

Government Expenditure and Tax Revenue, Causality and Cointegration: The Experience of Pakistan (1972–2007)

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1. INTRODUCTION

The main objective of Pakistan's fiscal policy is sustained economic growth with declining debt services, poverty alleviation, the creation of employment opportunities and investment in human and physical infrastructure. The tax to GDP ratio fluctuated in a narrow band of 10 to 11 percent for almost one decade because of half hearted attempts to reform tax procedure. On the revenue side, tax-GDP and revenue to GDP ratios either remain stagnant or secular decline, mainly due to structural weaknesses in the tax system and administration at the federal level and at provincial government level. The expenditure of the government in relation to GDP with total expenditure is also showing, overall decline since the beginning of 1980.

In the short run, fiscal policy can be considered expansionary when public expenditures exceed public revenues and the resulting deficit can be explained as to finance additional government expenditures. If these expenditures are growth enhancing, then a government deficit reveal an indirect effect on long-term economic growth. In a Ricardian economy, deficit simply means taxes delayed, there should be no difference between tax and deficit finance of government expenditures, as long as the tax structure remains unchanged in the future [Ludvigson (1996)]. On the other hand, if the economy is non-Ricardian, then public deficits can change the private incentives to accumulation and influence the rate of growth of the economy.

In Pakistan, higher level of current budget deficit are financed significantly by government borrowings these, raise the interest burden, future expenditure as well as expectations of higher taxes. Thus debt financing is an important variable in the nexus between tax revenue and expenditure. Although the relationship between revenue and expenditure is still an unsettled issue, the main purpose of the present study is to check and explain the relationship between tax revenue and expenditure variables in the context of Pakistan.

The various estimates to test the revenue/tax-expenditure nexus are examined in context to different countries and different results have been found, this study attempts to

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investigate the causality between government expenditure and tax revenue in Pakistan but it differs from earlier studies on the following aspects.

Firstly, it examines two-hypothesis tax-spend or spend-tax by granger causality test verification in context of Pakistan. Secondly, it investigates for long run relationship between both of the variables with current data. The rest of the paper is organised as follows. Section 2 describes the overview of theoretical literature and literature review. Section 3 discusses the data and methodology and empirical result. Section 4 provides conclusion.

2. FISCAL CONDITION IN PAKISTAN

In Pakistan, since the last decades, on the revenue side, tax-to-GDP and hence, revenue-to-GDP ratios either remain constant or showed secular decline, due to structural deficiencies in the tax system or administration, at federal level and at provincial level. The expenditure to GDP exhibits a similar pattern. In 2008-09, the decline in total expenditures 40 percentage points of GDP is shared by current expenditures 1.5 percentage points of GDP and development expenditures 2.1 percentage points of GDP total revenue as percentage of GDP increase due to improvement in non-tax revenue as percent of GDP, excise duty contribution in revenue is 9 percent, total tax revenue as percentage of GDP remained at 10-11 percent since last decades due to structural weakness in tax system in Pakistan. The indirect tax and sales tax have a relatively high contribution in tax revenue, in total, indirect tax to GDP ratio stood at 5 percent and direct tax-to-GDP ratio that remains always low, requires a considerable policy measures in order to widen the tax base and strength the tax administration.

The average growth of FBR tax collection was around 16 percent during the current period comparative to the growth rate of 12 percent during the decades of 1990s. The growth rate from 12-16 percent shows the positive impact of tax reforms if nominal GDP growth rate is increasing in isolation. While the falling tax-to-GDP implies that nominal GDP grew at a faster rate than tax growth.

In Pakistan, indirect taxes contribute 60 percent of total revenue generally and particularly custom collection falls during the last decades, mostly due to trade liberalisation and GST contribution. With relation to tax, there has been a difficult time on expenditures side for the economy of Pakistan due to many unexpected events on both the domestic and external level [*Economic Survey of Pakistan (2008-09)*], if better fiscal discipline and expenditure management adopt, it would lead to drastic improvement in fiscal discipline. Total expenditures have fluctuated between 16-20 percent of GDP during the last 18 years. Negative growth in total expenditures is due to significant decline at the cost of a decline in development spending with 15.1 percent. There is a increase in total expenditures during 1980-2009 from 63.6 to 2431 billion with account of current expenditures from 37.8 to 2066 and interest payment 5.9 to 624 and defense expenditures 15.3 to 3123 billion but growth is negative in real expenditures with total expenditures 7.7 to -13.1, current 10.5 to -9.3, development 2.7 to -29.6 and defense expenditures decline 8.9 to -5.7 percent.

In future, to encourage judicious distribution of the tax burden among the different sectors of the economy it is necessary to expand the tax net to un-taxed and under-taxed sectors and also to achieve targeted tax-to-GDP ratio which is around 15 percent.

3. OVERVIEW OF THE THEORETICAL LITERATURE

The relationship between tax and spending is discussed in the literature with the help of four hypotheses, namely the tax-and-spend hypothesis, the spend-and-tax hypothesis, the fiscal synchronisation hypothesis, and the institutional separation hypothesis.

Tax-Spend Hypothesis

According to Friedman (1978) the level of spending adjust to the level of tax available and causality runs from tax to expenditure. This hypothesis defines a positive relationship between government spending and taxation. If tax revenue are increased government spending will also increase and will decrease with the decrease in tax revenue. As Government want to spend whatever is available for spending.

Buchanan and Wagner (1977, 1978) and Niskanen (1978, 2002, and 2006) presented an alternative version of the tax-spend hypothesis that is negative relationship between federal expenditure and tax revenues. Contrary to Friedman (1978), they suggest that higher taxes would lead to spending reductions. According to fundamentals of the Buchanan and Wagner (1977, 1978) taxpayers suffer from fiscal illusion. They argue that tax cuts lower the perceived price of government provided goods and services by the public, which increases quantity demanded of these goods and services. However, the public may incur even higher costs. One reason for this is the indirect inflation taxation that results from excessive money creation by the government. Another reason is higher interest rates associated with government debt financing that may crowd out private investment. To reduce expenditures, Buchanan and Wagner favour limit the ability of government for deficit financing. In sum, tax changes bring changes in spending, the relationship between the two is a negative. This hypothesis is also known as the “revenue dominance hypothesis” [Hasan and Linclon (1997)].

While Friedman (1978) and others believe that lower deficits require lower taxes and they oppose tax hikes as a means of reducing budget deficits [see Darrat (1998, 2002)] other proponents of the tax-and-spend hypothesis such as Buchanan and Wagner (1977) believe that tax increases as a means of solving the budget deficits. Thus, combined increases in taxes with spending cuts will lower budget deficits contrast with Friedman (1978) Who explains a positive causal relationship between the two fiscal variables, Buchanan and Wagner (1977) hypothesise a negative relationship [see Darrat (1998, 2002)].

Spend-Tax Hypothesis

According to the spend-and-tax hypothesis, government first spends than tax policies and revenues are adjusted to accommodate the desired level of spending. It is expenditure that causes taxes where causality runs from spending to revenue. According to Peacock and Wiseman (1979) once a relatively high level of taxation and expenditure is set during extra ordinary situations like wars, natural disasters, or deep recessions justify temporary increases in expenditures and taxes to pay them so, that public sector is permanently enlarged. From a policy perspective, the optimal solution for the proponents of the spend-and-tax hypothesis, a spending restraint is required to reduce public deficits and reducing expenditure for sustain current budget deficits.

Another explanation of this hypothesis is based on the research of Barro (1974, 1979, 1986). In his tax smoothing hypothesis, government spending is considered as an exogenous/dependent variable to which taxes adjust. Moreover, the intertemporal budget constraint requires that an increase in current expenditures higher future taxes. Therefore Barro, rejects the concept that the taxpayers suffer from fiscal illusion. Within the framework of the Ricardian equivalence theorem, he explain that taxpayers are rational that an increase in the current debt in nothing but a delayed burden in form of taxation. Taxpayers are, therefore, expected to fully capitalise the future tax liability. This hypothesis is also known as “expenditure dominance hypothesis”.

Fiscal Synchronisation Hypothesis

The first of these is the *fiscal synchronisation* hypothesis where it is postulated that the government take decision to tax and to spend is simultaneously and changes occur concurrently and causality runs in both directions. To the proponents of this hypothesis, the quantity and quality of public goods offered by the public sector reflects the preferences of the community and the size of the government is determined by the welfare-maximising choice of a decisive individual and the decisive voter chooses the appraisal and comparison the marginal cost and benefits associated with government alternative packages implement by the government [Meltzer and Richard (1981)]. According to Musgrave (1966, p. 19) the expenditure and tax sides of the budget must be decided jointly’ so as to maximise society’s intertemporal social welfare function. The government budgetary process works on incremental basis therefore according to Wildavsky (1964) government expenditure and tax revenue determines each other simultaneously. So the implication of this hypothesis that causality runs in bidirectional.

Institutional Separation Hypothesis

According to this hypothesis the management and legislative government branches have different taxation and spending functions because such all these are different institutions. So all these institutions have independent decisions regarding expenditure and revenues, indicating no causal relationship between government expenditure and tax revenue.

The *institutional separation* hypothesis suggests that there is no inter-temporal causality between public expenditure and public revenue. This absence of causal link is due to ‘many important actors with divergent interests and agendas’ [Hoover and Sheffrin (1992), p. 246] and that the disagreement between parties or groups in the decision-making process is a cause for the growing pattern of public debt [Drazen (2001); Persson, *et al.* (2000)]. A major advocate of this view is Wildavsky (1988).

Who maintains that ‘budgeting can be incremental and adjustments can be made on the margin if these separate institutions reach a consensus on the fundamentals.

4. LITERATURE REVIEW

For finding the hypothesis and causality between government expenditure and tax revenue previous studies that took place include [Dhanasekaran (2001); Friedman (1972–1978); Blakely (1986); Marlow (1986); Barro (1999); Wiseman (1979)]. This issue has

been investigated for a number of countries, but a consensus has not been reached about the nexus between government revenues and expenditures. The results from these empirical studies are sensitive to the sample period under examination, the degree of temporal aggregation, the inclusion of macroeconomic controls, and the choice of econometric methodology.

The spend-tax hypothesis in the one hand, predict that governments spend first and then increase ax revenues to finance their expenditures [Peacock and Wiseman (1979); Barro (1981)].

According to (S. H. Hussain) in case of Pakistan there is unidirectional causality exist, spend to tax that is support to Barro hypothesis and the result that *TR* does not cause *GE* can best and only be explained by the political economy of Pakistan where the main expenditures are the outlays chiefly determined politically by bureaucratic and military influence (defense, debt servicing, general administration). The case of India has been recently examined by Dhanasekaran (2001) who found evidence in support of the spend tax hypothesis. It is evident, therefore, that the question remains empirically unsettled. He conclude for absence of co integration between both of the variables, unidirectional causality exist in case of India. S. Raju paper support for both the expenditures lead revenues (spend and tax hypothesis) and revenues lead expenditures (tax and spend hypothesis) between total receipts/tax receipts and different categories of expenditures at the level of the central government for India. In case of Turkey studied by Abu Wahid, using the Granger-causality testing, the results support the hypothesis that government expenditure causes tax revenues to increase in Turkey.

The so-called hypothesis tax-spend postulates that government raises tax revenues ahead of engaging in new expenditures [Friedman (1978); Buchanan and Wagner (1974); Blakely (1986); Marlow and Manage (1987); Owoye (1995)]. Ewing and Payne (1998) have examined the case of five Latin American countries using pool data technique finding mixed results for the countries in their sample. Park (1998) researched for the case of Korea and found supporting evidence for the tax-spend hypothesis. Debi, *et al.* worked for transitional economics, the empirical findings which are based granger causality test, supporting the tax-spend hypothesis. However, Friedman (1972, 1978) supports the view that increasing taxes means that one would have just as large a deficit but at a higher level of government expenditures. Owoye (1995) conducted a study of G7 countries and finds that the direction of causality runs from tax revenues to government expenditures in the case of Japan and Italy. Cheng (1999) in a study of eight Latin American countries detects a similar direction.

There is also the fiscal synchronisation hypothesis that suggests that government take decisions about revenues and expenditure simultaneously [Musgrave (1996); Meltzer and Richard (1981)]. Studied on this hypothesis worked by Mariam, *et al.* for the case of Malaysia and found bi-directional causality supporting the view of fiscal synchronisation hypothesis. Furthermore, Manage and Marlow (1986) find the presence of bi-directional causality between U.S. federal revenues and expenditures for 1929–82.

Data

Data that is used here taken from various issues of economic survey of Pakistan, international financial statistics from the year 1972 to 2007. Data choice depends on the availability of data and time period effect after separation Pakistan.

5. METHODOLOGY AND EMPIRICAL RESULTS

Granger Causality and Co-integration Test

The mostly used method to estimate causality is Granger Causality Test which shows the direction of causality. Before applying the Granger Causality test it is must to check the stationary of the variables. If the variables are stationary then apply Causality test. If variables are non-stationary, then make the ADF test to the 1st difference or logarithm and obtain the stationary series because the Granger Causality, if applied on non-stationary variables will lead to spurious regression and may provide wrong results.

In the same way co-integration test to non-stationary variables also provides spurious regression. So according to Engel Granger Co-integration if the linear combination of non-stationary variables is stationary variables have long-run relationship. To avoid the problem of heteroscedasticity we have taken the natural log of both of the variables so variables are defined as LNTR and LNGE.

Unit Root Test

$$\Delta GE_t = \alpha_1 + \alpha_2 + \beta GE_{t-1} + \Sigma \delta \Delta GE_{t-1} + \mu_t$$

$$\Delta TR_t = \alpha_1 + \alpha_2 + \beta TR_{t-1} + \Sigma \delta \Delta TR_{t-1} + \mu_t$$

Where α α are constants, t represents time or trends and is pure white noise error term. The null and alternative hypotheses are $H_0: \beta=0$ and $H_1: \beta < 0$. If ADF value of $\Delta LN GE_t$ is greater than the MacKinnon value at 1 percent, 5 percent or 10 percent level of significance the null hypothesis is accepted which shows that $\Delta LN GE_t$ has unit root and is non-stationary. On the other side if null hypothesis is rejected show that GE is stationary.

Results of ADF Test

Variable	ADF Critical Value (1% Level)	Critical Value (5% Level)	Critical Value (10% Level)	Result	
LNGE	-2.160618	-4.252879	-3.548490	-3.207094	Non-stationary
Δ LNGE	-4.951326	-3.639407	-2.951125	-2.614300	Stationary
LNTR	-1.948808	-3.639407	-2.951125	-2.614300	Non-stationary
Δ LNTR	-8.623730	-3.639407	-2.951125	-2.614300	Stationary
v_t	-3.778997	-3.632900	-2.948404	-2.612874	Stationary

The results of ADF are showing that the ADF value of LNTR and LNGE are both greater than Mackinnon value at 1 percent, 5 percent and 10 percent level of significance so null hypothesis is accepted ,both the variables are non-stationary. While 1st difference of both variables $\Delta LNGE$ and $\Delta LNTR$ are stationary at 1 percent, 5 percent and 10 percent level of significance.

Granger Causality Test

For Granger Causality economic variables must be stationary which have been proved by the unit root test that GE and TR are stationary at 1st difference.

Results of Granger Causality Test

H ₀	Obs	F Value	P Value	Result
LNTR does not Granger Cause LNGE	34	0.88922	0.42188	Accept H ₀
LNGE does not Granger Cause LNTR		3.02703	0.06398	Reject H ₀

The results of causality represent that in case of Pakistan GE are cause to TR and TR are not cause to GE. Therefore the results verify unidirectional causality i.e. spends and tax hypothesis. It is found that GE does not depend on TR so only the tax revenue may tend to reduce the budget deficit but this is difficult to answer only considering the causal relationship between two variables. Proper cost and benefit analysis of any change in taxation and expenditure is needed in order to study the problem of federal deficit.

Further it implies that Pakistan's government first engages in spending and after that to pay for this spending raise taxes to boost government revenue but it may have negative impact on investors and human capital that is skilled one because of fear to pay higher taxes in future. Due to this problem capital may flight.

Engle Granger Co-integration Test

Co-integration defines that if the 1st difference of variable is stationary there is cointegration (long-run relationship) between the variables. Two methods are used in order to check co-integration. 1st method is presented by Engel and Granger it deals with two variables and the 2nd method is presented by Johns and Juselius based on Vector Auto Regression and this method is used for three or more variables.

Here because of two variables we have used Granger co-integration test. 1st we regress TR on GE as follows.

$$LNTR_t = \alpha_1 + \alpha_2 LNGE_t + \mu_t$$

The results of OLS regression are

$$LNTR = 0.048999 + 0.992287 * LNGE + v_t$$

S. E.	(0.173941)	(0.014539)	Adjusted R ² = 0.992540	D.W = 1.302447
t	(0.281698)	(68.24909)	F = 4657.939	Prob = 0.00000

In second step we check the stationarity of residual by the help of ADF. Here the ADF value is smaller than Mackinnon critical value at 1 percent, 5 percent and 10 percent level of significance the residual is stationary because it has no unit root. So the results show that there is co integration relationship between TR and GE. The OLS regression is showing the co integration relationship that is long run relationship between TR and GE. A 1 percent rise in GE raises tax revenue by 0.99.

Here the coefficient of government expenditure is positive and significant which indicates that economic activity enhances as government increases its expenditure as a result tax base and tax revenue also increases because of high income. The results represent that in the long run the most important factor that affects tax revenue is government expenditure.

6. CONCLUSION AND POLICY IMPLICATION

In this study, the causal relationship between government total expenditure and government total revenue has been studied. In general, the results support the Barro hypothesis that government expenditure causes revenues. The result that TR does not cause GE can only be explained by the political economy of Pakistan where the main expenditures are the determined politically by bureaucratic and military influence (defense, debt servicing, general administration). Most of these consumption expenditure are for self interests rather than overall welfare.

The results conclude that while government expenditures and revenues exhibit a stable long run relationship there exists unilateral causality from expenditures to revenues in Pakistan. That is, although the possibility of budget deficit explosion in the long-run is limited, the government decide to spend first and then raise tax revenues and request for grants to finance its expenditures, rather than adopting the method of raising funds first and collect revenues and take decision to spending later according the revenues.

In general, a major portion of development expenditure in Pakistan is the residual amount left over from different consumption expenditure. Furthermore, seeing that our tests can not guarantee the final benchmark remedy of the issue of reducing the deficit, we cannot support increasing tax revenues over decreasing expenditure. Only reducing the expenditures can not solely be resolution; rather, what we need primarily is (i) reduction in the size of large consumption expenditures and use them for development and other investment expenditures, thereby moving towards Pareto optimal solutions, (ii) in determining the new development purpose and implement outlays, economic efficiency should be preferred over political determination.

In addition, as is the target for this nexus, as the tax and tariff reform programme of the government, we must need expenditure reform in which inclusive cost benefit analyses should be conducted for government expenditures together with the analyses of adopting optimal approach for gradual shifting and reformation. This whole scenario should be reanalysed in a general equilibrium framework in order to spread distributional consequences of expenditure on the entire economy.

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