

The Impact of Tax on Economic Growth of Pakistan: An ARDL Approach

¹Najid Ahmad, ²Arslan Ahmad, ³Kausar Yasmeen

¹Bahauddin Zakariya University, Multan, Sub-Campus Layyah, Pakistan

²Economics Department University of the Punjab, Lahore, Pakistan

³Economics Department University Of Utara, Malaysia

Received: September 20 2013

Accepted: October 22 2013

ABSTRACT

This paper investigates the impact of taxes (Tax Revenue) on economic growth of Pakistan by using time series data for the period of 1976-2011. GDP is taken as dependent variable while taxes, exchange rate, life expectancy and trade liberalization as independent variables. After checking the stationarity of the variables (through ADF test), Autoregressive Distributive Lag (ARDL) approach to co-integration is used to find association among variables. Results show that tax and exchange rate have negative and significant effect on economic growth in short and long run. The impact of trade liberalization and life expectancy on economic growth is positive in both periods. Diagnostic tests confirm that our model is free from heteroskedasticity and autocorrelation with satisfactory functional form. The CUSUM and CUSUMSQ show that model is structurally stable. Direct taxes should be increase (rather than indirect taxes) as these would help in the economic prosperity of the country.

KEYWORDS: Taxes (Tax Revenue), Economic Growth, ARDL, Pakistan

INTRODUCTION

This paper examines the behavior of taxes toward the economic growth of Pakistan. Tax is any penalty, fee or the amount that is payable. Pakistan's condition regarding tax collection is worse. Federal Board of Revenue is responsible to collect taxes in Pakistan but its transparency has been questioned. Both poor and rich are not willing to pay tax and think it as a burden. The feelings of insecurity are everywhere while paying taxes. However, poor salaried individuals or group of individuals are forced to pay taxes while Government of Pakistan is unable to capture the feudal class. Haider (2013) views that taxes are classified into two main categories (indirect and direct tax). Direct taxes are collected from corporate profit, income and properties while indirect taxes are imposed on value added import tax and sales tax.

A number of studies explore the relation between economic growth and tax. Most of the economists find negative relation between tax and economic growth. Tax rate inversely affects the economic growth in three ways. High marginal tax rate discourage work effort. High tax rates can drive productive citizens to other countries where taxes are low. It can be the big loss of the country. Marginal tax rate distort price signals. It reduces incentives to invest for physical and human capital. If they invest more they will have to pay more. Foreign investors cannot move to the country where tax rate is quite high as their profit will not be maximum. While profit maximization is the dream of every investor. The local investors will start investing to abroad where the opportunities will be high and tax rate will be low. So, tax burden and structures of taxation matter for economic growth. Economic theory does provide the explanation for inverse relation between economic growth and tax. Tax raises the cost or lowers the return to taxed activity. People want to engage in the activities that minimize their taxes.

Majority of the economists seem to agree with the point that high tax is not good for economic growth. Every country has different method for revenues collection. Some countries increase taxes and some countries do not alter their policies regarding taxation. Any type of tax distorts economic growth (Engen, 1996). Solow (1956) and Sawan (1956) presented the fundamental views about the endogenous growth theory. Tax policies have temporary effect on the growth in the exogenous model while in the endogenous growth model this effect is permanent on economic growth. The first authors who investigate the relationship between taxation and economic growth are Judd (1985), Barro (1999), King and Rebelo (1990). They use two sector model i.e. physical and human capitals. They conclude in their studies that three most useable taxes (labor tax, consumer tax and corporate tax) have negative impact on economic growth in the long run. Leibfritz (1997) and Dowrick (1993) also find negative relation between tax and economic growth.

*Corresponding Author: Najid Ahmad, Bahauddin Zakariya University, Multan, Sub-Campus Layyah, Pakistan
Email: najid_2iqbal@yahoo.com

Margareta (2012) says that there exists negative relation between taxes and general level of government expenditures. It is because of raising tax revenues. The author uses panel data for the period of 1975-2011 for 25 rich OECD countries and finds negative relation between corporate income and economic growth. He says that higher tax rate negatively affect the economic growth. However lower tax rate is necessary for the economic growth of the country as it generates revenues that can be spend in the productivity. While Koester (1989) and Padovano (2001) find no statistically significance relationship between taxes and economic growth. Ergete Ferede (2012) uses 10 Canadian province data for the period of 1977-2006. The author finds negative relation between tax rate and economic growth of the country. He says that corporate income tax lower the economic growth. Reduction in taxes can boost economic growth and vice versa. Taxes affect the economic growth through total factor productivity and factor accumulation. Higher tax rate discourage investors and in this way economic performance of the country is affected. The efficiency of factors of production can be affected due to taxes as these reduce the efficiency of resource allocation.

There is a debate of how taxes affect the economic growth and distribution of wealth. Progressive taxation favors the equal distribution of income. These help to increase income equality (Clark, 2008). Barry (2008) investigates the relation between tax policy and economic growth by using the regression analysis for the period of 1964-2004. The author uses framework of endogenous growth model and finds negative relationship between tax and economic growth. Here is Masood (2010) who explores the relationship between economic growth and tax revenue for Pakistan. He uses time series data for the period of 1973-2008 for his analysis. He is in a view that taxes play an important role in the economic growth and development of the country. Tax policy is a fundamental component for economic policies of every country. Higher tax depresses investment. Wrong policies discourage productivity by reducing research and development. Lower the tax rate means people and organizations will focus on research and development and vice versa. Taxes reduce work incentive that will effect labor participation and ultimately reduce economic growth. Policies regarding tax can affect marginal productivity of capital because the investors will switch to those sectors where tax ratio will be lower.

Ogbonna (2011) examines the tax reform on economic growth in Nigeria. The author uses secondary data for the period of 1994-2009 for his study. Johansen and Granger Causality test shows that tax reforms have positive and significant relation between economic growth. However, only tax reforms are not sufficient to achieve economic development. A tax system provides an opportunity as a major player for the economy while Santiago (2012) seems to disagree by saying that there is a negative relation between tax and economic growth. The author finds strong negative association between personal income tax and economic growth. Christopher (2009) and Mihai (2011) also consider tax major player for the economy.

DATA COLLECTION & METHODOLOGY

The variables used in our paper are GDP, tax (percentage of GDP), trade liberalization, exchange rate and life expectancy. The data is collected from various issues of economic survey of Pakistan, Statistical yearbooks of Pakistan economy and World Development Indicators (WDI). GDP is treated as dependent variable while others as independent variables. Autoregressive Distributive Lag (ARDL) to co-integration technique is used. It is proposed by Pesaran and Shin (1999) to disclose relationship among variables. It can be used when variables are I (0) or I (1) and both. Endogeneity problem can be avoided by using ARDL technique.

Keeping in view the theoretical framework following econometric model is given below:

$$\ln(GDP) = \beta_0 + \beta_1 \ln(TAX) + \beta_2 \ln(TL) + \beta_3 \ln(EXC) + \beta_4 \ln(LE) + \varepsilon_t$$

Where

GDP=Gross Domestic Product

TAX=Tax as Percentage of GDP

TL=Trade Liberalization

EXC=Exchange Rate

LE=Life Expectancy

ε_t =Stochastic error term

Moreover, β_0 , β_1 , β_2 , β_3 , β_4 are the respective parameters.

The equation of ARDL is as follows:

$$\begin{aligned} \Delta \text{Ln}(\text{GDP})_t &= \beta_0 + \beta_1 \text{Ln}(\text{GDP})_{t-1} + \beta_2 \text{Ln}(\text{TAX})_{t-1} + \beta_3 \text{Ln}(\text{TL})_{t-1} \\ &+ \beta_4 \text{Ln}(\text{EXC})_{t-1} + \beta_5 \text{Ln}(\text{LE})_{t-1} + \sum_{i=1}^n \delta_i \Delta \text{Ln}(\text{GDP})_{t-i} \\ &+ \sum_{i=0}^n \theta_i \Delta \text{Ln}(\text{TAX})_{t-i} + \sum_{i=0}^n \eta_i \Delta \text{Ln}(\text{TL})_{t-i} + \sum_{i=0}^n \gamma_i \Delta \text{Ln}(\text{EXC})_{t-i} \\ &+ \sum_{i=0}^n \varphi_i \Delta \text{Ln}(\text{LE})_{t-i} + U_t \end{aligned}$$

The null and alternative hypotheses are as follows:

$$H_0 : \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = 0 \quad (\text{No long run relationship exist})$$

Against the alternative hypothesis:

$$H_1 : \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq \beta_5 \neq 0 \quad (\text{long run relationship exist})$$

The error correction equation is used to find the speed of adjustment towards the equilibrium; ECM equation is as follows:

$$\begin{aligned} \Delta \text{Ln}(\text{GDP})_t &= \beta_0 + \sum_{i=1}^n \delta_i \Delta \text{Ln}(\text{GDP})_{t-i} + \sum_{i=1}^n \theta_i \Delta \text{Ln}(\text{TAX})_{t-i} \\ &+ \sum_{i=1}^n \eta_i \Delta \text{Ln}(\text{TL})_{t-i} + \sum_{i=1}^n \gamma_i \Delta \text{Ln}(\text{EXC})_{t-i} + \sum_{i=1}^n \varphi_i \Delta \text{Ln}(\text{LE})_{t-i} \\ &+ \lambda (\text{ECM}) + U_t \end{aligned}$$

Cumulative sum (CUSUM) and Cumulative sum of square (CUSUMSQ) tests are utilized to check the stability of the variables in short and long run. If the plots of the CUSUM and CUSUMSQ are lying within the critical bounds of 5 % significance levels the null hypothesis cannot be rejected. It means that the variables used in the model are structurally stable.

Table 1 shows the order of integration of variables. ADF test is used to check stationary of the variables used under the assumption of constant and trend.

Variables	Level / 1st Difference	ADF test statistic		Conclusion
		Trend	Drift	
Ln (GDP)	Level	-2.107	-2.878*	I (0)
Ln (Tax)	Level	-2.379	-0.266	----
Δ Ln (Tax)	First Diff	-5.593*	-4.884*	I (1)
Ln (TL)	Level	-3.643*	-2.739*	I (0)
Ln (Exc)	Level	-2.214	-1.712**	I (0)
Ln (LE)	Level	-1.234	-1.449**	I (0)

Note: * denote significance at 5% and ** denote significance at 10%
Source: Author

Augmented Dickey Fuller (ADF) test shows that GDP, trade liberalization, exchange rate and life expectancy are integrated of order zero [I (0)] while tax as a percentage of GDP is integrated of order one [I (1)]. Therefore, ARDL to co-integration technique is preferred.

F-statistic	95% Level of Confidence		90% Level of Confidence	
	Lower Bound	Upper Bound	Lower Bound	Upper Bound
5.2047	3.2802	4.5773	2.6967	3.8965

Source: Author

In table 2, calculated F-statistic = 5.2047 is higher than the upper bound critical value at 5% level of significance (4.5773). It confirms the presence of long run relationship among variables.

Item	Test Applied	CHSQ (χ^2)	Probability value
Serial correlation	Lagrange Multiplier Test	1.5600	[0.212]
Functional Form	Ramsey's reset test	0.61805	[0.432]
Normality	Test of skewness and Kurtosis	0.93799	[0.626]
Heteroscedasticity	White Test	1.9518	[0.162]

Source: Author

Table 3 demonstrates that model is free from serial correlation and heteroskedasticity. Moreover, the functional form is correct and stochastic residual are normally distributed. The estimated model satisfies all indispensable diagnostic tests.

Variable	Coefficient	Std. Error	T-Statistic	Prob.
Ln GDP(-1)	0.68954	0.081638	8.4464	[0.000]
Ln (TAX)	-0.088218	.028907	-3.0518	[0.005]
Ln (TL)	0.8930E-3	0.028292	0.031562	[0.975]
Ln (EXC)	-0.16023	0.031590	-5.0722	[0.000]
Ln (LE)	6.1383	1.2828	4.7852	[0.000]
C	-15.5780	3.0964	-5.0310	[0.000]
R-Squared	0.99		R-Bar-Squared	0.99
DW-statistic	2.2953		F-Stat. F(5,29)	8574.4 [0.000]

Source: Author

Table 4 shows the dynamic analysis of the variables used in the model. GDP is a dependent variable and independent variables are tax, trade liberalization, exchange rate and life expectancy. It is found that taxes have negative and significant impact on economic growth of Pakistan, therefore ($\beta_1 = -0.08$) 1 % increase in taxes leads to 0.08 % decrease in GDP. Exchange rate investment is negatively & significantly affecting economic growth, thus ($\beta_3 = -0.16$) 1% increase in exchange rate brings 0.16 % decrease in GDP. Furthermore, the effects of trade liberalization and life expectancy on economic growth are positive.

The value of R^2 (i.e. the coefficient of determination) represents that 99 % of the variations in the dependent variable is due to independent variables. F-statistic shows the overall significance of the variables used in the model. Moreover, stochastic error term (ϵ_t) is normally distributed (Appendix-A).

Variable	Coefficient	Std. Error	T-Statistic	Prob.
Ln (TAX)	-0.28416	0.10878	-2.6122	[0.014]
Ln (TL)	0.0028763	0.091079	0.031581	[0.975]
Ln (EXC)	-0.51612	0.13472	-3.8311	[0.001]
Ln (LE)	19.7718	2.0332	9.7243	[0.000]
C	-50.1780	7.6517	-6.5578	[0.000]

Source: Author

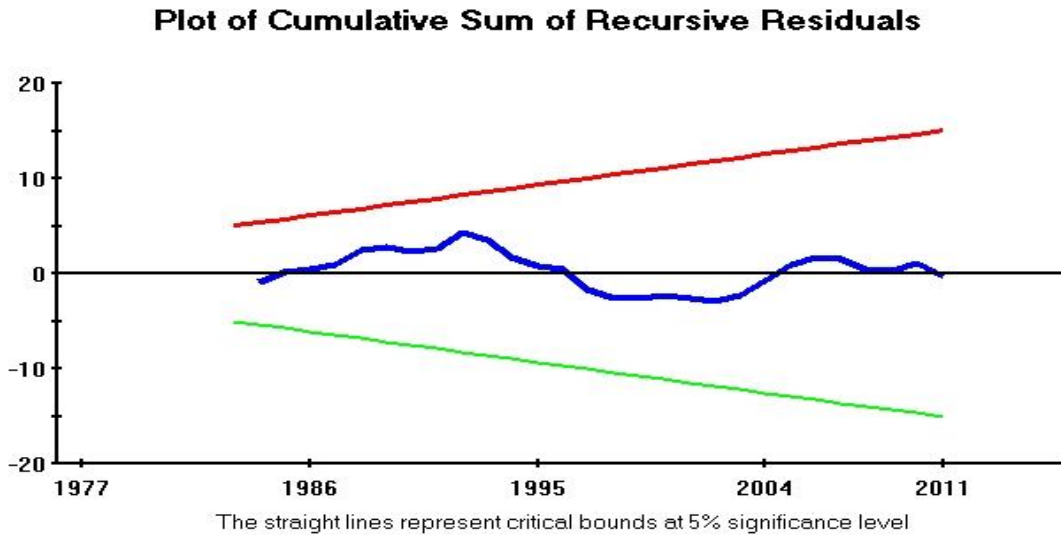
Table 5 shows that the impact of taxes and exchange rate on economic growth is negative and significant in the long-run whereas increase in trade liberalization and life expectancy leads to higher economic growth in the long-run.

Variable	Coefficient	Std. Error	T-Statistic	Prob.
Δ Ln (Tax)	-0.088218	0.028907	-3.0518	[0.005]
Δ Ln (TL)	0.8930E-3	0.028292	0.031562	[0.975]
Δ Ln (EXC)	-0.16023	0.031590	-5.0722	[0.000]
Δ Ln (LE)	6.1383	1.2828	4.7852	[0.000]
Δ (C)	-15.5780	3.0964	-5.0310	[0.000]
ECM(-1)	-0.31046	0.081638	-3.8028	[0.001]
R-Squared	0.6189		R-Bar-Squared	0.55329
DW-statistic	2.2953		F-stat. F(5,29)	9.4224[0.000]

Source: Author

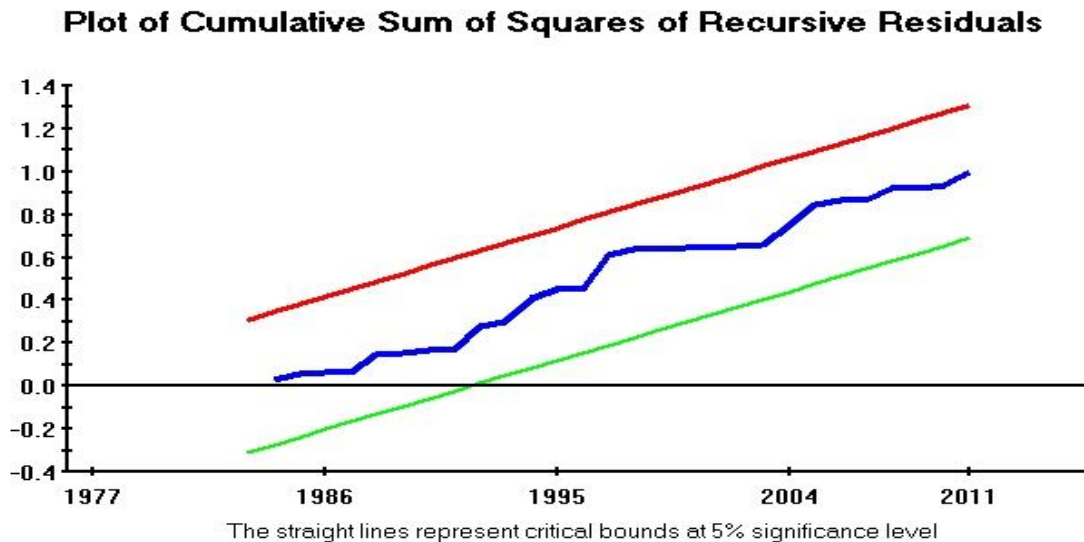
Table 6 demonstrates the results of short run by using ARDL approach. It is found that both taxes and exchange rate have negative and significant impact on economic growth in short-run. Moreover, in short-run life expectancy is the significant determinant of economic growth; however effect of trade liberalization is positive but insignificant. The ECM (-1) is the lag value of one period of error term that we get from the long run relationship. The coefficient ECM (-1) should be negative and statistically significant. The value of ECM term shows that the process of adjustment is moderate and 31 % of the last year disequilibrium in GDP (economic growth) from its equilibrium path will be corrected in present year.

Figure 1: Plot of Cumulative Sum of Recursive Residuals



Source: Author

Figure 2: Plot of Cumulative Sum of Squares of Recursive Residuals



Source: Author

Figure 2 and 3 highlight that both CUSUM and CUSUMQ are lying within the critical bounds so our model is stable structurally.

Conclusion and Policy Recommendation

The objective of this paper was to investigate the impact of taxes on economic growth of Pakistan. Autoregressive Distributive Lag (ARDL) approach to co-integration was used to find the short run and long run relation among the variables for the period of 1976-2011. Results indicate that impact of taxes and exchange rate on economic growth is negative and significant in the short and long-run whereas increase in life expectancy leads to higher significant economic growth in both periods. Trade liberalization is an insignificant determinant of economic growth. Diagnostic tests confirm that our model is free from serial correlation and heteroskedasticity. Stochastic residuals are normally distributed. The co-efficient ECM (-1) is negative and statistically significant. The process of adjustment is moderate and 31 % of the last year disequilibrium in (economic growth) GDP from its equilibrium path will be corrected in present year. Both CUSUM and CUSUMSQ are showing that our model is structurally stable and are lying within the 5% of critical bounds.

Pakistan is facing increasing socio-economic problems. Terrorism and crime, Poverty and Unemployment, Energy crisis, Political instability, Low literacy rate, Law and Order situation are the major problems. These reduce economic activities in the country and foreign investors feel insecurity while investing in Pakistan. All this reduce economic performance of the country resulting in the form of low GDP. Majority of the developed countries focus on the progressive tax i.e. tax increase with the increase in income level. The situation is worse in Pakistan and focus is on indirect tax. Elite class is not ready to pay taxes and they use unfair means by thinking tax as a burden. These things are enough to destroy the entire tax system that is the major source of income for government. Low per capita income in Pakistan shows unequal distribution of income and high unemployment. Major proportion of tax is collected through indirect tax in Pakistan as it depends on the sales of goods and services. Indirect taxes have an adverse affect where unequal distribution of income prevails. There is a need to increase direct tax in Pakistan.

Political instability is a big hurdle in tax collection. As collection process requires consistency in the implantation. Law and Order situation is indirectly related with tax. Stability in the economy means greater investment and availability of more jobs. People would be able to pay taxes most effectively. Economic growth is hidden in the attraction of foreign investors. It is possible if we reduce taxes. If there will be greater aggregate demand and economic activities then these can help to generate more indirect tax. Fiscal policy is the most important tool that government uses to maintain stable economic growth in the country. Federal Government in Pakistan increases revenues in the form of direct and indirect tax by implementing sales tax, income tax, custom and excise duty. Increased tax declines productivity as people don't want to work in this situation. People will be less productive. Lower the tax rate means higher the value of goods and services produced in the country.

Acknowledgment

The authors declare that they have no conflicts of interest in this research.

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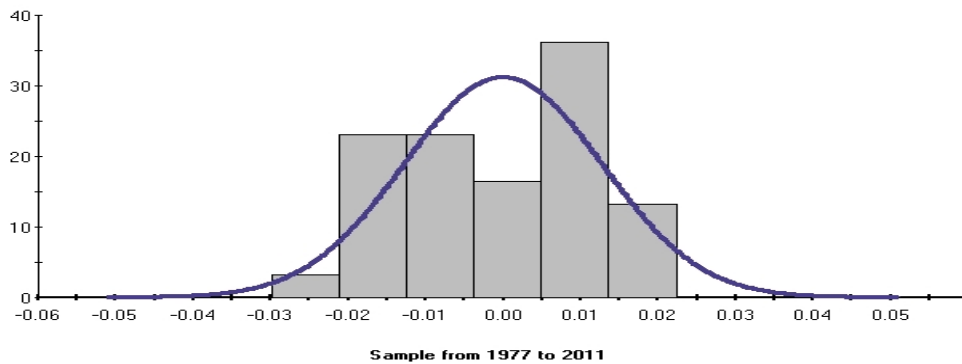
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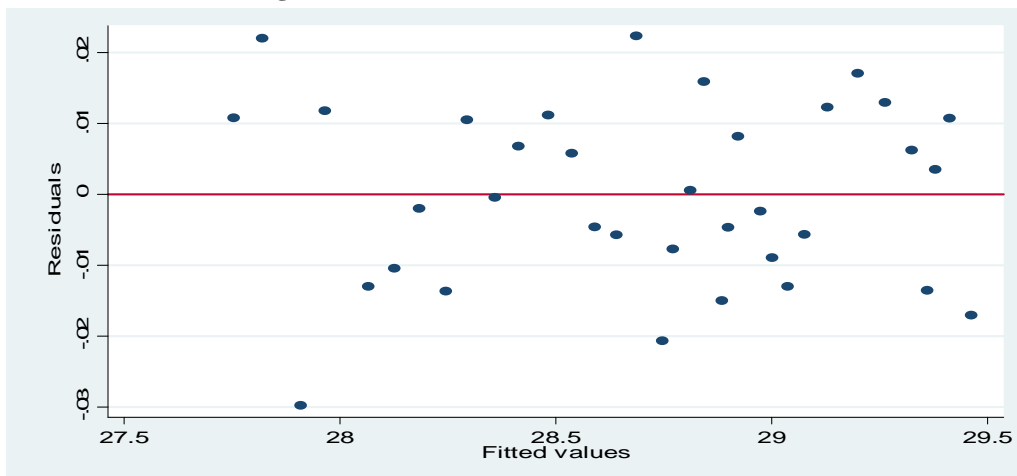
APPENDIX

Figure 3: Error Term (ϵ_t) of the model is normally distributed
Histogram of Residuals and the Normal Density



Source: Author

Figure 4: RVFPLOT (Residual VS Fitted Plot)



Source: Author

There exists no systematic pattern in this graph so model is free from heteroskedasticity