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Impact of Fiscal Variables on Economic Development of Pakistan

Zaheer Khan KAKAR
Department Of Economics, National University of Modern Languages (NUML)

ABSTRACT

The objective of this paper is to determine the impact of the fiscal variables on economic growth in Pakistan using time series data for the period 1980-2009. Cointegration and error correction techniques are used for this analysis and Granger causality test is used to determine the direction of causality. This study will provide help in determining the importance of fiscal policy for the development of Pakistan.

Keywords: Fiscal policy, economic growth, cointegration, error correction, Granger causality

JEL codes: E0, H87

1. Introduction

The role of government in economic growth is an issue of debate since the time of Adam Smith. Recent wave of privatization in many developing and under developing countries is based on perceptions that, "for sustainable development and efficient output the role of government in economic policies should be reduced". Landau (1985), and Marlow (1986) and Ram (1986) take into account the degree of relationship between government expenditures and economic growth. The focus of these studies was either the role of government expenditure or taxes. This leads to a rather misleading result. Currently the economists are of two different views about the role of government in economic activities. According to neo-classical, reducing the role of private sector by crowding out effect is important because it reduces the inflation in the economy; increase in public debt increases the interest rate which reduces the inflation in the economy as well as the output. The new-Keynesians present their multiplier effect in response and argue that the increase in public spending will increase demand and thus increase the economic growth.

In Pakistan, government expenditure constitutes a major portion of total expenditure. This has a direct impact on inflation because it may result in demand pull inflation, and indirectly affects the fiscal deficit. Consequently, inflation increases as result of fiscal policy. A number of studies have determined the association between inflation and budget deficit and money growth in developing countries. Like other developing countries, where high inflation appears when government attempts to control the fiscal deficit through money creation, current rapid inflation in Pakistan is also a result of money creation to meet government expenditures to run the economy. Previous studies focus either on comparison of fiscal and monetary policies, or to determine the aggregate effect of monetary and fiscal policy in the economy. Hussain (1982) and Saqib and Yasmin, (1987), investigate the relationship of monetary and fiscal policy on economic activity.

The study on hand determines the long and short run dynamics of fiscal policy variables in Pakistan, as at present public debt is on the rise in Pakistan and economy is suffering from fiscal disproportion, which raises question about the sustainability of the economy.

it is difficult to run the economy smoothly by conventional means (i.e. revenue and public borrowings). In early 1970s, the introduction of nationalization policy contributes in massive government expenditures. Since the early 1990's the major source of financing for Pakistan is remittances and foreign aid. According to Haque and Montiel (1994) lack of a political consensus on broadening the tax base has prevented any substantive growth in revenues as a percentage of GDP, and the deficit remains high because of the political and administrative inability to either raise revenues or reduce.

There is a consensus among policy makers that a regulatory fiscal policy can endorse economic development. A regulatory fiscal policy requires the government to monitor the specified targets and strategies. To encourage fiscal sustainability and macroeconomic stability a fiscal policy rule can be used as an instrument. In Pakistan, macroeconomic imbalances have contributed to deceleration in economic growth and investment which in turns translated into a rise in poverty levels. Fiscal Responsibility and Debt Limitation (FRDL) Act, was passed by the Parliament in June 2005. This act is intended to encourage financial regulation in the country and to ensure responsible and accountable fiscal management by government, and to encourage public debate about fiscal policy. It is required that the government should be clear about its short and long term fiscal intensions and imposes high standards of fiscal disclosure.

The objective of this study is to determine the impact of different fiscal indicators on economic growth in Pakistan for the period 1980-2009.

2. Literature Review

Gupta et al. (2002) "using a sample data of 39 low-income countries for the period 1990-2000 indicates that the cuts in current expenditure has a bigger growth impact than those based on revenue increases and cuts in capital spending; they indicates that in the countries where wage rate determines the consumption patterns tend to be least developed, while those that allocate higher share to capital and non wage goods and services enjoy faster economic growth".

Hyder (2001) "tests the crowding-out hypothesis for Pakistan, using a vector error-correction. He indicates the corresponding relationship between public and private investment".

Looney (1995) "suggests that in the large manufacturing sector, the private investment does not suffer from real crowding-out associated with the government's non infrastructural investment program".

Kelly (1997) while investigating the effects of public expenditures on growth using the data of 73 countries for the period 1970-1989 found significant contributions of public investment and social expenditures in growth.

Aschauer (1985, 1989) "examines the role of public capital in explaining total factor productivity and the rate of the return on private capital in the United States' non-financial corporate sector. They found that public capital has positive marginal product and that private investment can be enhanced by increasing public investment".

Easterly and Schmidt-Hebbel (1993) indicate that in developing countries exist a correlation between inflation and the fiscal deficit when inflation rate tends to be high and government fulfills their expenditures by money creation.

Guess and Koford (1984)7 used the Granger causality test to find the causal relationship between budget deficits and inflation, GNP, and private investment using annual data for seventeen OECD countries for the period 1949 to 1981. They concluded that budget deficits do not cause changes in these variables.

3. Data and Methodology

The fiscal policy exerts its effects on economy through factors output or productivity. Increase in GDP growth rate characterizes economic development in the country. In the existing study the fiscal variables included in the model comprise of set of net taxes revenue, real interest rate, public expenditure, consumer price index, capital stock and population growth rate as independent variables and consequently measure, their impact on overall growth indicated by GDP growth rate.

The annual data is collected for the period of 1980-2009 from various sources including World Bank database and IFS CD Rom, and State Bank of Pakistan.

First of all the unit root test has been employed to determine the order of integration for the variables. After that Johansen cointegration and error correction model is used to test the long run relationship between the variables, Granger causality test is used to determine the direction of causality between the variables. Following model is used for analysis.

$$Y = \alpha + \beta 1\ (NTX) + \beta 2\ (IR) + \beta 3\ (CPI) + \beta 4\ (GXP) + \beta 5\ (PG) + \beta 6\ (GFCF) + \mu i \quad (1)$$

where:
Y = Annual growth rate Gross Domestic Product
NTX = Net Tax Revenue
PG = Population Growth rate
IR = Real Interest Rate
CPI = Consumer Price Index
GXP = Government Expenditure
GFCF = Gross Fixed Capital Formation
μi = Error Correction Term

4. Results and Discussion

Augmented Dickey Fuller unit root test has been used to test the order of integration and to solve the problem of non-stationary of variables. The ADF is conducted at level and at first difference. The results given in Table 1 indicate that all the variables are found to be no stationary at level. However, at first difference all the series become stationary, which indicates that all the variables are integrated of same order (i.e., I (1)).

Table 1 ADF Unit Root Test

	Level		**1st Difference**		
Variables	Constant	Constant and Trend	Constant	Constant and Trend	**Result**
LNY	-2.485243	-3.467657	-6.597274*	-6.961929*	I(1)
LNCPI	-2.406272	-2.331617	-4.583077*	-4.535236*	I(1)
LNGFCF	-2.518048	-2.459378	-4.111895*	-3.899453*	I(1)
LNGXP	0.543353	-0.334160	-5.288336*	-5.710200*	I(1)
LNNTX	1.311865	-1.127356	-4.075670*	-4.494377*	I(1)
LNPG	-0.916121	-2.246035	-5.461927*	-5.365014*	I(1)
LNRI	-2.751140	-2.718962	-5.102693*	-4.993574*	I(1)

Note: the data is stationary at 5% significance level at critical value "-2.976263" for constant and critical value "-3.580623" for constant and trend.

Because the variables are found to be integrated of same order, the Johansen cointegration test has been used to determine the log run equilibrium between variables. The optimal lag length is determined using Vector Auto Regressive(VAR) method and the “Final prediction error (FPE), Akaike information criteria (AIC), and Schwartz information criteria (SC)” indicates the optimal lag length as "1". Table 2 shows the result of Johansen co-integration test. Both the trace test and maximum Eigen value given in panel "(a) and (b)" of Table 2 indicate four cointegrating equations at 5% level of significance. This indicates that there is long run equilibrium in the model. The cointegration result indicates the presence of error correction model. Thus, the vector error correction model is tested. This indicates short run dynamics of the model. The error correction model given in Table 3 tells about the speed by which the model returns to equilibrium form an exogenous short run shock.

Table 2 Johansen Co-integration Test

(a): Trace statistics.

Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.890473	218.1865	139.2753	0.0000
At most 1 *	0.864647	160.6853	107.3466	0.0000
At most 2 *	0.810434	108.6887	79.34145	0.0001
At most 3 *	0.748913	65.45022	55.24578	0.0049
At most 4	0.532917	29.51937	35.01090	0.1716
At most 5	0.309935	9.726902	18.39771	0.5071
At most 6	0.003137	0.081679	3.841466	0.7750
Trace test indicates 4 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

(b): Max-Eigenvalues.

Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.890473	57.50113	49.58633	0.0062
At most 1 *	0.864647	51.99663	43.41977	0.0047
At most 2 *	0.810434	43.23848	37.16359	0.0089
At most 3 *	0.748913	35.93085	30.81507	0.0109
At most 4	0.532917	19.79247	24.25202	0.1745
At most 5	0.309935	9.645223	17.14769	0.4308
At most 6	0.003137	0.081679	3.841466	0.7750
Max-eigenvalue test indicates 4 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

The error correction model represents short-run and long-run impact of the lagged explanatory variables. The error correction equation indicates presence of error correction term for population growth, net taxes, real inters rate and government expenditure.

Table 3 Vector Error Correction Model

Error Correction:	D(GDPGR)	D(CPI)	D(GFCF)	D(GXP)	D(NTX)	D(PG)	D(RI)
CointEq1	0.418789	1.771451	0.128689	-0.105637	-15431050	-0.001459	-1.199543
	(0.28538)	(0.42056)	(0.15810)	(0.09709)	(3.431257)	(0.02288)	(0.31325)
	[1.46747]	[4.21212]	[0.81397]	[-1.08802]	[-0.44972]	[-0.06376]	[-3.82930]
D(GDPGR(-1))	-1.216143	-0.855059	-0.034852	0.038910	2.4429691	-0.027865	1.071315
	(0.27904)	(0.41122)	(0.15459)	(0.09493)	(3.35502)	(0.02237)	(0.30629)
	[-4.35830]	[-2.07934]	[-0.22545]	[0.40987]	[0.72815]	[-1.24558]	[3.49766]
D(CPI(-1))	-0.651135	-1.238768	-0.164331	0.041129	3.4273719	-0.005298	0.005012
	(0.27517)	(0.40551)	(0.15244)	(0.09362)	(3.30847)	(0.02206)	(0.30204)
	[-2.36632]	[-3.05484]	[-1.07799]	[0.43934]	[1.03594]	[-0.24017]	[0.01659]
D(GFCF(-1))	0.130823	0.328838	0.467847	0.218708	3.7633298	0.029966	-0.098960
	(0.40849)	(0.60199)	(0.22630)	(0.13898)	(4.11488)	(0.03275)	(0.44839)
	[0.32026]	[0.54625]	[2.06734]	[1.57372]	[0.91123]	[0.91501]	[-0.22070]
D(GXP(-1))	0.507047	1.805175	0.479150	-0.147733	-3.7289395	0.062313	-1.068834
	(0.77647)	(1.14427)	(0.43016)	(0.26417)	(9.33685)	(0.06225)	(0.85231)
	[0.65301]	[1.57757]	[1.11388]	[-0.55924]	[-0.39942]	[1.00100]	[-1.25404]
D(NTX(-1))	-2.832569	-1.375499	-1.056585	-4.100530	0.293800	-6.846341	4.718075
	(2.35753)	(3.32131)	(1.248573)	(7.66752)	(0.27098)	(1.80686)	(2.47387)
	[-1.25682]	[-0.41414]	[-0.84645]	[-0.53479]	[1.08422]	[-0.37891]	[0.19072]
D(PG(-1))	13.51341	10.19114	1.469576	-0.784361	-2.321838	0.263143	-12.08658
	(4.24948)	(6.26239)	(2.35420)	(1.44574)	(5.10893)	(0.34069)	(4.66453)
	[3.18001]	[1.62736]	[0.62424]	[-0.54253]	[-0.45443]	[0.77239]	[-2.59117]
D(RI(-1))	-0.338775	-0.757296	-0.168792	0.045598	2.849194	-0.008264	0.256149
	(0.22381)	(0.32982)	(0.12399)	(0.07614)	(2.69095)	(0.01794)	(0.24567)
	[-1.51368]	[-2.29606]	[-1.36133]	[0.59885]	[1.05880]	[-0.46057]	[1.04266]
C	1.276974	1.271784	0.119567	0.182013	9.527718	-0.046697	-1.045925
	(0.65932)	(0.97163)	(0.36526)	(0.22431)	(7.92730)	(0.05286)	(0.72372)
	[1.93680]	[1.30892]	[0.32735]	[0.81143]	[1.20189]	[-0.88344]	[-1.44521]

Note: error term in ( ) and t-statistics in [ ].

It is often difficult to interpret the error correction model, so the variance decomposition approach is used to drive the conclusion about error correction model. The variance decomposition measure how much the percentage of "forecast error variance" of each of the variable can be explained by exogenous shocks to the other variables.

Table 4 Summary Of Variance Decomposition Model

Variance Decomposition of GDPGR:								
Period	S.E.	GDPGR	CPI	GFCF	GXP	NTX	PG	RI
1	2.631066	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
2	3.954803	72.51107	3.308234	1.439729	9.670298	5.927812	6.716570	0.426292
3	4.432245	71.61113	2.952566	3.759873	7.740676	4.841887	5.830658	3.263213
4	5.054921	72.52501	2.287645	2.894317	7.218220	4.498115	7.982800	2.593896
5	5.477693	73.81098	2.025909	3.389125	6.352045	4.403124	7.515903	2.502918
Variance Decomposition of CPI:								
Period	S.E.	GDPGR	CPI	GFCF	GXP	NTX	PG	RI
1	3.877358	0.355545	99.64445	0.000000	0.000000	0.000000	0.000000	0.000000
2	7.205540	6.068265	48.12074	11.58617	0.143597	21.06907	0.047751	12.96440
3	10.21069	5.844153	25.22920	14.91759	1.681989	35.95281	0.492336	15.88192
4	12.16338	5.274009	18.62900	18.29369	2.963185	39.35539	0.536620	14.94811
5	13.41211	4.568748	18.88098	20.83802	3.496643	37.54588	0.562905	14.10682
Variance Decomposition of GFCF:								
Period	S.E.	GDPGR	CPI	GFCF	GXP	NTX	PG	RI
1	1.457604	0.604532	40.81292	58.58255	0.000000	0.000000	0.000000	0.000000
2	2.526428	1.039365	40.43824	54.77609	0.399327	3.197083	0.084770	0.065122
3	3.456390	0.844196	37.76137	52.70489	0.220361	8.086821	0.307394	0.074971
4	4.266422	0.962960	35.28898	50.88038	0.217146	12.24497	0.317894	0.087673
5	4.993925	1.046348	34.01323	48.08462	0.159664	16.26314	0.368245	0.064750
Variance Decomposition of GXP:								
Period	S.E.	GDPGR	CPI	GFCF	GXP	NTX	PG	RI
1	0.895130	0.828882	34.64456	1.749467	62.77709	0.000000	0.000000	0.000000
2	1.196086	1.597541	22.34154	6.789191	67.51163	0.104331	0.003619	1.652145
3	1.567887	1.211777	16.04071	12.46864	65.18877	0.569286	0.061819	4.458992
4	1.880701	1.062808	14.48553	15.92300	62.95820	0.423394	0.212867	4.934204
5	2.145425	0.818989	12.74129	17.84326	63.06458	0.646086	0.212733	4.673058
Variance Decomposition of NTX:								
Period	S.E.	GDPGR	CPI	GFCF	GXP	NTX	PG	RI
1	3.16E+08	0.453137	1.002782	0.493035	4.995169	93.05588	0.000000	0.000000
2	5.26E+08	0.224175	0.566791	2.080754	4.005943	92.79209	0.084349	0.245901
3	6.71E+08	0.969315	2.703618	2.517974	4.160698	88.93640	0.071218	0.640782
4	7.95E+08	0.860017	4.053135	3.840997	3.843672	86.80190	0.059694	0.540591
5	9.07E+08	0.853904	4.329648	4.764836	3.945891	85.63057	0.045980	0.429174

Table 4 (continued)

Variance Decomposition of PG:								
Period	S.E.	GDPGR	CPI	GFCF	GXP	NTX	PG	RI
1	0.210936	44.77765	6.366548	0.113304	24.17220	4.908585	19.66171	0.000000
2	0.291539	37.25619	7.710689	0.995151	21.23083	4.903516	27.33959	0.564028
3	0.358245	33.11168	10.33059	5.984425	15.91998	5.899069	26.80693	1.947337
4	0.415500	34.18163	9.817921	7.233105	14.04005	4.430822	28.61663	1.679838
5	0.462830	34.83573	9.131635	9.042466	12.96994	3.649807	28.77768	1.592734
Variance Decomposition of RI:								
Period	S.E.	GDPGR	CPI	GFCF	GXP	NTX	PG	RI
1	2.888044	2.358197	13.79669	16.98309	5.342569	2.000643	0.261080	59.25773
2	5.250890	3.871272	57.68996	8.224493	1.948882	9.356809	0.943035	17.96555
3	8.184876	11.02370	27.91155	12.90975	0.923784	34.06008	0.728737	12.44240
4	10.75972	9.886966	16.16455	16.32179	3.127710	44.21013	0.503147	9.785712
5	11.92520	9.114228	14.56830	19.18993	3.763997	44.66464	0.519765	8.179135
Cholesky Ordering: GDPGR CPI GFCF GXP NTX PG RI								

To capture the both short and long term response here we have consider 5 year period for one standard shock. The results of variance decomposition model are given in Table 4. In the first year the real GDP (100%) is fully explained by its own innovation which indicates the exogenous nature. However next 4 periods show very little fluctuation and by the 5th year, it is reduced to 74%, CPI (2%), GFCF (3%), public expenditure (6%), net tax revenue (4%) and population growth (8%) influence the real GDP. Decomposition of CPI indicates (99.64%) effect of its own innovation and GDP (0.35%) in the first period and in the last period it is explained only (19%) by CPI, (38%) taxes, (20%) by GFCF and (14%) by real interest rate. For the first period Gross fixed capital formation is explained (59%) by its own innovation and (41%) by CPI. This decreased to (48%) in the last period and CPI (34% and net taxes (17%) explain the innovation. Innovation in government expenditures for the first period is explained (63%) by itself and (34%) by CPI and at the 5th period with a very little change (63%) innovation is explained by its own self while CPI and GFCF respectively effect the innovation by (13%) and (18%).

In the first period the Innovation in NXT is explained (93%) by NTX itself and with minor effects of other variables NTX is major contributor in its innovation explains about (86%) by itself that indicates the exogenous nature of net tax revenue as well. In the first period Innovation in population growth is explained (45%) by GDPGR and (25%) by government expenditures and only (20%) by population growth. However the ratio of innovation indicates minor changes in the 5th period where the share of innovation by population growth itself increased to (28%) and GDPGR with innovation of (35%) as a 2nd major factor. For the 1st year Innovation in real interest rate is explained (60%) by itself, and GFCF (17%) and CPI (14%).and in last period only (8%) by itself, (45%) by NXT, GFCF (20%), and (15%) by CPI.

Pair wise Granger Causality Tests is used to determine the nature of causality between the variables. Table 5 indicates the results of Granger Causality test.

Table 5 Granger Causality Tests

Null Hypothesis:	Obs	F-Statistic	Probability
CPI does not Granger Cause GDPGR	29	3.22242	0.08474
GDPGR does not Granger Cause CPI		0.09798	0.75686
GFCF does not Granger Cause GDPGR	29	6.35477	0.01818
GDPGR does not Granger Cause GFCF		1.55350	0.22373
GXP does not Granger Cause GDPGR	29	0.32406	0.57406
GDPGR does not Granger Cause GXP		0.88470	0.35557
NTX does not Granger Cause GDPGR	29	0.00949	0.92315
GDPGR does not Granger Cause NTX		1.46408	0.23717
PG does not Granger Cause GDPGR	29	0.61466	0.44040
GDPGR does not Granger Cause PG		5.86500	0.02303
RI does not Granger Cause GDPGR	29	1.41899	0.24433
GDPGR does not Granger Cause RI		0.58296	0.45203

The result indicates unidirectional causality between CPI and GDPGR and direction of causality runs from CPI to GDPGR. Bidirectional casualty exists between GFCF and GDPRG and direction of causality is form GFCF to GDPGR. No significant relationship exists between GXP and GDPGR. Unidirectional casualty exists between PG and GDPGR and NXT and GDPGR, and GDPGR because NXT and PG. Furthermore unidirectional causality exists between real interest rate and GDPGR and interest rate cause GDPGR.

5. Conclusions

The objective of this study is to determine the short and long-run dynamics of fiscal policy of Pakistan's economy for the period 1980-2009. We employed Johansen cointegration test to determine the long-run behavior of the fiscal variables, and vector error correction model is used to investigate the presence of error correction term in the model. The results indicate that fiscal policy affects the long run economic development. To explain the results of error correction model we used variance decomposition model, which indicates the effect of exogenous shocks of variables in the model. Empirical results indicate that fiscal policy is very important for sustainable economic growth in Pakistan and results also indicates that fiscal policy measures are more of long-run phenomena rather than short-run. In the short-run economic development can be stimulated by controlling interest rate and government expenditures at the cost of inflation. But such a policy might affect the speed of growth process.

References

Saqib and Yasmin., 1987. Some Econometrics Evidence in the Relative Importance of the Monetary and Fiscal Policy. The Pakistan Development Review 26: 4.pp 541-51.

Hussain, M. 1982., The Relative Effectiveness of Monetary and Fiscal Policy: An Econometric Case Study of Pakistan. Pakistan Economic and Social Review, 20. pp 159–181.

Marlow, M.L. 1986., Private sector shrinkage and the growth of industrialized economies. Public Choice, 49. pp143-154.

Ram, R., 1986. Government size and economic growth: A new framework and some evidence from cross-section and time-series data. American Economic Review, 76. pp 191-203.

Gupta, et al., 2002, Expenditure Composition, Fiscal Adjustment, and Growth in Low- Income Countries. IMF Working Paper No: 02/77.

Hyder, K., 2001. Crowding-out Hypothesis in a Vector Error Correction Framework: A case study of Pakistan. The Pakistan Development Review 40: 4. pp 633–650.

Looney, R. E., 1995. Public Sector Deficits and Private Investment: A Test of the Crowding-out Hypothesis in Pakistan's Manufacturing Industry. The Pakistan Development Review, 34:3. pp 277-292.

Haque, Nadeem U. and Montiel, Peter., 1991. The macroeconomics of public sector deficits: the case of Pakistan. Policy Research Working Paper Series: 673.

Kelly, T. 1997., Public Expenditures and Growth. Journal of Development Studies, Vol: 34, no l. pp 60-84.

Aschauer, D. A., 1985. Fiscal Policy and Aggregate Demand. American Economic Review, Vol. 75. pp 117-127.

Easterly, William and Schimt-Hebbel, Klaus., 1993. Fiscal Deficits and Macroeconomic Performance in Developing Countries. The World Bank Research Observer. Vol, 2. pp 211-237.

International Monetary Fund. Fiscal Affairs Department., 1995. Guidelines for Fiscal Adjustment. Pamphlet Series No. 49, IMF.

Guess G. and Koford, K. 1984., Inflation, Recession and the Federal Budget Deficit (or, Blaming Economic Problems on a Statistical Mirage). Policy Sciences. Vol. 17. pp 385-402.

Landau, D. 1985., Government Expenditure and Economic Growth: A Cross-Country Study. Southern Economic Journal, Vol. 49. pp 783 – 792.

Aschauer, D.A. 1989b., Does Public Capital Crowd Out Private Capital? Journal of Monetary Economics, Vol. 24. pp 171-88