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Policy Brief

VOLUME 01 ● SERIES: MACROECONOMICS 02 ● DECEMBER 2020

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GROWTH EFFECTS OF FISCAL POLICY IMPLICATIONS FOR BANGLADESH

INTRODUCTION

The national budget implemented each year reflects the government's fiscal policy. National budget, together with monetary, trade, and exchange rate policies, constitutes the most important instruments at the government's disposal to influence macroeconomic stability, economic growth, and income distribution. In Bangladesh, public spending—current and development expenditure—is financed mainly by tax and non-tax revenues.. The revenue and expenditure allocations in the yearly budget influence activities not only in the formal but also in the informal economy. Importantly, the annual budget is the instrument through which the government tries to meet the strategic development targets and goals stated in the country's medium-term, five-year plans and long-term, perspective plans. The GDP growth rate, public debt, and inflation for example, are crucial targets of these plans. The revenue and expenditure policies stated in the budget reflect its fiscal stance and are meant to achieve the

annual targets set for these macroeconomic variables in the budget as well as to attain the plan targets.

Since the Great Depression (1929-33), a great body of theoretical and empirical research has been undertaken to evaluate the effects of fiscal variables on macroeconomic target variables such as GDP, investment, consumption, inflation, income distribution, etc. In developing economies such as Bangladesh, the focus of macroeconomic policy is less on modulating cyclical economic activity but rather on achieving strong economic growth with price stability (low inflation) and sustainable public debt. In view of the government's sharp focus on achieving high economic growth rates (8-10%) over the next five years, this paper examines the effects of fiscal policy on economic growth (GDP) in the short and long run.[1]

METHODOLOGY AND DATA

Econometric estimations of the effect of fiscal policy (independent variables) on national income (GDP) for Bangladesh have thus far used partial specifications of the national budget constraint (i.e., a subset of revenue, expenditure and the budget deficit/surplus were used). The parameter estimates in such regressions thus tend to be biased and/or inconsistent. The starting point of this paper has been to use the complete specification. Econometric estimation with complete specification of the budget constraint, however, requires omitting one of the fiscal variables from the regression model to avoid multicollinearity. It is important, though, to omit the right variable from the regression model since the choice determines the optimality (unbiasedness and consistency of the parameter estimates and hence the growth effects of the fiscal variables). As shown below, this study chose to omit non-tax revenue to estimate the growth effects of the fiscal variables.

The paper used various methods to examine the relationship between fiscal variables and the GDP. Several tests were conducted: the unit root tests[2] to check stationarity; the cumulative sum (CUSUM) and cumulative sum of squares (CUSUMSQ) to check model stability; the Bounds test of the ARDL and Johansen cointegration test to check the existence of long-run relationships among the variables in the regression model; and the Granger causality test to identify the presence and direction of causality among the pairs of variables in the model. Results of these tests, except the last one, are discussed in the Appendices.

The data for the analysis below were obtained from the Sixth Five Year Plan and the Bangladesh Economic Review (BER) 2019. Annual time-series data from FY1976 to FY2019 have been used for GDP and the following fiscal variables: direct tax, indirect tax, revenue expenditure, ADP expenditure (henceforth referred to as development expenditure), and fiscal deficit (including grants). All the variables were adjusted for inflation, using the general Consumer Price Index (CPI), for purposes of analysis.

ESTIMATION RESULTS AND KEY FINDINGS

The Bounds test of the ARDL method confirmed the existence of long-run stable relationship between economic growth and fiscal variables[3], permitting us to estimate the long-run parameter using the ARDL method. The estimation results of alternative specifications of the basic regression model (Model 1) are shown in Table 1 below. The speed of adjustment to the long-run equilibrium is reflected by the error-correction coefficient, denoted by ECT, which was found to be negative and significant

[1] This policy brief summarises the findings of a study conducted by the BRAC Institute of Governance and Development (BIGD) on the same issue for Bangladesh from FY1976 to FY2019.

[2] See Dickey and Fuller (1979) & Dickey and Fuller (1981); Phillips and Perron (1988); Kwiatkowski, Phillips, Schmidt and Shin (1992) and Ng and Perron (2001) for unit root tests.

[3] See Rahman and Siddiquee (2020). Forthcoming BIGD's Working Paper 'Exploring Short- and Long-run Growth Effects of Fiscal Policy in Bangladesh.'

for all four models (not shown here). Thereby, this implies the eventual convergence towards long-run equilibrium even if a shock occurs in the short-run. Results using the Granger causality test show that direct tax has two-way causal relationships with economic growth in the short-run. However, indirect tax has a unidirectional relationship with GDP (i.e., indirect tax causes GDP). Similarly, revenue expenditure bears a unidirectional causal relationship with economic growth (i.e., revenue expenditure causes growth to be positive) both in the short- and long-run. Neither two-way nor unidirectional relationship is evident for ADP (See Table 2 for details). Now we discuss the results sequentially by fiscal variables used in the model.

DIRECT TAX

Direct tax appears to have no effect on GDP growth. The parameter estimate of direct tax (DT) is not statistically significant or not different from zero in Model 1 (Table 1 below). In models 2 and 3,however, the estimated parameter for DT changes substantially in magnitude and statistical significance. This is an important result and we shall return to this point later in this policy brief. Continuing with the estimated parameter of DT in Model 1 at present, we show that a change in direct tax will have no effect on GDP. In other words, tax revenue increases can be achieved without affecting national income. This also implies, however, that direct tax cannot be used as an effective counter-cyclical instrument, nor can it be used to reduce aggregate demand by increasing the direct tax.

Theoretically, the neutral effect of changes in the tax policy on aggregate demand or output is commonly attributed to 'Ricardian Equivalence,' which suggests that if the government reduces taxes to stimulate economic growth, consumers anticipate a future rise in the taxes to finance an increase in public spending (fiscal deficit resulting from the tax cut) and hence do not respond by increasing current consumption, leaving aggregate demand and GDP unchanged.[4] But, the theory has been criticised for its implicit stringent assumptions, including 'rational expectations' of consumers.[5] In the case of Bangladesh, this result is more likely to be due to the low share of direct tax in GDP and weak institutions which encourage tax evasion. Direct tax is unlikely to be an important instrument of fiscal policy for Bangladesh at this stage of development.

INDIRECT TAX

Indirect tax (IT) has a negative and statistically significant growth effect, i.e., an increase in IT decreases GDP. This may be interpreted in neoclassical terms as the effect of an indirect tax on economic incentives and the shift in incidence of such taxes from producers to consumers. These effects would alter resource allocation and consequently aggregate demand and output.

Revenue Expenditure Has A Significant Positive Effect On Growth

Revenue expenditure (RE) has a statistically significant positive effect on GDP. As explained above, RE represents recurrent public spending and three of its largest components are the pay and allowance of government servants, debt service payment (i.e., interest payment), and grants in aid—all important instruments of fiscal expansion to support economic growth. Thus the positive relationship between the RE and GDP is in line with the theoretical expectation. The estimated parameter of RE also suggests that a ten per cent increase in current public spending will increase GDP by eight per cent in the long-run.

[4] See Handbook of public economics, Martin Feldstein, Alan J. Aurbach, eds., North Holland (August 1, 1985), ISBN 978-0-444-87612-6

[5] See Evans et al. (2012). Does Ricardian Equivalence Hold When Expectations Are Not Rational? Journal of Money, Credit and Banking, Vol. 44, No. 7.

Development Expenditure Has A Significant, Positive Effect On Gdp

Model 1 indicates that the estimated parameter for DE is not statistically significant, implying that increasing (or decreasing) it would not increase (or decrease) GDP. This is contrary to theoretical expectation and counterintuitive since DE is a key instrument of fiscal expansion in developing countries like Bangladesh, where the tax base is narrow—cutting taxes is unlikely to stimulate aggregate demand relative to increasing public spending. It represents the annual development plan (ADP) outlays of the government or the budgetary allocation to the different economic and social sectors. The ADP is prepared based on a macroeconomic framework with GDP growth as a key target. It is important to capture the effect of this key fiscal variable on GDP. We therefore estimate an alternative specification of the budget constraint, i.e., Model 4 which captures the three most important factors in assessing the effects of fiscal policy on economic growth. All three variables, i.e., RE, DE and FD, have the expected signs and are statistically significant at low error probability levels. Model 4 clearly shows that higher development expenditures increase the GDP.

The Fiscal Deficit Has a Robust and Positive Effect on GDP

The estimated parameter for FD (fiscal deficit) is positive and statistically significant. The significance level of the parameter is high across all four specifications. This clearly indicates that economic growth in Bangladesh has benefitted from expansionary fiscal policy. This pro-cyclicality has been a characteristic of fiscal policy in Bangladesh throughout the sample period. The result provides strong evidence in favour of an expansionary fiscal stance to support the country's high economic growth objective.

Some Further Comments on the Results of Estimation

We alluded to the changing signs and significance levels of two parameter estimates (i.e., direct and indirect taxes) in the alternative model specifications above. It was noted that omitted variables in model specification results in an upward bias in one or more remaining parameter estimates. Model 3, for example, does not include all variables of the budget constraint. In this model, the estimated parameter of DT (direct tax) is positive and statistically highly significant. This represents an upward bias attributable to the omitted variable problem. Including RE in the model and re-estimating it as Model 2, yields a statistically significant parameter estimate of IT, in addition to RE. However, the sign of IT is positive which is noted as counter-intuitive. We attribute this to the omitted variable bias—upward bias—as in the case of DT in Model 3. Including DE in the model and re-estimating it as Model 1, i.e., a more complete specification of the budget constraint corrects the biases in DT and IT observed in Models 2 and 3.

Table 1. Long-run estimates using ARDL

Dependent variable: ln (GDP)	Model 1	Model 2	Model 3	Model 4
ln (DT)	-0.3177 (0.1873)	-0.3172 (0.1845)	0.2297*** (0.0776)	-
ln(IT)	-0.7111* (0.3829)	0.6434** (0.2654)	0.0845 (0.0869)	-
ln(RE)	0.8466** (0.3689)	0.9036*** (0.2943)	-	0.9293*** (0.2345)
ln(DE)	-0.0235 (0.0926)	-	-	0.1166** (0.0570)
ln(FD)	0.3742*** (0.1194)	0.3623*** (0.1074)	0.1017*** (0.0347)	0.0893** (0.0350)
N	40	40	41	40

Notes: *, **, *** indicate significance at 1%, 5% and 10% level respectively. Standard errors are shown in parentheses.

Table 2. Granger Causality Tests

Null hypothesis	F-statistic			
	Model 1	Model 2	Model 3	Model 4
Direct tax does not cause GDP	5.8430***	5.8430***	9.1186***	-
GDP does not cause direct tax	3.7232**	3.7232**	1.4558	-
Indirect tax does not cause GDP	2.3303*	2.3303*	6.6389**	-
GDP does not cause indirect tax	1.4213	1.4213	0.1706	-
Revenue expenditure does not cause GDP	5.1673***	5.1673***	-	6.8825**
GDP does not cause revenue expenditure	2.0186	2.0186	-	10.1343***
ADP expenditure does not cause GDP	0.9698	-	-	2.7646
GDP does not cause ADP expenditure	1.2001	-	-	0.0640
The fiscal deficit does not cause GDP	0.4167	0.4167	2.2110	2.2110
GDP does not cause fiscal deficit	1.4909	1.4909	4.2007**	4.2007**

Note: *, **, *** indicate significance at 1%, 5% and 10% level respectively.

POLICY IMPLICATIONS

The estimated results using the ARDL method reveal that direct tax continues to be an untapped source of revenue because a significant number of individuals, with taxable income, remain outside the tax base. In addition, direct tax translates into higher economic growth when it is used to finance the revenue expenditure. If these are guaranteed, the direct tax can bring an efficient distribution of resources as it has no provision for shifting the tax burden on others. Furthermore, because direct tax is progressive, it improves the equity of taxation . To boost the collection of direct tax, the revenue-collecting authorities need to introduce and implement effective tax measures, such as higher tax inspection. A monitoring mechanism has to be deployed for tracking the progress of the implementation of the tax measures.

The results of estimation show the importance of appropriate specification of the regression model in estimating the effects of fiscal variables on economic growth. Specifically, in our case, it showed both tax variables to have an upward bias when the regression model is not fully specified (IT and DT in Models 2 and 3 above). An alternative specification of the budget constraint, i.e., (Model 4) which excludes both taxes (IT and DT) yields the best, both econometrically as well as from a policy vantage point. Model 4 shows that policy makers can leverage any of the fiscal variables, i.e., revenue expenditure (RE) or development expenditure (DE), to stimulate or boost economic growth. The result also suggests that a pro-cyclical fiscal policy, i.e., increasing the fiscal deficit will increase the GDP. Bangladesh's moderate expansionary stance in fiscal policy has supported GDP growth indeed. Importantly, the model dynamics indicates that Model 4 is stable. Thus, changes in the policy variables are not destabilising, i.e., that a new equilibrium GDP will be attained.

A major comment to draw the attention of policy makers regarding the data on fiscal variables is as follows. The data on public spending as it is 'constructed' and presented in the form of public investment and public consumption can be more meaningfully related to economic theories. Such a presentation of data would permit a more robust analysis and a different set of perspectives on the effects of fiscal policy on economic growth. As it stands now, the variables, RE and DE, are 'hybrid' variables, combining elements of both consumption and investment. They are, nevertheless, important since they are embedded in the public policy and plans in Bangladesh.

APPENDIX A

Descriptive Analysis

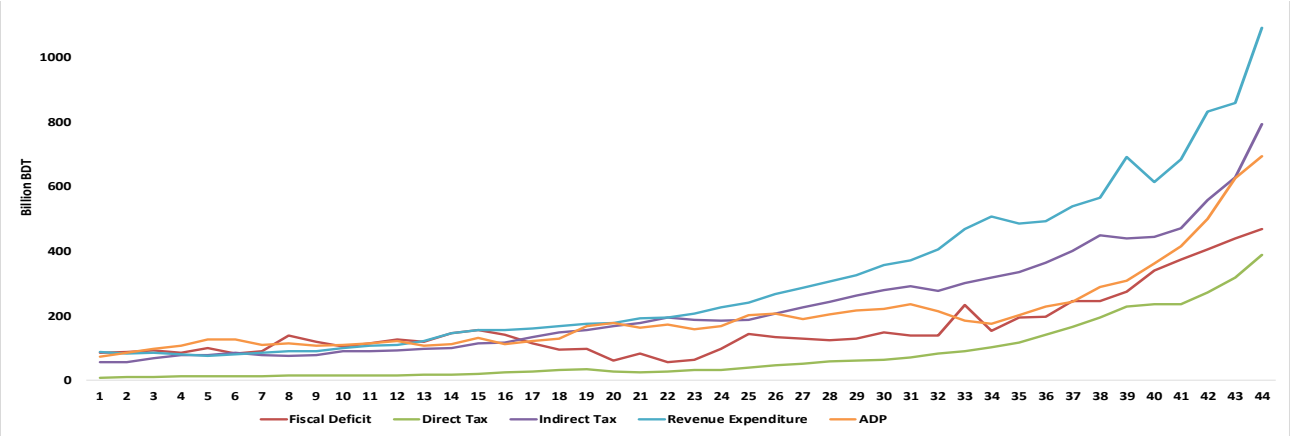
Table A1 summarises the fiscal variables of our interest while Figure A1 helps to visualise the time series data.

Table A1. Summary statistics of GDP and fiscal variables

Variable	Mean	Median	Maximum	Minimum	Std. Dev.
GDP	3,741.68	2,882.13	9,805.45	9,81.03	2,342.66
Direct tax (DT)	77.43	31.77	389.40	8.00	93.97
Indirect tax (IT)	231.00	184.94	793.38	55.13	170.11
Revenue expenditure (RE)	307.48	200.57	1091.88	75.97	248.47
ADP expenditure (DE)	202.44	169.80	694.64	71.61	133.62
Fiscal deficit (FD)	160.97	128.20	468.75	56.23	102.33

Notes: Author's calculations using CPI and base FY2005-2006. Figures are in billion BDT.

Figure A1. Fiscal variables in real terms (FY1976-FY2019)

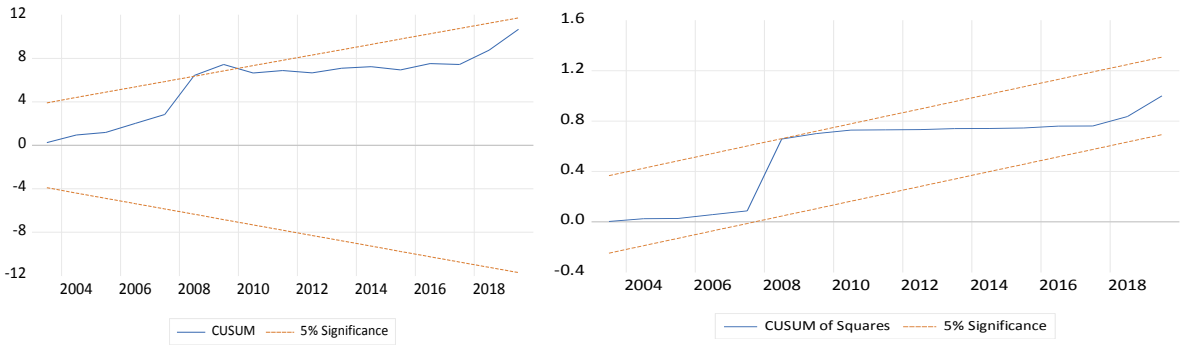


APPENDIX B

Unit Root and Stability Tests

This study applies unit root tests to explore the order of integration of the data used for econometric analysis. To apply the ARDL Bounds test, it is important to check that no variable used for estimation is *I*(2). The unit root tests prove the non-stationarity of the fiscal variables at their levels. But all the fiscal variables become stationary (not shown here) at their first differences, which we call integrated of order 1, *I*(1). The maximum lag length of 4 using the Akaike Information Criterion (AIC) was obtained for our study. The CUSUM and CUSUMSQ tests prove the stability of long-run relationships (see Figure B1 for Model 1) in all four specifications presented in Table 2.

Figure B1. Plots of the Stability tests statistics for Model 1



APPENDIX C

Johansen Cointegration Test

The Johansen test assesses the robustness of the ARDL Bounds test (see Table C1). As per both trace and maximum eigenvalue statistics, there exists, at best, four cointegrating vectors in Model 1 and these are consistent with the Bounds test. Hence the findings are robust.

Table C1. Results using Johansen Cointegration Test

Unrestricted cointegration rank test (trace)					Unrestrict cointegration rank test (Maximum eiqenvalue)				
Hypothesized No. of CE(s)	Eigenval-ue	Trace Statistic	0.05 Critical Value	Prob.	Hypothesized No. of CE(s)	Eigen-value	Max-Eigen Statistic statistic	0.05 Criti-cal Value	Prob.
Model 1									
None **	0.9594	329.7929	107.347	0.0000	None **	0.9594	124.9323	43.4198	0.0000
At most 1 **	0.9039	204.8606	79.3414	0.0000	At most 1 **	0.9039	91.3498	37.1636	0.0000
At most 2 **	0.7662	113.5108	55.2458	0.0000	At most 2 **	0.7662	56.6803	30.8151	0.0000
At most 3 **	0.6802	56.8306	35.0109	0.0001	At most 3 **	0.6802	44.4657	24.2520	0.0000
At most 4	0.2503	12.3648	18.3977	0.2828	At most 4	0.2503	11.2361	17.1477	0.2936
At most 5	0.02853	1.1288	3.8415	0.2880	At most 5	0.0285	1.1288	3.8415	0.2880

Note: ** indicates rejection of hypothesis at a 5% significance level. We assume the level data has quadratic trends and the cointegrating equations have linear trends.