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Munir, Kashif and Sultan, Maryam

University of Central Punjab, Lahore, Pakistan

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Are Some Taxes Better for Growth in Pakistan? A Time Series Analysis

Kashif Munir*

&

Maryam Sulatn[†]

**University of Central Punjab,
Lahore, Pakistan**

* Associate Professor, Department of Economics, University of Central Punjab, Lahore, Pakistan.
Phone: +92 321 5136276, Fax: +92 42 35954892, email: kashif.munir@ucp.edu.pk, kashif_ok@hotmail.com

[†] Research Associate, Department of Economics, University of Central Punjab, Lahore, Pakistan.

Abstract

This study analyzed the impact of taxes on economic growth of Pakistan for the period 1976 to 2014. The study has disaggregated taxes into direct and indirect tax. Indirect tax has further disaggregated into five categories (excise duty, sales tax, surcharges, tax on international trade and other taxes). By applying autoregressive distributive lag framework, study confirmed the existence of long run relationship between taxes and real GDP of Pakistan. Results indicate that in the long run direct tax, taxes on international trade, sales tax and other indirect taxes has positive and significant impact on real GDP. However, in the short run sales tax, tax on international trade and other tax have positive relationship, while excise duty has negative relation with real GDP of Pakistan. The results confirmed that direct tax, sales tax and tax on international trade are pro-growth taxes. Government should increase direct taxes as they have positive and significant impact on economic growth in the long run.

Keywords: Economic Growth, Direct Tax, Indirect Tax, ARDL, Pakistan

JEL: H20, C22, O40

1. Introduction

Tax revenue is the most important and powerful tool to enhance and sustain economic growth in a country. Tax system is an efficient and strong channel to mobilize the internal resources of a country. Primary objective of the tax system is to reduce the income inequality, finance the public goods and services, promote efficient allocation of resources, and economic stabilization (Musgrave, 2006). Tax-growth nexus has always been the most controversial topic among economists and policymakers. Are taxes cause growth? This is the question which has been addressed in numerous empirical and theoretical studies. Previous studies suggest that there is a correlation between taxes and economic growth. Different tax instruments have different impacts in exogenous and endogenous (neoclassical) growth theory. Exogenous growth theory argues that changes in tax policy do not have long run growth effect but they only generate temporary effects (Ramsey, 1928; Solow 1970; Lee & Gordon, 2005). On the other hand, the proponents of endogenous growth theory believe that change in tax rate may have long run growth effect and increase economic activity (Romer, 1986; Lucas, 1988; Rebelo, 1993).

According to endogenous growth theory, both the tax composition and level of taxes are important in order to maintain long run economic growth. There are two instruments of taxation in endogenous growth theory, the distortionary taxation which prevents to increase human and physical capital and the other is non-distortionary taxation which has no impact on capital accumulation (Benos, 2009). Direct taxes discourage the capital accumulation which lowers the economic growth, while indirect taxes only affect consumption choices over the time. Harberger (1964) demonstrated that a change in tax composition has negligible impact on economic growth. Hall (1968) found that tax composition has no relation with economic growth.

There exist another controversy in the literature regarding the choice between direct and indirect taxes for enhancing growth. Some studies found positive relationship between direct taxes and economic growth (Myles, 2000; McCarton, 2006; Gordon & li, 2005; Mamatzakis, 2005), while other found negative relation between direct tax and economic growth (Margalioth, 2003; Barry & Jules, 2008). Tosun and Abizadeh (2005), and Djankor et al. (2009) found that personal income tax and corporate taxes are harmful for economic growth of a country. On the other hand, Manuelle and Rossi (1993), Wildmam (2001), Li and Sarte (2004), Lee and Gordon (2005), and Arisoy and Unlukaplan (2010) confirmed positive relationship between indirect taxes and

economic growth. Bird (2003) reported that a tax system which generates maximum revenue with minimum cost and disproportionate manner is the most efficient and effective tax for developing countries. He found value added tax as an ideal one for this situation.

The objective of this paper is to explore the relationship between growth and taxes in Pakistan. Taxes are disaggregated into direct and indirect taxes, while indirect taxes have been further disaggregated into excise duty, sales tax, surcharges, tax on international trade and other taxes to explore the relationship with growth in Pakistan. The structure of taxation is different in different countries. Pakistan being a developing country remained unable to increase the share of taxation as percentage of GDP to a minimal level compared to other regional partners. This paper will provide useful insight for policy makers in designing taxes and their effect on growth.

2. Literature Review

There are number of theoretical and empirical studies on the effects of taxation on economic growth. Instrument of tax policy have different impacts in endogenous and exogenous (neoclassical) growth theory. The researchers have used different tax components, tax rates, policies and reforms to check their hypothesis on the relationship between taxes and growth.

2.1 Literature on Tax Revenue and Growth

Marsden (1984) explored the relationship between taxes and growth for twenty countries. The study has used cross-sectional data divided into low and high income countries. He found significant negative impact of tax on economic growth, employment, government services and productivity. The results of the study remained consistent by dividing the countries into low and high income countries. He also concluded that among individual components of tax only the tax on goods and services showed significant negative impact on economic growth. Skinner (1988) examined the impact of tax and government expenditure on economic growth of Sub-Saharan African counties. He used pooled cross-sectional time series data for 31 countries from 1965 to 1973 and 1974 to 1982. He found that tax structure is an important growth determinant in Sub-Saharan African counties and concluded that only personal income tax and corporate tax significantly and negatively affect economic growth while import, export and corporate taxes negatively affect investment. Martin and Fardmanesh (1990) found the impact of tax, government expenditure and fiscal deficit on economic growth of 76 low, middle and high income countries from 1972 to 1981. The study confirmed negative impact of taxes on growth

but its impact is positive by incorporating its benefit in decreasing deficit. The impact of government expenditure was opposite to tax.

Easterly and Rebelo's (1993) found the impact of different tax categories on economic growth in developing countries. They found that income tax has significant negative impact on economic growth of developing economies and concluded that private investment is negatively affected by income tax, domestic tax and investment. Mendoza et al. (1995) explore the relationship between tax policy, investment and growth for 18 OECD countries from 1966 to 1990. They found that relationship between tax rate and economic growth is subject to substantial changes, while investment is negatively affected by income tax and positively affected by consumption of tax in selected OECD countries. Branson and Lovell (2001) analyzed the impact of tax structure, its rates, optimal tax mix and tax burden on economic growth of New Zealand from 1946 to 1995. They found an indirect relation between observed tax burden, tax mix and economic growth. They suggested that for the maximization of growth in New Zealand the share of direct tax must be greater in total tax revenue.

Mashkoo et al. (2010) analyzed the relationship between total tax revenue and growth in Pakistan from 1973 to 2008. They employed Granger causality test and ARDL technique to achieve the objectives of the study. The results indicate that tax revenue has positive and significant impact on economic growth in the short run and causality run from direct tax to economic growth. Taha et al. (2011) examined the causality between tax revenue and economic growth in Malaysia from 1970 to 2007. The study employed Johenson co-integration and Granger causality test on tax revenue and economic growth. They found that there is only unidirectional causality run from economic growth to tax revenue. Aruwa (2012) checked the behavior of Nigerian public policy by examining the effect of government revenue and expenditure on economic growth. The study used time series data from 1979 to 2008 and employed Johenson co-integration and VAR based ECM in order to find co-integration and causality respectively. The results indicate that casualty runs from government revenue to government expenditure and from real GDP to government expenditure. Garba (2014) examined the tax revenue and growth nexus in Nigeria by incorporating individual components of taxes. The study conducted a time series analysis from 1980 to 2001 and employed ECM for achieving the objectives of the study. The study found that there exist a significant relationship between tax revenue and economic growth in Nigerian economy.

2.2 Literature on Direct/Indirect Tax and Growth

The choice between direct and indirect tax as a growth promoter is another controversial issue among researchers. Different researchers have different arguments and findings regarding the effects of direct and indirect taxes on growth.

Poterba et al. (1986) examined the results of a shift from direct to indirect taxes on economic growth of the UK and USA. They have used quarterly data from 1964:3 to 1983:4 for the UK and 1948:3 to 1984:4 for the USA. The study found that real output of both the UK and USA decreases due to a shift to indirect taxes along with an increase in price level and after-tax wages. They also confirmed that these effects are only a short-run phenomenon. Madsen and Damania (1986) examined the shift from direct to indirect taxes on economic growth for 22 OECD countries for the period 1960 to 1990. They applied the Engle-Yoo procedure consisting of three steps in order to estimate both short and long-run impacts of a tax switch. The results indicated that indirect tax has no significant impact on economic growth in the long run. Bleaney and Gemmell (1999) examined the impact of indirect taxes on economic growth of 22 OECD countries from 1970 to 1995. They found that indirect tax has a positive and significant impact on economic growth and concluded that indirect taxes are less harmful to economic growth as compared to direct tax.

Koch et al. (2004) measure the influence of direct and indirect tax rates on economic growth along with the tax-growth nexus. The study employed data envelopment analysis (DEA) on time series data for the period 1960 to 2002 on the South African economy. They opposed the tax literature by giving a negative impact of indirect tax on economic growth and concluded that income tax and growth has a direct relation in South Africa. Wet et al. (2005) evaluated the trade-off between direct and indirect tax for encouraging economic growth in the South African economy. The study has analyzed the two-sector production model of Feder (1983) for the period of 1969 to 2003. They also confirmed the negative impact of direct tax on economic growth while the impact of indirect tax was not significant. Musanga (2007) evaluated the impact of direct and indirect taxes on economic growth of Uganda. He used time series data from 1987 to 2005 and employed Co-integration regression techniques to achieve the objectives. The study found a positive relation of direct tax and a negative relation of indirect tax with economic growth in Uganda.

Johansson et al. (2008) explored the effect of consumption taxes, taxes on property, personal income taxes, and corporate income taxes on GDP per capita for OECD countries. They found that consumption tax and corporate income taxes are negatively related to GDP per capita and taxes on personal income and taxes on property are positively related with growth. Arnold (2008) examined the link between tax structure and economic growth by using tax indicators into panel growth regression for twenty-one OECD countries. His analysis was based on both Solow (1970) growth model and endogenous growth of Lucas (1988). He found that income tax is associated with lower economic growth as compare to consumption tax, and property tax was growth friendly whereas corporate income tax had a pure negative effect on GDP per capita.

Poulson and Kaplan (2008) explored the impacts of tax policies and economic growth in the states of US within the framework of endogenous growth theory. They used multiple regression analysis to find the relationship between various taxes and economic growth from 1964 to 2004. They found that difference in long term equilibrium growth depends upon different tax policies conducted by different states and concluded that higher rate of marginal taxes are associated with lower economic growth in the states. Karras (2009) measured the effects of four major types of taxes (taxes on income, profits, and capital gains; taxes on property; social security contributions; and taxes on goods and services) on economic growth in nineteen European countries. He used benchmark model to calculate the response of GDP against four types of taxes and found that property taxes are associated with positive growth in the short run. An increase in social security have large negative effect on economic growth and taxes on income, profit and capital gains have minor effects as compare to taxes on social security and taxes on goods and services.

Kadir et al. (2011) investigated the impacts of indirect taxes on GNP for Malaysia using the time period from 2001 to 2008. They used multiple regression analysis and granger causality test to find the link between taxes and economic growth. They found that export duty and sales tax are negatively affecting the economic growth, while import duties, excise duties, service taxes and other taxes are positively affecting economic growth. Arisoy and Unlukaplan (2010) analyzed whether direct tax causes economic growth or indirect tax in Turkey using time series data from 1968 to 2006. The study follows Feder's (1983) two sector production model and estimates the model with ordinary least square. They found that indirect taxes negatively affect the economic growth, while the impact of direct tax is not significant. Ebimobwei and Ebiring (2012)

investigated the growth of Nigeria with respect to petroleum profit tax during 1970 to 2010. They employed Johansen Co-integration and Granger causality test to achieve the objectives of the study. The study found that petroleum profit tax is most important category of direct tax in Nigeria as it has long run relationship with economic growth and casualty run from petroleum profit tax to economic growth.

Ilaboya and Mgbame (2012) analyzed the relationship between indirect tax and growth in Nigeria. They used Engel-Granger co-integration and Autoregressive Distributive Lag (ARDL) model to achieve the objectives. They found negative but insignificant relation between indirect tax and economic growth in Nigeria. Umoru and Anyiwe (2013) attempted to examine the national tax policy of Nigeria with its specific objectives of revenue generation and enhancing economic growth. They used time series data from 1975 to 2011 and employed co-integration and ECM. The results indicate that only the direct taxes are enhancing growth in Nigeria, while indirect taxes have insignificant and negative relation with economic growth. Ayuba (2014) analyzed the effect of non-oil tax revenue on economic growth of Nigeria. The study conducted time series regression analysis from 1993 to 2012. He confirmed the positive long run relation between non-oil tax revenue and growth.

The above discussed literature shows contradictory relationship between direct and indirect taxes on growth. Developed and developing countries have different economic and social structure, which hinders the relationship between taxes and growth. The relationship between different forms of taxes on growth is ambiguous in case of Pakistan because there are very few studies which focus on Pakistan.

3. Tax Composition and Growth in Pakistan

Tax to GDP ratio in Pakistan is very low. Among developing nations alone, Pakistan falls in bottom ranked nation because only 5% population is paying direct taxes. The budget potential of Pakistan can increase by strengthening the tax base. The tax revenue is only 13-14% of GDP which is very low as compared to other developing countries. The tax revenue of Pakistan has fallen continuously from 1961 to 2014. Due to the presence of small tax base and large number of tax exemptions granted in excise duty, income tax, sales tax and custom duty the income elasticity of tax is low. Federal tax receipts were started to increase from 15% in 1990s to 32% in 2000 and 40% in 2010. Income tax contributes around 95-97% of total direct taxes. Major

portion of income tax come from withholding tax i.e. 53%. Thus the leading source of direct tax is withholding tax followed by voluntary payments (29.5%) and collection on demand (17.5%). Second major contribution in revenue generation came from sales tax. 65% of indirect taxes came from sales tax during 2009 to 2010. 60% of total domestic sales tax has come from sales tax on imports of petroleum products (40%) and telecom sector. Share of custom duty was 12.2% and of excise duty was 9.1% in total tax receipts during 2009-2010 that has decreased up to 5.5% and 8.5% in 2013-2014. Tax on international trade (tariff) and surcharges contributes around 9.25% and 5.75% in total tax revenue during 2013-2014 respectively.

Figure 3.1: Direct, Indirect, Total Tax, Non-Tax and Total Revenue as % of GDP and GDP Growth Rate

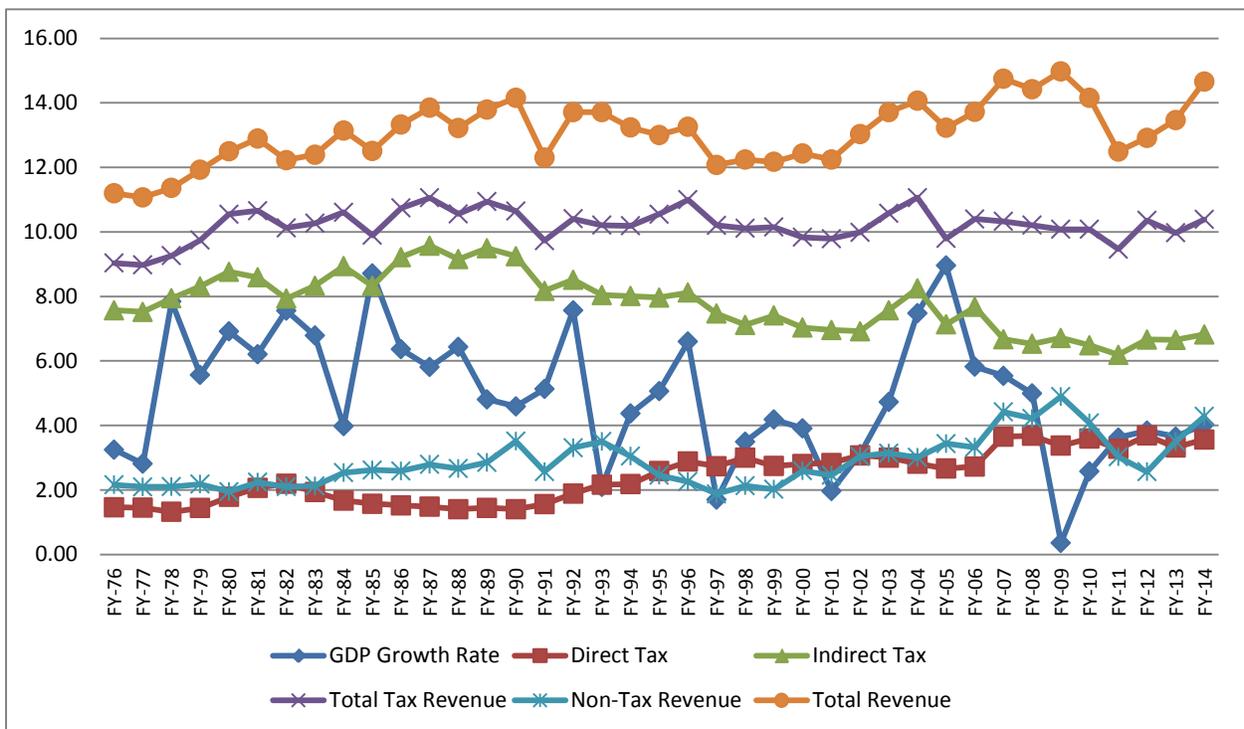


Figure 3.1 demonstrates the trend of direct, indirect, total tax, non-tax revenue and total revenue as a % of GDP along with growth rate of Pakistan from 1976 to 2014. Direct tax as percentage of GDP was 1.76% in 1980, 1.40% in 1990, 3% in 1998, 2.66% in 2005, and 3.56% in 2014. However, indirect tax as a percentage of GDP was 7.57% in 1976, 8.94% in 1984, 8.17% in 1991, 7.12% in 1998, 8.24% in 2004, and 6.82% in 2014. The trend of indirect tax indicates considerable changes in its contribution in growth rate of Pakistan from 1976 to 2014. The evolution of GDP growth rate shows significant fluctuations throughout the period. It was 3.25% in 1976 and went to its highest point of 8.96% in 2005 and then reached to its lowest level of

0.36% in 2009. The flow of total tax revenue showed slight variations in its value from 1976 to 2014. The evolution of total revenue also described the oscillations throughout the period due to the swings in tax structure.

Figure 3.2: Direct Tax and Various Forms of Indirect Tax as % of GDP

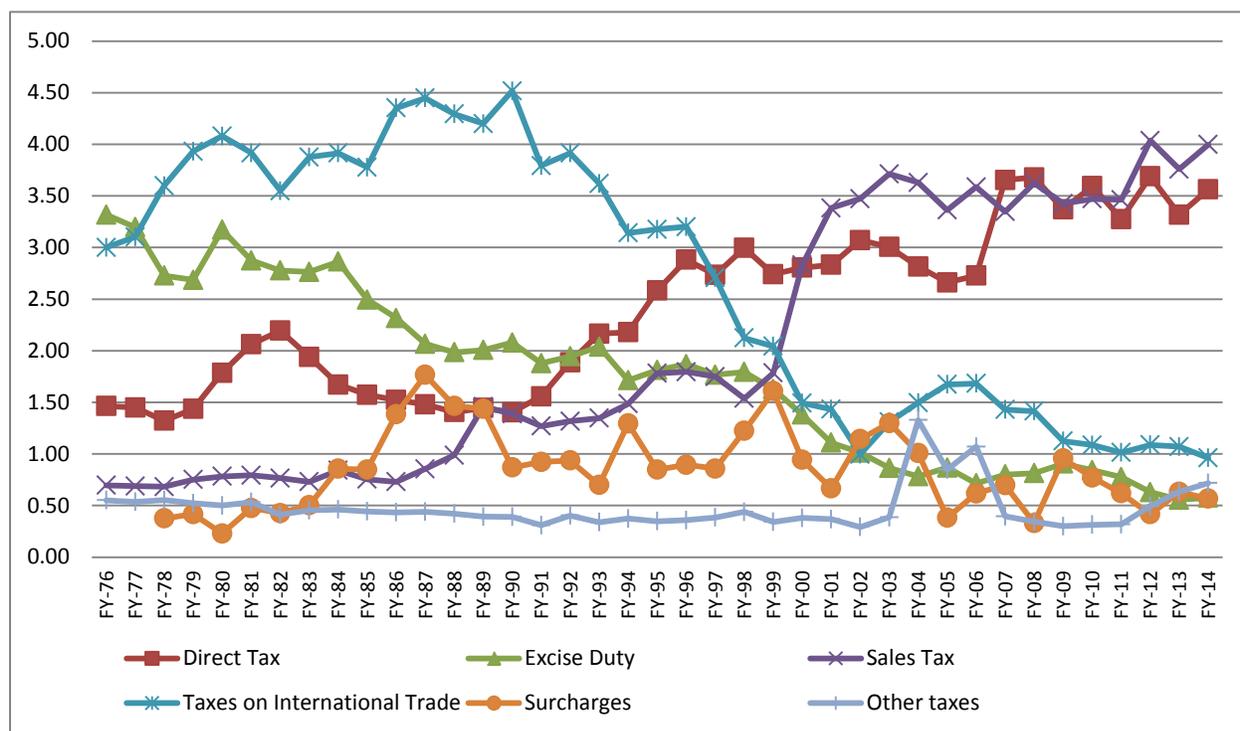


Figure 3.2 shows the trend of direct tax and different forms of indirect taxes i.e. excise duty, sales tax, tax on international trade, surcharges and other taxes as % of GDP. It is quite obvious from above graph that trend of sales tax, direct tax, excise duty and tax on international trade shows significant oscillations over the time. Sales and direct taxes started with lower rates in 1976 (0.55% and 1.46% respectively) and end with almost same higher rates in 2014 i.e. 4% and 3.56% respectively. While the trend of tax on international trade and excise duty is quite opposite to sales and direct taxes. The trend of tariffs is quite surprising due to its significant swings during the period. Its evolution started from 3% in 1976 reached to its highest value of 4.52% in 1990 and end with its lowest value of 0.96% in 2014. It shows that initially the taxes on international trade were higher but in recent years liberalization has reduced the tariffs in significant amount. On the other hand the excise duty shows decreasing trend over the period.

4. Methodology and Data

This study has utilized a simple time series model to measure the relationship between different forms of taxes on economic growth. A simple model for analysis is:

$$RGDP = f (TTR) \quad (1)$$

Where, RGDP is real gross domestic product and TTR is total tax revenue. Total tax revenue has been disaggregated into direct tax (DT) and indirect tax (IDT). Thus, the model becomes:

$$RGDP = f (DT, IDT) \quad (2)$$

Indirect tax has been further disaggregated into various forms (i.e. excise duty, sales tax, surcharges, tax on international trade, and other taxes) to capture the effects on growth as:

$$RGDP = f (DT, ITED, ITST, ITSUR, ITTR, ITOT) \quad (3)$$

Where, RGDP is the real gross domestic product, DT is direct tax, ITED is excise duty, ITST is sales tax, ITSUR is surcharges, ITTR is tax on international trade, and ITOT is other taxes.

The study is using time series data which is very sensitive to the problem of stationarity. Stationarity of each series is checked by Augmented Dickey Fuller (ADF) and Phillips-Perron (PP) unit root tests. The only difference between PP and ADF unit root test is their way to encounter the problem of serial correlation. PP test uses nonparametric approach while ADF test use lag of dependent variable as explanatory variable. Pesaran, Shin and Smith (2001) introduced another technique for co-integration called Autoregressive Distributive Lag (ARDL). This technique is used when the variables are mixture of I(0) and I(1). The two important assumptions of ARDL must be full filled i.e. the dependent variable must be of I(1) and none of the variable is I (2). Furthermore, the study has applied ARDL bound test because this test provides more precise results as compared to other tests.

The ARDL model can be specify as:

$$\begin{aligned} \Delta RGDP_t = & \alpha_0 + \sum \alpha_i \Delta RGDP_{t-i} + \sum \beta_i \Delta DT_{t-i} + \sum \gamma_i \Delta ITED_{t-i} + \sum \delta_i \Delta ITST_{t-i} \\ & + \sum \theta_i \Delta ITSUR_{t-i} + \sum \vartheta_i \Delta ITTR_{t-i} + \sum \mu_i \Delta ITOT_{t-i} + \varphi_1 Y_{t-1} \\ & + \varphi_2 DT_{t-1} + \varphi_3 ITED_{t-1} + \varphi_4 ITST_{t-1} + \varphi_5 ITSUR_{t-1} \\ & + \varphi_6 ITTR_{t-1} + \varphi_7 ITOT_{t-1} + \varepsilon_t \end{aligned} \quad (4)$$

Where, Δ shows the difference, $\alpha, \beta, \gamma, \delta, \theta, \vartheta$ & μ indicates short run dynamics, while φ show long run coefficients. The following null hypothesis is tested for co-integration.

$$H_0: \varphi_1 = \varphi_2 = \varphi_3 = \varphi_4 = \varphi_5 = \varphi_6 = \varphi_7 = 0 \text{ (There is no co-integration)}$$

$$H_1: \varphi_1 \neq \varphi_2 \neq \varphi_3 \neq \varphi_4 \neq \varphi_5 \neq \varphi_6 \neq \varphi_7 \neq 0$$

In ARDL bond test the value of F-statistics is compared with upper and lower bounds. If the value is greater than upper bound then it confirms the existence of co-integration among the variables by rejecting the null hypothesis and if the value of F-statistics fall below the lower bound then there is no co-integration but if the value falls between the upper and lower bound then the results are inconclusive. We have also employed diagnostic tests for serial correlation (Breusch-Godfrey LM test), heteroscedasticity (Breusch-Pagan-Godfrey test) and model specification error (Ramsey Reset test). CUMSUM and CUSUMSQ tests are also used to check the stability of the parameters.

4.1 Data

This time series study is conducted for the period 1976 to 2014 at annual frequency for Pakistan. The data for RGDP, direct tax, different forms of indirect taxes (i.e. excise duty, sales tax, taxes on international trade, surcharges and other taxes) and non-tax revenue has been taken from Pakistan economic survey (various issues). All the nominal variables are converted into real form by deflating them with GDP deflator. The data of GDP deflator has been taken from WDI.

5. Results

The study has adopted ARDL and ECM mechanism in order to find the short and long run relationship between taxes and growth in Pakistan. Augmented Dickey Fuller (ADF) and Phillip-Perron (PP) unit root test are applied and results indicate that all variables are stationary at first difference except ITOT and ITSUR which are stationary at level. The results of unit root test fulfilled the assumptions of ARDL bound test i.e. dependent variable (RGDP) is integrated of order one I(1) and none of the variable possess order of integration I(2). The results of ADF unit root test are confirmed by using PP unit root test. The results are almost similar with ADF tests except ITOT variable which is stationary at first difference I(1) but in ADF it is I(0). The results of ADF and PP test are presented in table 4.3.

Table 4.3: Results of ADF and PP Unit Root Tests

Variables	Augmented Dickey Fuller (ADF) Unit Root Test		Phillip-Perron (PP) Unit Root Test		Order of Integration	
	Level	1 st Difference (Δ)	Level	1 st Difference (Δ)	ADF	PP
RGDP	3.3281	-2.9977**	3.8252	-2.9688**	I(1)	I(1)
DT	-2.5202	-7.3917*	-2.4110	-7.4003*	I(1)	I(1)
ITED	-1.6857	-5.4006*	-1.7461	-5.4257*	I(1)	I(1)
ITOT	-4.5132*	-----	-3.1406	-8.6470*	I(0)	I(1)
ITST	-1.5232	-5.9057*	-1.2957	-5.9057*	I(1)	I(1)
ITSUR	-3.0862**	-----	-2.9019***	-----	I(0)	I(0)
ITTR	-1.8769	-5.4072*	-1.9314	-5.5102*	I(1)	I(1)
NTR	-2.4269	-4.6946*	-2.2084	-4.9232*	I(1)	I(1)

Note: *, **, *** shows significance at 1, 5, and 10% respectively

In order to check the long run relationship between variables the study has applied ARDL bound test for co-integration. Bound test is applied using (2, 3, 0, 3, 0, 0, 1) model specification with Schwarz criterion (SIC) for lag selection and the results of unrestricted ECM model are presented in table 4.4.

Table 4.4: Unrestricted ECM model for Bound Test

Dependent Variable: RGDP					
Selected Model: ARDL(2, 3, 0, 3, 0, 0, 1)					
Variable	Coefficient	Variable	Coefficient	Variable	Coefficient
RGDP(-1)	0.4192** (0.1654)	ITED	-1.5747 (1.5745)	ITTR	1.8427** (0.6920)
RGDP(-2)	0.4008** (0.1675)	ITST	2.5767* (0.7843)	ITOT	1.5529 (0.9128)
DT	0.6268 (0.6092)	ITST (-1)	-1.7396** (0.7517)	ITOT (-1)	3.7417* (0.9302)
DT (-1)	1.4719** (0.6873)	ITST (-2)	-0.2223 (0.8245)	C	262712.6* (109423.3)
DT (-2)	-1.6182** (0.7475)	ITST (-3)	2.2992* (0.7667)	R-squared	0.9996
DT (-3)	1.1714*** (0.5667)	ITSUR	-0.2981 (0.4147)		

Note: *, **, *** shows significance at 1, 5, and 10% respectively. Standard errors are in parenthesis

The results of bound test are presented in table 4.5. F-statistics is compared with upper and lower bounds values as proposed by Pesaran (2001). The value of F-statistics is 8.44 which is above the upper bound (4.43) at 1% level of significance. Thus, we reject the null hypothesis that there is no co-integration.

Before estimating the long run and short run parameters, diagnostic test are applied for serial correlation (Breusch-Godfrey LM test), heteroscedasticity (Breusch-Pagan-Godfrey test) and model specification error (Ramsey Reset test). These tests are applied to avoid the chances of

Table 4.5: AEDL Bound Test

Test Statistic	Value	k
F-statistic	8.4459	6
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	2.12	3.23
5%	2.45	3.61
2.5%	2.75	3.99
1%	3.15	4.43

invalid and misleading results. The results of these tests (table 4.6) indicate that our model is not suffering from the problem of serial correlation, heteroscedasticity and model specification error.

Table 4.6 Diagnostic Tests

Test	F-statistics	Null Hypothesis
Serial Correlation: Breusch-Godfrey LM Test:	1.0589 (0.3924)	No Serial Correlation
Heteroscedasticity: Breusch-Pagan-Godfrey Test	0.7320 (0.7282)	No Heteroscedasticity
Model Specification: Ramsey Reset Test	0.6047 (0.4464)	Model is Correctly Specified

Note: P-values are in parenthesis and shows that we cannot reject the null hypothesis.

After diagnostic tests, the long run and short run parameters are estimated as proposed by Pesaran (2001). The results of long run dynamics are presented in table 4.7. Results indicate that there is significant positive relationship between direct tax and real GDP growth. With 1% increase in direct taxes it can enhance 9% economic growth. The results are consistent with the findings of Myles (2000), Gordon and Li (2005), Mamatzakis (2005), McCarton (2006), and Musanga (2007). Taxes on international trade, sales tax and other taxes have positive relation with real GDP of Pakistan at 1%, 5% and 10% level of significance respectively. Our results suggest that other taxes (29%) has greater effect on real GDP of Pakistan followed by sales tax (16%) and tax on international trade (10%). However, the impact of excise duty and surcharges are insignificant on growth in the long run. These results are similar with the findings of Bleaney and Gemmell (1999), Manuelle and Rossi (1993), Wildmam (2001), Li and Sarte (2004), Lee and Gordon (2005), and Arisoy and Unlukaplan (2010).

The results of short run (ECM) dynamics are presented in table 4.8. The lagged value of ECT indicates the speed of convergence and it should be negative and significant. Negative and significant value indicates that convergence exist in short run. Its absolute value (0.2109) indicates that economy can restore 21% shock in each period. The results demonstrate that sales

Table 4.7: ARDL Long Run Dynamics

Coint eq = RGDP - [9.1862(DT) - 8.7571(ITED) + 16.2055 (ITST) -1.6582 (ITSUR) +10.2473 (ITTR) + 29.4434 (ITOT) + 1460933.6020]					
Variable	Coefficient	Variable	Coefficient	Variable	Coefficient
DT	9.1861*** (4.7005)	ITST	16.2054** (4.6942)	ITTR	10.2473* (2.4386)
ITED	-8.7571 (8.1520)	ITSUR	-1.6581 (2.3976)	ITOT	29.4434*** (16.2981)
C	1460933.601* (493430.087)				

Note: *, **, *** shows significance at 1, 5, and 10% respectively. Standard errors are in parenthesis

tax, tax on international trade and other tax has positive, while excise duty has negative and significant impact on economic growth in the short run. The first and second lag of sales tax has negative and significant impact on growth. However, direct tax and surcharges have insignificant impact on economic growth. Results indicate that tax on international trade (2%) has greater impact on economic growth followed by sales tax (1.91%) and other taxes (1.29%).

Table 4.8: Short Run Dynamics

Dependent Variable: RGDP					
Selected Model: ARDL(2, 3, 0, 3, 0, 0, 1)					
Variable	Coefficient	Variable	Coefficient	Variable	Coefficient
D(RGDP(-1))	-0.5425** (0.2027)	D(ITED)	-2.3990*** (1.3176)	D(ITTR)	2.0279* (0.6114)
D(RGDP(-2))	-0.0995 (0.2004)	D(ITST)	1.9186** (0.8030)	D(ITOT)	1.2941*** (0.6657)
D(DT)	0.7264 (0.5534)	D(ITST (-1))	-2.1385* (0.5468)	D(ITOT (-1))	-1.0079 (1.3435)
D(DT(-1))	0.0970 (0.6189)	D(ITST (-2))	-2.9187* (0.7457)	C	16110.66 (22018.70)
D(DT(-2))	-0.9445 (0.5931)	D(ITST (-3))	-0.0617 (1.0091)	ECT (-1)	-0.2109* (0.0486)
D(DT(-3))	-0.6636 (0.5507)	ITSUR	-0.6296 (0.4187)	R-squared	0.9322

Note: *, **, *** shows significance at 1, 5, and 10% respectively. Standard errors are in parenthesis

The study has also applied CUSUM and CUSUMSQ test in order to check the stability of parameters. These tests are proposed by Borensztein et al. (1998) and they used these tests to observe the stability of the parameters. Residuals of estimated ECM is empirically investigated for stability by using CUSUM and CUSUMSQ tests (Pesaran and Shin, 2001) under the null hypothesis (i.e. that the regression equation is correctly specified). Figure 4.1 and 4.2 demonstrate the stability of parameters by applying CUSUM and CUSUMSQ test respectively and it is clear that these statistics remains within the critical bounds of the 5 percent significance level.

Figure 4.1: CUSUM Test

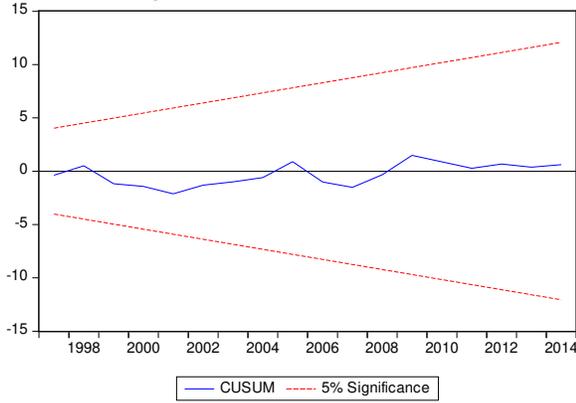
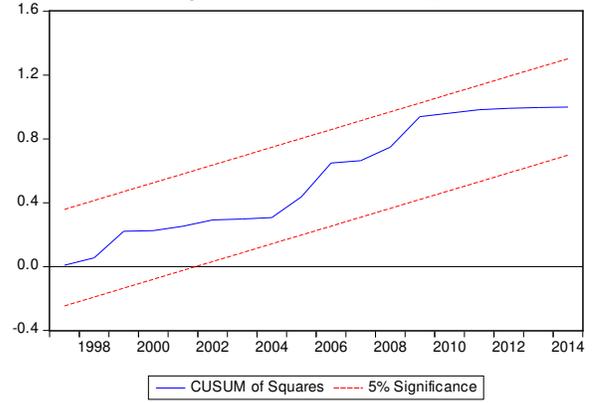


Figure 4.2: CUSUMSQ Test



5.1 Robustness Analysis

Total government revenue includes tax revenue and non-tax revenue. For robustness purpose we have included the non-tax revenue (NTR) as well in the model to check the consistency of the results. The model is

$$RGDP = f (TTR, NTR) \quad (5)$$

Where, RGDP is real gross domestic product, TTR is total tax revenue and NTR is non-tax revenue. Total tax revenue has been disaggregated into direct tax (DT) and indirect tax (IDT). Indirect tax has been further disaggregated into various forms (i.e. excise duty, sales tax, surcharges, tax on international trade, and other taxes) to capture the effects on growth. Thus, the model becomes:

$$RGDP = f (DT, ITED, ITST, ITSUR, ITTR, ITOT, NTR) \quad (6)$$

ARDL model specification by adding non-tax revenue (unrestricted ECM) is:

$$\begin{aligned} \Delta RGDP_t = & \alpha_0 + \sum \alpha_i \Delta RGDP_{t-i} + \sum \beta_i \Delta DT_{t-i} + \sum \gamma_i \Delta ITED_{t-i} + \sum \delta_i \Delta ITST_{t-i} \\ & + \sum \theta_i \Delta ITSUR_{t-i} + \sum \vartheta_i \Delta ITTR_{t-i} + \sum \mu_i \Delta ITOT_{t-i} + \sum \omega_8 \Delta NTR_{t-i} \\ & + \varphi_1 Y_{t-1} + \varphi_2 DT_{t-1} + \varphi_3 ITED_{t-1} + \varphi_4 ITST_{t-1} + \varphi_5 ITSUR_{t-1} \\ & + \varphi_6 ITTR_{t-1} + \varphi_7 ITOT_{t-1} + \varphi_8 NTR_{t-1} + \varepsilon_t \end{aligned} \quad (7)$$

To check the long run relationship between variables ARDL bound test for co-integration is applied using (2, 3, 0, 3, 0, 0, 1, 3) model specification with Schwarz criterion (SIC) for lag selection. The value of F-statistics is compared with upper and lower bounds. Table 4.10 reports the result of bound test.

Table 4.10 Bounds Testing for Co-integration

Test Statistic	Value	k
F-statistic	6.9258	7
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	2.03	3.13
5%	2.32	3.5
2.5%	2.6	3.84
1%	2.96	4.26

The value of F-statistics is 6.92 which is higher than upper bound (4.26) at 1% level of significance. The results demonstrate that there exists long run relationship among the variables. The results are similar with the findings of our first model. Serial correlation, heteroscedasticity and model specification error tests are also applied and results indicate that our model is not suffering from the problem of serial correlation, heteroscedasticity and model specification error. The results are robust to the findings of model without NTR.

Table 4.11 present long run dynamics of the model and demonstrate that direct tax, sales tax and tax on international trade are growth enhancing factors in the economy of Pakistan in the long run. All these taxes have direct and significant impact on real GDP of Pakistan. Other tax has positive, while excise duty, surcharges and non-tax revenue has negative relation with real GDP but their impact is insignificant.

Table 4.11: ARDL Long Run Dynamics

Cointeq = RGDP -[16.7948 (DT) -15.7270(ITED)+18.3989(ITST) - 7.5613(ITSUR) +18.0468(ITTR)+ 24.2507(ITOT)- 6.9773 (NTR) + 1413268.8790]					
Variable	Coefficient	Variable	Coefficient	Variable	Coefficient
DT	16.7948* (5.4245)	ITSUR	-7.5613 (4.7628)	NTR	-6.9773 (7.1064)
ITED	-15.7269 (9.3946)	ITTR	18.0468** (7.4776)	C	1413268.87* (522879.86)
ITST	18.3989*** (9.1910)	ITOT	24.2506 (17.1157)		

Note: *, **, *** shows significance at 1, 5, and 10% respectively. Standard errors are in parenthesis

Table 4.12 shows the results of short run dynamics by adding NTR in the model. The results indicate that excise duty has negative and significant impact on real GDP of Pakistan in short run. On the other hand, sales tax has positive and significant impact on growth but its first, second and third lag has negative and significant impact on real GDP. Tax on international trade and other taxes have positive and significant relation with real GDP. The first, second and third

lag of NTR indicates positive and significant effect on growth. The value of error correction term (ECT) is -0.2365 which indicates that economy can restore 23% shock in the short run.

Table 4.12: Short Run Dynamics

Dependent Variable: RGDP					
Selected Model: ARDL(2, 3, 0, 3, 0, 0, 1, 3)					
Variable	Coefficient	Variable	Coefficient	Variable	Coefficient
D(RGDP(-1))	-0.7553** (0.2459)	D(ITST)	1.5042*** (0.7240)	D(ITOT (-1))	-1.4227 (1.2876)
D(RGDP(-2))	-0.3051 (0.2344)	D(ITST (-1))	-3.6571* (0.7088)	D(NTR)	0.3456 (0.3754)
D(DT)	0.9466 (0.5408)	D(ITST (-2))	-2.8628** (1.0739)	D(NTR(-1))	0.8885*** (0.4281)
D(DT (-1))	-0.7043 (0.7561)	D(ITST (-3))	-1.6993 (1.1268)	D(NTR(-2))	1.6931* (0.3579)
D(DT (-2))	-1.7426 (0.5105)	ITSUR	-1.2407* (0.4026)	D(NTR(-3))	1.0335*** (0.5222)
D(DT (-3))	-0.8163 (0.6686)	D(ITTR)	2.8797* (0.6479)	C	14080.92 (20127.69)
D(ITED)	-4.2228* (1.2834)	D(ITOT)	1.5673** (0.6895)	ECT (-1)	-0.2365* (0.0522)
R-squared	0.9617				

Note: *, **, *** shows significance at 1, 5, and 10% respectively. Standard errors are in parenthesis

There is no considerable change in the results of both the models. Both models show that there exists long run relationship among the variables. Direct tax, sales tax, and tax on international trade are accelerating the growth in the long run. The only difference in both models is that the impact of other taxes becomes insignificant by adding non-tax revenue in the model. Overall results indicate that direct tax, sales tax and tax on international trade are pro-growth taxes in Pakistan in the long run.

Robust analysis has confirmed that taxes have significant impact on economic growth of Pakistan. Direct taxes have positive relation with economic growth in the long run. It means that government should increase direct taxes in order to enhance economic growth. Our results are consistent with the finding of Myles (2000), McCarton (2006), Gordon and Li (2005), and Mamatzakis (2005). In Pakistan sales tax, tax on international trade (tariffs) and other taxes have positive impact on growth of Pakistan. However, sales tax and other taxes started to impact negatively on growth in the short run after one year because people realize decline in their real income. These results are similar with the findings of Manuelle and Rossi (1993), Wildmam (2001), Li and Sarte (2004), Lee and Gordon (2005), and Arisoy and Unlukaplan (2010).

6. Conclusion

This paper attempts to examine the relationship between economic growth and tax revenue in Pakistan during 1976 to 2014. Tax revenue includes direct and indirect taxes. The study has further disaggregated indirect taxes into five different categories (i.e. excise duty, sales tax, surcharges, tax on international trade, and other taxes). Time series analysis is conducted under ARDL framework. The study has applied ADF and PP unit root test in order to check the time series properties of the variables. The study has also conducted the robust analysis by incorporating non-tax revenue.

The findings of the study demonstrate strong evidence of co-integration between real GDP and different forms of taxes. Results confirmed the positive and significant relationship between direct tax, sales tax, tax on international trade and economic growth in the long run. Sales tax, tax on international trade and other forms of tax has positive and significant relationship with real GDP of Pakistan in short run. Results indicate that tax on international trade (2%) has greater impact on economic growth followed by sales tax (1.91%) and other indirect taxes (1.29%) in the short run. The first and second lag of sales tax has negative and significant impact on real GDP. Direct taxes and surcharges have insignificant impact on economic growth of Pakistan. Negative and significant value of ECT indicates that economy of Pakistan can revert 22% shock in short run. The stability of parameters is verified by CUSUM and CUSUMSQ tests. The study has conducted robust analysis by incorporating non-tax revenue into the model. Robust analysis has confirmed that tax revenue has significant impact on economic growth of Pakistan. The addition of NTR revenue brought no significant change in our results. Both models showed that DT, ITST, and ITTR are accelerating the growth of Pakistan.

This study suggests that government should increase direct taxes as they have positive and significant impact on economic growth of Pakistan in the long run. Government should increase direct taxes by increasing tax base. Indirect taxes usually indicate negative impact after one and two years. Indirect taxes are growth retarders therefore government should decrease its reliance on indirect taxes. Tax collection process should be consistent in its implementation and this consistency in implementation will come from good governance. Government should promote tax awareness among the people which increase the tax morale of people.

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