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Research

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## RELATIONSHIP BETWEEN CORPORATE TAX AND PRIVATE INVESTMENT IN PAKISTAN: AN EMPIRICAL ANALYSIS

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### Abstract

*Investment plays a pivotal role in promoting growth and bringing prosperity countries. However higher Corporate Tax rates are considered to be one of the main hurdles in the way of Investment. Keeping in view this fact, the present study has been an effort to empirically explore this contrivance for Pakistan. The Study used time series data for the time period 1984-2014 by applying Auto Regressive Distributed Lag (ARDL) technique for econometrics analysis. Results show that higher corporate tax rate has mitigated private investment in Pakistan. High tax rate for corporate sector increases the cost and reduces the corporate profits; hence it decreases private investment. The present study recommends that corporate tax rate should be decreased to enhance private investment in Pakistan.*

**Keywords:** Corporate tax, private investment, domestic credit.

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### Introduction

Investment plays a vital role for the growth and prosperity of any country. Most of the countries in the world have solved economic problems such as unemployment, poverty, low per capita income by increasing the investment level. Developing countries have made efforts to attract the attention of investors. The adequate investment in different economic sectors can change their economic conditions so developing countries try to attract the investors with good infrastructure, better law and order situation and lower tax rates.

There are many factors that can affect the private investment like: credit to investors at lower interest rate, political stability, law and order situation, energy supply and tax rate is also one of major factors. Researchers have put considerable effort in evaluating the effect of different levies on investment and the growth rate of GDP (Cerdeira, 2010). Particularly, the effect of corporate tax policy on capital stock and the reinvestment is a main focus of the academia and researchers. Regarding this issue there are two school of thoughts, one thinks that there is negative relationship between corporate tax and investment and the other thinks that there is no relationship between them. Ahmed and Root (1979), Mody and Wheeler (1992), Mughal and Akram (2011), Reed and Yulin (1995) concluded that corporate tax has no significant impact on investment. According to them the major determinants are political instability and social issues. Mutti and Grubert (1991), Rice and Hines (1994), Guisinger and Loree (1995), Cassou (1997) and Kemsley and Harris (1999) concluded that corporate tax has negative impact on investment.

Various countries in South America have generally faced low investment. These countries employed tax reforms to encourage investment and long-term economic growth. Mexico, Colombia and Chile are countries that clearly implemented policies in this regard (Vergara, 2010). In developing countries financial market also play a

significant role for investment. Vergara (2010) explored that credit constraints were having a significant impact on investment in Chile. Cardoso (1993), Hsieh and Parker (2001) found similar evidence that domestic credit to private sector and interest rate are important determinants for investment in developing countries.

Pakistan has adopted different policies to promote investment. Government has introduced different tax holiday schemes in short periods of time in 1960s and 1970s. These policies were supportive for investment. Government of Pakistan has also introduced tax credit schemes to encourage investment. Tax credit for industry was introduced in 1976-77. It was suspended in 1989-90 and started again in 1990-91. In spite of this Pakistan's entire corporate sector is paying the highest tax rate in the South Asian region. Average corporate tax rate remained at 27 percent in all Asian countries in 2014, while in Pakistan it was 34 percent. "Gross fixed investment declined substantially, from 22.5 percent of GDP in 2006-07 to 13.4 percent provisionally in 2010-11. This is the lowest ever investment rate in last four decades", (Economic Survey of Pakistan, 2011). "Total investment has declined from 13.1 percent to 12.5 percent of GDP in 2011-12 as compared to 2010-11", (Economic Survey of Pakistan, 2012). Present study is an effort to explore the impact of corporate tax on private investment in Pakistan. Rest of the study is organized as: section II reviews the relevant existing literature. Section III discusses the estimation methodology, data and results; section IV concludes the study.

#### **Literature Review**

Vergara (2010) examined the impact of taxation on private investment in Chile. The study used neoclassical investment model as theoretical base. The study used macro and micro evidence to analyze whether the reduction in tax rate is the main cause of investment promotion in Chile in 1980s. The Macro evidence used time series data (1975-2003) which was obtained from Ministry of Finance Chile and International Financial Statistics (IFS). Private investment as

percentage of capital stock and GDP was used as dependent variables. The study used Johansen Co-integration technique and found that lower rate of corporate tax decreases expenses on capital. It also increases finance for private sector that increased investment in Chile. The Micro evidence used eighty seven publically held companies' Panel Data (1980-2002) and investment as percentage of fixed assets used as dependent variable. Results were same in micro and macro evidence and it showed that reduction in corporate tax has a positive impact on investment promotion in Chile.

Cerda and Larrain (2008) examined whether corporate tax affect labor demand and capital in under developed countries. The study used microeconomic level data which was obtained from Chilean Manufacturing Industries Survey for 1986-1996 periods. The study utilized Cost Minimization Theory and used logarithm form of real wages, corporate tax and some business cycle variables in a Probit Model. The study found that 1 percent increases in corporate tax rate decrease labor demand by 0.2 percent and capital stock 0.12 percent. The study concluded that corporate tax rate has a key determinant for investment particularly in under developed countries.

Hall and Jorgenson (1967) explored the investment behavior and tax policy in America. The study used neoclassical investment model to explore the investment behavior. The study used panel data from 1954 to 1963 of American industry. The study calculated three major tax amendments in tax policy at postwar period in America and concluded that tax on capital asset has negative impact on investment.

Edgerton (2010) explored tax incentives on firm's investment and used modified form of Q model. The study used panel data (1967-2005) of US firms which was obtained from Compustat North America Database. The study constructed three variable, taxable status, carry forward stock and carry back stock. The study used investment to

capital stock ratio as dependent variable. Study concluded that tax incentives have little affected the investment.

Chatelaine and Tiomo (2001) examined tax rates impact on investment in France and used panel data of different manufacturing firms in 1990-1999. The study used King and Fullerton's (1984) approach as a theoretical base and used Auto Regressive Distributed Lag Model (ARDL) to check log run relationship between tax rates and investment behavior. The study concluded that tax rate has negative impact on investment and tax rate decreased the investment by 2 percent if there is 1 percent increase in tax rate.

Hsieh and Parker (2001) found that the impact of tax on poor developed markets in developing countries. The study developed its own investment model and it consisted on two periods. The study used the panel data of different firms which were obtained from Chilean National Account from 1982-1992. The study found that investment boom in Chile from 1984-86 due to reduction in tax rates of Firms.

Shah and Ahmed (2003) analyzed cost of capital impact on FDI in Pakistan. The study used Jorgensen's neo-classical investment model as a theoretical base. The study used corporate income tax, interest rate, rate of depreciation and price index of capital goods are component of cost of foreign capital as variables which was obtained from FBR of Pakistan. The study concluded that cost of capital has strongly affected the foreign investor and different fiscal incentives influenced the investor.

Feltestein and Shah (1991) examined how tax polices promote investment in Pakistan. The study used Dynamic General Equilibrium Model and used Simulation Technique to address the issue of tax rates impact on investment in Pakistan. The study estimated that investment increased when tax rates were decreased 30 to 15 percent. The study concluded that tax credits and corporate tax rates were main instrument for promoting capital formation in Pakistan.

Grubert and Mutti (1991) examined that the impact of Transfer Pricing, Tariffs and Taxes in corporate sectors of USA to investment in other countries. The study used cross-section data of 33 countries in 1983. The study examined the tax rates and tariffs on stock of real capital in these countries. The study found that tax rates have a significant impact on multinational corporations but tariffs were affected mixed these countries.

Mughal and Akram (2011) examined that the market size affected the FDI in Pakistan. The study used time series data (1984-2008) which was obtained from World Bank website. The study used four variables corporate tax rate, market size, FDI and exchange rate. The study utilized Autoregressive Distributed Lag (ARDL) technique to estimate determinates of FDI in Pakistan. The study found corporate tax rates did not influence the FDI in the long run time period.

Root and Ahmed (1979) explored determinants of Foreign Direct Investment in under developed countries. The study used Panel data from 1966 to 1970 of 70 under developed countries which consisted on highly attractive, moderately attractive and unattractive countries. The Study used capital inflow as dependent variable and 38 different kinds of variables used as independent variable. The study concluded that corporate tax has not a significant impact on FDI in under developed countries. The major issues of these countries were politically and social which was the main determinant in these countries.

Wheeler and Mody (1992) investigated different American's Firms decision regarding international investment's location. The study examined the U.S multinational companies' investment decisions in 1980s. The study concluded that the corporate tax affected location choice in short run period but in long run it was not affected. The specialized input supplier, good infrastructure and an expanding domestic market were the main determinates.

Yulin and Reed (1995) examined The American Foreign Direct Investment in Agriculture Sector of different countries. The study used panel data (1983-1989) of six industrialized countries. The study concluded that investment was affected with cultural linkages, trading blocs, host market size, host market growth rates but tax rates were not affected investment in these countries.

Bustos *et al.* (2004) examined long run demand for capital in Chile when tax rates were decreased in 1980s. The study used panel data of eighty three Firms of Chile from 1985 to 1995 periods. The study used Hall and Jorgenson (1967) neoclassical investment model to provide the theoretical base and all the variables are in logarithm form. The study utilized Bertola and Caballero's (1990) co-integration technique and results revealed that the long run demand for capital was not affected when corporate taxes were higher.

After reviewing the literature, this study concluded that the relationship between tax rate and investment is extensive and contains mixed evidence as to whether or not changes in tax rate do affect investment. This literature concluded that tax rates are obstacle for investment in developing countries. The developed countries addressed this issue and gave different incentives to their investors but unfortunately mostly under developed countries are in confused situation about the issue of high tax rates for private sector. They are giving importance to public sector and do not facilitate the private sector.

### **Research Methodology**

This Section provides theoretical and econometric background to the idea under consideration.

### *Theoretical Framework*

In developing countries investment decisions are representative with Jorgenson's (1963, 1967) neoclassical investment model. Firms use capital (K) and labor (L) to produce goods (Y). In this model firms maximizes the present values of the shareholders' dividends.

$$\text{Max}_{K,L} \int_0^{\infty} e^{-rt} [1-\tau)(F(K_t, L_t) - wL_t) - ((1-\tau)(b+z))p_t I_t] dt \dots \dots \dots (1)$$

Subject to:

$$\dot{K}_t = I_t - \delta k_t \dots \dots \dots (2)$$

r = interest rate

$\tau$  = corporate income tax

b = fraction of investment financed

z = present value of depreciation allowance

p = price of investment

I = investment

In above equation all tax features are included. When marginal product of capital is equal to user's cost of capital in first order conditions then investment depends on tax rate.

### *Data*

The data is collected from Federal Board of Revenue Pakistan (FBR) and World Development Indicator (World Bank) for the time period 1984-2014. Present study used four variables (private investment, corporate tax rate, domestic credit and interest rate) to estimate the model. The dependent variable is private investment while corporate tax rate, domestic credit and interest rate are independent variables. The private investment, private credit, and interest rate were obtained from database of World Bank. Private credit is used as percentage of GDP. Private credit to domestic sector



is used for proxy of liquidity constraint. Corporate tax rates were obtained from Federal Board of Revenue Pakistan. There are three different categories of corporate tax rates in Pakistan like Bank's income tax rate, public companies and private companies income tax rates. This study used private companies' income tax rates (1984-2014).

*Model specification*

The following model is being utilized to explore the factors responsible for influencing private investment in Pakistan. Similar model was used by Vergara (2010) in case of Chile.

$$PVG = \alpha + \beta_1 T + \beta_2 I + \beta_3 C + \mu \dots \dots \dots (1)$$

- PVG = Private investment as percentage of GDP
- T = Corporate tax rate
- I = Interest rate
- C = Domestic credit as percentage of GDP
- $\mu$  = error term

Mostly time series data of Macroeconomics variables have been found to be possessed non-stationary property. If data is non-stationary then we can study its behavior only for time period under consideration. It is not possible to generalize it to other time periods. To eliminate this issue difference of a non-stationary variable is taken. If all variables are of same order of integration, then there can be a significant relationship among variables. In the first stage, we applied the unit root tests and in the second stage ARDL technique developed by Pesaran et al. (2001) has been employed to the check long-run relationship among variables.

The general representation of the ARDL is as follows:

$$\Delta PVG = \alpha_0 + \sum_{i=1}^r b_i \Delta PVG_{t-i} + \sum_{i=1}^s c_i \Delta T_{t-i} + \sum_{i=1}^u d_i \Delta C_{t-i} + \sum_{i=1}^q f_i \Delta I_{t-i} + \delta_1 PVG_{t-1} + \delta_2 T_{t-1} + \delta_3 C_{t-1} + \delta_4 I_{t-1} + \varepsilon_t$$

Here:

- $\Delta$  is the first difference operator.
- The coefficients:  $b_i$ ,  $c_i$ ,  $d_i$ , and  $f_i$ , represent the short run dynamics.
- The coefficients  $\delta_1$ ,  $\delta_2$ ,  $\delta_3$  and  $\delta_4$  represent the long run.
- $\varepsilon_t$  represent the white noise error term.

The null hypothesis of this model is

$$H_0: \delta_1 = \delta_2 = \delta_3 = \delta_4 = 0 \quad (\text{there is no long-run relationship})$$

$$H_1: \delta_1 \neq \delta_2 \neq \delta_3 \neq \delta_4 \neq 0$$

Bounds test is used to test the null hypothesis for the existence of no co-integration. There are some benefits to check co-integration using bounds test.

- The test treats each and every variable as endogenous.
- This test does not consider integration order and can be used for variables I (0) and I (1).
- Both short run and long run coefficient are estimated at once.

There are three potential conclusions for bounds test:

- If F-statistics > upper bound  $\rightarrow$  (co-integration exists)
- If F-statistics < lower bound  $\rightarrow$  (no co-integration exists)
- If F-statistics lies amid upper and lower bounds  $\rightarrow$  (inconclusive)

If co-integration is found in the general form of ECM model in ARDL (r,s,u,q) formulation, then subsequent long-run model is projected:

$$PVG = \alpha_0 + \sum_{i=1}^r \delta_1 PVG_{t-i} + \sum_{i=0}^s \delta_2 T_{t-i} + \sum_{i=0}^u \delta_3 C_{t-i} + \sum_{i=0}^q \delta_4 I_{t-i} + \varepsilon_t$$

If the long run relationship between the variables is found, the next step is to estimate short run coefficients. The following ECM model is utilized to estimate short run coefficients of the variables.

$$\Delta PVG_t = \beta_0 + v_1 (ECM_{t-1}) + \sum_{i=1}^r \beta_2 \Delta PVG_{t-i} + \sum_{i=0}^s \beta_3 \Delta T_{t-i} + \sum_{i=0}^u \beta_4 \Delta C_{t-i} + \sum_{i=0}^q \beta_5 \Delta I_{t-i} + \varepsilon_t$$

In first step, ADF and PP test have been used to find the order of integration. The ADF and PP test can help in determining whether the ARDL model should be utilized for co-integration or not. Results of unit root tests are shown in Table 1 with the help of Eview 7 software. One variable; interest rate is stationary at its level in ADF test because there is no unit root in it. The null hypothesis is rejected, so the series is stationary. Other variables are found non-stationary at level on the basis of ADF and PP t-statistic. They are stationary at first differences. So there is a mixture of level and first differences series therefore we can proceed with ARDL approach.

**Table 1:**  
*ADF and PP Unit Root Test*

Variables	ADF level	ADF difference	PP level	PP difference
I	-2.9914*	-	-1.9889	-4.4662**
C	-2.4689	-4.4870**	-2.4689	-4.4746**
PVG	-1.2809	-3.4251*	-1.4409	-3.3985*
T	-0.0259	-5.8865**	-1.3254	-4.6392**

Note:\*\* significant at 1% level of significance and \*significant at 5% level of significance

The ARDL approach is utilized to investigate the long run relationship among these variables because three variables are stationary at I(1) and interest rate is stationary at I(0). Bounds test is used to check co-integration among variables. Table 2 shows bound test result of co-integration with the help of Microfit 4.0 software. Result shows that only one co-integrating equation exist because the F-statistic is higher than upper bounds. Co-integration exists among Private investment as percentage of GDP as dependent variables and corporate tax, domestic credit to private sector and interest rate as independent variables. Table 2 shows that Co-integration does not exist for other three models because the F-statistic value is less than, lower bounds of the F-critical value at 95 percent confidence level. In next step estimates of the long run relationship among variables with ARDL technique have been found.

**Table 2:**  
*Bounds Test for Co-integration Model*

Variables	F-value at I(0)	Critical 95% I(1)	F- statistics	Conclusion (H <sub>0</sub> )
F(PVG / T,C,I)	3.219	4.378	4.4634***[.019]	Co-integration
F(C/PVG , T,I)	3.219	4.378	3.1412*[.046]	No Co-integration
F(T/PVG, T,C)	3.219	4.378	.69600*[.606]	No Co-integration
F(I/PVG ,C,T)	3.219	4.378	2.60710*[.078]	No Co-integration

Note: <sup>1</sup>AIC and SBC were used for the lag length. \* Indicates that the statistic lies below the lower bound, \*\* it falls within the lower and upper bounds and \*\*\* it lies outside the upper bound at 5% level of significant.

The Long run coefficients of independent variables are given in the Table 3. These coefficients are estimated with the Schwarz Bayesian Criterion by minimizing the absolute value of Schwarz Bayesian and Akaike information Criterion. Probability is given in parenthesis. In long run coefficients of corporate tax (T), domestic credit to private sector (C) and interest rate (I) all are affecting the private investment significantly.

**Table 3:**  
*Long Run Coefficients using the ARDL Approach*

ARDL(1,0,0,0) selected based on Schwarz Bayesian Criterion  
Depended is PVG

Regressors	Coefficient	Standard Error	T Ratio [Prob]
T	-0.26289	0.026384	9.9640***[.000]
I	-0.15443	0.051682	2.9882***[.006]
C	0.89119	0.074928	11.8939***[.000]
CONSTANT	4.2603	2.8180	1.5118[.144]

Note: \*\*\* represents the significance level at 1%

The results show that if corporate tax is increased by one percent there will be 0.26 percent decrease in private investment. The result of this study reconciles with the previous studies like (Vergara, 2010; Simeon et al. 2009; Cerda and Larrain 2008) and among other studies. The variable interest rate (I) is effecting negatively the private investment. The results show that if interest rate increases by one percent there will be 0.15 percent decrease in private investment, as higher interest rate raises the cost of borrowing for investment, higher cost of borrowing reduces the incentive for investment as return on investment is expected to be lower. Domestic credit to private sector is an important variable in developing countries which is a main determinant for investment. The domestic credit has significant impact on private investment which is shown in Table 3. If one percent increases in domestic credit to private sector there will be 0.89 percent increases in investment. The result of domestic credit to private sector in this study is consistent with the findings of (Vergara, 2010). After testing long run relationship ECM approach is utilized for short run dynamics. Table 4 shows that all the coefficients are significant in the short run except intercept. Corporate tax, interest rate and domestic credit have significant impact on the private investment. Table 4 shows that Error Correction Mechanism (ECM) sign is negative which show the speed of adjustment, convergence to equilibrium. After any disturbance in equilibrium, value of ECM shows high speed of adjustment i.e. converges to equilibrium. The value of ECM is -0.6954 which means that speed of adjustment from the last year's disequilibrium in to present period's equilibrium is around 70 percent.

Table 5 shows the results of Diagnostic tests of the model. Diagnostic tests are performed in order to check the accuracy of the model. In the table LM test and F test statistic are given. Tests of heteroscedasticity, functional form, normality, serial correlation, and autocorrelation have been applied. Null hypothesis of serial correlation is that there is no serial correlation in the residual and alternative is the presence of serial correlation. Similarly null hypothesis are: no heteroscedasticity for the heteroscedasticity, residuals are normally

**Table 4:***Error Correction Representation of ARDL Model*


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ARDL(1,0,0,0) selected based on Schwarz Bayesian Criterion  
Depended variable is DPVG

Regressors	Coefficient	Standard Error	T-Ratio [Prob]
dT	-0.18282	.031423	5.8180***[.000]
dI	-0.61975	.068151	9.0938***[.000]
dC	0.10740	.035903	2.9913***[.006]
CONSTANT	2.9627	1.8480	1.6032[.122]
ECM(-1)	-0.69543	0.080885	8.5977***[.000]
<b>R-Squared</b>	<b>0.80727 R-Bar-Squared</b>	<b>0.77515</b>	

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Note: \*\*\* represents the significance level at 1%

distributed for normality and functional form is correct for functional form. The results of both F and LM version show that we fail to reject all the null hypothesis of these tests and confirms that there is no problem of heteroscedasticity and serial correlation in the model, residuals are normally distributed and functional form of the model is correct.

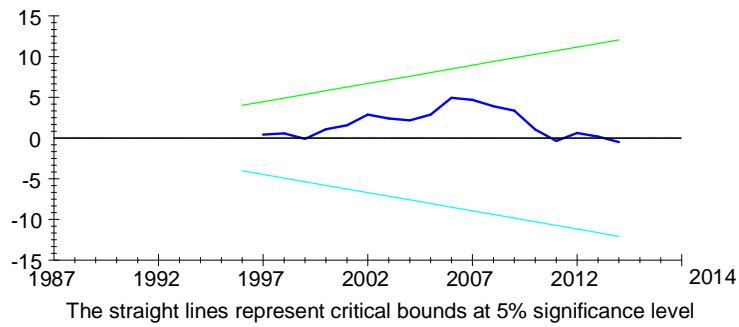
**Table 5:***Diagnostic Tests of model*

Test Statistics	LM Test	F Test
Serial Correlation	CHSQ (1) .51341[.474]	F( 1,18)= .33622[.569]
Functional Form	CHSQ (1)1.5309[.216]	F( 1,18)= 1.0411[.321]
Normality	CHSQ ( 2)2.3731[.305]	Not applicable
Heteroscedasticity	CHSQ (1) .70299[.402]	F(1,26)= .66959[.421]

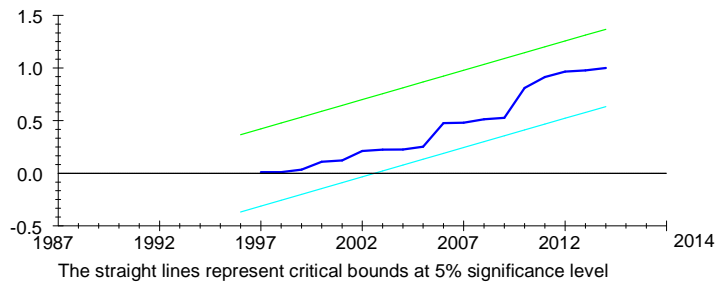
Source: Author's own calculation

Brown et al. (1975) introduced two tests Cumulative Sum (CUSUM) and Cumulative Sum of Square (CUSUMSQ) to examine the structural stability of a model. In present study parameter consistency is examined by employing these two tests. Both figure 1 and 2 shows that line of CUSUM statistic does not go beyond the upper and lower bounds of standard deviation. So the estimated parameters of regression are stable and their results at any point of time are reliable.

**Figure 1:**  
*Plot of Cumulative Sum of Recursive Residuals*



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



### Conclusion

The present study is modest step towards exploring the impact of corporate tax rate on private investment in Pakistan. The study utilized ARDL technique to investigate the relationship of corporate tax and private investment in Pakistan. Results indicate that the corporate tax rate is negatively effecting the private investment in Pakistan, so this is the one of main hurdles for corporate sector's investment. The private investment decreased by 0.26 units when there is 1 unit increase in corporate tax rate. The corporate tax rate is also effecting private investment in short run period. ECM value is - 0.69543, it is negative and statistically significant as well which shows that the speed of adjustment is around 70 percent of previous period shock. The domestic credit to private sector is also a significant determinant for private investment in Pakistan and it is effecting positively private investment in Pakistan. This means that credit availability to the private sector is boosting investment activities in Pakistan. Interest rate has negative impact on investment i.e. higher the interest rate lower will be the investment. On the basis of the results this study suggests that corporate tax rate should be reduced.



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