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Estimating the Federal Direct Tax Buoyancy for Pakistan in Post-1973 Era

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Estimating the Federal Direct Tax Buoyancy for Pakistan in Post-1973 Era

Abstract

This study used the simple co-integration technique to estimate the direct tax buoyancy for Pakistan economy for the 36 year period starting from FY-1974 to FY-2009. The buoyancy estimated was more than unity which represents slight improvement over previous estimates in past studies. The study attributes the improvement to factors such as expansion of tax base, diversification and deepening of manufacturing sector and structural change in the economy with the size of agriculture sector output shrinking as proportion of GDP and the proportion of direct tax increasing in proportion to total taxes gradually. The study recommends certain policy recommendations which include increase in tax base, reduction in tax rates, reducing tax evasion opportunities by taxing all sources of income and by increasing documentation through compulsory show of tax identity in making most material transactions.

Keywords Taxes, Fiscal Policy, Public Finance, Tax Buoyancy, Tax Elasticity, Tax to GDP Ratio

JEL Codes E62, H2, H3

1. Introduction

Studies in tax administration and policy in developing countries had been undertaken in past and in general, low tax collection and low tax to GDP ratio in developing countries had been attributed to low documentation, low level of monetization, lack of industrial base and lack of openness (Ahmed, 1994).

Pakistan is classified as lower to middle income country by IMF and it is ironic that among those countries, Pakistan has lowest Tax to GDP ratio, i.e. 9.5%. What is more concerning is the fact that the trend of the dismal tax to GDP ratio has shown even further decline in recent years. Chaudhry & Munir (2010) explained that determinants of low tax revenue in Pakistan include narrow tax base, more dependence on agriculture sector, devaluation, foreign aid, informal economy and low level of literacy rate. They opined that low tax revenue in Pakistan owes to large traditional agriculture sector and other 'hard to tax' sectors such as small business and shadow economy. Ahmed (2010) mentioned that rent seeking in tax administration has also led to dismal tax collection in Pakistan.

In Table 1, we present composition of tax collection in Pakistan in various heads in various eras of Pakistan economic history. It can be seen that with opening of economy and trade liberalization after Pakistan entered into Structural Adjustment Program (SAP) with IMF and World Bank in late 1980s, the share of excise and custom duty has steadily decreased as percentage of total tax collection.

It can also be seen that in compliance with SAP, fiscal authorities in Pakistan levied General sales Tax (GST) and the share of GST in total tax collection as percentage of total taxes has increased steadily.

However, Rafaqat (2005) showed that the welfare of the poor households has been reduced due to taxation of items such as sugar, vegetable ghee, and basic fuels, whereas rich households remain comparatively better off because most of the services used by them remain out of GST tax net and this empirical evidence also confirms the microeconomic theory of indirect taxes being regressive.

One of the most appreciable developments despite the almost stagnant tax to GDP ratio during the last 30 years is the increase in direct taxes as a percentage of total taxes collected in Pakistan.

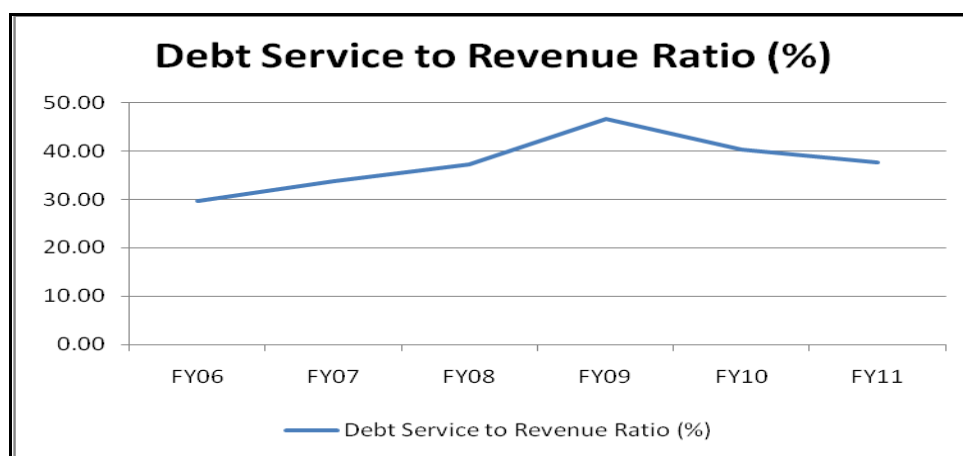
Table 1: Tax Composition in Pakistan (%)

Selected Tax Revenue Indicators					
			Composition of Indirect Tax		
Period	Tax to GDP (%)	Direct Tax (% of Total)	Custom Duty	Excise Duty	Sales Tax
FY 73-77	9.5	15.4	42.4	33.7	8.5
FY 78-88	11.7	17.7	44.2	29.4	8.7
FY 89-90	12.2	15.4	46.8	21.1	16.8
FY 91-93	12	19.2	43.1	22.2	15.5
FY 94-96	12.1	26.7	35.4	19.3	18.6
FY 97-99	11.1	33.8	25.1	20.6	20.4
FY 00-05	9.3	32.3	16.3	11.4	40.0
FY 06-08	10.3	36.2	16.7	8.6	38.3
FY 09-11	9.7	37.6	11.2	8.9	38.0

Source: Ministry of Finance

In Figure 1, high Debt Service to Revenue ratio confirms that going forward; this rising trend in debt is not sustainable if tax base is not expanded expeditiously. With high discount rate and amidst freeze on foreign debt currently, the persistent government domestic borrowing has resulted in debt servicing to surpass Rs 1,000 billion in FY12.

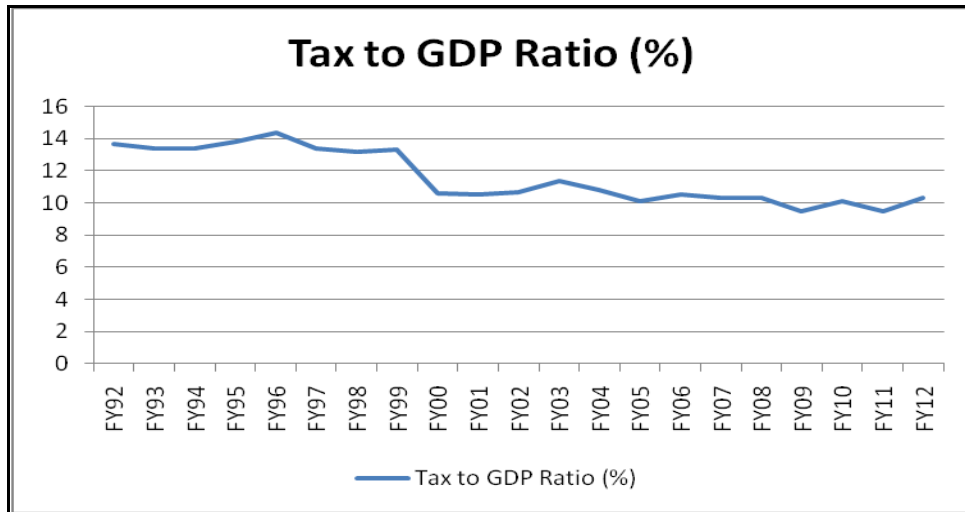
Figure 1: Debt Service to Revenue Ratio (%)



Source: Ministry of Finance

Figure 2 presents Tax to GDP ratio and it shows that the ratio has decreased consistently in last two decades in Pakistan. Still, the income tax collection is not as broad based as it should be and lack of documentation and ‘un-documentation’ due to stringent conditions for formal sector has resulted in slow progress in the expansion of tax base.

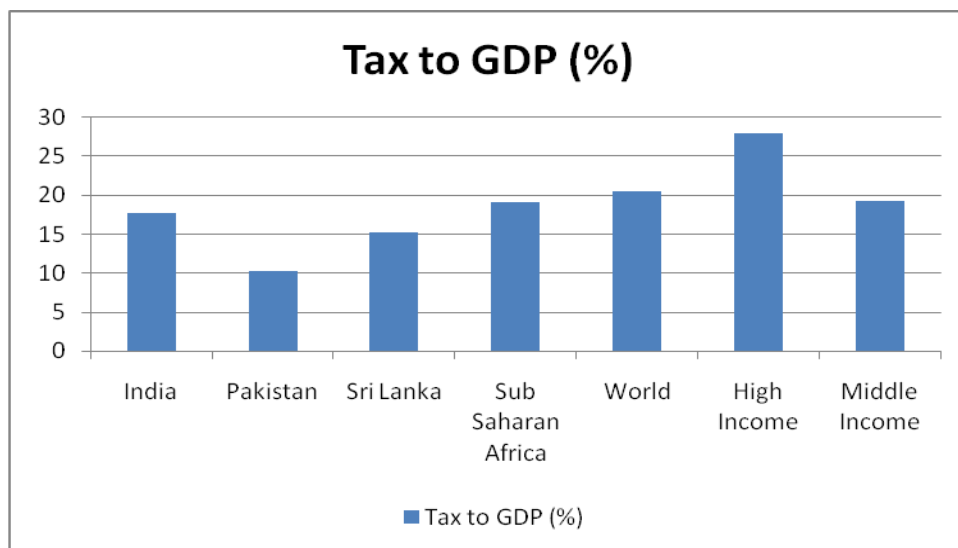
Figure 2: Tax to GDP Ratio (%)



Source: Ministry of Finance

Figure 3 presents Pakistan’s tax to GDP ratio in comparison to the other regional countries and also in comparison to the average for the world as a whole, middle income countries and high income countries. Comparison shows that Pakistan’s tax to GDP ratio is lowest in comparison to the regional countries and as well as other aggregated categories shown in Figure 3.

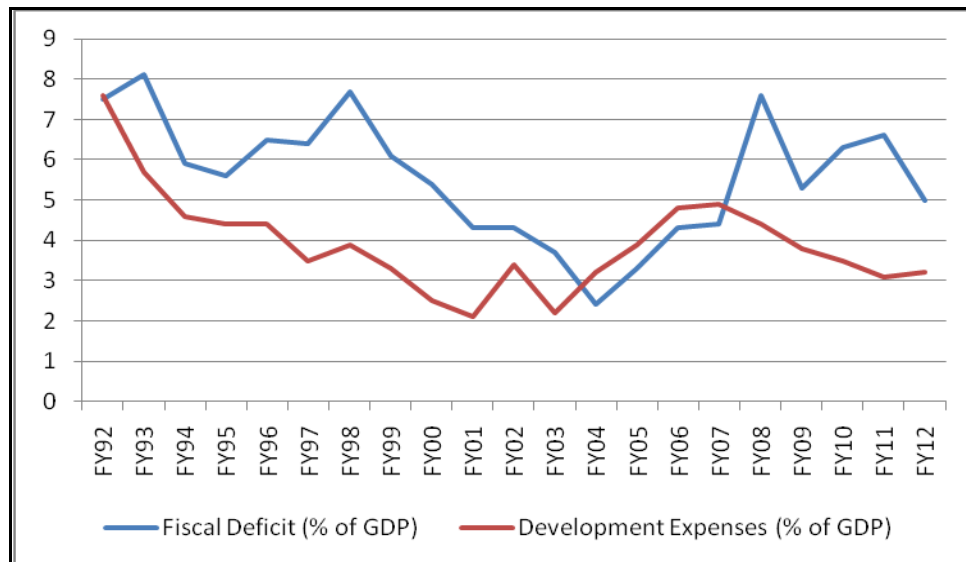
Figure 3: Comparison of Tax to GDP Ratio Across regional Countries & Other Categories (% of GDP)



Source: IMF

Due to low tax to GDP ratio, the fiscal deficit has remained largely above 4% of GDP leaving little room for development expenditure as most of the tax and non-tax revenues are eaten up by debt servicing as is shown in Figure 4. Development expenditure has in most periods declined with the rise in fiscal deficit as can be seen in Figure 4.

Figure 4: Fiscal Deficit & development Expenditure (% of GDP)



Source: Ministry of Finance

2. Problem Statement

The study strives to estimate the direct tax buoyancy for federal taxes in Pakistan for the 36 year period from FY-1974 to FY-2009 using suitable econometric methodology.

3. Objectives of the Study

The study sets forth following important objectives:

- 1) To estimate the direct tax buoyancy for the 36 year period covering the data from post 1973 period for Pakistan.
- 2) Analyzing the buoyancy estimates and discussing the determinants of low tax to GDP ratio in Pakistan and low tax buoyancy.
- 3) Providing policy recommendation to improve tax to GDP ratio and tax buoyancy in Pakistan.

4. Limitations of the Study

The study uses the time series data and most of the variables were found to be non-stationary. Natural log of customs duty and its base, i.e. natural log of total trade were non-stationary at I(0), but, stationary at I(1). Both were integrated of order (I), but the residuals were not stationary even at 10% level of significance when we used CRDW (Co-integrating Regression Durbin-Watson) test. Hence both variables were not co-integrated.

Natural log of excise duty and its base, i.e. natural log of total large scale GDP were non-stationary at I(0), but, stationary at I(1). Both were integrated of order (I), but the residuals were not stationary even at 10% level of significance when we used CRDW (Co-integrating Regression Durbin-Watson) test. Hence both variables were not co-integrated as well.

In the literature, non-stationarity in the relevant variables important to the study was also highlighted by Bilquees (2004).

5. Research Methodology

The buoyancy of the tax measures the total response of tax revenue to changes in the relevant tax base (Ahmed, 1994). If the effect of discretionary changes is subtracted, then, the ratio of percentage change in tax revenue divided by the percentage change in tax base gives tax elasticity. In this study, tax buoyancy is estimated.

The Ordinary Least Square (OLS) method is employed for regression. The model we use is as follows:

Model

$$\ln ICT_t = \beta_0 + \beta_1 \ln NAGR_t + \varepsilon_t$$

Where,

ln ICT	= Natural log of income & corporate tax.
ln NAGR	= Natural log of total non-agricultural GDP.
t	= Index for time period.
ε_t	= Random error term.

Data for variables had been taken from Ministry of Finance, Pakistan. The variables have been taken in log form to compute the values in percentages. Though, when we have log on both sides, the slope coefficient gives elasticity. But, in literature, the word tax elasticity is used to represent a responsiveness of tax revenue to relevant tax base, net of any discretionary changes to the tax system, such as tax rates and expanding the tax base (Gillani, 1984).

Ljung-Box test is used to test that the error term is a white noise process. The appropriate model where error term is white noise is used to check stationarity of the variables. Finding the order of integration in variables, decision is made about whether to use simple OLS if both variables are I(0) or to use co-integration provided both variables have same I(d) and the residuals are stationary, i.e. I(0). For testing stationarity of the residuals, CRDW test is used.

6. Literature Review

Study by Gillani (1984) estimating the tax buoyancy and tax elasticity for Pakistan found that tax buoyancy was more than unity and the estimate for tax elasticity was even higher than tax buoyancy. In another study, Mukarram (2001) estimated the tax buoyancy and elasticity of major taxes for the period 1981-2001 and found the buoyancy for total taxes to be exactly equal to unity.

In more recent studies using more standard econometric tools, Bilquees (2004) found the elasticity of the total tax revenue both with respect to the total GDP and the non-agricultural GDP base to be less than unity. Explaining the determinants of low buoyancy, the study mentioned in particular the existence of continued exemptions, allowances, and loopholes for evasion.

One possible reason for the low buoyancy could be the reduction in the tariff rates over time after the country opened its borders for foreign goods and left import substitution industrialization policy. But, on the other hand, the decline in the customs duty was offset by the sales tax revenue from imports. This is reflected in high ratio of sales tax to GDP in recent years as compared to the earlier periods.

Ahmad and Mohammad (2010) studied the determinants of tax buoyancy for 25 developing countries by using the cross sectional data for the year 1998 to 2008. The study revealed that growth in agriculture had insignificant effect and it owed to low documentation and gross exemption from direct taxes provided to the agriculture sector in most developing economies.

Growth in services and manufacturing sector had positive and significant effect on tax buoyancy. Furthermore, increased monetization also had significant effect showing that increased documentation through monetization leads to high tax buoyancy. Budget deficit also had positive relation with tax buoyancy signifying that high fiscal imbalance compels governments of the developing countries to increase tax effort and tax collection. In that study, it was further found that growth in grants had negative impact on tax buoyancy as availability of grants leads to lax tax efforts.

7. Data Analysis & Interpretation

7.1. Econometric Analysis of Model

At levels, both total income and corporate tax revenue and non-agricultural GDP exhibit exponential trend. Taking the natural log not only makes them linear, but also enables us to compute tax buoyancy. First, looking at the linear trend, we run the trend stationary model for both $\ln ICT_t$ and $\ln NAGR_t$ as shown below.

$$\text{Ln ICT}_t = \beta_0 + \beta_1 * \text{Ln ICT}_{t-1} + \beta_2 * T + u \quad \text{---- (i)}$$

$$\text{Ln NAGR}_t = \alpha_0 + \alpha_1 * \text{Ln NAGR}_{t-1} + \alpha_2 * T + u \quad \text{---- (ii)}$$

In equation (i), after making sure that the error term is white noise at AR(1), we test whether the true model is trend stationary or difference stationary. For this, we test:

$$\begin{aligned} \text{Ho: } & \beta_0 = 1 \ \& \ \beta_1 = 0 \\ \text{H}_A: & \beta_0 < 1 \ \& \ \beta_1 \neq 0 \end{aligned}$$

Using the F-test, we compare the test statistic with ADF (Augmented Dickey Fuller) critical values. The computed test statistic is found to be less than ADF critical values, i.e. (3.49 < 7.24), hence, we do not reject the null hypothesis at 5% level of significance and hence, the true model is difference stationary (random walk model with drift) and the variable is stationary at first difference, i.e. I(1).

In equation (ii), after making sure that error the term is white noise at AR(1), we test whether the true model is trend stationary or difference stationary. For this, we test:

$$\begin{aligned} \text{Ho: } & \alpha_0 = 1 \ \& \ \alpha_1 = 0 \\ \text{H}_A: & \alpha_0 < 1 \ \& \ \alpha_1 \neq 0 \end{aligned}$$

Using the F-test, we compare the test statistic with ADF (Augmented Dickey Fuller) critical values. The computed test statistic is found to be less than ADF critical values, i.e. (6.55 < 7.24), hence, we do not reject the null hypothesis at 5% level of significance and hence, the true model is difference stationary (random walk model with drift) and the variable is stationary at first difference, i.e. I(1).

For testing stationarity of the residuals, we use CRDW test and at 5% level of significance, our co-integration model yields DW statistic that is more than the critical value, i.e. (0.43 > 0.322). Hence, we reject null hypothesis that DW=0 at 5% level of significance. Thus, the variables are co-integrated. For mechanics of the test and critical values, we used the text by Gujarati (2002, p. 824). In table 2, we present the output of the model.

Table 2: Regression Output for the Model

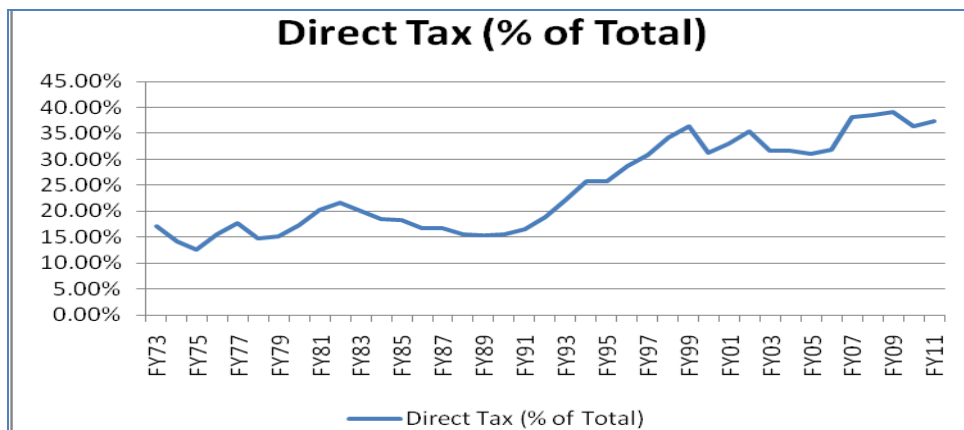
Model: LICT = $\beta_0 + \beta_1 * \text{LNAGR}$				
	Coefficient	Std. Error	t-Statistic	Prob.
β_0	-5.815406	0.276364	-21.04254	0.0000
B_1	1.173733	0.020200	58.10557	0.0000
R-squared	0.990030	Mean dependent var		10.15474
Adjusted R-squared	0.989737	S.D. dependent var		1.712802
S.E. of regression	0.173519	Akaike info criterion		-0.611104
Sum squared resid	1.023703	Schwarz criterion		-0.523131
Log likelihood	12.99987	Durbin-Watson stat		0.430068

7.2. Economic Analysis of the Results

We can see that the income tax buoyancy for the period under study had been marginally more than unity. A 1% increase in non-agricultural GDP yields more than 1% increase in total income & corporate tax revenue in Pakistan. To be more precise, a 1% increase in non-agricultural GDP yields 1.17% increase in total income & corporate tax revenue in Pakistan

It has increased over past estimates because of improvement in tax base expansion, diversification and deepening of manufacturing sector and structural change in the economy with the size of agriculture shrinking as a proportion of GDP. After the SAP with IMF/WB was over, the proportion of direct tax has been increasing in proportion to total taxes gradually and that also contributed to the improvement in direct tax buoyancy. In Figure 5, we present the trend of direct tax as a percentage of GDP during the period under study.

Figure 5: Direct Tax Contribution to Total Taxes (%)



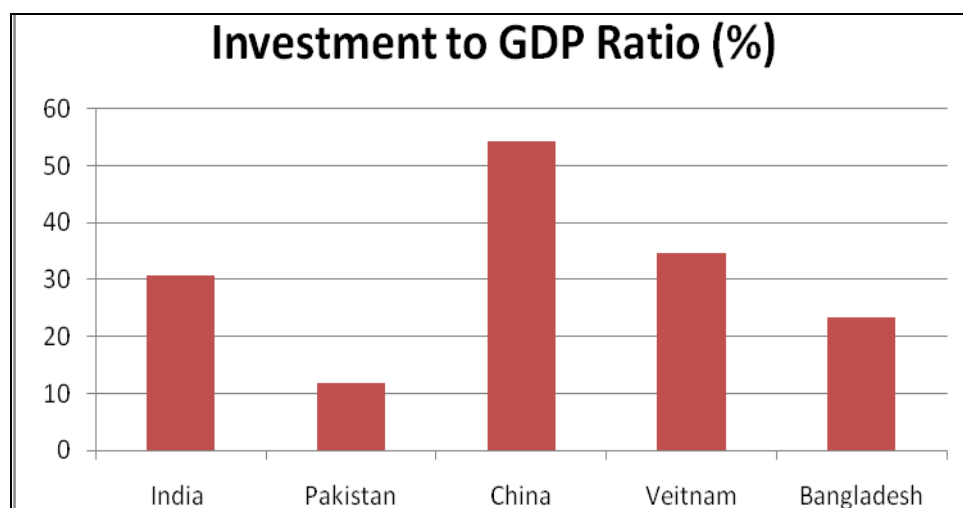
Source: Ministry of Finance

8. Policy Recommendations

Pasha (2010) recommended expansion of the current GST to cover services and exempted and zero-rated sectors; improvement of direct/income tax administration; and enhancement in the provincial tax- to-GDP ratio. The author also noted that success will crucially depend on the political will to bring improvements in the tax administration, adopt rational tax policies and promote higher tax compliance.

It is ironic that Pakistan has one of the lowest investments to GDP ratio in the world. Figure 6 provides a comparison of investment to GDP ratio in Pakistan as compared to the regional countries.

Figure 6: Investment to GDP Ratio (%)



Source: CIA Fact Book

One of the prime reasons of low investment to GDP ratio include the high cost of doing business which includes i) high taxes in the formal sector, ii) supply side bottlenecks, iii) weak security, iv) weak legal system & enforcement etc.

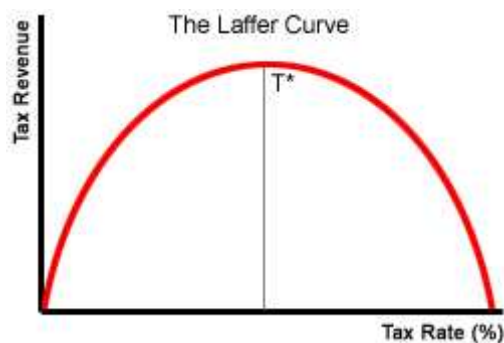
A reduced uniform tax rate along with uncomplicated tax procedures is needed to boost production. Tax base needs to be increased through documentation. Income tax should be levied on agricultural income, stock trade and real estate investment. Services especially the hotels/restaurants, franchises etc must be brought in tax net rather than looking to burden the already registered taxpayers.

Keeping the higher tax rates and following a multiple tax regime has not helped in increasing the tax revenue or the tax base. Reliance on indirect taxes for fiscal management has not helped in ensuring firm level competitiveness, nor has it helped matters in sustainable development.

Manufacturing requires industrial processing of raw materials. This mechanical processing requires energy. Since the country could not yet develop abundant, dynamic and efficient energy mix, cost of such mechanical/industrial processing is higher in Pakistan in most industries. Value addition requires a clear incentive in manufacturing over trading. Since income from retail trade and services is largely out of tax net, the producers paying bulk of business related taxes do not get necessary incentive in engaging in laborious act of value addition.

A reduced uniform tax rate along with uncomplicated tax procedures and ease in interest rates is needed to boost production. Below, we discuss this point with the help of 'Laffer Curve' illustrated in Figure 6.

Figure 6: Laffer Curve



Higher tax rates discourage entrepreneurship as they decrease the incentive to produce. Lower tax rates encourage entrepreneurship and hence increase the size of producing sector and hence production. With the increase in production, tax revenue in value terms increases. Lower tax rates can still ensure high tax to GDP ratio. This is evident from Table 3 which lists countries with corporate tax rates below 20% and their tax to GDP ratio.

Table 3: Corporate Tax Rate & Tax to GDP Ratio of Selected Countries

S.No.	Country	Tax to GDP Ratio	Corporate Tax Rate
1	Chile	17.1%	17%
2	Bulgaria	34.4%	10%
3	Czech Republic	36.3%	21%
4	Georgia	21.7%	15%
5	Greece	33.5%	22%
6	Hong Kong	12.8%	16.5%
7	Hungary	37.3%	16%
8	Iceland	40.4%	18%
9	Ireland	34%	12.5%
10	Kazakhstan	26.8%	15%
11	Netherlands	39.5%	20%
12	Poland	33.8%	19%
13	Romania	28.1%	16%
14	Russia	36.9%	20%
15	Serbia	34.1%	10%
16	Singapore	13%	17%
17	Slovakia	29.5%	19%
18	Switzerland	30.1%	13% -25%
19	Turkey	32.5%	20%
20	Uzbekistan	21%	12%

Source 1: International Tax & Business Guides- Economic Data – Statistics – Tax – EIU – The Economist

Source 2: 2009 Index of Economic Freedom – Heritage Foundation

Furthermore, tax base needs to be increased through documentation. Tax disclosure shall be made necessary in most material transactions. A strong and vibrant information network is

necessary encompassing major financial, legal, accounting, auditing and tax institutions for timely disclosure of malpractices and tax evasion.

Income tax should be levied on agricultural income, stock trade and real estate investment. Services especially the hotels/restaurants, franchises etc must be brought in tax net rather than looking to burden the already registered taxpayers.

Amnesty scheme shall be introduced for people to whiten their money. Rather than using the stick approach, the carrot approach could be used this time and people can be given a one-time final chance to whiten their money in an attractive scheme.

9. Areas for Further Study

This study did not estimate the tax elasticity for which the data on discretionary tax changes is required. In future studies, tax elasticity could be estimated for Pakistan economy using the updated and recent data sets and furthermore, cross country comparisons can be made for more effective policy analysis.

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