported cigarettes than by an actual decision of penalizing heavily the Bangladesh cigarette industry, because the statutory import tax rate on cigarette are of the order of 200% to 300%.

(4) Element of protection is quite substantial for edible oil (14%), yarn (29%), leather and leather products (12%).

(5) There are certain sectors which have zero nominal import tax but have effective taxes (*marked) some of which are quite high like gas (50%). These figures do not mean that the sectors are getting negative protection, because there are actually no imports of these products, either for policy reasons (e.g. jute, tea) or for the nature of the commodity (e.g., urban house building is by its nature a domestic output, not an imported one).

The differences between the two taxes in most cases are, however, showing positive protection and the tobacco case can be dismissed as an implausible one. The pharmaceutical case, is however, an exception and cannot be dismissed on grounds of statistical anomaly. The reverse protection arise presumably as a result of aggregative problem within the sector, e.g., imported pharmaceutical products are mainly of sophisticated nature where import duties are low, but which do not compete with pharmaceutical products that are produced domestically.

8. Taxation of Capital Goods.

The effective taxes on all goods and services are higher when taxation of capital goods is included along with the taxation of inputs. The estimates of tax element in the price attributable to the taxation of capital goods are made using equations (14), (15) and (16) in the model and by taking the value of r as 0.01 (i.e., 1 percent real rate of interest on capital) with both B^d and B^m matrices, and by taking t^d and t^m. The effective taxes on domestic goods and services $\hat{t}^{de}$, on imported inputs into domestic production $\hat{t}^{me}$, and the total effective taxes on domestic production $\hat{t}^{e}$ (which is the sum of $\hat{t}^{de}$ and $\hat{t}^{me}$) including taxation of capital goods are shown in columns 3, 4 and 5 of table 4. These taxes compare with the nominal domestic tax and total effective taxes on domestic production excluding taxation of capital goods in columns 1 and 2 of the table.

The pattern of variation in the effective taxes on domestic goods and services and on imported inputs into domestic production are similar in general to that of effective taxes estimated without taxation on capital goods, shown in column 2 of table 1, column 3 of table 2 and column 2 of table 3.

TABLE 4

Nominal and Effective Taxes on Domestic Production with Taxes on Capital Goods , 1986-87.

Commodities	t^d	t^e	$\hat{}t^{de}$	$\hat{}t^{me}$	$\hat{}t^e$
01-Rice	0.000	0.006	0.003	0.017	0.020
02-Wheat	0.000	0.007	0.005	0.018	0.023
03-Coarse Grain	0.000	0.003	0.002	0.008	0.010
04-Jute	0.000	0.007	0.004	0.014	0.017
05-Sugar Cane	0.000	0.012	0.005	0.013	0.018
06-Cotton	0.000	0.003	0.001	0.005	0.006
07-Tobacco	0.000	0.025	0.017	0.022	0.039
08-Potato	0.000	0.003	0.001	0.004	0.006
09-Vegetables	0.000	0.006	0.002	0.007	0.009
10-Pulses	0.000	0.004	0.002	0.009	0.011
11-Oil Seeds	0.000	0.005	0.003	0.007	0.010
12-Fruits	0.000	0.002	0.001	0.005	0.006
13-Tea	0.009	0.021	0.016	0.018	0.034
14-Other Crops	0.000	0.006	0.003	0.008	0.011
15-Livestock	0.000	0.008	0.003	0.010	0.014
16-Fish	0.000	0.013	0.004	0.039	0.044
17-Forestry	0.000	0.004	0.002	0.010	0.012
18-Other Food	0.014	0.065	0.022	0.050	0.072
19-Edible Oil	0.000	0.012	0.004	0.014	0.018
20-Sugar and Gur	0.020	0.032	0.025	0.014	0.039
21-Salt	0.000	0.018	0.006	0.019	0.025
22-Yarn	0.014	0.018	0.016	0.012	0.028
23-Cloth: Millmade	0.016	0.095	0.028	0.083	0.111
24-Cloth	0.001	0.076	0.009	0.074	0.083
25-Readymade Garments	0.000	0.065	0.007	0.068	0.075
26-Jute Textiles	0.018	0.043	0.029	0.040	0.069
27-Paper	0.042	0.104	0.061	0.071	0.132
28-Leather & Leather Products	0.005	0.027	0.011	0.024	0.035

29-Chemical Fertilizer	0.000	0.077	0.053	0.066	0.119
30-Pharmaceutical	0.035	0.095	0.051	0.066	0.117
31-Chemicals	0.018	0.057	0.030	0.048	0.077
32-Petroleum Products	0.052	0.112	0.069	0.051	0.120
33-Cement	0.096	0.169	0.125	0.082	0.207
34-Steel & Basic Metals	0.022	0.122	0.047	0.091	0.138
35-Metal Products	0.010	0.075	0.027	0.074	0.101
36-Machinery	0.086	0.137	0.096	0.062	0.158
37-Transport Equipments	0.015	0.055	0.025	0.048	0.073
38-Wood & Wood Products	0.004	0.019	0.009	0.019	0.028
39-Tobacco Products	0.520	0.543	0.527	0.023	0.550
40-Other Industries	0.009	0.073	0.031	0.066	0.098
41-Urban House Building	0.000	0.117	0.018	0.111	0.129
42-Rural House Building	0.000	0.045	0.007	0.046	0.053
43-Other Construction	0.000	0.103	0.015	0.097	0.112
44-Electricity	0.000	0.092	0.068	0.143	0.211
45-Gas	0.502	0.505	0.508	0.045	0.554
46-Trade Service	0.005	0.007	0.006	0.006	0.012
47-Transport Service	0.000	0.030	0.010	0.044	0.054
48-Housing Service	0.000	0.010	0.012	0.071	0.083
49-Health Service	0.000	0.025	0.008	0.025	0.033
50-Education Service	0.000	0.002	0.001	0.006	0.007
51-Pub. Admn. Service	0.000	0.024	0.005	0.029	0.035
52-Banking & Insurance	0.000	0.009	0.004	0.014	0.018
53-Prof. & Other Services.	0.006	0.011	0.008	0.009	0.017

Notes:

t^d = nominal domestic taxes

$t^{\wedge de}$ = effective domestic taxes including taxes on capital goods

= $t^d[I-(A^d+rB^d)]^{-1}$ $t^{\wedge me}$ = effective taxes on imports including taxes on capital goods

= $t^{\wedge m}(A^m+rB^m)[I-(A^d+rB^d)]^{-1}$

$t^{\wedge e}$ = $t^{\wedge de}+t^{\wedge me}$.

The extent of positive protection is lower and negative protection is higher with the inclusion of capital goods taxation as is shown in column 5 of table 5.

TABLE 5

Impact of Input and Capital Goods Taxes on Domestic Production. 1986-87

Commodities	$\hat{}t^{de}-t^{d}$	$\hat{}t^{e}-t^{d}$	$\hat{}t^{e}-t^{e}$	t^{m}	$t^{m}-\hat{}t^{e}$
01-Rice	0.003	0.020	0.014	0.000	-0.020
02-Wheat	0.005	0.023	0.016	0.000	-0.023
03-Coarse Grain	0.002	0.010	0.007	0.000	-0.010
04-Jute	0.004	0.017	0.010	0.000	-0.017
05-Sugar Cane	0.005	0.018	0.006	0.000	-0.018
06-Cotton	0.001	0.006	0.003	0.001	-0.005
07-Tobacco	0.017	0.039	0.015	0.082	0.043
08-Potato	0.001	0.006	0.003	0.000	-0.006
09-Vegetables	0.002	0.009	0.004	0.000	-0.009
10-Pulses	0.002	0.011	0.007	0.000	-0.011
11-Oil Seeds	0.003	0.010	0.005	0.007	-0.003
12-Fruits	0.001	0.006	0.004	0.231	0.225
13-Tea	0.007	0.025	0.013	0.000	-0.034
14-Other Crops	0.003	0.011	0.005	0.431	0.420
15-Livestock	0.003	0.014	0.006	0.031	0.018
16-Fish	0.004	0.044	0.030	0.000	-0.044
17-Forestry	0.002	0.012	0.007	0.000	-0.012
18-Other Food	0.008	0.059	0.007	0.015	-0.057
19-Edible Oil	0.004	0.018	0.006	0.147	0.129
20-Sugar and Gur	0.005	0.019	0.007	0.352	0.313
21-Salt	0.006	0.025	0.007	0.118	0.093
22-Yarn	0.002	0.014	0.010	0.311	0.283
23-Cloth: Millmade	0.011	0.094	0.016	0.107	-0.004
24-Cloth: Handloom	0.008	0.083	0.008	0.000	-0.083

25-Readymade Garments	0.007	0.075	0.011	0.332	0.256
26-Jute Textiles	0.011	0.051	0.026	0.000	-0.069
27-Paper	0.019	0.090	0.028	0.201	0.069
28-Leather & L. Prod	0.006	0.030	0.008	0.154	0.119
29-Chem. Fertilizer	0.053	0.119	0.042	0.000	-0.119
30-Pharmaceutical	0.015	0.081	0.022	0.035	-0.082
31-Chemicals	0.012	0.060	0.020	0.243	0.165
32-Petroleum Products	0.016	0.068	0.008	0.084	-0.036
33-Cement	0.029	0.111	0.038	0.105	-0.101
34-Steel&Basic Metals	0.025	0.116	0.016	0.234	0.097
35-Metal Products	0.017	0.090	0.025	0.061	-0.040
36-Machinery	0.010	0.072	0.021	0.078	-0.079
37-Transport Equipments	0.010	0.059	0.018	0.096	0.022
38-Wood & Wood Products	0.006	0.024	0.009	0.036	0.008
39-Tobacco Products	0.007	0.030	0.008	0.049	-0.501
40-Other Industries	0.023	0.089	0.025	0.323	0.226
41-Urban House Building	0.018	0.129	0.012	0.000	-0.129
42-Rural House Building	0.007	0.053	0.008	0.000	-0.053
43-Other Construction	0.015	0.112	0.008	0.000	-0.112
44-Electricity	0.068	0.211	0.119	0.000	-0.211
45-Gas	0.007	0.052	0.049	0.000	-0.554
46-Trade Service	0.002	0.008	0.005	0.000	-0.012
47-Transport Service	0.010	0.054	0.024	0.000	-0.054
48-Housing Service	0.012	0.083	0.073	0.000	-0.083
49-Health Service	0.008	0.033	0.009	0.000	-0.033
50-Education Service	0.001	0.007	0.004	0.000	-0.007
51-Public Admin. Service	0.005	0.035	0.011	0.000	-0.035
52-Banking & Insurance	0.004	0.018	0.008	0.000	-0.018
53-Professional & Other Services	0.002	0.011	0.006	0.000	-0.017

Notes: t^m = nominal import taxes which includes import taxes and sales taxes on duty paid value of imports.

The difference between the effective taxes including and excluding the taxation of capital goods together with the taxation of intermediate inputs as presented in table 5 show the impact on purchaser prices and the possible unintended consequences of different aspects of taxation. The difference between $\hat{t}^e$ and t^e is, however, not very pronounced, varying between 1% to 5% in general, with the exception of 12% and 7% difference for electricity and housing services respectively (which have, of course, particularly high capital input requirement).

9. Conclusion.

The review of the results presented in the tables shows the relevance of effective rates of taxation rather than the statutory or nominal rates of taxation in analyzing the impact of taxation on domestic production. The estimate of effective taxes focus attention on:

(A) the level of effective tax rates and

(B) the difference between effective and nominal tax rates.

The discussion which follows summarizes the results from tables of effective tax rates allowing for current, but not for capital, input requirements. The tables which allow also for taxation of capital shows a similar pattern of results, although of course the effective rates of tax, and the excesses of effective over nominal rates, are somewhat larger.

(A) The level of Effective Tax Rates.

(1) The calculations of the Chapter convey information about the pattern of the effective taxes. The estimates show that:

- Agriculture remains very low taxed. It has zero nominal tax and effective tax is seldom above 1 to 2%.
- The commodities that are heavily taxed in terms of nominal tax rates, continue to be heavily taxed in terms of effective rates, e.g., gas and tobacco products.
- Certain services, though exempt from nominal taxes do have significant taxation in effective terms, e.g., transport and public administration.

(2) Given the assumptions underlying the calculations of effective tax rates, distortion of choice at the level of final demand would depend on effective, not on nominal tax rates. There is a presumption that commodities which are in close competetion with one another should be taxed at similar rates to avoid significant distortion of choice. Yet it should be noted that, in Bangladesh, effective tax rates sometimes differ sharply for commodities which appear to be close substitutes (e.g., gas and electricity). The practical impact of the differential taxation between gas and electricity may, however, be small, as discussed earlier.

(3) When considering the protective effect of the tax system, the nominal rate of import tax (custom duty plus sales tax) must be compared with the effective, not the nominal, tax rate on domestic production. Comparisons, in this Chapter, between t^m and t^e indicate that in most cases where the rates differ substantially, there is positive protection. The couple of cases

of significant negative protection which were identified are probably due to statistical anomalies or aggregation problem, but merit further examination.

(4) The distributional impact of the indirect tax system (on thr consumption side) will depend upon a comparison of the pattern of consumption observed of households of different levels of income with the full (i.e.,effective) tax falling upon the components of those consumption patterns. This aspect will be considered in the next Chapter.

(B) The difference between Effective and Nominal Taxes.

While principal attention is focussed upon the levels of effective tax rates, the differences between these tax rates and the nominal tax rates is of interest in itself, since it reflects the reliance of the tax system on purchased inputs. The calculations of this Chapter show that, in many cases, the difference between effective and nominal rates is quite large, rising as high as 10% for some commodities.

Tax analysts have tended to frown on systems which rely substantially on unrebated taxes on purchased inputs, and have tended to give preference to single stage taxes or VAT.There are two main reasons for this preference. The first is that the differential taxes on different type of inputs may distort the choice of productive process and may be a source of inefficiency, additional to that from differential effective taxation of goods in final demand. The second is that substantial taxation of intermediate inputs reduces transparency of tax system: if attention is focussed only on the more easily observed nominal rates of tax on final sales, the system may have unintended distributional effects, or the real extent of differential taxation of different goods, or of effective protection, may not be appreciated. These objections, however, may not be decisive, because substitution possibilities among purchased inputs, or between purchased and primary inputs, may in fact be very limited, [24]and the policy makers may be fully aware of the need to take intermediate as well as final taxes into account. If there are administrative advantages in a system which relies substantially on unrebated taxes on inputs, these have to be weighted against the possible drawbacks listed above.

[24]. As pointed out before, the assumption used in computing effective tax rates excluded the possibility of any substitution at all among productive inputs, though this probably overstates the rigidity of production relationships in practice.

APPENDIX 1

(in Taka Crore)

Sector	Excisable Commodities falling under IO Sectors	Excise Tax
01-Rice		0
02-Wheat		0
03-Coarse Grain		0
04-Jute		0
05-Sugar Cane		0
06-Cotton		0
07-Tobacco		0
08-Potato		0
09-Vegetables		0
10-Pulses		0
11-Oil Seeds		0
12-Fruits		0
13-Tea	Tea	45.6
14-Other Crops	1. Vegetables Non Essential Oil 2. Vegetable Products.	0
15-Livestock	1. Milk 2. Milk Products.	0
16-Fish		0
17-Forestry		0
18-Other Food	1. Beverages 2. Bread and Biscuits 3. Liquor and Narcotics 4. Glucose and Dextrose	253.67
19-Edible Oil		0
20-Sugar and Gur	Sugar	198.969
21-Salt	Salt	0
22-Yarn	Cotton Yarn Man Made Yarn Woolen Yarn	68.549

23-Cloth: Millmade	1. Cotton Fabrics 2. Woolen Fabrics	24.775
24-Cloth: Handloom		14.925
25-Readymade Garments		0
26-Jute Textiles	Jute Manufacture	173.3
27-Paper	1. Paper 2. Paper Board 3. Blank Cheque	175.882
28-Leather & L. Products	1. Tanned Leather 2. Leather Products 3. Shoes	33.081
29-Chemical Fertilizer		0
30-Pharmaceutical	1. Medicine 2. Antiseptic 3. Disinfectant 4. Etc.	350.625
31-Chemicals	1. Soap and Detergents 2. Paints and Varnishes 3. Cosmetics 4. Matches 5. Boot Polish 6. Starch 7. Oxygen, Carbon Oxide,etc. 8. Sodium Silicate. 9. Glycerine	315.732
32-Petroleum Products	1. Petroleum 2. Petroleum and Lubricants 3. Asphalt 4. Naptha 5. Furnace Oil 6. HSD 7. Diesel Oil 8. Condensed Jet Fuel 9. Kerosene Oil 10. Motor Spirit 11. Petroleum Grease and Jelly 12. Lubricating Oil 13. Development Surcharge	476.629
33-Cement		57.72
34-Steel & Basic Metals	1. M.S. Products 2. Steel and G.I.Pipe 3. Stainless Steel and Cutlery 4. Steel Billet 5. Steel Furniture	166.5

35-Metal Products		94.61
	1. Aluminum Fillings 2. Metal Container 3. Wires and Cables 4. Nuts and Bolts	0 7.57 8.14 0.9
36-Machinery		244.491
	1. Electric Bulb and Tubes 2. Electric Batteries 3. Electric Fans, Parts 4. Radio Receiving Apparatus 5. Welding Electronics 6. Insulation Board 7. Electrical Goods 8. Electric Rods and Fittings	25.944 63.329 27.003 92.114 34.207 1.184 0.71 -
37-Transport Equipments		0
	Mechanized Vehicles	27.387
38-Wood & Wood Products		0
	Wooden Furniture and Fixtures	12.909
39-Tobacco Products		4189.604
	1. Cigarettes 2. Regulatory Duty 3. Bidi 4. Filter Rod 5. Pipe Tobacco 6. Cigar/Cheroot/Zorda	3698.223 - 490.019 0.888 0.078 0.396
40-Other Industries	1. Plastic Products 2. Rubber Products 3. Tires and Tubes 4. Glass and Glass Wares 5. Ceramics, China Ware, Porcelain Ware 6. Gold and Silver Products 7. Packaging Materials 8. Bricks 9. Plastic Bags 10. Cinematographic Film 11. Sanitary Ware and Glazed Tiles 12. Video Cassettes	193.65
41-Urban House Building		0
42-Rural House Building		0
43-Other Construction		0
44-Electricity		0
45-Gas	Petroleum Gas	1680.8

46-Trade Service	1. Decorators and Caterers 2. Hotels and Restaurants 3. Telephone and Teleprinter Services	147.865
47-Transport Service		0
48-Housing Service		0
49-Health Service		0
50-Education Service		0
51-Public Ad Service		0
52-Banking & Insurance		0
53-Prof.& Other Services		0
Total		9143.754

APPENDIX TABLE 2

(In Crore Taka)

Sector	Taxed Imported Goods falling under IO Sector Categories	Import Duty	Sales Tax
01-Rice		0	0
02-Wheat		0	0
03-Coarse Grain		0	0
04-Jute		0	0
05-Sugar Cane		0	0
06-Cotton	Cotton	2.5	1.9
07-Tobacco	(Unmanufactured)	10	2.5
08-Potato		0	0
09-Vegetables		0.16	0
10-Pulses		0	0
11-Oil Seeds		6.4	.7
12-Fruits		284.61	0
13-Tea	Tea	0	0
14-Other Crops		0	0
	Spices	94.2	58.9
15-Livestock	1. Milk 2. Milk Products.	216.2	50

16-Fish		0	0
17-Forestry		0	0
18-Other Food		10.4	3.2
	1. Beverages 2. Spirits 3. Vinegar		
19-Edible Oil		833.3	509.4
	Tallow Edible Oil	7.9 825.4	4.8 504.6
20-Sugar and Gur	Sugar	922.9	369.1
21-Salt	Salt	24.6	0
22-Yarn		528.2	511.3
	Cotton Yarn Man Made Yarn	213.4 314.8	
23-Cloth: Millmade		526.1	24.775
	1. Cotton Fabrics 2. Woolen Fabrics	136.6 389.5	
24-Cloth:Handloom		0	0
25-Readymade Garments		357.45	0
	Readymade Garments Second Hand Clothing	184.85 172.6	
26-Jute Textiles		0	0
27-Paper		530.6	271.1
	1. Pulp 2. Paper 3. Paper Board		
28-Leather & L. Products		2.42	0.02
	1. Leather 2. Leather Products		
29-Chemical Fertilizer		0	0
30-Pharmaceutical	Medicine	83.5	2.2
31-Chemicals		1524.2	836.7
	1. Soap & Detergents 2. Coconut Oil 3. Paints & Varnishes 4. Matches 5. Other Chemicals 6. Coal Tar	23.4 181 466.4 0 571.9 13.1	0 116.2 238.1 0 307.3 15.2

32-Petroleum Products		1196.1	131.9
	1. Pitch Bitumen	5.7	3
	2. Crude Petroleum	836.1	117.9
	3. Petroleum Products	325.9	4.8
	4. Coal	28.4	6.2
33-Cement		364.5	6.7
34-Steel & Basic Metals		1633.9	718.8
	1. Cutlery and Other Articles of Base Metal.	187.8	72.2
	2. Iron and Steel Products.	1444.1	646.6
35-Metal Products		247.3	178.2
	Metals other than Gold, Silver, Iron and Steel		
36-Machinery		2388.8	594.2
	1. Machinery, Appliances, Parts	1994.5	505.8
	2. Generator, Transformer, Motor Rectifier	141.6	28.8
	3. Electric Batteries		
	4. Telephone and Telex Equipment		
	5. Making and Breaking of Electric Circuit	11.6	7.7
		41.5	17.7
		199.6	33.2
37-Transport Equipments		1098.8	487
	Railway	65.4	38.4
	Motorcar	770.4	235.6
	Aircraft	0.9	0.5
	Ships	262.2	212.3
38-Wood & Wood Products		22.3	0
	Wood & Wood Products		
39-Tobacco Products		1	2
	Tobacco Products		

40-Other Industries		1475.76	756.3
	1. Plastic Products		
	2. Rubber & Rubber Products	326.1	158.2
	3. Tires and Tubes	133.2	33.7
	4. Ceramics, Glass and Glassware		
	5. Bricks		
	6. Gold and Silver		
	7. Books & Journals		
	8. Photographic and Cinemato-graphic	27	11.2
	9. Miscellaneous Other Industries	64	36.1
		925.46	517.1
41-Urban House Building		0	0
42-Rural House Building		0	0
43-Other Construction		0	0
44-Electricity		0	0
45-Gas		0	0
46-Trade Service		0	0
47-Transport Service		0	0
48-Housing Service		0	0
49-Health Service		0	0
50-Education Service		0	0
51-Public Admin. Service		0	0
52-Banking & Insurance		0	0
53-Prof.& Other Services		0	0
Total		14386.2	5513.3

Note:Matching of the commodities falling under excisable and import tax with Input-Output sector categories is made by using Input-Output Table, 1986-87, data from Fiscal Statistics, 1987. Plannig Commission, Dhaka and * data from NBR,GOB.

CHAPTER 6

REDISTRIBUTIVE EFFECTS OF INDIRECT TAXES IN BANGLADESH

1. Introduction

The analysis of redistributive effects of taxation or tax incidence is an important area of public finance. It has been a subject of great debate among economists for a long time. The issue of tax incidence is of immense interest specifically for the developing countries where development needs compel the governments to raise substantial revenue through taxation often without much regard to the redistributive effects of the taxes. The philosophy of growth first and distribution later led to greater emphasis on the mobilization of resources through indirect taxation in the developing countries like Bangladesh (as discussed in Chapter 1 of the thesis). The question of the sharing of the burden of taxes however gained prominence gradually. The estimation of tax incidence was therefore found necessary to investigate into these questions and provide a basis for appropriate policy proposals.

In this chapter we shall try to estimate the redistributive effects of major indirect taxes in Bangladesh. Since the Government of Bangladesh draws a major part of the tax revenue from indirect taxes of which consumers goods and raw materials form a large proportion, it is generally believed that the tax structure in Bangladesh is regressive in effect (World Bank, 1990, pp. 222). We shall try to analyze the distribution of tax burden in Bangladesh from this point of view. We intend to evaluate the pattern of the tax burden distribution in both the urban and the rural areas, since people in these areas have different consumption patterns and living conditions. We shall also attempt to distribute the tax burden arising from the consumption of domestic products and of imported products, since imported products form a significant proportion of total consumption expenditures of people in different income groups in different areas.

As we have discussed in Chapter 5, there is a choice between analysing only the direct effects of taxation on the basis of simple assumptions which exclude the presence of indirect effects, or setting up, on the basis of a different set of assumptions, a model which allows for indirect as well as direct effects and can be used to simulate the full distributional impact of taxation. We have chosen the first alternative. The calculations of incidence of indirect taxation presented in this Chapter are therefore made on the basis of the assumptions that indirect taxes are fully reflected in the prices to the final consumers and that the effect on the distribution of pre-tax money income can be neglected. In other wards, we have focussed our study of the distributional effects of indirect taxation entirely on the 'uses' aspect of real income, rather than on the 'sources' side.

In principle, of course, indirect taxation may effect the distribution of real income both by changing the relative prices of goods which are prominent in the budgets of different categories of household and by changing the relative rewards for productive services supplied by different categories of households. Only in very special cases can the possibility of redistribution through one of these routes be excluded: for example, if all households have identical homothetic preferences, indirect tax is powerless to affect the distribution of real income on the uses side, while if households do not differ in the relative amounts of different factor services they can supply, indirect taxation is powerless to affect the distribution of income on the sources side. Neither case is realistic, so in principle a general equilibrium analysis is required in order to estimate the full effects of an indirect tax system on the distribution of real income within a country. Such an approach has been quite widely used since the development of computational techniques made it feasible to solve large general equilibrium systems, but for reasons examined in the previous Chapter, the distributional effects on the 'sources' side, estimated on the basis of this procedure, are fairly speculative: by constrast, the information used to estimate distributional effects on the 'uses' side is comparatively straightforward. However, it must be acknowledged that 'uses' redistribution is only one part of the picture, and the findings of the later part of the Chapter must be considered with this qualification in mind.

One of the justifications for avoiding a general equilibrium approach in the context of the previous Chapter was the observation that, in practice, relative pre-tax prices of commodities might be fairly insensitive to tax changes. That is not sufficient justification in the present context. Even if relative pre-tax prices are insensitive, so that the calculated effective tax rates give a good approximation to the impact of taxation on consumer prices, the impact on consumer prices is only one side of the distributional effects. The other side is the impact on the prices of different types of primary inputs, which can have significant distributional implications in view of the different proportions in which different types of primary inputs are distributed among the socio-economic groups.

For this reason, some studies of the distributional impact of taxation have adopted CGE approach (Serra Puche. 1983, Lewis. 1986). A good survey of CGE modelling is given by Robinson (1986). On the other hand, the difficulties relating to the absence of sufficient data for the country studied, and hence the need to impose functional forms and parameter values in the model, remain. Furthermore, a simulation study conducted by Devarajan and others (1980), specially directed to exploring the possible errors involved in the conventional incidence assumptions that indirect taxes are passed on and direct taxes are not, has provided quite strong support for the conventional assumptions where direct taxes are concerned and some, though weaker, support in relation to indirect taxes.

In looking at the distributional effects of taxation, particular interest is attached to the extent to which the tax burden varies as a proportion of household income/expenditure. Whatever the ideal distribution of income may be - a subject on which there is obvious scope for conflicting value judgements - there is a fairly wide consensus that a reduction in the existing degree of inequality of real income is desirable. We therefore focus attention on whether the system of indirect taxation taken as a whole is, or could be made, progressive.

2. Earlier Studies

There are numerous studies on tax incidence of UK, USA and other countries by economists to estimate the redistributive effects of taxation (Prest, 1955, pp. 234). An intensive review of the earlier literature on developing countries is made by Bird and Wulf (1973, pp. 639-682). Most of these studies tried to analyze the redistribution of income through fiscal systems. Some of the studies focused on the tax efforts on various income-classes from the point of view of vertical equity while some others were interested in horizontal equity and intersectoral resource transfer between urban and rural areas (TEC, 1955; Sahota, 1961; NCAER, 1972). Studies on Latin America emphasized on income-groupwise incidence while those in India mostly preferred agricultural and non-agricultural distinction in tax burden analysis from developmental point of view. Most of the studies in India found that the agricultural sector was under-taxed in relation to the non-agricultural sector and hence that there should be transfer of resources from the former to the later to augment the growth rate of the economy. (Gulati, 1960; Gandhi, 1966). These studies assumed that the rural/urban classification used in some studies (TEC, 1955; Sahota, 1961) could be adopted for agricultural and non-agricultural tax incidence analysis.

Most of these tax incidence studies found the tax system as a whole to be progressive. Goode (1984) however concluded that heavy reliance on indirect taxes made the tax system regressive. The studies on Pakistan arrived at the conclusion that the urban areas are taxed relatively more than the rural areas and though the tax system as a whole was found progressive due to progression in the direct taxes, the indirect taxes were found slightly regressive (Jeetun, 1978; Malik and Saquib, 1989). These studies used different concepts and methodologies in measuring tax burden. The Taxation Enquiry Commission of India, 1953-54 (India, 1954) measured tax burden as a percentage of different monthly expenditure classes. Many subsequent studies used this method in measuring tax burden, e.g., Sahota 1961, NCAER 1972, instead of using income-classes as the data on income for the later classification were not available. Different authors used different concepts of income also, e.g., national income (Gandhi, 1966), taxable income (Gupta, 1972). Use of different concepts of tax incidence however may have great influence on the tax incidence results (Ahmed and Stern 1986, pp.27).

Attempts were made to estimate formal incidence as distinguished from effective incidence by economists of different countries. The former is concerned with the estimation of tax burden as intended by the Government while the later tries to estimate the final resting place of a tax, taking into account all the shiftings that might occur in between. Most of the Indian studies were concerned with formal incidence while the studies on Latin America tried to estimate effective incidence (Wulf De Luc, 1975, pp. 65). Wulf (1975, pp. 65) criticized that estimation of formal incidence to quantify tax burden as intended by the government may be difficult as it is difficult to know the intentions of the authorities. Sharma and Thavaraj (1971, pp. 958) however observed that it would be possible to have some idea of the government intentions from the annual budget speeches of the Finance Ministers. To estimate formal incidence, the procedure followed was that all the taxes were distributed among various income classes as a ratio of tax to income, assuming full forward shifting of the indirect taxes and non-shifting of the direct taxes. These assumptions were made to avoid the complications that might arise in tracking down the tax burden due to the process of shifting.

The problem of allocating input tax burden was considered by the Indirect Taxation Enquiry Committee of India in 1973-74 (ITEC, 1977-78). The inappropriateness of using nominal taxes for estimating tax burden was recognized by them, but in the absence of full information on the input- output structure of the economy, they made case by case allocation of taxes on inputs and machinery to different expenditure groups on the basis of the consumption pattern of the final goods. The studies indicated a progressive pattern of indirect taxation in India. In another study (Rao, 1974), input-output data were used in allocating taxes on inputs while taxes on final consumptions were allocated on the basis of expenditure data. Dey (1974)) in his study on the incidence of indirect taxation in India made improvements in the methodology. He divided all taxed commodities into four broad groups and distributed whole production among four users. He also examined the urban-rural distribution of tax burden and concluded that the urban sector paid more taxes relative to the rural sector (Dey 1974, pp.15-51). Ahmed and Stern (1986, 1987) made further improvements and gave a very refined methodology in distributing taxes on inputs and on inputs of inputs and made distinctions between nominal and effective taxes in their studies for India. The recent studies on India and Pakistan used the concept of effective taxes in distributing tax burden (Jha & Srinivasan 1989, pp.811-8; Malik & Saquib 1989, pp.13-25). The study on India showed progressivity while the study on Pakistan showed regressivity of indirect taxes on the whole.

World Bank (1990) made some estimates of tax incidence in Bangladesh which showed progressivity of total indirect taxation, though domestic indirect taxes were found to be regressive while import taxes were found to be progressive. We would discuss about the results of World Bank study in relation to our results later on.

3. Tax Incidence in Bangladesh

In this study of tax incidence in Bangladesh, we have tried to look at the distributional aspect of different indirect taxes by estimating the burden of these taxes falling on households belonging to different income classes. In estimating tax burden we have considered effective tax instead of nominal tax, since effective tax shows the total tax element in the price of the final products arising from taxes on inputs plus taxes on the final products. The effective tax burden would therefore provide a better measure of taxes actually borne than would the nominal tax burden.

3.1 Methodology

The tax burden is defined as the ratio of taxes paid for both direct and indirect consumption of goods and services by households to the average expenditures made on them, i.e., a tax to income/expenditure ratio. The expenditures made are assumed synonymous to income of the household income group (HHIG) for simplicity's sake, though in practice income and expenditures are found to differ as reported in Household Expenditures Survey of Bangladesh (1983-84, pp.65). Since expenditures tend to be more stable than income of the households, it is regarded as a better indicator of household income position and hence a better base to estimate tax burden per household.

We have tried to estimate the incidence of major indirect taxes in Bangladesh, e.g., excise tax and import tax including import sales tax. The methodologies used in estimating these two types of taxes are slightly different. The estimation of excise tax burden is made by first distributing effective excise taxes in proportion to the expenditures of the household on domestically produced goods and services and then taking the ratio of these taxes to the average total expenditure of households in each income group. This can be expressed in the following way:

$$b^{dh} = \sum_j \frac{t_j^{de} \cdot \bar{x}_j^{dh}}{\bar{x}^h}$$

where,

t^{de} = Vector of effective excise taxes.

$\bar{x}^{dh}$ = Vector of consumption from domestic production of h^{th} group.

$\bar{x}^h$ = Average total expenditure of the h^{th} group.

b^{dh} = Tax burden from excise tax on h^{th} group.

In estimating tax burden from import duties, the effective import tax on consumption from domestic production and nominal import tax on final import consumption are considered. These two estimates are considered separately since part of the imports enter into the production of domestic consumption goods as input and part is used for final consumption. The sum of these estimates is taken as a ratio of average total household expenditures to estimate the effective import tax incidence. Thus:

$$b^{mh} = \sum_j \frac{[(t_j^{me}\ \bar{x}_j^{dh}) + (t_j^{m}\ \bar{x}_j^{mh})]}{x^h}$$

where:

b^{mh} = Tax burden of import duty on h^{th} group.

t^{me} = Vector of effective import tax applicable to domestically produced consumption x^{dh}.

t^{m} = Vector of nominal import tax applicable to final import consumption.

$\bar{x}^{mh}$ = Final consumption of imported goods and services.

Calculation of b^{dh} and b^{mh} on the basis of the above formulae requires knowledge of x_j^{dh} and x_j^{mh} separately, whereas published data give information only about the total of domestically produced and imported goods, $(x_j^{dh} + x_j^{mh}) = x_j^{h}$. In order to apply the formulae, therefore, it was necessary to estimate imported and domestically produced components of consumption expenditures by applying the ratios of imports to total availability for each commodity as calculated in the previous chapter.

Thus:

$$x_j^{mh} = m_j x_j^{h}$$

and, $x_j^{dh} = (1-m_j)x_j^{h}$.

This procedure implies that, for any given commodity, the share of imports in total consumption is the same for all household income groups. This is at variance with the widespread belief that the rich are more disposed to consume imported goods. If this belief is true, our figures will underestimate the progressivity of the import tax system and overestimate that of the domestic excise tax system; however, we have no data by which we might estimate the size of these biases.

Although the data do not provide information about the distribution of expenditure between domestically produced and imported goods, they do present household expenditure figures separately for urban and for rural households. This has made it possible to provide estimates of tax incidence for the two groups of households separately.

3.2 Data

The estimation of tax incidence needed a large set of data of various types from different sources. We needed an economy wide input output (I-0) table, comprehensive household expenditure survey, different indirect taxes matching input-output commodity classification by sectors, value of gross domestic output and total import at purchaser prices and final demand for different I-0 sector categories. Most of the data sources are explained in Chapter 5 of the thesis, where the same set of data (except the data for household consumption expenditures) was used to estimate effective taxes.

The consumption expenditure data for both urban and rural areas are given for quite a large variety of goods and services in the Household Expenditure Survey (HES) of Bangladesh for

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1983-84. These data are available for per capita monthly household income groups. These expenditure data needed to be matched with the commodity classification of input-output sectors. The commodity classifications made in the HES by Bangladesh Bureau of Statistics (BBS) are different from those of the input-output tables made by the Planning Commission, Government of Bangladesh. It is quite difficult to match the HES data with sectoral classification of input-output table. BBS however prepared a matching of the HES consumption expenditure data of 1983-84 according to 1976-77 input-output sector classification, which was available to us. Since the HES data are matched according to 1976-77 sector category, it was necessary to adjust 1986-87 input-output sector categories in conformity with 1976-77 sector categories. The use of HES 1983-84 data obviously implies the assumption that the expenditure pattern remained more or less the same between 1983-84 and 1986-87 and that the level of income and expenditures changed in the same proportion so that the application of effective taxes of 1986-87 to the income-expenditure ratio in 1983-84 would not make any difference.

As already mentioned, it was necessary to study incidence in relation to household income rather than in relation to income per head or individual income. This is because, while data on expenditure by households classified by different levels of income per head is available in the HES, allocation of this expenditure to I-0 sectors is available only for data classified by total household income.

The input-output matrix of 1986-87 has been reduced to 47 sectors according to 1976-77 input-output matrix sectors. The bifurcation of the input-output (I-0) matrix of 1986-87 into a domestic and an import matrix was done according to 53 sector classifications. The effective excise and import taxes were also calculated for 53 sectors accordingly. These taxes were adjusted to 47 sector classification of 1976-77 I-0 matrix.

The effective taxes are estimated for Bangladesh in Chapter 5 of the thesis. The effective excise, import and total taxes as presented in tables 1, 2 and 3 of Chapter 5 are used for estimating effective excise, import and total tax incidence and distributing them among urban and rural household income groups in this study.

The per capita household expenditure data of 1983-84 matched with I-0 sector classification as obtained from BBS was prepared for the urban and the rural areas and not for Bangladesh as a whole. To estimate the distribution of total effective taxes for the country as a whole, it was necessary to apply the total effective indirect taxes for the urban and the rural areas to the weighted expenditures of the urban and the rural areas per household, the weight being the total Bangladesh expenditure per household.

4. Tax Incidence Results

4.1 Incidence of Indirect Taxes in Bangladesh

The incidence of indirect taxes in Bangladesh for 1986-87 are presented in table 1. The results show that indirect tax incidence in Bangladesh as a whole is mildly progressive, rising from 3.25 per cent from the bottom income class to 3.97 per cent for the top income class. The incidence of domestic indirect tax in Bangladesh shows some fluctuation. It rises till the middle income group and falls and then rises again. On the whole, it is slightly on the

TABLE 1
Incidence of Indirect Tax in Bangladesh, 1986-87.

Monthly Household Income Group (1983-84)	Domestic Tax Incidence (%)	Import Tax Incidence (%)	Total Indirect Tax Incidence (%)
(O-500)	0.86	2.39	3.25
(50O-749)	1.19	2.44	3.63
(75O-999)	1.36	2.38	3.74
(100O-1249)	1.41	2.36	3.76
(1250-1499)	1.42	2.33	3.75
(1400-1999)	1.50	2.36	3.86
(2000-2499)	1.59	2.35	3.94
(2500-2999)	1.46	2.34	3.80
(3000-3999)	1.48	2.35	3.84
(4000-4999)	1.53	2.38	3.91
(5000-5999)	1.47	2.36	3.83
(6000-6999)	1.63	2.35	3.99
(7000-7999)	1.32	2.39	3.71
(8000+)	1.54	2.43	3.97

Source:Computed from HES data matched with I-O sector commodity classification and using method explained in the text. Bangladesh tax incidence is estimated by using weights to urban and rural domestic and import tax incidence results.

progressive side. The incidence of import tax in Bangladesh can be said to be more or less proportional. The total indirect tax incidence in Bangladesh is therefore showing some progressivity.

The degree of progressivity is very modest. At first sight this appears to be difficult to explain. The rates of effective taxation on agricultural products are particularly low, and expenditure on these products declines markedly as a proportion of total expenditure as income rises. However, this decline is almost matched by an increase in the proportion of expenditure devoted to services, which are also lightly taxed. Thus the progressivity of the tax system is limited to the 35% or so of expenditure which is not devoted to basic food and services, and within this area there is no strong link between rates of tax and the character of the commodities as technical "luxuries" or "necessities".

A more detailed analysis of the distributional characteristics of different elements of the indirect tax system is provided in the following pages.

The tax burden distribution results show a different pattern from what is expected in general in Bangladesh (World Bank, 1990, pp.222). The domestic taxes are usually expected to be regressive and the import taxes to be progressive. This is based on the view that the domestic taxes fall on most of the essential consumer items including necessities while import taxes fall mostly on non-necessities and luxury items believed to be consumed mainly by the people in the upper income groups. In the final analysis however it is the relative shares of total expenditure on different consumption goods bearing varying degrees of effective taxes, and not the nominal taxes, that determine the tax burden falling on different income groups.

4.2 Incidence of Domestic Taxes in Bangladesh

The incidence of domestic taxes as shown in Table 1 appears to be progressive over the lower income range, than proportional. As can be seen from an examination of effective tax rates in Chapter 5 (table 1), two commodities, tobacco products and gas, are subjected to very high rates of domestic taxation in Bangladesh. Taxation of these commodities are so heavy by comparison with other commodities that they account for the major part of domestic indirect tax revenue, although they represent only a very small part of household consumption expenditure; similarly quite small variations in the proportion of expenditure allocated to these two items imply a substantial variation in the ratio of indirect tax to expenditure. The limited progressivity of domestic taxation at the lower end of the household expenditure scale, evident in Table 1, can be statistically fully accounted for by the increased share of these items in total spending, from less than ½% in the bottom income group to nearly 2% in group 7. Thereafter, the share of these items declines somewhat for rural household and fluctuates for urban households, as higher income groups are considered: correspondingly, the incidence of domestic taxation shows no clear pattern of progressivity when groups 7 to 14 are studied on their own.

Of course there are variations in the proportion of expenditure on other taxed items as well: for example, the proportion of income spent on petroleum products tends to decrease with income, and that spent on machinery to increase. However, the rates of tax on these items are much lower and the effects of variations in expenditure shares from different products tend to offset one another, so that the overall pattern of progressivity is largely set by expenditure on gas and tobacco alone.

4.3 Incidence of Import Taxes in Bangladesh

The incidence of import taxation, in respect of final imports for consumption, imported inputs for the production of domestic consumption goods and the total of the two, is presented in table 2. The incidence, both for direct imports and for imported inputs into domestic production appears to be very close to proportional. This is not to be explained by

TABLE 2
Import Tax Incidence in Bangladesh.

Monthly Household Income Group (1983-84)	Imported Input Tax Incidence (%)	Final Import Tax Incidence (%)	Total Import Tax Incidence (%)
(O-500)	1.16	1.23	2.39
(500-749)	1.30	1.14	2.44
(750-999)	1.26	1.11	2.38
(1000-1249)	1.23	1.12	2.36
(1250-1499)	1.20	1.13	2.33
(1500-1999)	1.23	1.13	2.36
(2000-2499)	1.25	1.10	2.35
(2500-2999)	1.25	1.09	2.34
(3000-3999)	1.23	1.12	2.35
(4000-4999)	1.27	1.12	2.38
(5000-5999)	1.21	1.15	2.36
(6000-6999)	1.21	1.15	2.35
(7000-7999)	1.24	1.15	2.39
(8000+)	1.22	1.20	2.43

Source: Computed from HES data matched with I-0 sector commodity classification.

the near uniformity of rates of import taxation: there is a small number of commodities - sugar, edible oil, mill-made cloth, chemicals, machinery, transport equipment and petroleum products - which are important for final import taxation because the tax rates are quite high and the share of imports in total demand is substantial, and a further group, overlapping with but not the same as the first, which are important for imported input taxation. Some of these goods, such as transport equipment, are technical "luxuries" in Bangladesh; others such as petroleum products, are "necessities". The effects of these conflicting patterns of variations of expenditure with income more or less cancel out, leaving rough overall proportionality of tax to income.

4.4 Comparison with World Bank Estimate of Tax Incidence in Bangladesh

The result of indirect tax incidence of Bangladesh for 1986-87 can be compared with the estimates of World Bank for 1985-86 as reported in table 3. The table shows the World Bank results quite contrary to the findings of our study. It shows domestic tax incidence to be slightly regressive and import tax incidence to be clearly progressive. The total indirect

TABLE 3
Incidence of Indirect Taxes in Bangladesh. 1985-86

Monthly Household Income Group (1983-84)	Domestic Tax Incidence (%)	Import Tax Incidence (%)	Total Indirect Tax Incidence (%)
(O-500)	1.67	1.59	3.26
(50O-749)	1.67	1.98	3.65
(75O-999)	1.65	2.00	3.65
(100O-1249)	1.59	2.00	3.59
(1250-1499)	1.59	1.26	3.85
(1400-1999)	1.58	2.42	4.00
(2000-2499)	1.61	2.93	4.54
(2500-2999)	1.59	3.44	5.03
(3000-3999)	1.50	3.48	4.98
(4000-4999)	1.58	4.00	5.58
(5000-5999)	1.52	4.34	5.86
(6000-6999)	1.59	5.01	6.60
(7000-7999)	1.79	5.99	7.78
(8000+)	1.16	4.52	5.68

Source: World Bank Report, 1990. pp. 222.

tax incidence for Bangladesh is shown to have smooth progressivity due to progressive import tax, rising from 3.26 per cent in the bottom income group to 5.68 per cent in the top income group.

The difference between the two estimates of indirect tax incidence for Bangladesh is striking. Unfortunately, the World Bank report (1990) provides few details about the methods and the data used in the study, and we have been unable to replicate their results. Nevertheless, the differences are so marked that it is desirable to examine possible explanations. The World Bank report does not state clearly the methodology used in estimating the tax incidence, except referring to tax burden as tax to income ratio (World Bank, 1990, pp.154). Whether the tax is nominal or effective is not stated explicitly, though it appears that the Bank has used the effective tax concept as it is mentioned that in general effective tax in Bangladesh is favouring the poor (Ibid, pp.154).

The World Bank report (1990) also does not state the methodology used in estimating effective taxes. However, the procedure we have adopted is a standard one, so it seems likely that the main explanation for the difference in results must lie elsewhere.

The first difference is the methodology used in estimating import tax burden. We have decomposed import tax incidence into two parts as explained earlier. It focuses on the import content of domestic goods since imported input taxes are calculated in relation to domestic expenditures and not in relation to import expenditures. The World Bank does not seem to have made this distinction.

In estimating effective tax burden we have used nominal taxes based on market prices. It is not known whether the basis of calculation of nominal import taxes by World Bank is market price or c.i.f. price. Use of two different prices may cause two different tax distribution patterns. Since import value at market prices includes import tax, trade and transport cost and scarcity premiums wherever applicable, the nominal taxes and hence the effective taxes would differ to the degree of differences between c.i.f. prices and market prices for each sector. This may cause differences in the import tax distribution pattern depending on the probable lower rates of effective taxes of certain imported goods which have high scarcity premiums (e.g. machinery, metal products, sugar, other food, transport equipments, etc.).

We preferred to use market prices instead of c.i.f. prices to calculate nominal taxes, as the consumers purchase goods at the going market prices which include tax, trade and transport cost and also scarcity premiums, if applicable. The use of market prices seems reasonable, since in calculating effective taxes, we estimated the tax element in the price paid by consumers for goods in the market. In Bangladesh, the presence of scarcity premiums due to quantitative restrictions raise the import price of certain goods quite high. When Government introduce some changes in the import tax rates for certain policy purposes, they might not be reflected in the changes in the market prices of those import goods if nominal taxes do not include scarcity premiums. The increase in the import tax rates in these cases would be absorbed in the scarcity margins without having their impact on the market prices of those goods unless the rates are raised too high. To achieve certain policy objectives through changes in the tax rates of imported goods, therefore, it seems appropriate to estimate nominal import taxes at market prices so that the effects of such changes are transparent both to the Government and to the purchasers.

In estimating import tax incidence we assumed that expenditures on imports are made according to the ratio of imports to total availability throughout the income classes. This is a very simplified assumption, as it conceals the variations in the relative proportional expenditures on imports for different sectoral goods by different income classes. In the absence of better information, however, we had no alternative. It is possible that the World Bank had access to direct information about variations in the share of imports in household expenditure at different levels of household income, and that this is responsible for their different estimates of tax incidence. However, the Bank's Report (1990) provides no detail as to the basis on which household expenditure was taken to be divided between imports and domestically produced goods.

There may be some items which remained unallocated in the 'matched' input-output sectorial household expenditure data for 1983-84 that was available to us from Bangladesh Bureau of Statistics (BBS). The Bank may have had access to these unallocated items in using 1985-86 HES data from BBS tape. This could cause differences in the two tax incidence results. The items such as handloom cloth, cement, steel and basic metal, housebuilding, other industries etc. are not allocated in the data that we obtained from BBS. It is not known whether Bank has included these items in some sectors. The effective tax rates would vary with the inclusion of these items. It however seems unlikely that such inclusion would generate significantly different result of import tax incidence to lead to a progressive distribution pattern. On the other hand, the sector groupings of 1988 HES followed by W.B (1990), has similar distribution pattern in HES in 1983-84 (p.67) so that the possibility of many items being left out in our data seems improbable. The conclusion is also confirmed by an estimate made to see the percentage of unallocated items in HES 1983-84 data used by us.

TABLE 4
Unallocated HES Expenditures in I-O Sector Groups
(Matched by HES Expenditures per income groups)

MHHI-G of 1983-84	HES Exp. per HH in Urban Area	IO Exp. per HH income groups	Allocated Exp. (%) Urban	Unallocated Exp. (%) urban	HES Exp. per HH in Rural Area	IO Exp.per HH Income Groups	Allocated Exp. (%) Rural	Unallocated Exp. (%) Rural
	1	2	2/1=3	4	5	6	6/5=7	8
(0-500)	351.60	256.15	72.85	27.15	370.49	325.05	87.74	12.26
(500-749)	625.17	474.26	75.86	24.14	636.80	475.77	74.71	25.29
(750-999)	870.31	656.05	75.38	24.62	855.21	638.64	74.68	25.32
(1000-1249)	1071.71	856.29	79.90	20.10	1065.78	805.25	75.55	24.45
(1250-1499)	1328.45	1050.06	79.04	20.96	1278.00	1113.26	87.11	12.89
(1400-1999)	1676.88	1330.17	79.32	20.68	1599.55	1354.53	84.68	15.32
(2000-2499)	2070.29	1745.42	84.31	15.69	2003.52	1608.46	80.28	19.72
(2500-2999)	2542.41	2027.44	79.74	20.26	2472.17	2067.20	83.62	16.38
(3000-3999)	3134.45	2483.57	79.23	20.77	3032.37	2595.90	85.61	14.39
(4000-4999)	4090.27	2936.31	71.79	28.21	3530.00	2943.97	83.40	16.60
(5000-5999)	5196.22	3696.55	71.14	28.86	4179.31	3636.69	87.02	12.98
(6000-6999)	5947.25	4836.13	81.32	18.68	5159.62	4411.92	85.51	14.49
(7000-7999)	6421.95	4887.14	76.10	23.90	4698.91	4549.24	96.81	3.19
(8000+)	8955.79	7918.28	88.42	11.58	7061.26	6591.86	93.35	6.65

Source: Computed from HES (1983-83) and I-O (1986-87) data.

Table 4 shows that the proportion of HES expenditure for urban and rural households that are apparently not been allocated to input-output groups (matched by HES income groups) appear to show no clear relationship with income levels for urban households and to show a generally declining relationships for rural households. In both sectors, the proportion of unallocated expenditure is particularly low for the highest income households. Thus it does not seem that the greater progressivity revealed in the World Bank study (1990) can be accounted for by the exclusion from our study of unallocated expenditures which may bear a particularly high rate of tax.

From the discussion above, it appears that the difference in the two results may be due to (1) the methodology used in estimating effective tax incidence, (2) different nominal taxes for two different periods 1985-86 and 1986-87,(3) coverage of data and (4) Decomposition of import expenditure . Given the data sources and the methodology used in our study, we see no reason to reject the results of our study despite the very different pattern of incidence presented in the World Bank report. The results explain the tax distribution pattern in Bangladesh for 1986-87 in a reasonably satisfactory manner.

4.5 Comparison with Tax Incidence Studies in Pakistan and India.

Our results of indirect tax incidence in Bangladesh can be compared with similar studies in Pakistan (Malik and Saquib, 1989) and India (Jha and Srinivashan. 1989). The tax incidence study of Pakistan for 1978-79 shows slightly regressive import taxes and excise duties, making indirect taxes as a whole regressive. These results are also regarded as surprising by the authors, since they were found to be contrary to their expectation (Ibid, P 18). The Tax incidence study of India ,on the other hand, shows that both the import and the central excise taxes were progressive for 1984-85 in urban as well as in rural areas making the indirect tax system as a whole progressive. Table 5 and 6 show the indirect tax incidence in Pakistan and India respectively.

The results of both the studies are different from our results. Both import and excise taxes are found to be regressive in Pakistan and progressive in India, while import tax is found to

TABLE 5
Effective Tax Rates for the Fiscal Year 1978-79 in Pakistan.
(Taxes paid by households as percentage of their personal income)

Monthly Income Class (Rupees)	Import Duties	Excise Duties	Sales Taxes	Surcharges	Total Commodity Taxes
Upto 300	5.56	3.68	1.11	0.84	11.19
301-400	5.18	3.70	1.02	0.79	10.69
401-500	4.88	3.53	0.95	0.74	10.10
501-600	5.36	3.67	1.05	0.72	10.80
601-800	4.80	3.62	0.95	0.70	10.06
801-1000	5.11	6.78	1.02	0.72	10.63
1001-1500	4.57	3.58	0.93	0.63	9.71
1501-2000	4.38	3.41	0.91	0.58	9.29
2001-2500	4.19	3.48	0.89	0.54	9.10
2501-3000	4.10	3.35	0.90	0.51	8.86
3001-3500	4.53	3.30	1.04	0.51	9.38
3501+	4.40	3.36	1.05	0.46	9.26
TOTAL	4.70	3.56	0.97	0.63	9.86

Source: Malik and Saquib, 1989. pp. 22.

TABLE 6
Tax Burden for India for 1984-85

Annual Per Capita Expenditures (Rupees)	Rural Area		Urban Area	
	Central Excise Duty	Import Duty	Central Excise Duty	Import Duty
0- 389	4.57	1.97	4.75	2.20
389- 518	4.46	1.95	5.03	2.31
518- 648	4.56	2.04	5.28	2.55
648- 777	4.67	2.12	5.13	2.43
777- 907	4.81	2.22	5.26	2.55
907-1101	4.98	2.34	5.37	2.66
1101-1296	5.13	2.44	5.51	2.76
1296-1619	5.36	2.54	5.70	2.90
1619-1943	5.59	2.62	5.78	2.94
1943-2594	5.53	2.32	5.93	2.98
2594-3239	5.96	2.63	6.02	2.98
3239-3887	6.14	2.59	6.08	3.00
3887+	6.49	2.35	6.24	2.82

Source: Jha and Srinivashan, 1987. pp. 817

be proportional and excise tax is found to be slightly progressive in Bangladesh. The total indirect tax in Pakistan is found to be regressive as a result of regressivity of both the major indirect taxes and in India, the total indirect tax is found to be progressive due to the progressivity of both import and excise taxes.

In Bangladesh, the total indirect tax shows mild progressivity due to slight progressivity of excise taxes, as import taxes remain proportional. There may be various reasons for such differences in the results, e.g. time period, data coverage, methodology used and the tax rates, as discussed in the case of World Bank study.

4.6 Distribution of Effective Indirect Tax Burden in the Rural and the Urban Sectors in Bangladesh.

The effective indirect tax incidence for rural and urban sectors in Bangladesh are shown in Table 7. The table shows that the rural domestic tax burden is rising from 0.86 percent to 1.30 percent from the bottom to the top income classes, but in between there are fluctuations. The rural import tax on the other hand shows proportionality on the whole. The total rural indirect tax burden shows the same pattern of distribution as the rural domestic tax. The incidence of indirect taxes shows a slightly different picture in the urban sector. The urban domestic tax shows slight regressivity. The total indirect tax shows progressivity in the urban area on the whole, if we disregard the 6.1 percent ratio of tax to expenditure calculated for the third income group. This anomalous figure is almost wholly accounted for by the (implausibly) high ratios of expenditure on gas to total expenditure reported for the group (over 3 percent, compared to about 0.2 percent for the adjacent groups). Because gas and

TABLE 7
Incidence of Indirect Taxes in Rural and Urban Areas in Bangladesh. 1986-87.

Monthly HH Income Group	Rural Indirect Tax Incidence			Urban Indirect Tax Incidence		
	Domestic Tax Incidence	Import Tax Incidence	Total Indirect Tax Incidence	Domestic Tax Incidence	Import Tax Incidence	Total Indirect Tax Incidence
	(%)	(%)	(%)	(%)	(%)	(%)
0- 500	0.86	2.37	3.24	0.84	2.79	3.63
500- 749	1.21	2.39	3.60	0.88	3.22	4.10
750- 999	1.19	2.35	3.53	3.31	2.70	6.01
1000-1249	1.38	2.34	3.72	1.62	2.52	4.13
1250-1499	1.38	2.31	3.69	1.81	2.48	4.29
1500-2000	1.43	2.34	3.77	2.08	2.56	4.64
2000-2499	1.52	2.31	3.83	2.07	2.62	4.69
2500-2999	1.40	2.31	3.71	1.82	2.55	4.36
3000-3999	1.40	2.30	3.70	1.84	2.57	4.42
4000-4999	1.38	2.32	3.70	1.85	2.53	4.38
5000-5999	1.32	2.26	3.58	1.78	2.54	4.32
6000-6999	1.30	2.27	3.56	2.30	2.53	4.84
7000-7999	1.34	2.31	3.65	2.38	2.57	4.95
8000+	1.30	2.43	3.72	2.25	2.42	4.68

Source: See in Table 1.

tobacco products are very heavily taxed, small variations in the proportion of expenditure allocated to these products have a strong influence on the ratio of tax to total expenditure. (The ratio of expenditure on tobacco products to total expenditure is also high for this group and out of line with the ratio for the adjacent groups).

The import tax distribution results are unexpected as they show some regressivity in the urban sector, while in the rural sector they show proportionality. As already mentioned, the figure may understate the true progressivity of import taxation, because we had no information about a possible link between household income and the propensity to consume imported rather than domestically produced goods.

A decomposition of import tax burden may provide some explanation of the pattern of import tax distribution in the rural and the urban sectors. Table 8 shows the incidence of imported input tax and the final import tax in the rural and the urban sectors.

TABLE 8
Incidence of Import Taxes in Rural & Urban Areas in Bangladesh, 1986-87.

Monthly HH Income Group	Rural Import Tax Incidence			Urban Import Tax Incidence		
	Imported Input Tax Incidence	Final Import Tax Incidence	Total Rural ImportTax Incidence	Imported Input Tax Incidence	Final Import Tax Incidence	Total Urban ImportTax Incidence
	(%)	(%)	(%)	(%)	(%)	(%)
0- 500	1.15	1.22	2.37	1.26	1.53	2.79
500- 749	1.29	1.10	2.39	1.49	1.73	3.22
750- 999	1.23	1.11	2.35	1.60	1.10	2.70
1000-1249	1.21	1.13	2.34	1.47	1.05	2.52
1250-1499	1.18	1.13	2.31	1.41	1.07	2.48
1500-2000	1.21	1.13	2.34	1.45	1.11	2.56
2000-2499	1.21	1.09	2.31	1.48	1.14	2.62
2500-2999	1.21	1.09	2.31	1.46	1.09	2.55
3000-3999	1.19	1.11	2.30	1.43	1.15	2.57
4000-4999	1.20	1.12	2.32	1.42	1.11	2.53
5000-5999	1.12	1.14	2.26	1.37	1.16	2.54
6000-6999	1.12	1.15	2.27	1.39	1.15	2.53
7000-7999	1.12	1.19	2.31	1.53	1.04	2.57
8000+	1.19	1.23	2.43	1.31	1.11	2.42

Source: See in Table 1.

The results show that both imported input tax and final import tax are showing proportionality in the rural sector leading to proportionality in the total rural import tax. In the urban sector, imported input tax is showing some regressivity and final import tax some proportionality, so that the total urban import tax exhibit slight regressivity. The most obvious departure from proportionality relates to the relatively high incidence, for the bottom two income groups, of taxation of final imports in the urban sector. This is accommodated by the fact that these groups spend a particularly high proportion of their budgets on certain items - notably, petroleum products, sugar and surprisingly, mill-made cloth - which are largely imported and also attract high rates of import taxation.

Table 8 also shows that in general the proportion of imported input tax burden is higher than that of the final import tax in both the rural and the urban sector. This is to be expected as the imported input taxes are estimated as proportion of domestic consumption expenditures, which are much higher than the expenditures on final imports. One surprising information is that though the incidence of imported input tax is higher in the urban sector relative to that in the rural sector, the incidence of final import tax is almost same in both the sectors.

All these results show that the total indirect tax incidence is higher in general in the urban sector than that in the rural sector, but the difference is not very significant. The indirect tax system, therefore, does little to reduce the disparity in average income between the two sectors. It could be argued that the tax system should impose lower burden on the rural sector because it receives a relatively low share of the benefit from public expenditures (also income per head in the urban sector is 32 percent higher than that in the rural sector. HES, 1985-86, pp. 17). The effective tax burden results for the two sectors, however, could be somewhat different if the effective direct tax burden could be added for the two sectors. This is due to the fact that personal and corporate income taxes are contributed mostly by the urban people while the contribution of agricultural income tax is negligible in the rural sector.[25] In the absence of empirical investigation, however, no definite conclusion can be

[25]. Government food procurement programme at below market price is, on the other hand, regarded as a concealed tax on the agricultural sector.

reached in this regard.

The tax incidence results presented here need to be considered with some qualifications. The results show that the tax burden distribution is determined by many factors which need careful analysis based on good information. In estimating tax burden, we made several limiting assumptions in the absence of full informations. The sectoral allocations of HES data that we used for our study assign zero values to categories of consumption expenditures in the household budget like handloom cloth, paper, other crops, etc., which bear effective domestic and import taxes. Besides, HES data matched with I-O sector categories are made on the basis of monthly per capita expenditure, overlooking the distribution of household members according to age, dependency etc., in the households. The results, therefore, may be more useful in considering the overall distribution pattern of different taxes in the urban and the rural sectors than in considering the exact percentage distribution.

4.7 Distribution of Tax Burden By Socio Economic Groups.

The analysis of tax incidence with reference to income classification used in the HES data is adequate for discussion of the Bangladesh situation as such. However, for international comparisons, it is convenient to classify income in a more standardized way. The table which follow, therefore, group income by reference to the deciles of the distribution of household income and examines the incidence of taxation in the ten inter-decile groups.

For this analysis it is necessary to calculate the deciles. Since only group data is available, this can be done only approximately. The procedure followed here has been (1) to use the cumulative relative frequency distribution by the HES income classes to determine in which HES class a particular decile must lie, and then (2) to calculate the value of the decile within the HES class by assuming a uniform frequency distribution of incomes within the class.

Where, as sometimes happens, the mean income reported for HES class is significantly different from the midpoint of the income range, the assumption of uniform frequency distribution within the class is inconsistent with the evidence. It is possible to modify the assumptions so as to be consistent with the reported data and it would probably be desirable to do so if primary interest were focused on the precise location of the decile. However, it is extremely unlikely that such modification would make any appreciable difference to the calculated pattern of incidence of taxation by inter-decile groups.

TABLE 9
Cumulative Percentage Distribution of Number of Households in Banglaedsh and in Urban and Rural Areas

Income Classes	Cumulative Percentage of number of Household in Bangladesh	Cumulative Percentage of number of household in Urban Areas	Cumulative Percentage of number of household in Rural Areas
1	3.00	0.87	3.27
2	11.39	5.21	12.17
3	23.12	13.54	24.34
4	36.41	24.88	37.88
5	48.71	35.59	50.38
6	68.34	52.43	70.36
7	79.87	64.52	81.82
8	86.87	73.32	88.59
9	93.39	84.14	94.56
10	96.07	90.80	96.74
11	97.61	94.74	97.97
12	98.39	96.82	98.59
13	99.00	98.09	99.11
14	100	100	100

Source: Computed from HES 1983-84 data. HES 1983-84. pp. 57.

Table 9 shows the cumulative percentage distribution of the number of households in the urban and the rural sectors and in Bangladesh as a whole.

Table 10 shows the distribution of households income by decile groups in Bangladesh and in the urban and the rural areas. The top income group includes all income above the ninth decile group. The top decile incomes are reweighted to allow for different levels of income per household after ninth income group in the following way:

TABLE 10
Per Capita Monthly Household Income Ranges by Decile Group

Deciles	Bangladesh	Urban	Rural
1	0- 708.6	0- 893.8	0- 689.0
2	- 933.5	-1142.4	- 910.8
3	-1129.4	-1369.5	-1104.5
4	-1323.0	-1630.9	-1292.4
5	-1532.9	-1927.9	-1192.4
6	-1787.6	-2312.5	-1740.7
7	-2072.0	-2811.4	-1991.0
8	-2509.3	-3617.4	-2420.0
9	-3480.1	-4879.9	-3236.2
10	3480.1+	4879.9+	3236.2+

Source: Computed from HES data. HES 1983-84. pp. 57

Let $W_1.,\ldots,..W_6$ be the proportions of the top decile households in the component HES groups ($\Sigma W_i=1$).

Let $Y_1\ldots,\ldots,..Y_6$ be income per household in the component HES group. Let $\bar{Y}$ be average household income for the top decile, i.e.:

$$\overline{Y} = \sum_{i=1}^{6} W_i Y_i$$

Then the new weights W_i are given by:

$$W_1 \frac{Y_1}{\overline{Y}},\ W_2 \frac{Y_2}{\overline{Y}}, \ldots, W_6 \frac{Y_6}{\overline{Y}},\ \ with\ \Sigma \hat{W}_i = 1$$

Thus for the top decile in the rural area, for example, number weights adjusted by the ratio of average income within the top decile is used, instead of number weights only.

Table 11 shows the distribution of indirect tax burden by decile groups in Bangladesh and in the urban and rural areas.

TABLE 11
Incidence of Indirect Taxes by Decile Group (%)

Deciles	Bangladesh	Urban	Rural
1	3.516	4.974	3.480
2	3.712	4.796	3.550
3	3.758	4.212	3.642
4	3.763	4.440	3.714
5	3.764	4.640	3.690
6	3.859	4.682	3.767
7	3.873	4.511	3.767
8	3.934	4.400	3.828
9	3.790	4.397	3.730
10	3.890	4.619	3.642

Source:Computed from tables 1,7,10 and HES data(1983-84.p57)

Notes:
1. For calculating tax incidence for the 10th decile for Bangladesh, first, the 10th decile is estimated by expenditure weighting rather than by number-of-household wieghting. Instead of using number weights, we used number weights adjusted by the ratio of average income within HES group to average income within the top decile.
2. The same method is followed in calculating the top decile for the urban and rural areas.
3. For incidence estimates, tax rates from household income groups are applied to the decile incomes containing the income groups.

The calculation of effective tax rates by decile household income groups is made in the following way:

Let t_i (i = 1,...., 14) be the effective tax rates for HES income group i

Let T_j (j = 1,...., 10) be the computed effective tax rate for decile group j

Thus T_j is a weighted average of t_i for those i which are partially or wholly included in decile group j. The weighting is most simply carried out on the basis of the number of households included in j for each HES group. A more sophisticated procedure would take account of different levels of expenditures per household for different groups. The alternatives are most simply illustrated by an example, say for the households in Bangladesh whose income lies between the 4th and the 5th deciles.

Weighting by number only:

$$0.871 \times t_5 + 0.129 \times t_6 = \text{Effective tax incidence on 5th decile}$$

Weighting by numbers adjusted for income levels is preferable to weighting by numbers only for top income group where income levels are high for small numbers of households in different top income groups.

In estimating effective tax incidences for the decile groups in 1986-87 we used the HES 1983-84 data for income distribution and expenditures. It implies an implicit assumption that the income distribution and expenditure pattern remained same between these two periods.

The estimation of tax incidence by the decile groups for Bangladesh shows a similar tax distribution pattern as for the household income groups. There is a slight difference in the results of urban tax incidence pattern for decile groups compared to the household income groups. While tax incidence is progressive in the rural area, for the urban area it is progressive from the third decile group. The first two decile groups have higher tax incidence relative to the rest of the decile groups. This difference in tax incidence of the two bottom decile groups and two household income groups is due to the application of relatively higher tax rate for the third household income group for estimating tax incidence of the first and the second decile groups. The higher tax rate for the third household income group is explained by proportionately higher expenditures of this income group on tobacco and other food, gas and trade services compared to the other household income groups. Tobacco and gas have got highest effective excise tax rates (53% and 51% respectively).

The tax burden distribution obviously does not go in favour of the poorer section in the economy since the degree of progressivity in the tax burden distribution in Bangladesh is very mild. The difference between the tax burden distribution between the urban and the rural sector is not very significant. The indirect tax burden needs to be distributed more progressively to ensure equity.

4.8 Distribution of Effective Indirect Tax by Sector of Consumption.

Distribution of effective indirect tax by sector of consumption is shown in Table 12. It is derived by applying total effective tax rates for each sector to private consumption expenditure in each sector.

The results show different tax distribution for different sectors as determined by the relative expenditures for each sectoral commodity groups bearing different effective taxes. The table shows that the tobacco product is the sector where consumption makes largest contribution (27.1% of the total) to indirect tax revenue as is expected since more than fifty percent

TABLE 12
Distribution of Effective Indirect Tax by Sector of Consumption,1986-87.

Sectors	Private Consumption(pc)Tk .mn.	te	pc*te.Tk.mn.
01-Rice	132023.80	0.00637	840.52
02-Wheat	12857.16	0.00699	90.18
03-Coarse Grain	120.68	0.00262	0.32
04-Jute	505.18	0.00725	3.66
05-Sugar Cane	508.19	0.01206	6.13
06-Cotton	0.00	0.00282	0.00
07-Tobacco	0.00	0.02464	0.00
08-potato	4463.48	0.00291	12.97
09-Vegetables	2968.38	0.00560	16.63
10-Pulses	2853.39	0.00357	10.18
11-Oil Seeds	0.00	0.00530	0.00
12-Fruits	12874.79	0.00236	30.32
13-Tea	3865.68	0.02112	81.64
14-Other Crops	7034.73	0.00561	39.49
15-Livestock	32590.12	0.00767	250.09
16-Fish	24959.99	0.01321	329.73
17-Forestry	14739.95	0.00437	64.41
18-Other Food	19063.27	0.06505	1239.99
19-Edible Oil	9463.15	0.01204	113.93
20-Sugar and Gur	10926.06	0.03187	348.23
21-Salt	854.74	0.01780	15.22
22-Yarn	0.00	0.01803	0.00
23-Cloth:Millmade	1182.97	0.09486	112.21

24-Cloth:Handloom	19773.55	0.07567	1496.30
25-Readymade Garmnts	115.53	0.06483	7.49
26-Jute Textiles	479.78	0.04342	20.83
27-Paper	2023.70	0.10444	211.36
28-Leather & L. Prod	1255.32	0.02723	34.19
29-Cheml. Fertilizer	0.00	0.07710	0.00
30-Pharmaceutical	9853.47	0.09464	932.57
31-Chemicals	9636.538	0.05671	0.00
32-Petroleum Prodcts	3771.34	0.11187	421.92
33-Cement	0.00	0.16852	0.00
34-Steel&Basic Metls	0.00	0.12198	0.00
35-Metal Products	3718.05	0.07540	280.35
36-Machinery	9097.90	0.13673	1243.99
37-Transpt.Equipmnts	1426.51	0.05519	78.74
38-Wood & Wood Prod.	1018.966	0.01931	0.00
39-Tobacco Products	7910.46	0.54260	4292.20
40-Other Industries	6193.82	0.07301	452.18
41-Urbn House Buildg	0.00	0.11741	0.00
42-Rurl House Buildg	0.00	0.04484	0.00
43-Other Constructn.	0.00	0.10330	0.00
44-Electricity	726.19	0.09192	66.75
45-Gas	728.43	0.50469	367.63
46-Trade Service	0.00	0.00697	0.00
47-Transport Service	44590.50	0.03025	1349.00
48-Housing Service	60359.49	0.00957	577.57
49-Health Service	3642.41	0.02461	89.65
50-Education Service	7284.25	0.00230	16.75
51-Pub. Admn.Service	774.89	0.02375	18.40
52-Banking &Insurnce	5101.92	0.00929	47.41
53-Prof.& Oth. Serv.	28164.43	0.01129	317.92
Total	510847.65		15928.75

Source: Computed from I-O data, 1986-87 and, table 3 of Chapter 5.

of the excise tax is collected from tobacco products. The contribution of the handloom sector is quite high (9.4%) though the sector bears zero nominal tax.[26] Transport services, machinery and other food sectors bear substantial amount of effective taxes (8.47%, 7.9% and 7.75% respectively). Of the agricultural sectors, rice sector bears 5.3% tax.

If we group together the sectors according to major economic activities, e.g., agriculture, industry, fuel and services, then we get a clear picture of the tax burden borne by different sectors in the economy. Table 13 shows the distribution of the tax burden according to major sectors.

TABLE 13
Distribution of Effective Tax Burden by Major Economic Sectors in Bangladesh

Sectors	Effective Tax (%)
Agriculture	11.15
Industry	71.86
Fuel	5.38
Services	15.17

Source: Table 12

The table shows that industrial sector bears the largest tax burden, though it is a small sector in the economy contributing only about 11 % of the GDP, while agriculture bears 11% of tax burden though it is the largest sector in the economy (contributing about 48% of the GDP). Services sector bears 15% of the tax burden. Both agriculture and the services sector have, except for a few items, zero nominal taxes. The services sector is growing, and

[26]. This result is surprising in the light of the earlier discussion where the allocation of household expenditure among the 47 I-O sectors gave a zero weight to the handloom cloth sector. It throws some doubt on the reliability of the allocations among sectors provided by the BBS and used in the earlier analysis.

expenditures on some services like housing, transport and professional and others are responsive to income. The table shows the scope of introducing reforms in the indirect tax system in Bangladesh.

5. Summary of the Findings, and Policy Options for Increasing Progressivity of Taxation.

The foregoing section on tax incidence results has considered various aspects of the distributional impact of indirect taxation in Bangladesh. On the whole, the incidence of total indirect taxation is mildly progressive. Overall, the incidence of import taxation appears to be proportional to household income, while that of domestic indirect taxation is mildly progresive. A comparison of the incidence of indirect taxes in urban and in rural areas has shown that the burden is somewhat higher in urban areas, the percentage burden of indirect taxation being about 1/2% greater in urban areas for lower households and about 1% greater for higher income households. A comparison of the distribution of indirect taxation in the neighbouring countries of India and Pakistan, which face many problems similar to Bangladesh in tax administration, has shown that there is nothing inevitable in these particular pattern: in India, for example, indirect taxation is found to be progressive in regard to both the imported and the domestic components of expenditure, while in Pakistan, taxation of both components is moderately regressive.

In considering whether these findings of a very modest degree of progressivity of the indirect tax system should provoke a review of policy options, it is necessary to take into account both the reliability of the findings and the priority to be given to reducing economic inequality as a policy objective. On reliability, we have discussed at some length the much greater degree of progressivity of indirect tax shown in the World Bank study of Bangladesh, but also the difficulty of reconciling that degree of progressivity with published information and the study's description of the methods used; we have also acknowledged that our estimate of distributional impact is limited to effects on the 'uses' side, but have given reasons for regarding estimates of distributional impacts of indirect taxation on the 'sources' side, based on computable general equilibrium models, as considerably more speculative.

The priority to be given to reducing economic inequality is a political rather than an economic decision, but it is a widespread view, reflected also in the pronouncements of international bodies, that a reduction in present levels of inequality would be desirable. Given the predominance of indirect taxation in total revenue in Bangladesh, it is therefore a matter of concern that, at least as measured in this study, it appears to be an ineffective instrument of redistribution. In the section which follows, therefore, we consider possible ways of making the tax system more progressive without incurring heavy costs in terms of revenue loss or adverse economic effects.

There may be several policy option before the Government of Bangladesh for these purposes: (1) to increase the progressivity of the direct tax system impinging on more of the people in the higher income classes, (2) to introduce value added tax (VAT) and (3) to make the indirect tax system more progressive.

5.1 Direct Tax

Since we are mainly concerned with the incidence of indirect taxes, we shall discuss very briefly the loopholes in direct taxation and the possible changes that could be introduced, to have greater progressivity in the tax system.

Income tax is the most important direct tax in Bangladesh the main sources of which are personal income tax, corporate income tax and agricultural income tax. Agricultural income tax is negligible. Personal income tax is realized mainly from salaried employees and self-employed persons. A major part of income tax is realized from the corporate sector, which contributes about 70% of the total income tax (vide Table 12 Chapter 1). Personal income tax covers a fairly wide range of subjects but liberal provisions of tax exemptions, exclusions, deductions and allowances have eroded the personal income tax base to a considerable extent (Income Tax Order 1984). A high global exemption limit together with availability of legal loopholes has reduced the effectiveness of progressive rate structure of income taxation in Bangladesh. The allowances need to be rationalized and restricted to selective activities in order to make them effective.The companies also enjoy incentive allowances in the form of tax holiday and accelerated depreciation allowances. There are questions regarding the usefulness of these incentive measures on efficiency and equity grounds. An estimate shows that Government "lost" about Taka 130 million revenue in 1984 -85 for tax holiday provision (World Bank Report No. 7196-BD Vol 1, 1989 pp. 26) It is also estimated that a change from tax holiday to accelerated depreciation allowances (ADA) would lead to a cumulative revenue gain over 10 year period to more than Taka 1 billion in 1984-85 prices (Ibid pp. 27). For agricultural sector where avoidance of income tax payment is easy, introduction of presumptive tax may increase tax revenue from this source if enforced firmly (Musgrave, 1989, pp. 253). It may,however, be a less effective tax handle to administer in Bangladesh. A graduated land tax system may be better alternative to raise larger revenue from the agricultultural sector in an equitable way.

5.2. Value Added Tax (VAT)

VAT has been introduced in Bangladesh from July 1991 at manufacturing-cum-import tax stage. VAT would replace the present excise tax on all domestically produced goods except tobacco, gas and petroleum products for revenue and administrative reasons. At the import stage, VAT would replace the present sales tax on duty paid value of imports. Thus VAT is introduced in the organized sectors only at the initial stage. It does not extend to retail level for administrative limitations, presence of too many small enterprises and for poor accounting system. It is a consumption type tax based on destination principle, the final destination being the consumers in Bangladesh.

The tax is imposed at an uniform rate of 15% on all domestically produced goods registered under excise tax having annual turnover of sales above Tk. 200,000 and on imported goods subject to sales tax. Small scale enterprises and most of the wholesale and retail trades and specified services (banking and hotel) will remain exempt from VAT (VAT: General Information. NBR. May 1991. pp. 4-5). Besides, tobacco products, gas, petroleum, oil and lubricants will also remain outside the purview of VAT for initial administrative difficulties (Annual Budget. 1991-92. pp. 20). There will however, be standard VAT rate on these items at import level. Luxuries and non-necessities will be treated under supplementary excise tax rates. It is therefore similar to Modified VAT or ModVAT introduced in India in 1986 where major revenue earning domestic products and small enterprises were kept under the existing excise tax system and VAT was introduced in a limited scale (Jha and Srinivashan, 1989).

Under this system, the seller adds VAT at the standard rate to its sales of output and deducts certified payments of VAT on its purchases of raw materials and capital goods. The net amount of VAT is paid to the authorities. The introduction of VAT at an uniform rate is expected to make the tax system more efficient by broadening the base, eliminating discrimination between domestic production and import, reducing cascading effects and making the tax system more transparent. Such expectations may be ambitious, since the major revenue earning items are kept outside the VAT network at both domestic and import level. Whether the system would be equitable also is a matter of investigation. It is expected that input crediting would reduce the effective tax rates, reduce product prices and make the system more equitable. The realization of much of these expectations would depend on efficient tax administration and elimination of tax avoidance inspite of the feature of self-policing and cross-checking under VAT. It would take sometime to know the effectiveness of VAT in these regards, At present, it is too early to make an assessment of the impact of VAT on the tax structure of Bangladesh. It is reported in the Budget speech by the Finance Minister that the loss of revenue due to input crediting has to be made up by raising the rates of excise tax on gas and liquor, and of customs duty by 10% on all imported goods except a few (Ibid. pp. 13 and 21). There are pressures on NBR to raise the registration ceiling and lobbying in NBR for exempting certain enterprises.[27]

[27] Interview with some NBR officials.

A single uniform VAT rate does not seem to be suitable to achieve the equity objective in Bangladesh, though it simplifies administration in the initial stages. Two or three rates are more common in countries having VAT. Korea and China started with a single rate but now have three rates. (World Bank Report No. 7196-BD. Vol II. 1989. pp. 18.) However, the introduction of VAT itself was a challenging task for the Government of Bangladesh. It may need modification later on with the gaining of experience and initial adjustment. Whatever may be the changes, unless government remains firm on its stand, the objectives may not be realized.

A point to be noticed in defence of the introduction of VAT on a single-rate basis is that the existing system of multiple rates of excise taxation "does not" appear to achieve a marked degree of progressivity: so replacement of multiple rates by a single VAT, particularly by one which zero-rated basic foods, would not introduce a markedly less redistributive system.

5.3. Making the Existing Indirect Tax System more Progressive.

Since VAT is being introduced in a very limited scale in Bangladesh, it may be worthwhile to explore the possibility of making the existing indirect tax system more progressive. As is evident from our tax incidence study, the indirect tax system in Bangladesh has little redistributive effects. The system can be made more progressive by selecting alternative tax rates for different products on the basis of criteria which reflect this objective.

In general, inputs need to be exempted to avoid cascading effects of taxes. The inputs are however, taxed for revenue reasons or, to reach the consumers who would otherwise not be covered easily by the tax net, e.g., cement for luxury construction. The rates on inputs however, need to be kept as low as possible if they are taxed. The necessities ought to be taxed at a very low rate to put minimum pressure on the low income groups. Non-necessities should be taxed at a higher rate than necessities, and luxury consumption should be subject to the highest rate of taxation.

Besides such general criteria for selecting tax rates on commodities, it is necessary to examine the nature of price elasticity of demand for the items so that revenue does not decrease with increases in tax rates. In general, necessities have low price elasticities, but they also have low income elasticities, so that revenue does not increase in proportion to the increase in income. Luxury items on the other hand have by definition, high income elasticities of demand while the elasticity of the non-necessities may vary in between.

Necessities and mass consumption goods are lucrative targets for the governments of developing countries to raise larger revenue easily. Taxation, however, needs to be based on equity grounds also, if reduction of inequality is an aim of policy. There are some commodities which need special treatment like narcotics, alcohol and tobacco products. Such merit goods can be taxed at a high rate to discourage their consumption. Since many consumers are to some degree, addicted to these products, the reduction in consumption is unlikely to be so severe that the imposition of higher rates actually involves a loss of tax revenue.

In the section which follows, some simulations are carried out to examine the consequences of trying to amend the tax system to take these considerations into account.

5.3 (a) Simulation Exercises

We selected three different scenarios for simulation exercises. Commodities, other than tobacco and gas, are classified into four groups: A (preponderantly consumed by low income groups), B, C, and D (preponderantly consumed by high income groups). We simulated three tax systems: a high rate, a medium rate and a low rate, with these four groups of commodities. For each group, a uniform nominal rate of excise tax, increasing from group A to group D is applied to all commodities within the group. The tax rates used in the simulations are presented in table 14.

TABLE 14
Simulation Tax Rate Scenario

Commodity Groups	Simulation		
	High Rate	Medium Rate	Low Rate
A	0	0	0
B	.10	.05	.005
C	.15	.10	.05
D	.20	.15	.10

The assignment of commodities into groups A, B, C and D is presented in table 15. For instance, basic food and clothing, etc. which are preponderantly consumed by lower household income groups are assigned to group A, while livestock, pharmaceuticals, transport equipment, professional services etc., which are largely consumed by the higher household income groups, are assigned to group D. Gas and tobacco are excluded from these groups: on the principle that these commodities are currently taxed at extremely high rates and that "an old tax is a good tax," the existing tax rates are applied to these two commodities in all the simulations.

The commodities are put to different rates according to their observed income elasticities of demand. The classification is determined by observing the proportional expenditures of income groups on commodities in each sector out of total expenditures in both the urban and rural areas. The data on household expenditures matched with input-output sector categories are used for the purpose. Demand for some of the commodity groups is found to be quite responsive to income while some other commodity groups are found to have medium or low responses. Taking low rate simulation as an illustration, the commodities having low responses are put to 0% category, the ones with low to medium are put to 0.5% category and the ones with medium and high responses are put to 5% and 10% categories. Similar procedure is followed in selecting tax rates for medium and high scenario.[28]

5.3 (a.1) Domestic Tax Simulation

The simulated nominal domestic taxes are used to estimate effective tax rates for domestic products. Using equation (11) of effective tax in Chapter 5, we have estimated simulated effective taxes by replacing t^d with t^d_s as follows:

$$t^{de'} = t^{d'}[I-A^d]^{-1} \ldots (11)$$

[28] The selection of tax rates for particular commodity groups has been constrained owing to the level of aggregation of the commodity groups. More disaggregative data produce better tax incidence results. Thus Kakwani (1986) used 350 sector I-O table of Australia to study sales tax progressivity. In Bangladesh, certain goods like beverages in other food groups includes intoxicating drinks also and deserve to be treated under high tax rate, but the level of aggregation restrained us from using high rates for this group. We have suggested some tax rates for certain services on the basis of demand responses. These service sectors had zero nominal taxes. There might be some administrative problems in handling these taxes which however need to be overcome gradually to tap growing sources of revenue to the government.

$$t_s^{de'} = t_s^{d'}[I-A^d]^{-1} \ldots\ldots (11a)$$

where:

$t_s^{de'}$ = Simulated effective tax.

t_s^d = Simulated nominal tax on domestic product.

TABLE 15
Simulated Nominal and Effective Domestic Taxes

SECTORS	t_{s1}^d	t_{s1}^{de}	t_{s2}^d	t_{s2}de2	t_{s3}^d	t_{s3}^{de}	Groups
RICE	0.00000	0.02840	0.00000	0.02140	0.00000	0.01450	A
WHEAT	0.00000	0.03311	0.00000	0.02489	0.00000	0.01680	A
COARSE GRAIN	0.00000	0.02198	0.00000	0.01637	0.00000	0.01082	A
JUTE	0.00000	0.04729	0.00000	0.03529	0.00000	0.02336	A
SUGAR CANE	0.00000	0.03181	0.00000	0.02428	0.00000	0.01687	A
COTTON	0.00000	0.01521	0.00000	0.01136	0.00000	0.00754	A
TOBACCO	0.00000	0.08878	0.00000	0.06845	0.00000	0.04882	A
POTATO	0.00000	0.01327	0.00000	0.00993	0.00000	0.00669	A
VEGETABLES	0.00000	0.02474	0.00000	0.01870	0.00000	0.01275	A
PULSES	0.00000	0.01513	0.00000	0.01121	0.00000	0.00738	A
OIL SEEDS	0.00000	0.01749	0.00000	0.01320	0.00000	0.00916	A
FRUITS	0.00000	0.00879	0.00000	0.00651	0.00000	0.00429	A
TEA	0.15000	0.16952	0.10000	0.11497	0.05000	0.06051	C
OTHER CROPS	0.00000	0.02771	0.00000	0.02073	0.00000	0.01384	A
LIVESTOCK	0.20000	0.21212	0.15000	0.15932	0.10000	0.10655	D
FISH	0.00000	0.01590	0.00000	0.01110	0.00000	0.00716	A
FORESTRY	0.00000	0.01475	0.00000	0.01102	0.00000	0.00731	A
OTHER FOOD	0.10000	0.14910	0.05000	0.08511	0.00500	0.02663	B
EDIBLE OIL	0.00000	0.01651	0.00000	0.01224	0.00000	0.00822	A
SUGAR & GUR	0.15000	0.17801	0.10000	0.12069	0.05000	0.06375	C
SALT	0.00000	0.02272	0.00000	0.01632	0.00000	0.01004	A
YARN	0.00000	0.00435	0.00000	0.00322	0.00000	0.00212	A
CLOTH-MILLMADE	0.15000	0.18602	0.10000	0.12708	0.05000	0.06512	C
CLOTH-HANDLOOM	0.00000	0.03312	0.00000	0.02424	0.00000	0.01238	A
GARMENTS: RM	0.00000	0.05116	0.00000	0.03635	0.00000	0.02124	A

JUTE TEXTILES	0.10000	0.15945	0.05000	0.09354	0.00500	0.03292	B
PAPER	0.00000	0.05850	0.00000	0.04265	0.00000	0.02692	A
LEATHER & L. PROD.	0.20000	0.35718	0.15000	0.26731	0.10000	0.17750	D
CHEMICAL FERTILIZER	0.20000	0.28560	0.15000	0.22114	0.10000	0.15839	D
PHARMACEUTICALS	0.20000	0.26457	0.15000	0.19705	0.10000	0.12959	D
CHEMICALS	0.15000	0.22852	0.10000	0.15844	0.05000	0.08846	C
PETROLEUM PRODUCTS	0.15000	0.19601	0.10000	0.13098	0.05000	0.06596	C
CEMENT	0.15000	0.18844	0.10000	0.13236	0.05000	0.07766	C
STEEL & BASIC METALS	0.10000	0.15181	0.05000	0.19203	0.00500	0.03214	B
METAL PRODUCTS	0.15000	0.24224	0.10000	0.16911	0.05000	0.09860	C
MACHINERY	0.20000	0.23155	0.15000	0.17313	0.10000	0.11618	D
TRANSPORT EQUIPMENT	0.20000	0.22959	0.15000	0.17274	0.10000	0.11749	D
WOOD AND W. PRODS.	0.00000	0.01823	0.00000	0.01385	0.00000	0.00956	A
TOBACCO PRODUCTS	0.52035	0.54077	0.52035	0.53580	0.52035	0.53094	*
OTHER INDUSTRY	0.00000	0.06076	0.00000	0.04627	0.00000	0.03200	A
URBAN HOUSE BLDG	0.00000	0.04413	0.00000	0.03373	0.00000	0.02684	A
RURAL HOUSE BLDG	0.00000	0.02778	0.00000	0.02085	0.00000	0.01604	A
OTHER CONSTRUCTION	0.00000	0.04688	0.00000	0.03512	0.00000	0.02716	A
ELECTRICITY	0.15000	0.24922	0.10000	0.18237	0.05000	0.11558	C
GAS	0.50155	0.50441	0.50155	0.50373	0.50155	0.50308	*
TRADE	0.00000	0.00578	0.00000	0.00418	0.00000	0.00260	A
TRANSPORT	0.20000	0.22694	0.15000	0.17013	0.10000	0.11345	D
HOUSING SERVICE	0.20000	0.21366	0.15000	0.15960	0.10000	0.10591	D
HEALTH SERVICE	0.15000	0.18669	0.10000	0.12717	0.05000	0.06778	C
EDUCATION SERVICE	0.15000	0.15208	0.10000	0.10148	0.05000	0.05090	C
PUB. ADMINSTRATION	0.00000	0.02994	0.00000	0.02218	0.00000	0.01481	A
BANKING & INSURANCE	0.15000	0.17097	0.10000	0.11558	0.05000	0.06040	C
PROF. & OTHER SERVICE	0.20000	0.20709	0.15000	0.15522	0.10000	0.10336	D

Note: ts1d, ts2d, ts3d are simulated nominal taxes and ts1de, ts2de, ts3de are simulated effective taxes of high, medium and low scenarios. A, B, C, D are commodity groupings with low, low-medium, medium & high response.

* marks show existing rates on tobacco products and gas.

Table 15 shows the simulated nominal and effective tax vectors estimated for domestic products on the basis of three scenarios. $T_{s1}{}^{d}$, $T_{s2}{}^{d}$, $T_{s3}{}^{d}$ are high, medium and low nominal tax rates, and $T_{s1}{}^{de}$, $T_{s2}{}^{de}$, $T_{s3}{}^{de}$ are the corresponding simulated effective domestic taxes.

The simulated effective domestic taxes are higher that the benchmark taxes (Table 1, in Chapter 5). Most of the agricultural commodity groups' taxes have increased due to the imposition of taxes on fertilizer and raising taxes on machineries (which includes agricultural machineries also). There is of course a problem, because the commodities which are selected for high rates of taxation under simulation procedure as they are mainly consumed by the rich, may also to some extent, be consumed by the poor. Thus, for example, taxing fertilizer is a problem for Bangladesh as it is used by all the farmers, though in much larger proportion by the rich farmers.[29] The poorer farmers could be subsidized, but this solution may not be very effective as the distribution channel may not be very efficient in delivering the good properly to the deserving candidates. Taxing of the machinery group is posing a problem owing to the level of aggregation. The tax rates can therefore be modified on the basis of practical problems, equity considerations and development needs.

5.3 (a.2) Import Tax Simulation

Similar changes can be made in the import tax rates for final goods. The reforming of the import tax rate structure, however, is complicated, as it involves many critical considerations. The question of trade liberalization along with some protection to foster

[29] It is, however, a general problem that the poor consume some of the commodities which are mainly consumed by the rich.

domestic industries are critical for Bangladesh. At the same time, the objective of moving away from trade based taxes to domestic taxes for revenue purposes is important. It is desirable to set appropriate tax rates with these considerations in mind.

5.3 (a.2.1) Case 1

We can consider the case of providing zero protection to domestic industries to make them competitive. To achieve this objective, we have to set nominal import tax rates similar to the rates that fall on domestic production, i.e, domestic effective taxes and the effective imported input taxes. The simulated nominal import tax vector is constructed in the following way.

From our demand equation (10) in chapter 5, we derived the total effective tax on domestic production as:

$$t^{e'} = t^{d'}(I-A^{d})^{-1} + t^{m'}A^{m}(I-A^{d})^{-1} \ldots\ldots (13)$$

$$= t^{de'} + t^{me'}$$

where:

$t^{de'}$ = vector of domestic effective tax;

$t^{me'}$ = vector of effective tax on imported inputs that enter into domestic production.

For zero protection case therefore we have to assume that these two taxes which fall on domestic production are equal to nominal import tax so that imported goods would be fully competitive with the domestic goods. Thus we know that $t^e =/= t^m$ in general, but if we impose the condition that $t^e = t^m$, then we cannot pick t^e and t^m arbitrarily. For given t^d_s (simulated t^d), we must choose t^m_s (simulated $t^{m'}$) so as to satisfy the (matrix) equation.

We can therefore rewrite equation (13) as:

$$t_s^{m'} = t_s^{d'}(I-A^d)^{-1} + t_s^{m'}A^m(I-A^d)^{-1} \ldots\ldots (13a)$$

To find $t_s^{m'}$, therefore we have to find a given value of $t_s^{m'}$ which can satisfy this equation (13a). Given the condition $t^e = t^m$, we can solve equation (13a) to find $t_s^{m'}$ as follows:

$$t_s^{m'}[I-A^m(I-A^d)^{-1}] = t_s^{d'}(I-A^d)^{-1}$$

or,

$$t_s^{m'} = t_s^{d'}(I-A^d)^{-1}[I-A^m(I-A^d)^{-1}]^{-1}$$

and,

$$t_s^{me'} = t_s^{m'}A^m(I-A^d)^{-1}$$

By distributing the simulated nominal and effective import taxes among households income groups we can estimate the tax incidence in the urban and rural sectors and in Bangladesh as a whole.

Table 16 (Case 1) : Simulated Nominal and Effective Import Tax

	I-O Sectors	t^m	$t_{s3}{}^m$	t^{me}	$t_{s3}{}^{me}$
1	RICE	0.00000	0.02245	0.00446	0.00795
2	WHEAT	0.00000	0.02406	0.00376	0.00726
3	COARSE GRAIN	0.00000	0.01436	0.00187	0.00354
4	JUTE	0.00000	0.03111	0.00472	0.00775
5	SUGAR CANE	0.00000	0.03227	0.00785	0.01540
6	COTTON	0.00140	0.01142	0.00174	0.00388
7	TOBACCO	0.08239	0.06464	0.00879	0.01581
8	POTATO	0.00000	0.01037	0.00192	0.00368
9	VEGETABLES	0.00045	0.01964	0.00351	0.00688
10	PULSES	0.00000	0.01105	0.00210	0.00367
11	OIL SEEDS	0.00712	0.01413	0.00259	0.00497
12	FRUITS	0.23082	0.00619	0.00130	0.00190
13	TEA	0.00000	0.06989	0.00667	0.00937
14	OTHER CROPS	0.43091	0.01898	0.00345	0.00514
15	LIVESTOCK	0.03114	0.11006	0.00517	0.00351
16	FISH	0.00000	0.06788	0.01016	0.01072
17	FORESTRY	0.00000	0.01163	0.00322	0.00432
18	OTHER FOOD	0.01502	0.04673	0.04402	0.02010
19	EDIBLE OIL	0.14685	0.02010	0.00895	0.01188
20	SUGAR & GUR	0.35167	0.07494	0.00777	0.01119
21	SALT	0.11787	0.02025	0.01270	0.01020
22	YARN	0.31139	0.01187	0.00266	0.00975
23	CLOTH-MILLMADE	0.10665	0.08791	0.06859	0.02279
24	CLOTH-HANDLOOM	0.00000	0.03042	0.06739	0.01803
.25	READYMADE GARMENTS	0.33155	0.07359	0.05895	0.05235
26	JUTE TEXTILES	0.00000	0.05664	0.01712	0.02372
27	PAPER	0.20128	0.05971	0.04572	0.03279
28	LEATHER & L. PRODUCTS	0.15394	0.19565	0.01709	0.01815
29	CHEMICAL FERTILIZER	0.00000	0.17806	0.02772	0.01967
30	PHARMACEUTICALS	0.03495	0.15385	0.04616	0.02426
31	CHEMICALS	0.24264	0.11221	0.02913	0.02376
32	PETROLEUM PRODUCTS	0.08361	0.13748	0.04393	0.07152

33	CEMENT	0.10534	0.20912	0.04745	0.08146
34	STEEL & BASIC METALS	0.23435	0.14677	0.07702	0.05962
35	METAL PRODUCTS	0.06085	0.14616	0.05080	0.04757
36	MACHINERY	0.07850	0.15924	0.04302	0.04306
37	TRANSPORT EQUIPMENT	0.09585	0.14445	0.03166	0.02696
38	WOOD AND WOOD PRODUCTS	0.03567	0.02093	0.01085	0.01137
39	TOBACCO PRODUCTS	0.04900	0.54490	0.01597	0.01396
40	OTHER INDUSTRY	0.32336	0.06428	0.04393	0.03228
41	URBAN HOUSE BUILDING	0.00000	0.09501	0.10019	0.06818
42	RURAL HOUSE BUILDING	0.00000	0.04794	0.03848	0.03190
43	OTHER CONSTRUCTION	0.00000	0.10643	0.08931	0.07926
44	ELECTRICITY	0.00000	0.17516	0.03698	0.05958
45	GAS	0.00000	0.50642	0.00239	0.00334
46	TRADE	0.00000	0.00390	0.00153	0.00130
47	TRANSPORT	0.00000	0.14305	0.02177	0.02960
48	HOUSING SERVICE	0.00000	0.11209	0.00811	0.00618
49	HEALTH SERVICE	0.00000	0.08472	0.01755	0.01694
50	EDUCATION SERVICE	0.00000	0.05223	0.00183	0.00133
51	PUBLIC ADMINISTRATION	0.00000	0.03408	0.01947	0.01926
52	BANKING & INSURANCE	0.00000	0.06554	0.00659	0.00514
53	PROF. & OTHER SERVICES	0.00000	0.10607	0.00395	0.00271

Note: $t_s^{m'} = t_s^{d'}(I-A)^{-1}[I-A^m(I-A^d)^{-1}]^{-1}$; $t_s^{me'} = t_s^{m'}.A^m(I-A^d)^{-1}$

5.3 (a.2.2) Case 2

Many domestic industries in Bangladesh have been enjoying protection for a long time behind a high tariff wall and too many exemptions and exceptions. This has made the system unnecessarily complicated and difficult to administer. Zero protection however, does not seem to be a desirable objective at this stage of development of Bangladesh. There are certain industries for which there would always be protection, e.g. jute, tea, leather - the major export industries in Bangladesh. There is also a strong case to provide protection to the domestic capital goods sector. If demand response is in favor of such imported goods, then the unprotected domestic capital goods sector would have a set back and loose linkages with final goods industries. Finished goods containing these inputs can be imported instead to make domestic production of such final goods efficient. There may be some other industries also which would need protection for sometime. Some degree of competitiveness however may be better for other industries to ensure better efficiency. Moderate tax rates with fewer exceptions may be a better alternative to the existing system.

We, therefore, have to simulate new nominal import tax rates with this criterion of providing protection to the deserving industries (table 16.b). In this case, we impose the condition that:

$$t_s^{m'} = t_s^{e'} + h'$$

where h' is constructed so that:

$$h_i = \max(0, t_i^m - t_i^e),$$

i.e., when industries are currently receiving positive protection, they continue to receive the same degree of positive protection under the simulation, whereas when industries are currently receiving negative or zero protection, they receive zero protection under the simulation.

Adding these rates to $t_s^{e'}$, we get $t_s^{m'}$ for case 2. We then get the equation:

$$t_s^{m'} = t_s^{d'}(I-A^d)^{-1} + t_s^{m'}A^m(I-A^d)^{-1} + h' \ldots\ldots (13b)$$

or,

$$t_s^{m'}[I-A^m(I-A^d)^{-1}] = t_s^{d'}[I-A^d]^{-1} + h'$$

or,

$$t_s^{m\prime} = [t_s^d(I-A^d)^{-1} + h]\,[I-A^m(I-A^d)^{-1}]^{-1}$$

and we get:

$$t_s^{me\prime} = t_s^{m\prime}A^m(I-A^d)^{-1}$$

Distributing $t_s^{m\prime}$, $t_s^{me\prime}$, among rural and urban household income groups, we can estimate the simulated import tax incidence for Case 2.

TABLE 16(b) : Simulated Nominal and Effective Import Tax

	I-O Sectors	t^m	t^m_s	t^{me}	t^{me}_s
1	RICE	0.0000	0.0250	0.0045	0.0105
2	WHEAT	0.0000	0.0262	0.0038	0.0095
3	COARSE GRAIN	0.0000	0.0155	0.0019	0.0047
4	JUTE	0.0000	0.0338	0.0047	0.0105
5	SUGAR CANE	0.0000	0.0362	0.0078	0.0194
6	COTTON	0.0014	0.0123	0.0017	0.0048
7	TOBACCO	0.0824	0.1289	0.0088	0.0224
8	POTATO	0.0000	0.0114	0.0019	0.0047
9	VEGETABLES	0.0005	0.0216	0.0035	0.0089
10	PULSES	0.0000	0.0120	0.0021	0.0046
11	OIL SEEDS	0.0071	0.0176	0.0026	0.0066
12	FRUITS	0.2308	0.2352	0.0013	0.0025
13	TEA	0.0000	0.0725	0.0067	0.0120
14	OTHER CROPS	0.4309	0.4462	0.0034	0.0070
15	LIVESTOCK	0.0311	0.1375	0.0052	0.0075
16	FISH	0.0000	0.0735	0.0102	0.0163
17	FORESTRY	0.0000	0.0132	0.0032	0.0059
18	OTHER FOOD	0.0150	0.0837	0.0440	0.0570
19	EDIBLE OIL	0.1468	0.1602	0.0089	0.0172
20	SUGAR & GUR	0.3517	0.3991	0.0078	0.0156
21	SALT	0.1179	0.1282	0.0127	0.0181
22	YARN	0.3114	0.3067	0.0027	0.0112

23	CLOTH-MILLMADE	0.1067	0.1584	0.0686	0.0815
24	CLOTH-HANDLOOM	0.0000	0.0897	0.0674	0.0773
25	READYMADE GARMENTS	0.3316	0.3780	0.0590	0.0901
26	JUTE TEXTILES	0.0000	0.0647	0.0171	0.0317
27	PAPER	0.2013	0.1834	0.0457	0.0596
28	LEATHER & L. PRODUCTS	0.1539	0.3355	0.0171	0.0313
29	CHEMICAL FERTILIZER	0.0000	0.1988	0.0277	0.0404
30	PHARMACEUTICALS	0.0350	0.1913	0.0462	0.0617
31	CHEMICALS	0.2426	0.3194	0.0291	0.0450
32	PETROLEUM PRODUCTS	0.0836	0.1416	0.0439	0.0756
33	CEMENT	0.1053	0.2205	0.0475	0.0928
34	STEEL & BASIC METALS	0.2344	0.3097	0.0770	0.1101
35	METAL PRODUCTS	0.0609	0.1779	0.0508	0.0793
36	MACHINERY	0.0785	0.1855	0.0430	0.0693
37	TRANSPORT EQUIPMENT	0.0959	0.2053	0.0317	0.0471
38	WOOD AND WOOD PRODUCTS	0.0357	0.0435	0.0108	0.0176
39	TOBACCO PRODUCTS	0.0490	0.5544	0.0160	0.0235
40	OTHER INDUSTRY	0.3234	0.3445	0.0439	0.0621
41	URBAN HOUSE BUILDING	0.0000	0.1639	0.1002	0.1370
42	RURAL HOUSE BUILDING	0.0000	0.0730	0.0385	0.0569
43	OTHER CONSTRUCTION	0.0000	0.1640	0.0893	0.1368
44	ELECTRICITY	0.0000	0.1843	0.0370	0.0687
45	GAS	0.0000	0.5076	0.0024	0.0045
46	TRADE	0.0000	0.0049	0.0015	0.0023
47	TRANSPORT	0.0000	0.1512	0.0218	0.0378
48	HOUSING SERVICE	0.0000	0.1175	0.0081	0.0116
49	HEALTH SERVICE	0.0000	0.0979	0.0176	0.0301
50	EDUCATION SERVICE	0.0000	0.0535	0.0018	0.0026
51	PUBLIC ADMINSTRATION	0.0000	0.0458	0.0195	0.0310
52	BANKING AND INSURANCE	0.0000	0.0702	0.0066	0.0098
53	PROFESSIONAL & OTHER SERVICES	0.0000	0.1088	0.0039	0.0055

Note: $t_s^{m'} = t_s^{d'}\,[(I-Ad)^{-1} + h']\,[I-A^m(I-A^d)^{-1}]^{-1}$

$t_s^{me'} = t_s^{m'}.A^m(I-A^d)^{-1}$

5.3 (b) <u>Simulation Results.</u>

5.3 (b.1) Results of Domestic Tax Simulation.

Table 17 shows the results of tax incidence simulation for three different scenario of tax changes for domestic products as given by t_{s1}^{de}, t_{s2}^{de}, and t_{s3}^{de}.

TABLE 17
Simulated Domestic Tax Incidence in the Rural & Urban Areas in Bangladesh (1986-87).

Monthly Household Income Groups of 1983-84		t^{de}_{s1}		t^{de}_{s2}		t^{de}_{s3}	
		rural	urban	rural	urban	rural	urban
1	(O-500)	8.46	8.63	5.99	5.88	3.73	3.37
2	(50O-749)	8.73	11.24	6.17	8.00	3.96	4.94
3	(75O-999)	8.69	10.36	6.17	7.87	3.99	5.80
4	(100O-1249)	8.34	9.04	5.99	6.54	4.01	4.42
5	(1250-1499)	8.36	9.83	6.03	7.20	4.06	4.96
6	(1500-1999)	8.71	10.26	6.28	7.57	4.25	5.32
7	(2000-2499)	10.02	10.69	7.27	7.89	4.93	5.52
8	(2500-2999)	9.21	10.62	6.63	7.77	4.44	5.35
9	(3000-3999)	9.64	11.15	6.98	8.20	4.69	5.68
10	(4000-4999)	9.71	11.83	7.02	8.71	4.70	5.99
11	(5000-5999)	10.16	12.24	7.38	9.02	4.95	6.20
12	(6000-6999)	10.52	13.81	7.66	10.31	5.13	7.18
13	(7000-7999)	11.19	14.58	8.16	10.95	5.41	7.70
14	(8000+)	12.04	15.18	8.71	11.39	5.70	7.95

Source: Computed from Table 15

The effects of introducing a new set of tax rates can be observed in the distribution pattern of the domestic tax burden for the three cases in the rural and urban areas. In the case of low scenario (with t_{s3}^{d}), the distribution of domestic tax burden shows smooth progressivity over the ranges. The results of medium and high scenario also show progressive distribution of tax burden though there are some fluctuations in the beginning and the middle income groups. The domestic tax incidence in all the three cases are however, much higher compared to the benchmark situation (in table 7) which ranged between 1 to 1.3 percent for the rural and 1 to 2.3 percent for the urban bottom and top income group. The tax incidence for the low scenario is however not high compared to those in Pakistan and India (vide Table 5 and 6). The tax burden distribution in Bangladesh however, can be modified by scaling down the nominal domestic tax rates, while maintaining the same degree of progressivity over the range. The changes in the nominal domestic tax rates has resulted into more than tripling of the domestic tax revenue from the benchmark revenue, increasing from Tk.9143.7 mn. to Tk.35135.3 mn. If we reduce the nominal domestic tax rates by two-thirds, the incidence pattern would be somewhat like 1.25 percent for the bottom and 1.90 percent for the top income group in the low scenario. Since the ratios calculated would all be reduced by two-thirds, revenue would reduce by two-thirds, but would still have moderate increases.

The simulation exercises thus indicate that within the existing system of non-rebatable excises, it would be possible to choose a rate structure which would be more logical and would make the system more progressive, provided the problems of administering the system, particularly those associated with introducing excise taxation on services, could be overcome.

5.3 (b.2) Results of Import Tax Simulation

In estimating $t_s^{m'}$ for both case 1 and 2, we have used simulated nominal domestic tax rates of low scenario, since it resulted in a domestic tax burden most nearly comparable with the present one. The simulated import tax incidence results of case 1 and 2 are presented in table 18 and table 19, along with simulated domestic tax incidence and the total indirect tax incidence,for rural and urban sectors. The tables 20(a) and 20(b) show the simulated total indirect tax results for Bangladesh as a whole.

Table 18 shows that imported input and final import taxes are proportional in case 1 for both the rural and urban areas so that the total import tax distribution is proportional in both the areas . In case 2 (table 19) the imported input tax burden is slightly regressive and final input tax burden is slightly progressive in both the areas leading to proportional distribution of total import tax. The only difference is that the import tax burden is scaled up in case 2 relative to case 1, due to positive protection to some sectors so that the total indirect tax burden is higher in the rural and urban sectors in case 2 relative to case 1. The total indirect tax burden in both the rural and urban areas is however progressive due to he progressivity of the domestic tax. The urban indirect tax is more progressive relative to the rural indirect tax in both the cases. The table show that the domestic taxes are higher than the import taxes though in case 2, the difference between these two tax burden for the rural bottom income groups is almost nil. These results show that the objective of moving away from trade based to domestic tax based revenue is possible to achieve.

TABLE 18

Simulated Indirect Tax Incidence in Rural and Urban Area (Case 1)

(1986-87)

	Simulated Rural Indirect Tax Incidence					Simulated Urban Indirect Tax Incidence				
MHHI-G	Domestic Tax Incidence	Final Import Tax	Imported Input Tax	Total Rural Import Tax	Total Rural Indirect Tax	Domestic Tax Incidence	Final Import Tax	Imported Input Tax	Total Urban Import Tax	Total Urban Indirect Tax
	%	%	%	%	%	%	%	%	%	%
(0-500)	3.73	0.97	0.88	1.85	5.58	3.37	0.99	1.02	2.01	5.38
(500-749)	3.96	0.85	0.93	1.79	5.75	4.94	1.31	1.12	2.43	7.37
(750-999)	3.99	0.86	0.92	1.77	5.77	5.80	0.82	1.19	2.01	7.80
(1000-1249)	4.01	0.92	0.92	1.84	5.84	4.42	0.81	1.12	1.92	6.34
(1250-1499)	4.06	0.92	0.91	1.83	5.89	4.96	0.82	1.07	1.90	6.85
(1500-1999)	4.25	0.91	0.92	1.83	6.08	5.32	0.82	1.10	1.92	7.24
(2000-2499)	4.93	0.88	0.89	1.77	6.70	5.52	0.86	1.11	1.97	7.49
(2500-2999)	4.44	0.89	0.91	1.80	6.24	5.35	0.84	1.09	1.93	7.28
(3000-3999)	4.69	0.93	0.89	1.82	6.52	5.68	0.89	1.07	1.96	7.64
(4000-4999)	4.70	0.95	0.89	1.85	6.55	5.99	0.85	1.06	1.91	7.90
(5000-5999)	4.95	0.97	0.84	1.81	6.76	6.20	0.93	1.03	1.96	8.17
(6000-6999)	5.13	0.97	0.83	1.80	6.93	7.18	0.93	1.03	1.96	9.14
(7000-7999)	5.41	1.04	0.82	1.86	7.27	7.70	0.85	0.85	1.71	9.41
(8000+)	5.70	1.09	0.82	1.91	7.61	7.95	1.09	1.00	2.09	10.04

TABLE 19 (Case 2)

Simulated Indirect Tax Incidence in Rural and Urban Area (1986-87)

	Simulated Rural Indirect Tax Incidence					Simulated Urban Indirect Tax Incidence				
MHHI-G	Domestic Tax Incidence	Final Import Tax	Imported Input Tax	Total Rural Import Tax	Total Rural Indirect Tax	Domestic Tax Incidence	Final Import Tax	Imported Input Tax	Total Urban Import Tax	Total Urban Indirect Tax
	%	%	%	%	%	%	%	%	%	%
(0-500)	3.73	1.77	1.72	3.50	7.23	3.37	1.99	1.93	3.92	7.29
(500-749)	3.96	1.58	1.89	3.47	7.44	4.94	2.47	2.25	4.71	9.65
(750-999)	3.99	1.59	1.83	3.42	7.41	5.80	1.55	2.37	3.92	9.72
(1000-1249)	4.01	1.66	1.81	3.47	7.47	4.42	1.50	2.20	3.71	8.12
(1250-1499)	4.06	1.66	1.77	3.44	7.50	4.96	1.54	2.12	3.66	8.62
(1500-1999)	4.25	1.66	1.80	3.47	7.72	5.32	1.57	2.17	3.74	9.06
(2000-2499)	4.93	1.61	1.79	3.39	8.33	5.52	1.63	2.21	3.84	9.36
(2500-2999)	4.44	1.61	1.81	3.42	7.86	5.35	1.58	2.17	3.75	9.10
(3000-3999)	4.69	1.67	1.77	3.44	8.14	5.68	1.68	2.13	3.80	9.48
(4000-4999)	4.70	1.70	1.78	3.48	8.18	5.99	1.62	2.12	3.74	9.73
(5000-5999)	4.95	1.73	1.68	3.41	8.35	6.20	1.73	2.06	3.79	9.99
(6000-6999)	5.13	1.75	1.66	3.41	8.54	7.18	1.73	2.07	3.80	10.98
(7000-7999)	5.41	1.85	1.65	3.50	8.91	7.70	1.57	2.04	3.61	11.32
(8000+)	5.70	1.91	1.73	3.63	9.33	7.95	1.83	1.98	3.80	11.75

Source: Computed from table 16(b).

The tax incidences are however quite high on the bottom income groups which is not desirable from an equity point of view. These results in tables 18 and 19 are based on the low scenario domestic nominal taxes used to simulate import taxes. If nominal domestic taxes are scaled down, there would be corresponding scaling down of the import taxes. It would however be necessary to estimate the consequent tax revenue changes. If, on the whole , the changes are revenue neutral for total indirect taxes, even though not revenue augmenting, the changes in the tax rates may be desirable. There may however be many other considerations before the policymakers to make the tax rates justified which are not taken into account in these simulations, since these are purely static exercises carried out from status quo given by the estimated benchmark situation.

5.3 (b.3) Results of Simulated Domestic and Import Tax Incidence for Bangladesh.

The tables 20(a) and 20(b) show the simulated domestic and import tax incidence for Bangladesh as a whole for case 1 and case 2. These results can be compared with the estimated benchmark situation given in table 1. The domestic tax incidence is progressive in both case 1 and case 2 as also in the benchmark situation. The import tax incidence is slightly progressive in case 2, whereas in case 1, it is more or less proportional like the original situation. The total indirect tax incidence in Bangladesh is progressive in both the cases and the progression is higher compared to the original situation. The higher progressivity of the total indirect taxes is accounted for higher progressivity of the domestic taxes relative to the import taxes. In the benchmark situation, import taxes are higher than domestic taxes for each income group.It is reverse in the simulated incidence results.

As can be seen from table 20(b), the import taxes are higher in case 2, relative to case 1 for Bangladesh as a whole. This is the result of positive protection for some sectors in case 2 as opposed to zero protection in case 1. The main sectors which are currently receiving positive protection (see table 3, chapter 5), are tea, sugar, mill made cloth, jute textiles, fertilizer, and chemicals. The simulated nominal tax rates are very low in these sectors in case 1. In addition, some sectors (at the level of aggregation at which data are obtained) appear to receive substantial negative protection, in particular pharmaceutical and tobacco products. For these sectors there is little difference between case 1 and case 2 in the simulated import tax rates, although these rates differ substantially from the rates currently being applied.

TABLE 20 (a)
Simulated Total Indirect Tax Incidence in Bangladesh. 1986-87

Simulation (Case 1)	Domestic Tax Incidence	Import Tax Incidence	Total Indirect Tax Incidence
t^{ms}_3 & t^{mse}_3	(%)	(%)	(%)
(O-500)	3.72	2.39	6.11
(5OO-749)	4.02	2.44	6.46
(75O-999)	4.14	2.38	6.52
(100O-1249)	4.05	2.36	6.41
(1250-1499)	4.15	2.33	6.48
(1400-1999)	4.36	2.36	6.72
(2000-2499)	5.00	2.35	7.35
(2500-2999)	4.57	2.34	6.91
(3000-3999)	4.88	2.35	7.23
(4000-4999)	5.10	2.38	7.48
(5000-5999)	5.37	2.36	7.73
(6000-6999)	5.81	2.35	8.16
(7000-7999)	6.09	2.39	8.48
(8000+)	6.27	2.43	8.70

Source: Computed from Tables 15 & 16.

Tables 20(a) and 20(b) also show that, as in the case of rural and urban tax incidence, the bottom income groups are bearing much higher tax burden relative to the benchmark situation. The distribution pattern may however be improved by modifying the tax rates, as discussed in the case of rural and urban tax incidence.

TABLE 20 (b)

Simulated Total Indirect Tax Incidence in Bangladesh. 1986-87

Simulation Case 2	Domestic Tax Incidence	Import Tax Incidence	Total Indirect Tax Incidence
(tms3 and tmes3)	(%)	(%)	(%)
(O-500)	3.72	3.56	7.28
(50O-749)	4.02	3.25	7.27
(75O-999)	4.14	3.25	7.38
(100O-1249)	4.05	3.35	7.40
(1250-1499)	4.15	3.36	7.51
(1400-1999)	4.36	3.36	7.73
(2000-2499)	5.00	3.29	8.29
(2500-2999)	4.57	3.30	7.87
(3000-3999)	4.88	3.44	8.32
(4000-4999)	5.10	3.50	8.60
(5000-5999)	5.37	3.57	8.94
(6000-6999)	5.81	3.60	9.41
(7000-7999)	6.09	3.68	9.77
(8000+)	6.27	3.81	10.08

Source: Computed from Table 15 and 16(b)

6. Conclusion

Taxes imposed by the government to raise revenue reduce the real income of the tax payers. It is necessary to trace out whose income is ultimately reduced and by how much. The question of sharing the tax burden in an equitable way therefore becomes important while mobilizing resources for development financing by the government. The dire need for generating larger revenue often compels the governments of developing countries to overlook the equity aspect of taxation. Such short term solution, however, may prove to be self-defeating in the long run. The question of equity in taxation is all the more important for countries where regressive taxation can create social tensions due to skewed income distribution patterns.

The study of tax incidence is important for countries like Bangladesh, where a major part of government revenue comes from indirect taxes which fall more on consumers goods and intermediate goods having their repercussions on production and distribution. The tax study can help in identifying the sectors and income groups which are undertaxed or overtaxed and provide some basis for possible tax reform measures for better distribution and larger revenue generation. It is argued that heavy dependence on indirect taxes has made the tax system in Bangladesh regressive in effect and that it is necessary to introduce reform measures to make the system more progressive and productive.

The results of our tax incidence study show that the indirect tax system in Bangladesh is mildly progressive. The progression is however accounted for by slight progressivity of the domestic taxes rather than of the import taxes, which are found to be more or less proportional. This is an unexpected result, contrary to the belief that domestic taxes are regressive and import taxes are progressive. As mentioned in our discussion of domestic tax incidence, the element of progressivity is largely accounted for by the tendency for the share of expenditure allocated to tobacco products and gas, overwhelmingly the highest taxed products, to rise with household income, especially at the lower end of the income scale. The proportionality of import taxes is accounted for by the absence of any significant correlation between the rates of import taxation on different goods and their income elasticities of demand. (Our inability to obtain data which identifies the share of imports in household consumption at different income levels is also likely to have contributed to the apparent absence of progressivity).

The effective indirect tax incidence in the urban and rural sectors show the relative total tax burden, consisting of both the domestic and the import taxes on these sectors. The tax burden is progressive in the urban areas and proportional in the rural area. The progressivity in the urban area is however not much relative to the difference in the income levels in the two sectors and between the lower and the upper income classes in both the sectors. Such a distribution pattern is not justified either on equity or on revenue grounds. The degree of progression is not significantly sufficient to reduce the existing income disparity nor to produce growing revenue to the exchequer.

Of course, taxation is only one side of the relationship between the state and individual households. The government expenditure programme also needs to be considered implicitly in evaluating the tax incidence results and in redesigning the tax rate structure to achieve certain policy objectives, e.g. equity, efficiency. The net incidence result may show a different picture from that given by tax incidence results alone. However since expenditure incidences depend on somewhat speculative assumptions about the distribution of benefits from public expenditures, people pay more value to the tax incidence results which impinge on them directly or indirectly. The tax incidence studies are important from this point of view.

The framing of an appropriate tax policy introducing reform measures to achieve the twin objectives of equity and an adequate flow of revenue to the government may be a difficult task and may ultimately need some compromises according to the exigencies of the situation.In the case of economies which are undergoing changes with the development process, their fiscal policies also need to be adjusted to the changes in the economies themselves. It is better if such adjustments are made after careful analysis of the situation on the basis of indepth studies, rather than on an ad-hoc basis.

The observation that the existing tax system is only slightly progressive, leeds to the question how, if at all, could the progressivity be increased. If the proprotionate allocation of expenditure on different commodities were the same at all income levels, indirect taxation, however sructured, could not introduce any progressivity (on the 'uses' side at any rate) into the tax system. However, this extreme situation does not apply in Banglsdesh. A review of the share of the broad sectors of expenditure at different levels of personal income shows that agricultural products tend to form a greater proprotionate share of expenditure at low incomes than at high, whereas the reverse is true for services, and similar variations are observed for individual commodoties.

One possibility is that a radical reform of the tax system, such as the replacement of the existing indirect taxes by VAT, would increase the progressivity of the tax system. This is uncertain. Introduction of VAT may help in reducing cascading effects and thereby reducing the effective tax burden on some sector groups, but revenue neutrality requires that nominal rates of VAT be set, in general, higher than the nominal rates of excises, to offset the rebating of tax on intermediate inputs. Whether the net effect would go in favour of the poorer section would need examination with passing of the initial phase. It seems likely that a single-rate VAT could be progressive if services were effectively included and food zero-rated.

A second possibility is a revision of the rate structure of the existing indirect tax system, so that high tax rates are more closely than at present associated with products with high income-elasticities of demand. As the simulation exercises show, such a revision could substantially increase the progressivity of the system. It would, of course, be necessary to overcome the administrative problems involved in handling these programme: no policy programme can be succesful if not administered efficiently. It would also be necessary to consider reform of the import rate srtucture along with that of the excise rate structure, to avoid unintended favouring of imports over domestic production or vice versa: one of the by products of the simulation exercises was the identification of cases where a comparison of import tax rates with effective domestic tax rates appeared to show a marked degree of negative protection for Banglsdesh production.

In principle, of course, the tax system could be made more progressive, without loss of revenue, by the combination of negative poll tax with much higher effectve rates of commodity taxation. It is generally believed, however, that the problems of implementing and policing such a poll subsidy would be formidable in Bangladesh, and the higher rates of commodity taxation would escalate the problem of securing fairness between those who consume commodities which they have produced themselves and those who buy them in the market at the taxed price.

If the poll subsidy route to reducing the dispersion of real incomes is considered impracticable, it seems likely that a determined effort to redistribute income through taxation cannot be carried out through indirect taxation alone. Direct taxes on income, as already shown, bring in only a fairly small part of total government revenue, and of that part most is accounted for by tax on company, rather than individual, incomes; but if redistribution is to be taken seriously, they will have to bring in a larger share of revenue in the future. This will generate administrative problems of assesment and enforcement, and a smoothly-operating personal income tax system covering most of the population cannot be expected: but some movement in this direction is both possible and desirable.

CHAPTER 7

SUMMARY AND CONCLUDING OBSERVATIONS

1. Introduction

The major developmental goals in Bangladesh are increasing the rate of growth of national income, reducing poverty and unemployment, minimizing dependence on foreign aid and decreasing inequality in income distribution.

Taxation is an important instrument in achieving these objectives, since it can play a crucial role in not only mobilizing larger resources, but also in affecting allocation of resources in the desired direction, providing incentives to increase savings and investment, helping ensure stability and reducing income inequality. However, use of one instrument (tax policy) to achieve multiple targets creates complications, since some of these objectives conflict with one another. For example, the growth objective conflicts with the distribution objective because sacrifices involved in the payment of those taxes which dominate the tax system of Bangladesh are high for the people with low income. Where such conflicts arise it is necessary to acknowledge the existence of a trade-off and to choose a mix of policies which reflects the relative weighting given to conflicting objectives.

The main focus of the thesis is on indirect taxation, since indirect taxes are overwhelmingly important in the total revenue of the Government and are going to remain so in the foreseeable future. However, we have also analyzed direct taxes and the possibility of increasing their revenue role in the tax system.

Taxation may have a pervasive effect all over the economy through its effects on allocations, growth with increased welfare, stability and distribution. For a developing country like Bangladesh, we have focussed our attention on the following major aspects:

- The aspect of revenue generation through tax rate change with its consequences.
- The aspect of redistribution of effective indirect tax burden on the tax payers.

The main conclusion of the thesis is that the system of indirect taxation has not played its full potential role in effectively achieving its goals. The major reasons for the ineffectiveness are:

- Ad hoc nature of decision making.
- Policy changes made without proper assessment of their probable consequences.
- Policy changes made without much coordination with other macro-economic policy variables.

The tax system can be made more effective by rationalizing various tax measures, introducing appropriate reforms - including strengthening the tax administration,by having proper coordination with other policies, and by having greater political commitment.

2. Review of Findings.

(1) In the first part of the thesis, the tax system was analyzed at the macro-level in the context of development goals and policy implications. The major thrust of the tax policy in Bangladesh is on revenue generation. Bangladesh is a resource poor country with a low rate

of savings and investment (vide Chapter 1). To accelerate the rate of growth, savings and investment must increase. Since many development expenditures are financed through public savings, the Government has to transfer resources from the private sector to the public sector through taxation and other means to generate larger public savings. The Government also has to provide directions for reallocations of private investment through fiscal and other incentives and control mechanisms in a way that is helpful for the accelerated growth of the economy.

As shown in Chapter 1, revenue generated from domestic sources other than taxation, e.g., non-tax revenue and the returns from the public enterprises, has not been significant so far to contribute sufficient funds for development financing: non-tax revenues are small, and the public enterprises have tended to make losses rather than profit.[30] Foreign funding has been contributing the largest amount in financing Government development expenditures. (Vide Chapter 1, Table 2) However, the undesirable consequences of heavy dependence on foreign funding made the policy planners conscious in placing greater emphasis on mobilization of larger domestic resources through taxation.

Taxation, therefore, plays the dominant role in generating revenue surplus for the public sector for accelerating the growth of the economy. The process of growth, however, is very complex and so are the effects of taxation - policy objectives may thus remain far short of realization if tax policy measures are not properly investigated and their various impacts evaluated carefully. It may, however, be difficult to isolate the effects of tax policy as they

30. The losses of several public sector enterprises rose from Tk 3525 million in 1982 to Tk.18815 million in 1989-90 (Planning Commission, 1992)

operate in conjunction with other macro-economic policies of the Government and therefore, are likely to be influenced by their operations.

The present tax system of Bangladesh has evolved through time not so much on the basis of careful analysis of the various impacts of tax measures, but more on the basis of ad-hoc decisions to meet the exigencies of the situation. Though revenue generation is the primary objective of taxation, the efforts to raise increased revenue through taxes has not been significant. As shown in Table 5, Chapter 1, the tax as a ratio of GDP is still at a very low level compared to the other countries in the region.

The revenue surplus generated for the public sector is thus very meagre in relation to the need for development financing.Substantial efforts would be needed to generate larger public savings for increasing growth.

(2) In Chapter 2 and 3 of the thesis, the relationships between tax revenue and GDP in Bangladesh were examined in detail. Chapter 2 presented a theoretical analysis of the issues involved, drawing a distinction between measures of the ratio of tax revenue to GDP at a given period of time and measures of the tendency for that ratio to increase, either automatically or as a result of policy changes,as GDP per head increases overtime. A tax system providing for automatic increase in the tax/GDP ratio ensures high elasticity of tax revenue with respect to GDP - a desirable feature for raising larger revenue. On the other hand, even if the tax system does not automatically provide for an increase in the ratio as GDP rises, it may be such as to facilitate policy changes which do provide such an increase. If the combined result of automatic and policy changes is to cause the ratio to increase as

GDP increases, the tax system is said to show high buoyancy with respect to GDP. Both these concepts are of interest in evaluating the performance of the tax system in the process of development[31].

(3) Our estimates of tax revenue determinants in Chapter 3 show that since the tax system is buoyant but not elastic, the prospect of generating larger revenues automatically through development is not very bright under the present revenue system in Bangladesh. Hence the Government has to take recourse to discretionary measures almost every year to keep the revenue growing. Such discretionary measures are undesirable since frequent tampering with the tax system creates uncertainty and confusion, frustrates investment activities and hampers the growth of various sectors of the economy. Since indirect taxes are imposed mainly on the industrial inputs and outputs, it is this sector which is affected most by the ad-hoc decisions of tax rate changes. It would be preferable to adapt the system to have built-in elasticity to be most revenue productive, without requiring much discretionary measures. Rationalization of various taxes and medium to long run reform measures can help in imparting greater elasticity to the tax system. The measures, however, have to be taken after careful consideration of the various implications.

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31. Of course, both elasticity and buoyancy measures require care in their interpretation. For example, elasticity measures depend on estimating what revenue would have been in the absence of policy changes and hence are sensitive to the meaning given to "unchanged policy". If "unchanged policy" is interpreted as keeping the tax system constant in real terms (e.g., by indexing rates of specific taxes and allowances and exemptions for direct taxes), direct taxation will in a time of inflation be measured as having lower elasticity than if, for the same data, unchanged policy were interpreted as keeping rates and allowances constant in money terms. High measured buoyancy, on the other hand, may simply reflect the fact that, over the period studied, the tax authorities moved from under-exploiting to fully-exploiting the revenue possibilities of a tax, without any implication that similar increases in revenue could be expected in the future.

One of the findings of Chapter 3 was that the elasticity of import taxation with respect to GDP was considerably higher than that of domestic excise taxes. This is a matter of concern because of the shift in emphasis of Bangladesh tax policy from the 1980's onwards, from trade-based taxes towards domestic taxes. There are important reasons for this shift in emphasis:

- Avoidance of excessive dependence of the public finance on the uncertainties of foreign trade and foreign aid.
- Reduction of excessive protection of domestic producers.
- Tendency of high import taxation to create an economically unproductive rent seeking class.

The policy change is also consistent with a widely observed tendency for the importance of trade taxes to decline relative to that of domestic taxes as the economy grows (Hinricks, 1966; Burges and Stern, 1992, pp. 79; Tanzi, 1991, pp. 211). However, the short and medium term implications of the shift to domestic taxes need to be considered carefully, if revenue is not to suffer.

(4) In Chapter 4, revenue from taxes on particular commodities was analysed. In principle, the effects of a tax rate change on a particular good extends to factor income and all other goods. The full analysis of the effects on revenue would, therefore, need a general equilibrium model, and if full information were available about technology and behaviour of the consumers and producers, this would clearly be the preferred methodology. In the absence of such information, predictions about revenue effects of tax rate changes in a

general equilibrium model will depend largely on assumptions made about parameters such as elasticities of substitution. We have therefore focussed on a partial equilibrium approach, which can also provide important information about possible revenue and other effects of tax rate changes. Under this approach, the responsiveness of revenue with respect to tax rate changes was estimated, focussing on the revenue attained by tax in the particular good. Indications were also provided on how rough allowances could be made for the revenue effects of shifts in demand for other goods. The method followed was to estimate a functional relationship between the tax revenue and variables such as statutory tax rate, after-tax price of the good and gross domestic product.

Changes in tax rates affect tax revenue directly while changes in market price and income - through their effects on demand - affect tax revenue indirectly. The combined effect of both determine the elasticity of tax revenue with respect to tax rate changes. The methodology developed thus helped to quantify the responsiveness of the tax revenue when tax rates of a particular good are changed. This approach has the advantage that it can address issues such as possible increase in evasion / avoidance as statutory tax rates are increased and the possible negative effects of a tax rate increase on tax revenue through the demand effect of the price increase. It has, however, a disadvantage that there is a functional relationship among the explanatory variables, which reduces the precision of coefficient estimates.[32]

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32. Of course some degree of correlation among "independent" variables is a common problem with most econometric analysis.

The evidence on tax rate related evasion was inconclusive: for some but not for all of the goods studied, an increase in tax rates tended to raise revenue less than proportionately, even after the demand effect had been allowed for, but the deviation from proportionality was in most cases not statistically significant. On the other hand, for none of the commodities did it appear that the demand and evasion effects of an increase in tax rates were strong enough to imply a negligible or negative overall effect on the tax revenue. The results thus show that, given the limitations, there is a predictable positive relationship between changes in tax rates and changes in tax revenue for particular goods.

(5) The indirect tax system in Bangladesh is, in essence, a multi-stage system in which rebating of taxes paid at earlier stages is partial, limited and subject to long delays. In such a system, the tax element in the prices of commodities is only imperfectly reflected by the nominal taxes on the commodities themselves. Of much more significance for both the distributive and the allocative analysis of taxation is the set of effective rates of taxation, which reflect not only the taxation of commodities but also the (unrebated) taxation of inputs required for the production of these commodities.

In Chapter 5, effective tax rates were computed for the outputs of the 53 sectors of the 1986-87 input-output table for Bangladesh, using a standard methodology. As expected, these rates were in all cases higher than the corresponding nominal rates: in some cases the differences are quite large (5 to 10 percentage points), though it remains true that the commodities with highest rates of nominal tax were also those with highest rates of effective tax, while agricultural commodities - nearly all, exempt from nominal tax - also bear very low rates of effective tax. There is some tendency for the dispersion of effective rates to be rather less than that of nominal rates, but it is not very marked: for example the taxation of inputs in the production of electricity raises the rate of tax from 0 to 9 percent, but a very wide gap remains between the rate and the 50+ percent rate on its competitive fuel, gas. The effective tax rates including taxation of capital goods have similar effects , but of higher magnitude. Of course the calculation of effective tax rates is only an intermediate stage in the devising of an appropriate indirect taxation policy, but it is an important one. For one thing, the gap between nominal and effective rates measures the significance of input taxation , which may be defensible on grounds of administrative convenience but which in general is likely to be more distorting than taxation of final sales. For another, it is the effective rates of tax which should be taken into account when discussing the tendency of the tax system to distort choice among commodities and analysing the distributional effects of the indirect tax system.

(6) As mentioned earlier, due to extreme pressure for increased revenue for growth, tax policies in Bangladesh are based mainly on revenue considerations with equity aspects getting secondary consideration. However, the latter aspect cannot be neglected altogether in developing countries with low income and its uneven distribution (Musgrave, 1987, pp. 247).

The distribution pattern of indirect tax system in Bangladesh was explored in Chapter 6. In principle, the indirect tax system can affect the distribution of real income by affecting the distribution of factor incomes as well as by affecting the distribution of spending power. A general equilibrium model would be required to trace such effects. The approach adopted in this thesis was to treat the effects on factor incomes as secondary and concentrate on the distribution of effective taxes paid on consumer expenditures by different household income groups. Table 1 summarizes our study of tax incidence in Chapter 6. The results show that the total indirect tax in Bangladesh is very mildly progressive for the country as a whole. The domestic taxes are slightly progressive while import taxes are proportional. For the urban area, the total indirect tax is slightly progressive while for the rural area, it is proportional.

The distribution pattern of the tax burden presented, does not seem to be justified on equity grounds. If the proportions of expenditures allowed to the different sectors were very similar at all levels of household income, then of course no reform of the rates of tax on the different sectors could make the indirect tax system significantly progressive.

TABLE 1
Tax Incidence in Bangladesh

Type of Taxes	Findings
Total Indirect Taxes	Mildly Progressive
Domestic Taxes	Slightly Progressive
Import Taxes	Proportional
Total Taxes in Urban Area	Slightly Progressive
Total Taxes in Rural Area	Proportional

To test whether such similarity of expenditure pattern is the principal explanation of the apparent near-proportionality of tax incidence in Bangladesh, a simulation exercise was carried out to examine the distributional effects of a tax system deliberately weighted towards imposing high rates on commodities more heavily consumed by the higher income groups. The outcome of this exercise was that such a deliberate selection of tax could in fact increase the progressivity of the Bangladesh tax system substantially.

Another possible reason for the departure of the results from that which is generally believed to be the case may lie in the assumed equal proportion of imports in the consumption of specific goods at different income levels. If the proportion of imported goods in consumption tends to be higher, the higher the income group, this will tend to increase the progressivity of import taxation and of the indirect tax system generally. However, the absence of detailed breakdown of consumption into domestic and imported components (see the discussion of data problem, pp. 277) makes it impossible to quantify the importance of this effect.

In general, the Bangladesh tax system as examined in this thesis, shows unsatisfactory performance in a number of respects:

- The overall ratio of tax revenues to national income is low by comparison with other countries of similar income levels. The system is very heavily dependent on indirect taxation, and within indirect taxation is still heavily dependent on taxes on imports. While this latter dependence has diminished to a certain extent over the last decade - as part of the move towards greater liberalization of trade - the shift has brought its own problems, because domestic excise tax revenue has in the past tended to be less income elastic than revenue from trade taxes.

- Both in direct and indirect taxation, the present structure has resulted from a number of ad-hoc decisions in the past rather than a consistent and coherent strategy. As a result, there are a number of anomalies and special provisions which distort choice and lead to avoidable loss of revenue.

- The tax system, or at least its predominant indirect tax component, appears to have only a minimal degree of progressivity: given the low average income in Bangladesh, this characteristic of taking nearly the same proportion of income from the poor as from the rich implies that an increase in tax effort is likely to impose high social costs.

The consequences of low tax revenue and of prospective reduction in income elasticity of revenue are serious. There has hardly been any effort to cut expenditures in the current budget to produce larger revenue surpluses to finance development. When revenue shortfall occurred, the axe, therefore, fell on development expenditures and on social sectors, with their precarious equity implications.[33] As already indicated, the prospects of raising larger revenues from non-tax sources, and from public corporations are not bright. Thus the need for additional tax revenue is urgent.

One ad-hoc reaction has been the attempt to maintain or increase import taxation artificially through exchange rate depreciation, which appreciates the value of import and hence the proceeds from ad-valorem taxation of those imports in terms of domestic currency. This cannot be a long term solution. Some tax reform measures are under way. The government of Bangladesh has introduced value-added-tax (VAT) from July 1991 as part of a long term reform program to make the tax system more elastic, efficient and equitable, but since import taxes and major revenue earning domestic taxes are kept outside VAT net, it is necessary to reform these taxes in the immediate future to serve these purposes.

In sum, the weaknesses of Bangladesh tax structure as discussed in Chapter 1 continue to persist inspite of the rationalization and reform measures taken from time to time. The structural adjustment programmes in the fiscal field initiated by the government of

33. Resource Position of the Government of Bangladesh, Planning Commission, Government of Bangladesh. Unpublished Paper, 1992.

Bangladesh to liberalize the economy and make the domestic industries competitive - have been facing a dilemma. It is observed that a growth rate of 5% per annum is the minimum rate required for structural adjustment to have some impact on the poor through its trickle-down process, but it is estimated that the existing shortage of resources can not allow more that 3 to 4 % growth per annum, given the capital output ratio of about 4:1. More important, the availability of foreign assistance does not seem to be a constraint for development, as Bangladesh has a substantial pipeline of project assistance (about $4 billion, 50% of which can be made operational).[34] Therefore, mobilization of domestic resources seems to be the most critical constraint for higher growth and poverty alleviation. The tax system, therefore, needs to change in a way that would make it more effective in realizing larger domestic resources and economic policy objectives.

3. Policy Implications.

Given the requirements outlined above, all possible avenues must be tapped to raise sufficient revenues in order to support the desired pace of development. By rationalizing and strengthening the tax system in the following ways, it is possibile to increase the revenue raised from both direct and indirect taxes:

1. The indirect tax bases can be expanded by rationalizing / eliminating a host of exemptions in the case of both domestic taxes and trade taxes. Domestic taxes cover only a small part of total domestic output (about 10 to 12%). This is in part due to the absence of

34. Interview with high official of Planning Commission, Government of Bangladesh, 1992.

nominal taxes on most agricultural goods which is defended on distributional grounds and on account of difficulty of enforcing taxes on goods consumed by their producers. Large scale exemptions of various domestic products erodes the tax base and reduces the average rate to a low level of about 8%. The base of domestic tax, which is mainly the manufacturing sector, can be expanded by eliminating undeserving exemptions, checking evasions and by taxing other sectors like services more effectively.

2. Streamlining of import taxation is all the more important since it is riddled with a large number of exemptions and allowances, making the system complex, discriminatory and non transparent. The tax base can be expanded by withdrawing many exemptions and allowances and checking evasions through under-invoicing. The customs administration needs modernization for this purpose by introducing computerized operations of the major activities, e.g. record keeping, customs clearance operations. Organized supervision of imports could check maldeclaration of goods and their values.

3. Extension of the tax base, particularly to include services, besides raising revenue, serves distributional purposes. We have seen in Chapter 6 from our simulation results that such extension of the tax base would also tend to increase progressivity of the indirect tax system.

4. An important measure to increase elasticity would be replacement of the present system of specific taxation of most goods by an ad-valorem system to capture the full benefit of rising market prices. Alternatively, the existing practice of setting specific rates might be retained, but the rates should be regularly adjusted to maintain their real value as price changes, i.e., create a regime of de-facto inflation indexation (Petrei, A.H., 1975).

The measures discussed above are likely to:

- Raise more revenue.
- Make the indirect tax system more elastic and progressive.

Reforms however should be sought not only in the area of indirect taxation. Although direct taxation, and more particularly, personal direct taxation plays only a modest role in the Bangladesh tax system, and was not the major focus of this thesis, it is potentially an important source of future revenue.

It has long been felt that allowances are too generous in the case of income taxes, but inspite of the incentives provided to private sectors, investment has not increased significantly (Mid Term Review, 1989, pp. 69). The income tax base can be increased considerably by:

- Rationalizing exemptions and allowances.
- Eliminating double exemption of income.
- Strengthening tax administration in the case of personal and corporate income taxes.
- Restructuring land taxation on the basis of presumptive income from agricultural land.

In considering suggestions for raising additional tax revenue it is necessary to bear in mind a number of other important factors, some of which are not strictly economic.

1. Tax provisions which include a large number of different rates of tax and special allowances and concessions make the tax system unstable and complex. The tax system

should be simple to understand and easy to administer. The presence of ambiguity encourages malpractice by the opportunists and reduces tax revenue by reducing tax bases.

2. Since tax policy is part of the overall economic policy of the country, it must be well coordinated with other economic policies of the country to achieve the desired economic goals. Thus, in pursuing the trade-liberalization policy in Bangladesh, its impact on revenue needs to be examined along with its effect on the growth of different domestic industries. Similarly, coordination with expenditure policy is essential to generate larger public savings for the public sector. Efforts to mobilize increased domestic resources could be less fruitful if unproductive current expenditures are not cut down.

3. The tax administration in Bangladesh is weak and unless made efficient, even a well designed tax policy cannot be effective. It is partly due to the limited tax handling capacity that VAT has been introduced at a small scale in Bangladesh. Besides, an inefficient tax administration increases inequity by imposing heavy burden on those who cannot escape the tax, while encouraging the growth of the parallel economy due to the evasion of tax by others who can. An efficient tax administration would help in increasing revenue by simply checking evasion and would make various tax provisions meaningful when enforced properly. The Taxation Enquiry Commission (TEC) of Bangladesh made a number of recommendations (TEC Report, 1979) as did the World Bank (Report No. 7196-BD, Vol. 11, 1989. pp. 49-77). The suggestions should be given due consideration.

4. Tax changes cannot be successful unless there is political commitment to push them forward against the hazards of resistance from pressure / interest groups. When any tax measure is introduced, it needs support of the general public to defend the actions of the

government. Such support is likely to come when the benefits are expected to be widespread over the country.

4. Data Problems.

In undertaking research work in a developing country, the problem of getting appropriate data poses problems. It is more a problem for Bangladesh where:

- The method of record keeping is primitive (no computer bank).
- Records are kept in a way suitable for official purposes, not particularly for research purposes.

It is, however, possible to get data on major macroeconomic variables and some socio-economic indicators from various statistical documents published by different government ministries and institutions and foreign organizations. But there are difficulties in getting micro-data for specified purposes, particularly on taxation.

For various empirical parts of the thesis, we faced acute data problems, both at the macro and micro level. The aggregate data on tax revenue were available from various sources, but the figures from different sources *always* differed from one another. Thus the tax data supplied by the Ministry of Finance and the National Board of Revenue (NBR) which is under the former, vary from one another. Again, data published by the Ministry of Finance, the Planning Commission and the Bangladesh Bank (the central bank) vary similarly. Since NBR collects 90% of the tax data, we used NBR data on tax revenue both at aggregative and disaggregative level.

We faced great difficulties in obtaining disaggregative data on tax rates and on prices of different commodities for our study of the revenue effect of tax rate changes. Since the method of record keeping is not modern in most offices, it is difficult to get time series data beginning from 1972-73 for specified study by an independent researcher. NBR has documents on statutory tax rates, but for annual changes in tax rates, there are separate gazette notifications made by NBR. We had to look into these documents / budget speeches of the Ministry of Finance to get the time series data of tax rates for different commodities. Since NBR makes estimates of tax revenue changes every year for different commodities for which discretionary tax changes are made, NBR has all the annual data on tax rate for each and every product for which it collects taxes. These data can easily be compiled into time series data for different products and stored in computer tapes as data bank for further reference. Computerization of all the tax data, indirect as well as direct, is essential for future research work, since a taxation study cannot be an once-for-all study, but should be a continuous one. Obtaining price series data, both for domestic and for imported commodities, had been even more difficult. We had to approach different public sector corporations and departments to get these data. Initially, we intended to cover quite a few important commodities for the study but finally had to limit ourselves to the study of only five commodities due to data problems.

The limited number of observations from time series study results in econometric outputs being subject to error. The data on prices and tax rates can be published on quarterly basis for at least major revenue earning commodities, along with some other important variables like GDP, exchange rate, net foreign asset, etc., which would give greater degree of freedom and might produce better results.

We had a problem with the Input-Output (I-O) Matrix also for estimating effective tax rates in Bangladesh. The Bangladesh Planning Commission has prepared three I-O tables, but without bifurcating them into domestic and import components. In the absence of separate domestic and import matrices, we had to bifurcate the I-O matrix 1986-87 (the latest one) into two components on the basis of some assumptions. The use of import matrix, which is being prepared on the assumption of proportionality of import to total availability may have introduced some bias in the results, since a constant ratio is applied for the households in different income levels. Though on the whole this method helped in estimating the effective import and domestic taxes separately, it leaves a certain margin of error which needs to be taken into account in considering the results.

5. Areas of Further Research.

In order to analyse Bangladesh's indirect tax system, the data problems just referred to,made it necessary to proceed sometimes on the basis of approximation and assumptions. One obvious area for further research is to seek more detailed data which would make such approximation unnecessary. It would then be possible, for example, to take the taxation of imports more accurately into account in computing estimates of effective rates of taxation or of the distribution of the indirect tax burden. The Bangladesh Planning Commission is currently preparing an actual import matrix which should make such estimates possible.

Although indirect taxation still provides the bulk of tax revenue in Bangladesh, the direct tax system is potentially very important for the future. Again, analysis of this system is severely hampered by data difficulties. The NBR do not make available data relating to the distribution of personal income and the tax collected from them at a disaggregative level.

Even information relating to the division of income tax revenue between taxes on companies and taxes on individuals is not readily available. Attention therefore should be paid to organize much fuller information on the direct tax system, as the basis for analysing the past and potential future contributions of the system to the development process.

The role of indirect taxation, or of taxation in general, in promoting economic growth largely depends on behavioral reactions to tax changes. Empirical evidence, or, at least publicly available empirical evidence, about such reactions is scanty for Bangladesh and the thesis has proceeded on the basis of assumptions about behavioral reactions which were regarded as plausible. It would clearly be preferable to analyse tax policy for Bangladesh in the light of how domestic enterprises and households can be expected to react to policy changes.

Finally, it must not be assumed that any policy change which the authorities may wish to make can be implemented with 100% efficiency. The thesis has made a tentative exploration of this issue through the specific form of the revenue equations estimated in Chapter 4. However, it may be the case that systematic study of the factors facilitating efficient tax administration and collection in Bangladesh would be at least as useful as conventional economic analysis in guiding the choice of tax policy to promote the country's development.

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