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**A Panel Study on Tax Effort and Tax Buoyancy
with Special Reference to Bangladesh**

Lutfunnahar Begum

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A Panel Study on Tax Effort and Tax Buoyancy with Special Reference to Bangladesh

Lutfunnahar Begum*

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Abstract

This paper attempts to identify the determinants of tax share and revenue performance in the past 15 years in Bangladesh along with 10 other developing countries through a panel data analysis. The results obtained suggest international trade, broad money, external debt and population growth to be significant determinants of tax efforts, with expected signs of the estimated coefficients. The study identifies Bangladesh as the lowest tax effort country in the sample, with an average tax effort index of 0.493. This has important policy implications that Bangladesh and other countries having low tax effort (less than unity) are not utilizing their full capacity of tax revenue, and therefore, have the potential for financing budgetary imbalance through raising tax revenue. The tax effort index for both direct and indirect taxes is below 0.6, implying that Bangladesh has the potential for raising revenue collection from both direct and indirect taxes. In terms of tax buoyancy, Bangladesh ranks the second highest among the sample countries, with a tax buoyancy ratio 1.235, meaning that tax revenue is quite responsive to GDP and effort has been made to increase tax revenue over the period.

Keywords: Tax effort, tax buoyancy, direct taxes, indirect taxes.

JEL Classification: E62, H21, O23

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1. Introduction

1.1 Background of the Study

Most developing countries are increasingly focusing on domestic resource mobilization toward economic development. In this context, tax performance is of crucial importance, especially for a developing country, since it is the prime source for domestic resource mobilization. Many developing countries often face difficulty in augmenting tax revenue to the desired level and considerable attention is being devoted to formulating fiscal policy best suited for increasing revenue. Traditionally, *tax effort* has been used as an indicator of how much a country is utilizing its taxable capacity. In its simplest form, tax effort is measured as the ratio of tax revenue to a simple tax base, such as GDP. However, this does not typically give the proper measure of a country's tax potential, since there are several other factors, e.g., the economic structure, the level of socio-economic development and the administrative and political constraints on the fiscal system that influence a country's tax effort. Therefore, a more desirable measure of tax effort index may be defined as the ratio of the actual tax share to the predicted (or potential) tax share.¹ If the value of the index is less than one, it means that the country is not utilizing its full revenue potential. Conversely, if the value of the index is greater than one, it implies that the country is collecting more taxes than would be predicted. The tax effort approach to measuring tax performance is termed 'static' in the sense that it gives the potential for tax increases in a country at a given point of time through comparisons with other countries. However, in order to ascertain whether a country has made efforts to increase tax revenue over a period, it is important to consider the tax performance in the dynamic sense also. The *tax buoyancy* provides such a dynamic index of tax performance, which measures the sensitivity and response of the tax system with respect to income/GDP.²

Bangladesh, as an emerging developing country, is committed to augmenting revenue and achieving fiscal discipline with a view to increasing self-reliance. The external environment influencing the tax performance of Bangladesh has changed remarkably as the country became increasingly integrated with the global economy during the 1990s (McCarten, 2005). In recent years, the Government of Bangladesh has initiated some administrative and policy reforms in the tax system. An improved tax administration in association with some pragmatic policy initiatives has resulted in a modest improvement in the tax-GDP ratio of late. However, the performance is still unsatisfactory as compared to other countries at a similar stage of economic development. Hence, a thorough investigation and analysis regarding the tax performance is necessary in order to enhance domestic resource mobilization of the country.

¹ The predicted tax share is calculated by regressing the tax-GDP ratio on explanatory variables that serve as proxies for the tax base and other structural factors influencing revenue performance. For details of approaches toward measuring tax effort, see Stotsky and WoldeMariam (1997).

² For a more detailed discussion on the static vs. dynamic measures of tax performance, see Chelliah (1971).

1.2 Purpose of the Study

This paper attempts to appraise tax performance of Bangladesh considering both static and dynamic indices. Tax effort of the country is estimated through an inter-country comparison with three South Asian countries, viz., India, Pakistan, Sri Lanka and seven other comparable countries based on GDP, purchasing power parity (PPP) per capita. The study uses panel data on the sample countries over the period FY91-FY05 in order to examine the determinants of tax share to construct tax effort indices and to estimate the buoyancy of tax. The remainder of the paper proceeds as follows: Section 2 reviews the theoretical issues regarding tax performance measurement and previous empirical work on this topic. Section 3 provides a brief overview of the tax system and tax performance of Bangladesh along with the recent reform measures undertaken in the tax system. Section 4 describes the model, estimation methodology and the empirical results of the study, while Section 5 provides the conclusion and some policy implications.

2. Measurement of Tax Performance: Literature Review

2.1 Theoretical and Conceptual Aspects

The significance of ‘tax handles’ in determining ‘tax effort’ has been addressed, among others, by Hinrichs (1966) and Musgrave (1969). Musgrave (1969) highlights four main approaches to assess the tax performance of a country, viz., i) ‘ability to give up approach’ ii) ‘efficient resource use approach’ iii) ‘ability to collect approach’ and iv) ‘comparison with average performance approach’, referred as the ‘stochastic approach’. He views that it is better to evaluate a country’s fiscal performance by comparing it with the average performance of other countries, rather than measuring a country’s absolute performance. This is regarded as the most effective approach.

The most commonly used approach to measuring tax effort is by regressing the tax ratio on a set of variables that serve as proxies for a country’s ‘tax handles’. The set of variables include the major determinants of output of the country (Bahl, 1971 and Chelliah, 1971). In the functional form,

$$(1) \quad T/Y=f(V)$$

where, T = tax revenue, Y= GDP or GNP, T/Y = the tax ratio and V = vector of ‘tax handles’.

The equation provides an average relationship between the tax ratio and the set of explanatory variables chosen and hence, the predicted tax ratio gives the ratio that the country would have if it had made the average tax effort. Thus the predicted tax ratio is interpreted as a measure of taxable capacity while the regression coefficients act as the “average” effective rates on the

bases. Tax effort index is measured by dividing the actual tax ratio by the predicted ratio (Chelliah, Baas & Kelly, 1975 and Tait, Gratz and Eichengreen, 1979). This measure of tax effort index is better than simple tax ratio analysis in the sense that it measures the tax performance of a country by taking into account the differences among countries in their capacity to raise taxes. Lotz and Morss (1970) first used the difference between actual and predicted tax ratios in a comparison of inter-country tax effort.

The buoyancy of tax can be estimated in two ways: (i) by calculating the ratio of percentage change in tax revenue to percentage change in national income/GDP; or (ii) by regressing the tax revenue on the tax base (e.g., national income/GDP) after taking the natural logarithm for each of them. It measures the relationship between the proportional changes in tax revenue and those of the tax base and therefore, gives a quantitative measure of the effectiveness of tax policy in terms of stimulating public resources (Teera, 2002).

2.2 Literature Review: Empirical Findings

Several empirical studies have been undertaken to assess tax performance across different countries. While most of the studies have looked into either the static or dynamic measurement aspect, a few have assessed tax performance of countries considering both measures. Most of the studies have used tax share in GNP/GDP or tax ratio as the dependent variable with different combinations of explanatory variables. Agricultural share generally turns out to be negatively related with the tax share, while mining share also turns out to exert significant negative influence on tax share with a few exceptions. Some studies also examine the effect of manufacturing/industry/service share and find different results. Trade/export/import share and per capita GDP/per capita GNP/per capita income are found to exert significant positive influence on tax share in most cases. The effects of foreign grants/loans/debt share are positive and statistically significant, while the results for corruption/shadow economy are different. The summary of major empirical studies previously undertaken is presented in *Annex Table I*.

3 Tax Structure and Tax Reform in Bangladesh

3.1 Tax Structure and Revenue Performance in Bangladesh³

The Bangladesh tax system, with its legacy continuing from the British and Pakistan era, has undergone continuous changes with a view to making it more amenable to optimize revenue collection through preventing leakages.

³ In analyzing revenue performance of Bangladesh, the latest available data is considered. However, in cases of comparison with other countries and estimation, FY06 and FY07 are not included due to data unavailability for other sample countries.

Table 1: Composition of Tax Revenue in Bangladesh

	(in crore taka)				
	FY03	FY04	FY05	FY06	FY07
Total Tax Revenue	24940	28300	31950	36175	42915
Total Tax Revenue as percent of GDP	8.30	8.50	8.67	8.70	9.18
Direct Taxes	5729	6239	6988	8303	9928
	(22.96)	(22.04)	(21.87)	(22.95)	(23.13)
Taxes on Income and Profit	4788	5270	5850	6960	8500
Taxes on Property and Capital Transfer	941	969	1138	1343	1428
Indirect Taxes	18906	21756	24667	27566	32532
	(75.78)	(76.88)	(77.21)	(76.20)	(75.81)
Taxes on Goods and Services	13031	14456	16667	19331	23047
(i) Value Added Tax	8071	8575	10605	12398	14729
(ii) Supplementary Duty	4390	5430	5600	6394	7701
(iii) Excise Duty and Others	570	451	462	539	617
Taxes on International Trade (Customs Duty)	5875	7300	8000	8235	9485
Other Taxes and duty	305	305	295	306	455

Notes: (i) Taxes on Income and Profit include Personal and Corporate Income Taxes; Taxes on Property and Capital Transfer include Estate Duty, Wealth Tax, Land Tax and Stamp (non-judicial); Value Added Tax and Supplementary Duty include revenue earned both at domestic and import stages; Other taxes on goods and services include Electricity Duty, Narcotics Duty, Motor Vehicles Tax. (ii) Figures in parentheses show direct and indirect taxes as percent of total tax revenue.

Source: Bangladesh Economic Review (2007), Ministry of Finance, Government of Bangladesh.

Tax revenue constitutes around 80 percent of total internal resources in the country. The National Board of Revenue (NBR) under the Internal Resources Division of the Ministry of Finance is the apex tax authority of Bangladesh and collects about 95 percent of the country's total tax revenue. The non-NBR portion of tax mainly includes narcotics duty, land revenue, non-judicial stamp, registration fee and motor vehicles tax. The composition of tax revenue in Bangladesh is presented in Table 1.

Main Features of Bangladesh Tax Structure

Following Ahsan (1995) and McCarten (2005), the stylized facts of Bangladesh tax system can be identified as follows, with a comparative scenario of the sample countries:

Inadequate Revenue Yield Relative to GDP

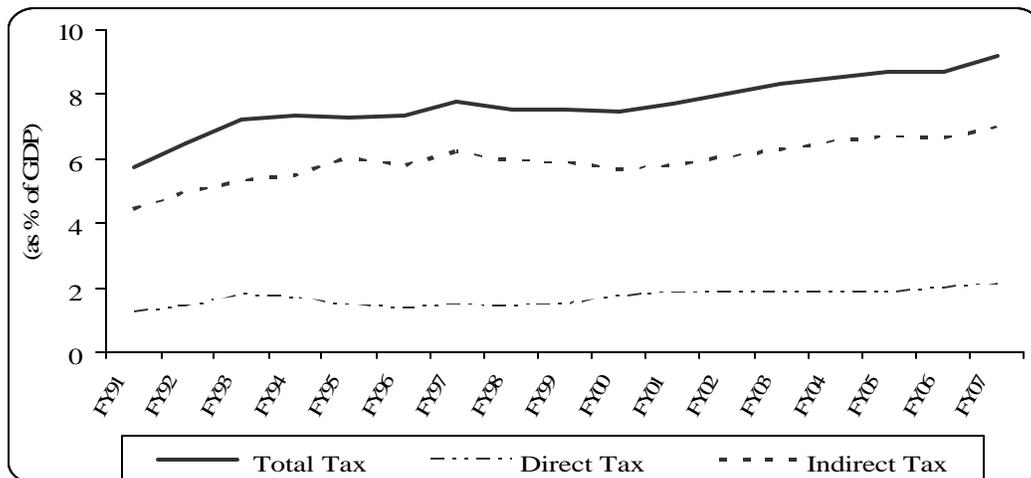
As Table 2 shows, the tax-GDP ratio in Bangladesh is very low, being the lowest among the sample countries. The tax-GDP ratio in Bangladesh shows a sharp increase over FY91-FY93, then remains almost stagnant over FY94-FY01 and then it shows a gradual improvement over the remaining period, as depicted in Figure 1.

Table 2: Tax-GDP Ratio in Bangladesh Compared to Other Sample Countries

	FY01	FY02	FY03	FY04	FY05
Bangladesh	7.687	8.027	8.301	8.499	8.671
Bolivia	12.366	13.721	13.378	15.382	17.581
India	13.844	14.478	15.003	15.908	16.583
Indonesia	11.317	11.564	12.191	12.292	NA
Jordan	18.682	17.522	18.281	20.807	23.899
Mongolia	18.293	16.707	22.581	NA	NA
Morocco	NA	NA	22.328	22.619	24.723
Nicaragua	12.719	13.488	15.033	15.499	16.607
Pakistan	10.653	10.922	11.386	11.034	10.015
Philippines	13.334	12.536	13.074	12.765	13.023
Sri Lanka	15.161	14.523	13.719	14.442	14.822

Sources: Government Finance Statistics Yearbook, various issues, International Monetary Fund; World Development Indicators 2006 CD-ROM, World Bank; World Development Indicators website; Bangladesh Economic Review (2007), Ministry of Finance, Government of Bangladesh; Indian Public Finance Statistics, various issues, Ministry of Finance, Government of India; Handbook of Statistics on Pakistan Economy, 2005, Government of Pakistan; Central Bank of Sri Lanka Annual Report, Various Issues.

Figure 1: Trend in Tax Revenue (as percent of GDP) in Bangladesh: FY91-FY07

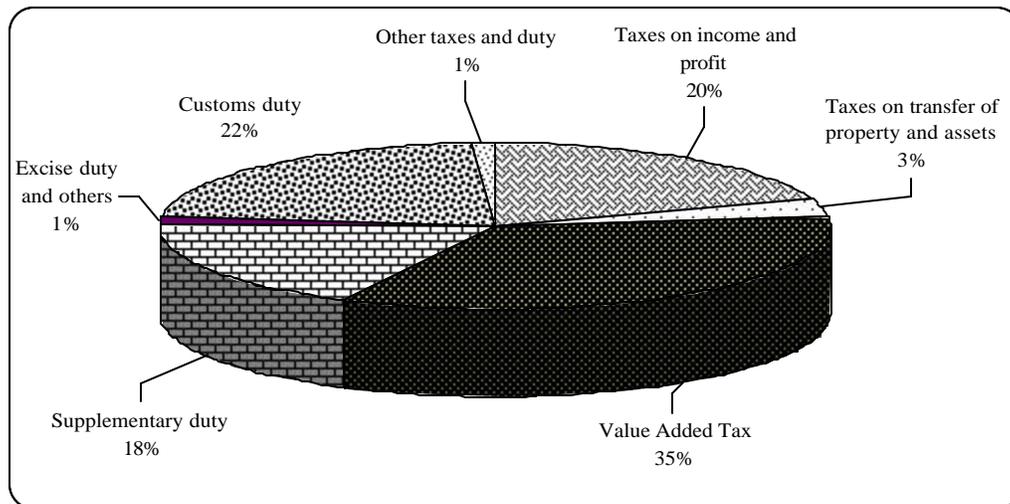


Source: Bangladesh Economic Review (2007), Ministry of Finance, Government of Bangladesh.

Heavier Reliance on Indirect Taxes

Like other developing countries, direct taxes contribute little to overall tax revenue in Bangladesh. As Table 1 shows, around 75 percent of the total tax revenue in Bangladesh is comprised of indirect taxes over the past few years. Among the indirect taxes, VAT constitutes 35 percent of total tax revenue for FY07, followed by Customs Duty and Supplementary Duty, as shown in Figure 2. Taxes on Income and Profit occupies major share of direct taxes, with 20 percent of total tax revenue in FY07.

Figure 2: Composition of Tax Revenue in Bangladesh: FY07



Source: *Bangladesh Economic Review (2007)*, Ministry of Finance, Government of Bangladesh.

Narrowly Based Tax Structure

Both direct and indirect taxes are quite narrowly based in Bangladesh. For example, in direct taxes, agricultural land has not been a buoyant source of revenue as the rates have not been revised periodically (McCarten, 2005). A significant number of tax expenditure measures exists in both direct and indirect taxes which creates an adverse impact on the overall revenue effort.⁴

Low Revenue Productivity and High Administrative Costs

Empirical studies have found that poor logistics, lengthy procedures, unofficial payments, etc. of Bangladesh tax system lead to high administrative costs and low revenue productivity (McCarten, 2005).

3.2 Reform in Tax Policy and Administration

During the 1990s, Bangladesh economy experienced a process of harmonization with the global economy. As such, tax administration faced new challenges to improve its professional, technological and legal capacity in order to keep pace with this changed circumstances. Accordingly, tax system of Bangladesh has been undergoing a reform process in administrative and policy framework that addresses the tax system (including rate structure, new taxes or amendments thereto) as well as administrative or legal issues. A Revenue Reform Commission, comprising of NBR officials, academia and business personnel was established in July, 2002. The Commission performed an extensive analysis and overview of different aspects of the tax system and delivered its report in January, 2003 with various policy recommendations and several policy and administrative reforms have taken place accordingly. A number of projects

⁴ For a detailed discussion on tax expenditure measures in Bangladesh, see Mortaza and Begum (2006).

aided by donor agencies and countries have been playing a vital role in the revenue reform process of the country. The notable achievements with the major reform initiatives undertaken can broadly be summarized as follows:⁵

(a) Direct Taxes

- *Introduction of TIN:* Nationwide tax identification number (TIN), allocated and stored centrally by NBR was introduced in 1994, replacing the local registration number (General Index Register or GIR). A process is now going on to introduce a unique taxpayer identification number (UTI), common for both income tax and VAT.
- *Widening of withholding tax:* With a view to increasing tax network and collection, the withholding tax has been gradually expanded over the years, covering almost 35 items at present.
- *Simplification of self-assessment procedure:* The scope for self-assessment system has been widened and the procedures have been made simpler over the years. At present, all categories of assessee are entitled to submit self-assessment return.
- *Establishment of Large Taxpayers' Unit (LTU):* Large Taxpayers' Unit for income tax was established in November 2003 with the support from the Department for International Development (DFID). The main objectives of establishing LTU were: i) to modernize tax practices through functional organization; ii) to improve the management data and information system; iii) to provide better services to taxpayers; iv) to secure and increase income tax revenue; v) to increase professionalism in the tax administration.

(b) Indirect Taxes

Value-Added Tax (VAT)

- *Introduction of VAT:* VAT was introduced replacing Sales Tax in Bangladesh with effect from July 01, 1991. Major objectives were i) to prohibit cascading taxation at different stages of production; ii) to consolidate the tax administration; iii) to bring transparency in the taxation system.
- *Widening of VAT net:* At initial stage, VAT was a sort of consumption tax, but its coverage has been extended gradually to import, production/ manufacture stage and at the wholesale and retail levels.
- *Strengthening VAT administration:* The management of VAT audit and investigation has been strengthened with technical assistance from the DFID and British High Commission during 1999 –2002.
- *Establishment of Large Taxpayers' Unit (LTU):* As for income tax, LTU for VAT was also established to modernize the VAT system.

⁵ Most of the reform analysis is based on ADB (2005).

Customs

- *Amendment of Customs Act:* The Customs Act 1969 was amended in compliance with Kyoto Convention – the international convention to harmonize the customs rules and procedures.
- *Simplification of procedures:* The customs clearance procedures for import and export were simplified by bringing down the signature requirement. The 10 digit HS classification in the customs tariff was completely revised and 8 digit HS classification was introduced. This drastically reduced the tariff lines and hence established transparency.
- *Introducing mandatory PSI:* Mandatory PSI (pre-shipment inspection) system was introduced in FY01 for valuation and inspection of imported goods replacing voluntary PSI system. Major objectives were i) to assist the customs authority for quick clearance of imported goods; and ii) to reduce misdeclaration of classification, quantity or value of imported goods.
- *Improvement in information system:* The Customs Valuation Department was upgraded by developing modern valuation database. A number of computer software modules were developed for better management of the customs information system. National import/export data archive was created and the channel for data distribution was developed to the stakeholders, i.e., Bureau of Statistics, Ministry of Commerce, Export Promotion Bureau and Foreign Trade Institute.

(c) **Establishing Central Intelligence Cell (CIC):** NBR established Central Intelligence Cell (CIC) in January 2004 with an objective to enquire into tax evasion and avoidance cases and to prevent leakages in the tax system.

Future Reform Process: The Strategic Development Plan of NBR

Recently, with financial assistance from the World Bank, NBR has prepared a Strategic Development Plan to describe its vision, goals and strategies to be implemented over the next few years in order to modernize and strengthen tax policy and tax administration in Bangladesh.

The *core goals* have been identified by the NBR as follows:

- increase revenue collection targets through modernization of tax administration and procedures;
- develop a sound and transparent legal and regulatory system;
- identify areas where revenue is at risk and to deal firmly and fairly with noncompliance;
- facilitate trade flows leading to speedy clearance of import/export cargo;
- develop and manage an effective revenue administration staffed with a well trained and motivated workforce;

- design and deliver fair, responsible, and effective enforcement mechanisms in ways that directly respond to changes in the economic environment and technological opportunities;
- foster and develop a taxpayer service culture and improve participation from civil society;
- ensure all businesses and individuals are treated in a uniform and consistent manner;
- develop a modern IT-based tax administration that is at once efficient, effective and transparent.

The NBR has identified the following *seven strategies* to achieve the above goals.

Strategy 1 Organizational restructuring

A. Phased introduction of a functional model

B. Strengthening core management functions

Strategy 2 Improving human resource management

Strategy 3 Strengthening the legal and regulatory framework

Strategy 4 Strengthening the effectiveness of the Large Taxpayers' Units

Strategy 5 National implementation of tax administration-functions/ procedures

Strategy 6 Customs modernization and trade facilitation

Strategy 7 Strengthening computerization of the NBR.

4 Estimating Tax Performance: Tax Effort and Tax Buoyancy

4.1 Model and Methodology

The present study uses regression approach to estimating tax effort and tax buoyancy in Bangladesh for the period FY91-FY05 relative to 10 other countries having a comparable level of economic development as measured by GDP per capita in purchasing power parity (ppp) terms.⁶ GDP per capita ppp is considered for comparison because it provides a better index of living standards than in US Dollar terms. The region-wise break-up of the 11 countries in the sample are: 4 from South Asia (Bangladesh, India, Pakistan and Sri Lanka), 3 from East Asia and Pacific (Indonesia, Mongolia and Philippines), 2 from Middle East and North Africa (Jordan and Morocco) and 2 from Latin America and the Caribbean (Bolivia and Nicaragua). According to the World Bank category of economies, 4 of the countries belong to the low-income group (Bangladesh, India, Mongolia and Pakistan) and 7 countries belong to the lower-middle income group (Bolivia, Indonesia, Jordan, Morocco, Nicaragua, Philippines and Sri Lanka) (World Development Indicators database, July 2006). Thus the sample consists of countries that tend to have similar economic characteristics although there might be some socio-political differences

⁶ In choosing the sample, this paper considers GDP per capita ppp as estimated by IMF (2006).

due to geographical differences. One advantage of considering countries having a similar level of development is that it gives a better picture when relative performance is compared. In practice, policymakers in deciding the levels of taxation, often make comparisons with other countries in similar stages of development (Chelliah, 1971). The study considers tax collected by both central and state governments (where applicable) but does not include local governments.⁷ The choice of sample size is mainly determined by the availability of data. An unbalanced panel data set is used due to missing values of some observations. A summary statistics describing the data set and other related information are presented in *Annex Table II*.⁸

The study considers GDP as the tax base on the same argument that Stotsky and WoldeMariam (1997) stated, viz., that GDP includes non-resident income earned locally and excludes income received from abroad by residents. On the other hand, GNP excludes the former and includes the latter. Typically, local income of non-residents is taxed while remittances from abroad are not and therefore, GDP produces a more accurate measure of taxable capacity.

Considering the economic characteristics of the sample countries, the following model is undertaken based on earlier studies:

$$(4.1) \quad \text{tgdp} = f(\text{indgdp}, \text{intrdgdgdp}, \text{m2gdp}, \text{debtgdp}, \text{gdpper}, \text{popg})$$

where, tgdp = tax revenue (as share of GDP); indgdp = industry, value added (as share of GDP); intrdgdgdp = international trade (as share of GDP); m2gdp = broad money (money plus quasi money) as share of GDP; debtgdp = external debt as share of GDP; gdpper = GDP per capita (at constant 2000 US\$); popg = population growth rate (annual percent).

The analysis is extended to assess the relative performances of direct and indirect taxes and therefore, two other models are estimated with the same specification for the two categories of taxes.⁹ The share of industry in GDP is considered as an important determinant of tax share because this sector generally grows faster than the overall economy in countries during its growth phase in the sample. The share of international trade is undertaken as a proxy for the degree of openness of an economy. Openness is thought to be an important determinant of tax share because it exerts a two-fold impact on revenue; *first*, the reduced tariff rate causes a

⁷ Considering central government revenue only, as most previous studies did, may understate revenue performance since state/ provincial governments in many countries generate substantial tax revenue. This study does not consider local government revenue mainly due to data unavailability and the relatively low share of local government revenue in most cases.

⁸ This paper does not include social security contributions into tax revenue following the classification of revenue in the GFS (Government Finance Statistics) system where social security contributions are treated separately.

⁹ Direct taxes include Taxes on income, profits and capital gains, Taxes on payroll and workforce (where applicable) and Taxes on property; Indirect taxes include Taxes on goods and services and Taxes on international trade and transactions.

negative influence on tariff revenue, while the increased trade volume creates a positive effect; secondly, liberalization accelerates the growth process in developing economies, causing a positive revenue effect on VAT and direct taxes. GDP per capita is considered as an indicator of overall economic development, while population growth rate is undertaken as a proxy for demographic characteristics, both of which are considered as important determinants of tax share. Debt-GDP ratio is taken as a determinant of tax share because the size of public debt may induce government to generate more revenue to service the debt on the one hand, while on the other, high debt burden may create macroeconomic imbalances, which might reduce revenue (Tanzi, 1989). The study uses broad money-GDP ratio as a determinant of tax share because the degree of monetization in an economy tends to affect the tax potential of an economy.

The study employs panel estimation (pooled time-series and cross-section data) allowing for both country heterogeneity and variations over time. The estimation technique uses least-squares method with different econometric specifications. In order to compare the relative fit of the fixed effects and random effects model, the Hausman test is used. The test rejects the random effects specification in favor of fixed effects estimation.¹⁰ Therefore, fixed effects methodology is used besides pooled OLS (Ordinary Least Squares).

The presumption underlying fixed effects method postulates that there are some country specific effects not captured by other explanatory variables that are uncorrelated with the error term. The fixed effects specification has an advantage that it removes the estimation bias caused by a possible correlation between explanatory variables and country specific variations as it allows individual effects to be correlated with the regressors. This study uses the extended (two-way) fixed effects specification by including the period specific effects, with time dummy variables serving as period fixed effects. Estimations have been carried out using *STATA 9.2* and *EViews 5.1* econometric software packages.

The basic regression equation considered is as follows:

$$(4.2) \quad tgdpi_t = a + \beta_1 indgdp_{it} + \beta_2 intrdgdpi_t + \beta_3 m2gdpi_t + \beta_4 debtgdpi_t + \beta_5 gdpper_{it} + \beta_6 popg_{it} + \mu_{it}$$

where, a is the constant term, i indexes countries and t indexes time with $i=1,2,\dots,11$ and $t=1,2,\dots,15$.

¹⁰ In case of the extended model taking direct taxes to GDP ratio as dependent variable, the Hausman test rejects random effects estimation at the 10 percent level. However, for the original model and the extended model for indirect taxes, the rejection occurs at the 1 percent level. Therefore, all the three models are estimated using the fixed effects method in order to maintain consistency.

For fixed effects specification,

$$(4.3) \quad \mu_{it} = \alpha_i + \gamma_t + e_{it}$$

where, α_i denote the country specific effects (which is time invariant), γ_t denote the period specific effects (which is country invariant) and e_{it} is the remainder capturing usual disturbance in the regression which varies at random with country and time.

4.2 Empirical Results

Estimation results of pooled OLS and fixed effects model are presented in Table 3. The results of pooled OLS are similar to that of fixed effects model for all variables except GDP per capita and the industry share. The value of R^2 suggests that fixed effects estimation explains the variation better than pooled OLS. Again, the value of F-test rejects the null hypothesis of insignificance of fixed effects estimation. Hence, the following analysis will focus on the results of fixed effects estimation.

Table 3: Determinants of Tax Share: Results of Panel Data Estimation

Dependent variables	Tax Revenue (share of GDP)		Direct Tax Revenue (share of GDP)		Indirect Tax Revenue (share of GDP)	
	Pooled OLS	Fixed Effects	Pooled OLS	Fixed Effects	Pooled OLS	Fixed Effects
Constant	7.67** (3.39)	13.77* (7.07)	-6.30*** (1.13)	-2.14 (7.91)	13.26*** (3.17)	15.03** (5.72)
indgdp	0.04 (0.10)	0.05 (0.25)	0.31*** (0.03)	0.11 (0.25)	-0.25** (0.09)	-0.07 (0.18)
intrdgdgdp	0.04* (0.02)	0.07** (0.03)	0.03*** (0.01)	0.04*** (0.01)	0.01 (0.02)	0.03 (0.03)
m2gdp	0.10** (0.04)	0.09** (0.03)	0.06*** (0.02)	0.05* (0.02)	0.04 (0.04)	0.04 (0.03)
debtgdp	0.01*** (0.003)	0.01*** (0.002)	0.0003 (0.002)	0.0006 (0.002)	0.01*** (0.003)	0.01*** (0.002)
gdpper	-0.0003 (0.003)	-0.01* (0.01)	-0.004*** (0.001)	-0.001 (0.003)	0.003 (0.002)	-0.008 (0.005)
popg	-1.15** (0.47)	-0.89*** (0.26)	-0.36 (0.22)	-0.26 (0.16)	-0.94** (0.43)	-0.59** (0.24)
Adjusted-R ²	0.51	0.85	0.65	0.81	0.46	0.81
Hausman Test (H ₀ : No systematic differences in coefficients)		chi ² =24.09 prob>chi ² = 0.001		chi ² =11.94 prob>chi ² = 0.063		chi ² =22.01 prob>chi ² = 0.001
Number of observations	155	155	155	155	155	155

Notes: i) Significance levels: * 0.05 < p < 0.10, ** 0.01 < p < 0.05, *** p < 0.01; (ii) Standard errors are in parentheses. Standard errors are robust, corrected for both heteroscedasticity, and intra-group correlation; (iii) R² values for fixed effects estimations include the variation caused by the explanatory variables and both country and time effects.

Source: Author's estimation.

According to the regression results, industry share shows no significant relationship with tax share. However, there appears to be a positive relationship between the variables, except for indirect tax share. The negative sign for indirect taxes may be explained by the relative insignificance of international trade taxes and the exemption of export-oriented firms from VAT and other taxes in developing countries. Again, there exist various tax expenditure measures (including tax holidays) in both direct and indirect tax structure that the emerging industry sector enjoys in most developing countries. These factors might explain why the variable is insignificant in explaining the country's tax share.

The positive and significant coefficient for international trade share signifies the positive influence of openness on tax share. However, the variable is significant for direct taxes only, implying the indirect effect of openness on direct tax revenue through contribution to the overall growth process in developing economies. This result also reflects the fact that developing countries intend to rely more on direct taxes in order to reduce the dependence on indirect taxes with the adoption of liberalization process.

The positive and significant coefficient for broad money/GDP ratio (except for indirect tax share) is consistent with intuition because monetization is expected to generate a positive influence on tax share through the effect it exerts on overall economic activity of an economy. The positive sign for debt share supports the theoretical argument that large debt necessitates an increase in revenue in order to meet the excess burden of servicing the debt (Tanzi, 1987, 1992).¹¹ The debt share is insignificant for direct taxes, while it is highly significant for indirect taxes. This result is not surprising because in such cases government usually prefer indirect taxes rather than direct taxes for easy implementation from two perspectives: *first*, the base for direct taxes is usually narrow and therefore, the scope for raising the direct tax revenue is limited in most of the developing countries; *second*, governments in the developing countries often face difficulty in raising direct tax revenue instantly due to socio-political or institutional pressures.

The negative coefficient for GDP per capita seems to deviate from intuition because tax share is generally expected to increase with economic development.¹² This might be due to the narrow tax base and low capacity to enhance the tax base that impedes developing countries to capture

¹¹ In this paper, external debt rather than total public debt is used due to data unavailability for domestic debt in a number of sample countries.

¹² GDP per capita (constant 2000 US\$) instead of GDP per capita, purchasing power parity (PPP) (constant 2000 international \$) is used in the model due to data unavailability of the latter variable for the whole sample period. However, the model has been estimated using GDP per capita, purchasing power parity (PPP) (constant 2000 international \$) with the available period (14 years) and it produces almost similar results.

the revenue potential arising from overall development process.¹³ However, the variable is significant at the 10 percent level in determining tax share. The negative coefficient for population growth rate signifies the fact that at early stages of economic development, a country often lags behind in the ability to capture new taxpayers, due to administrative constraints and/ or welfare considerations.

4.3 Tax Performance: Tax Effort Index and the Tax Buoyancy Ratio

Tax effort index measures the degree to which a country has utilized its taxable capacity. On the other hand, tax buoyancy shows tax performance over time in response to economic growth and discretionary tax measures.¹⁴ Therefore, in order to assess the tax performance from static and dynamic viewpoint, both the measures are estimated for the 11 countries. Tax effort index is constructed by taking the ratio of actual tax share to predicted tax share (from fixed effects estimation). Tax buoyancy ratio is estimated by regressing tax revenue on GDP in natural log form of the variables.

Table 4: Comparison of Tax Effort and Tax Buoyancy

Country	Tax effort	Tax buoyancy	Rank Tax effort	Rank Tax buoyancy	Direct Tax effort	Direct Tax buoyancy	Indirect Tax effort	Indirect Tax buoyancy
Bangladesh	0.493	1.235	11	2	0.692	1.253	0.483	1.23
Bolivia	1.039	1.413	3	1	0.696	1.459	1.154	1.445
India	0.909	1.013	7	4	1.063	1.345	0.903	0.902
Indonesia	0.906	0.874	8	8	1.424	0.785	0.62	0.994
Jordan	1.418	0.994	2	5	0.558	1.053	2.12	0.967
Mongolia	0.681	0.969	10	6	0.764	0.728	0.662	1.076
Morocco	1.72	1.036	1	3	1.393	1.704	1.888	0.713
Nicaragua	0.929	0.903	6	7	0.613	0.961	1.057	0.888
Pakistan	0.865	0.837	9	9	1.155	1.098	0.694	0.686
Philippines	0.952	0.835	5	10	0.992	1.108	0.863	0.656
Sri Lanka	1.033	0.825	4	11	0.675	0.74	1.217	0.843

Source: Author's own calculations.

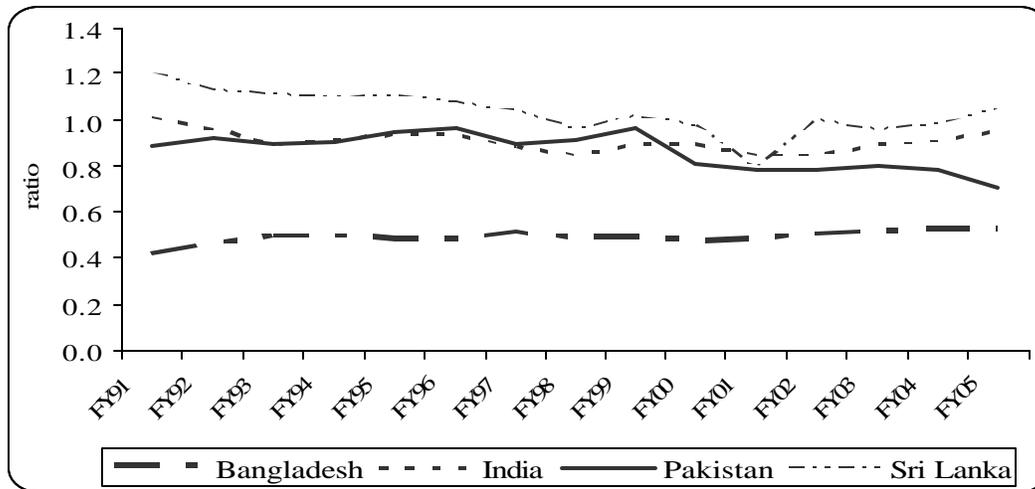
The calculated average tax effort indices over the period and tax buoyancy ratios are presented in Table 4. Five countries, viz., Bolivia, Jordan, Morocco and Sri Lanka are seen to have an average tax effort index above unity implying the full utilization of revenue potential. Among others,

¹³ This result conforms to prior studies such as Teera (2002) where the coefficient for GDP per capita turns out to be negative in case of low-income and lower-middle income countries, while for other groups of countries, it is positive. Alm and Martinez-Vazquez (2003b) and Ahsan and Wu (2005) also find a similar result.

¹⁴ Tax buoyancy differs from tax elasticity (built-in-elasticity) in that tax buoyancy measures the total response of the tax revenue due to both increase in national income and changes in the tax system in a country, while tax elasticity represents the automatic response of tax revenue to changes in national income.

India, Indonesia, Nicaragua, Pakistan and Philippines have an average index greater than 0.8. Morocco has the highest average tax effort index among the sample countries. Average tax effort index of Bangladesh is 0.493, which is the lowest in the sample. This implies that Bangladesh lags far behind its tax revenue potential. The average tax effort indices for direct and indirect taxes in Bangladesh are 0.692 and 0.483, respectively, implying better performance of direct taxes on average over the period.

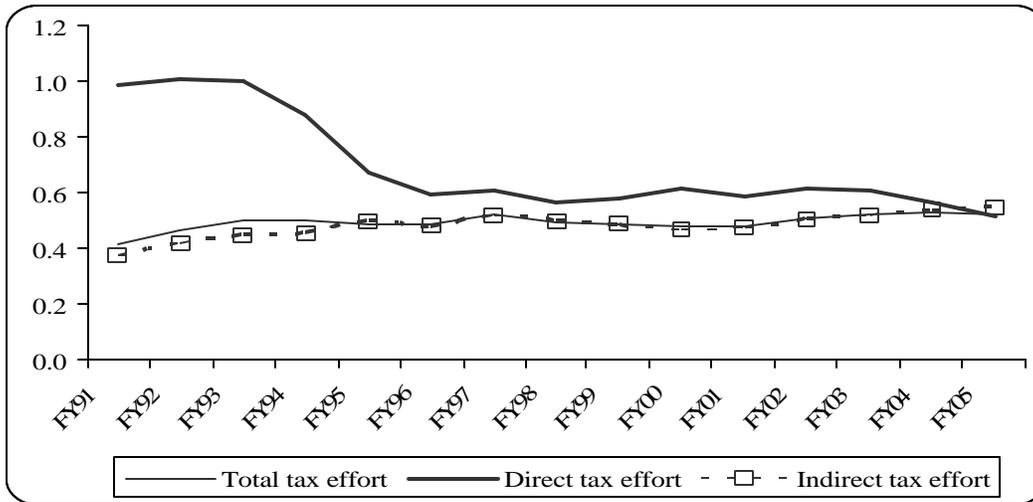
Figure 3: Trend in Tax Effort of South Asian Countries: FY91-FY05



Source: Author's estimation.

The trend in tax effort of Bangladesh over the period along with other South Asian countries is depicted in Figure 3. Sri Lanka ranks the highest among the South Asian countries over the period except FY01. Sri Lanka's tax effort shows a declining trend until FY01 after which the index starts rising. India and Pakistan have performed almost similarly until FY00 after which tax effort in Pakistan starts deteriorating, while that in India remains close to one over the whole period. While Bangladesh ranks the lowest among the South Asian countries, its performance shows a slightly improving trend over the period. In Bangladesh, tax effort for direct taxes have declined over the period while indirect taxes show consistently improving performance (Figure 4). The direct and indirect tax effort indices are 0.986 and 0.373 in FY91 and 0.513 and 0.553 in FY05, respectively. The improvement in indirect tax effort has more than offset the deterioration of direct tax effort and therefore, the overall tax effort has increased in Bangladesh over the period. The tax effort index has increased from 0.415 in FY91 to 0.527 in FY05. The tax effort indices for both direct and indirect taxes are low, implying that Bangladesh has the potential for raising revenue collection from both the categories of taxes.

Figure 4: Trend in Tax Effort of Bangladesh: Direct vs. Indirect Taxes



Source: Author's estimation.

The calculated tax effort indices for the whole sample period are presented in *Annex Table III* and tax effort indices for direct and indirect taxes are presented in *Annex Table IV (a) and IV (b)*. In order to find the relationship between tax effort and tax share, the pairwise Pearson correlation coefficients are estimated. The estimated correlation coefficients for total taxes, direct taxes and indirect taxes are 0.859, 0.699, 0.836, respectively; all being significant at the 1 percent level. The results suggest high correlation between tax effort and tax share, implying that tax share can be used as a proxy to measure tax performance in a country. This result is consistent with previous studies on tax effort.

In terms of tax buoyancy, Bangladesh ranks the second highest among the sample countries with a buoyancy ratio of 1.23, implying that tax revenue in Bangladesh is quite responsive to GDP and the country has made appreciable efforts over the period to increase its tax revenue. Among other countries with tax effort index below unity, only India has a tax buoyancy ratio greater than unity. On the other hand, Bolivia and Morocco both have the two indices above unity. To identify if there is any relationship between tax effort and tax buoyancy, the Spearman rank correlation coefficient between the ranking of countries in terms of tax effort index and tax buoyancy ratio has been estimated. The estimated correlation coefficient is insignificant with a value 0.10, which implies that there is no significant relationship between tax effort and tax buoyancy.

5 Conclusions and Policy Implications

This paper has attempted to identify the determinants of tax share and revenue performance over the past 15 years in Bangladesh along with 10 other developing countries through a panel data analysis. The results obtained suggest international trade, broad money, external debt and population growth to be significant determinants of tax efforts, with expected signs of the estimated coefficients. Industry share turns out to be insignificant and the sign of the coefficient of GDP per capita deviates from expectations; however, this variable is not highly significant. In addition to the traditional explanatory variables used in previous studies, the paper addresses the possible impact of monetization on the revenue performance and finds broad money (as percent of GDP) to be a significant determinant of tax share. With a view to assessing the revenue performance of the sample countries, the study estimates tax effort indices using the regression results obtained. Moreover, the study calculates tax buoyancy ratios for the countries in order to focus on the dynamic tax performance. The extension of the model to the two categories of taxes, viz., direct taxes and indirect taxes, helps to identify the source of the levels of tax effort and to give policy emphasis on the particular area.

The study identifies Bangladesh as the lowest tax effort country in the sample, with an average tax effort index of 0.493. Among the 11 countries, only Bangladesh and Mongolia have average tax effort below 0.8, whereas Bolivia, Jordan, Morocco and Sri Lanka have average tax effort above unity. This has important policy implications that Bangladesh and other countries having low tax effort (less than unity) are not utilizing their full capacity of tax revenue, and therefore, they have the potential for financing budgetary imbalance through raising tax revenue and reduce dependence on the banking system. On the other hand, countries having high tax effort index (more than unity) have little scope for raising tax revenues, which implies that in case of budgetary imbalance, these countries should attempt to reduce expenditures rather than raising tax revenues.

The average direct tax effort index over the 15-year period in Bangladesh is 0.692, while that for indirect taxes is 0.483. However, the tax effort for direct taxes has deteriorated over time, while that for indirect taxes has improved in recent years. The tax effort index has increased from 0.415 in FY91 to 0.527 in FY05. The tax effort indices for both direct and indirect taxes are low, implying that Bangladesh has the potential for raising revenue collection from both direct and indirect taxes. The average tax effort indices suggest that among other countries, Bolivia, Jordan, Nicaragua and Sri Lanka have more potential in raising direct taxes, whereas India, Indonesia, Nicaragua and Philippines have underutilized revenue potential in indirect taxes. Mongolia has scope for increasing revenue from both the categories.

In terms of tax buoyancy, Bangladesh ranks the second highest among the countries, with a tax buoyancy ratio of 1.235, meaning that tax revenue is quite responsive to GDP and effort has been made to increase tax revenue over the period. Tax buoyancy ratios for direct and indirect taxes in Bangladesh are 1.253 and 1.23, respectively; indicating direct taxes to be slightly more buoyant than the other. This indicates a positive sign in raising potential tax revenue collection that is very important for a low tax effort country like Bangladesh. The estimated rank correlation coefficient suggests no significant correlation between tax effort and tax buoyancy.

As the study suggests, Bangladesh is a low tax effort country having a high buoyancy ratio, implying that the policymakers of Bangladesh have the scope and potential to opt for greater revenue mobilization through internal resources in order to meet the budgetary deficit. Therefore, it is important to place greater emphasis on administrative reinvention and policy reform in order to identify and remove the loopholes in the revenue generation process.

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Annex Table I: Summary of Previous Studies on Tax Effort

Studies	Dependent variable	Explanatory Variables				
		Sectoral Composition of Value-Added	Openness of the Economy	Per Capita Demographic Characteristics	Income/	Foreign Debt/Tax Evasion
Lotz and Morss (1967) developed and developing countries	Ratio of tax revenue to GNP		Trade Share in GNP (positive, significant for the entire sample and for the low income countries, not significant for the high income countries)	Per capita GNP (positive, significant for the entire sample and for the low income countries, not significant for the high income countries)		
Shin (1969) Developed and developing countries	Tax ratio	Agricultural share in GNP (negative, not significant)	Trade Share in GNP (positive, not significant)	Per Capita GNP (positive, significant)		Rate of change in prices (positive, significant only for the low income countries)
Bahl (1971) Developing countries	Taxable capacity	Agricultural share (negative, significant) Mining share (positive, significant)	Export share (positive, not always significant)	Per capita income (positive, not significant)		
Chelliah, Baas, and Kelly (1975) 47 countries during 1969-1971	Tax share in GNP	Agricultural share (negative, significant) Mining share (positive, significant)	Export share (positive, not significant)			
Tait, Grätz, and Eichengreen (1979) 47 countries during 1972-1976	Tax share in GNP	Agricultural share in GNP (negative, not significant) Mining share in GNP (positive, significant)	Non-mineral export share in GNP (positive, significant)			
Tanzi (1981) 34 sub-Saharan African Countries for 1977	Tax ratio	Mining share (positive, significant)	Non-mineral export share (positive, significant)			
Tanzi (1987) 86 developing Countries for 1977	Tax share in GDP			Per capita income (positive, significant)		
Tanzi (1992) 83 Countries for 1978-1988	Tax share in GDP	Agricultural share (negative, significant)	Import share in GDP (positive, significant)	Per capita income (positive, not significant for some years)		Foreign debt share in GDP (positive, not significant in all estimations)

Annex Table I: Contd.

Studies	Dependent variable	Explanatory Variables			
		Sectoral Composition of Value-Added	Openness of the Economy	Per Capita Income/ Demographic Characteristics	Foreign Debt/ Tax Evasion
Stotsky and WoldeMariam (1997) 43 sub-Saharan African Countries for 1990-1995	Tax share in GDP	Agricultural share (negative, significant) Mining share (negative, significant) Manufacturing share (negative, not significant) Positive and (negative, not significant)	Import share in GDP (negative/positive, not significant) Export share in GDP (positive, significant)	Per capita income (positive, significant)	
Piancastelli (2001) developed and developing countries	Total tax revenue share in GDP	Agricultural share in GDP (negative, significant in a panel analysis) Industry share in GDP (positive, significant in a time-series analysis) Service share in GDP (positive, not always significant)	Trade Share (positive, significant)	GNP per capita (positive, not always significant)	
Teera (2002) developed and developing countries	Tax share in GDP	Agricultural share in GDP (negative and positive depending on the estimation, strong negative impact for low income countries) Manufacturing share in GDP (negative, not significant)	Trade share in GDP (negative and positive, not significant, strong positive effect for lower middle income countries)	GDP per capita (negative and positive, not always significant)	debt share in GDP (negative and positive, mostly significant, Shadow economy (positive, not always significant; negative and significant in one estimation)
Alm and Martinez-Vazquez (2003); developed and developing countries	Ratio of tax revenue to GDP	Agricultural share in GNP (negative, not significant) Mining share in GNP (positive, significant)	Trade Share in GNP, (negative, not significant)	GNP per capita, (negative, significant)	Shadow economy share in GDP, (negative, significant)
Bahl (2003) OECD and less developed economies	Ratio of tax revenue to GDP	Non-agricultural share in GDP (positive, significant)	Trade Share (positive, significant)	Population growth rate (positive, significant)	Simple correlation between tax effort and the size of shadow economy (positive, not significant)
Ahsan and Wu (2005) developed and developing countries for 1979-2002	Tax share in GDP	Agricultural share in GDP (negative, significant)	Trade Share in GDP (positive, significant)	GDP per capita (negative, significant) Population growth rate (negative, not significant)	Corruption Level (negative, not significant)

Annex Table II: Summary Statistics FY91-FY05

Variable	Obs	Mean	Std. Dev.	Min	Max
The whole sample					
Industry, Value Added (percent of GDP)	155	28.9	5.293	19.489	46.814
International Trade (percent of GDP)	155	67.268	34.673	17.226	190.425
Money plus Quasi-money (percent of GDP)	155	51.794	25.889	18.07	146.063
External Debt (percent of GDP)	155	85	96.727	17.756	736.088
GDP per Capita (constant 2000 US\$)	155	808.433	406.73	276.549	1988.394
Population Growth (annual percent)	155	1.995	1.071	-3.292	11.181
Tax Revenue (percent of GDP)	155	14.851	4.241	5.776	25.710
Direct Tax Revenue (percent of GDP)	155	4.24	2.382	0.944	14.173
Indirect Tax Revenue (percent of GDP)	155	10.12	3.401	4.451	16.976
Bangladesh					
Industry, Value Added (percent of GDP)	15	25.094	1.599	21.738	28
International Trade (percent of GDP)	15	30.082	6.257	18.89	38.65
Money plus Quasi-money (percent of GDP)	15	32.8	6.486	24.125	44.719
External Debt (percent of GDP)	15	38.256	4.033	32.45	46.266
GDP per Capita (constant 2000 US\$)	15	336.331	44.363	276.549	415
Population Growth (annual percent)	15	2.065	0.154	1.86	2.291
Tax Revenue (percent of GDP)	15	7.521	0.738	5.776	8.671
Direct Tax Revenue (percent of GDP)	15	1.635	0.222	1.256	1.906
Indirect Tax Revenue (percent of GDP)	15	5.81	0.584	4.451	6.694

Sources of Data

World Development Indicators 2006 CD-ROM, World Bank; World Development Indicators database; International Finance Statistics Yearbook, Various Issues, International Monetary Fund; Government Finance Statistics Yearbook, Various Issues, International Monetary Fund; Bangladesh Economic Review (2007), Finance Division, Ministry of Finance, Government of Bangladesh; Indian Public Finance Statistics, various issues, Ministry of Finance, Government of India; Handbook of Statistics on Pakistan Economy, 2005, Government of Pakistan; Central Bank of Sri Lanka Annual Report, Various Issues.

Annex Table III: Tax Effort Index for All Countries FY91-FY05

Year	Bangladesh	Bolivia	India	Indonesia	Jordan	Mongolia	Morocco	Nicaragua	Pakistan	Philippines	Sri Lanka
FY91	0.415	0.778	1.009	1.020	1.251	NA	1.927	0.975	0.889	1.164	1.199
FY92	0.461	0.834	0.960	1.019	1.564	NA	1.947	1.126	0.923	1.205	1.127
FY93	0.500	0.874	0.891	0.956	1.415	0.923	1.799	1.061	0.891	1.114	1.112
FY94	0.498	0.854	0.917	1.065	1.481	0.676	1.842	0.810	0.900	1.111	1.098
FY95	0.486	0.820	0.938	0.997	1.505	0.601	1.489	0.851	0.946	1.084	1.105
FY96	0.487	1.074	0.940	0.961	1.558	0.597	NA	0.880	0.970	1.072	1.075
FY97	0.517	1.110	0.890	1.054	1.427	0.578	1.596	0.881	0.892	0.974	1.044
FY98	0.493	1.205	0.849	0.732	1.475	0.455	1.691	0.906	0.915	0.869	0.961
FY99	0.488	1.067	0.895	0.928	1.395	0.515	1.639	0.863	0.965	0.830	1.016
FY00	0.479	1.104	0.895	NA	1.417	0.748	NA	0.885	0.809	0.787	0.976
FY01	0.483	1.001	0.847	0.652	1.391	0.834	NA	0.846	0.785	0.806	0.794
FY02	0.508	1.126	0.853	0.728	1.302	0.681	NA	0.874	0.784	0.766	1.000
FY03	0.523	1.058	0.895	0.810	1.250	0.881	1.569	0.945	0.801	0.803	0.957
FY04	0.529	1.287	0.910	0.862	1.352	NA	1.817	0.989	0.787	0.814	0.982
FY05	0.527	1.397	0.949	NA	1.487	NA	1.608	1.051	0.714	0.890	1.045

Source: Author's own calculations.

Annex Table IV (a): Direct Tax Effort Index for All Countries FY91-FY05

Year	Bangladesh	Bolivia	India	Indonesia	Jordan	Mongolia	Morocco	Nicaragua	Pakistan	Philippines	Sri Lanka
FY91	0.986	0.588	1.075	2.007	0.542	NA	1.511	0.912	0.745	1.179	0.971
FY92	1.003	0.601	1.030	1.927	0.547	NA	1.607	0.985	0.845	1.249	0.838
FY93	0.999	0.615	1.002	1.732	0.547	1.350	1.365	0.682	0.924	1.058	0.816
FY94	0.880	0.490	1.092	1.634	0.588	1.065	1.330	0.444	0.997	1.070	0.783
FY95	0.670	0.545	1.113	1.462	0.610	1.193	1.131	0.591	1.223	1.061	0.711
FY96	0.592	0.709	1.122	1.477	0.637	1.098	NA	0.566	1.251	1.035	0.745
FY97	0.604	0.697	0.990	1.670	0.577	0.881	1.206	0.514	1.199	0.952	0.687
FY98	0.563	0.725	1.007	1.197	0.529	0.407	1.277	0.504	1.382	0.955	0.599
FY99	0.579	0.784	1.085	1.591	0.530	0.242	1.321	0.467	1.449	0.902	0.723
FY00	0.614	0.753	1.053	NA	0.533	0.548	NA	0.515	1.439	0.844	0.593
FY01	0.588	0.636	1.009	0.837	0.588	0.408	NA	0.528	1.357	0.932	0.543
FY02	0.612	0.780	0.990	0.931	0.549	0.474	NA	0.613	1.363	0.871	0.596
FY03	0.609	0.736	1.115	1.041	0.501	0.734	1.471	0.801	1.152	0.874	0.539
FY04	0.563	0.888	1.087	1.007	0.493	NA	1.610	0.184	1.053	0.899	0.457
FY05	0.513	0.890	1.180	NA	0.599	NA	1.499	0.894	0.945	0.992	0.520

Source: Author's own calculations.

Annex Table IV (b): Indirect Tax Effort Index for All Countries FY91-FY05

Year	Bangladesh	Bolivia	India	Indonesia	Jordan	Mongolia	Morocco	Nicaragua	Pakistan	Philippines	Sri Lanka
FY91	0.373	0.782	1.047	0.546	1.857	NA	2.107	1.009	0.921	1.138	1.324
FY92	0.418	0.854	0.993	0.571	2.429	NA	2.113	1.185	0.943	1.151	1.275
FY93	0.447	0.894	0.909	0.569	2.100	0.689	2.031	1.158	0.801	1.117	1.263
FY94	0.456	0.984	0.920	0.782	2.211	0.513	2.094	0.877	0.730	1.033	1.260
FY95	0.499	0.957	0.940	0.733	2.250	0.392	1.695	0.977	0.787	1.035	1.307
FY96	0.482	1.262	0.939	0.646	2.281	0.463	NA	1.022	0.796	1.030	1.246
FY97	0.518	1.316	0.895	0.646	2.067	0.464	1.827	1.056	0.710	0.921	1.227
FY98	0.497	1.338	0.845	0.418	2.207	0.479	1.920	1.100	0.630	0.721	1.147
FY99	0.488	1.104	0.881	0.534	2.035	0.626	1.814	1.069	0.608	0.721	1.172
FY00	0.468	1.276	0.883	NA	2.081	0.843	NA	1.077	0.577	0.689	1.181
FY01	0.477	1.153	0.831	0.540	1.986	1.021	NA	1.015	0.597	0.665	0.932
FY02	0.504	1.270	0.840	0.614	1.887	0.805	NA	1.021	0.542	0.647	1.199
FY03	0.520	1.183	0.856	0.683	1.862	0.990	1.603	1.045	0.589	0.670	1.165
FY04	0.540	1.317	0.875	0.784	2.199	NA	1.909	1.085	0.588	0.687	1.252
FY05	0.553	1.628	0.887	NA	2.350	NA	1.650	1.163	0.590	0.717	1.310

Source: Author's own calculations.