IMPACTS OF PUBLIC EXPENDITURE ON POVERTY IN BANGLADESH: AN EMPIRICAL ANALYSIS

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ABSTRACT

Public expenditure and government intervention have very important impacts on people's living in Bangladesh. Especially, the poor segment of the population is affected by government's activities in many ways. Bangladesh Government spends a lot of public resources in some thrust sectors of the economy such as education, health, infrastructure building, power and energy etc in order to provide valuable public services to all people. However, the country has been suffering from rampant poverty for a long period of time despite the fact that successive governments in Bangladesh spend a big amount of public funds in poverty reduction activities and programs. This study seeks to investigate the relationship of public expenditure and poverty reduction in the Bangladesh perspective through an econometric analysis of time series data by the OLS estimation technique. Our empirical findings show that public expenditure in Bangladesh does not have any meaningful and significant impact in poverty reduction.

INTRODUCTION

Bangladesh has been facing a rampant and long standing hardship of poverty since Independence. As reported by the Household Income and Expenditure Survey (HIES) of 2010 conducted by the Bangladesh Bureau of Statistics (BBS) 31.5 percent of the total population in the country lives below the official poverty line. Moreover, spikes in food prices and high inflation plunge additional population under the officially estimated rate of poverty. If the problem cannot be addressed properly and the current trend continues, it was estimated that by 2021 more than 59.8 million Bangladeshis will fall below the national poverty line. From the above facts it can be claimed that the poverty reduction strategies (PRS) and the neo-liberal paradigm that successive regimes in Bangladesh have been pursuing are not sufficiently contributing to tackle the problem because evidence suggests that in the country still millions of people suffer from the curse of poverty (Rashed &Titumir, 2011).

Governments in Bangladesh try to focus on, *inter-alia*, the rate of annual growth in the country's real GDP as one of the main objectives of various economic and social policies. Macroeconomic instruments are engineered with an aim of overcoming persistent poverty and securing possible improvement in life standards of people. To ensure well-functioning markets, government also spends resources to enforce contract, maintain national security, protect citizens against criminals, and provide valuable public goods like provisions of education and health services. In this connection, ensuring a sound public expenditure management system is considered to be an important obligation of the Bangladesh government. Moreover, the principal objectives of government expenditure management should be focused to confirm, among others, expenditure in productive sectors, exercise austerity in public spending, and restrain unproductive or unnecessary outlays.

It was mentioned in the Bangladesh Economic Review 2010, published by the Bangladesh Ministry of Finance, that the key aspects of the nation's total public outlays in each year are to build physical infrastructure for channeling investment and developing human resources. On this ground, it is necessarily true that Bangladesh Government's pro-poor policies towards public spending in the areas of productive sectors, particularly in infrastructure development, health and education acted as a major force behind the progress made in the public expenditure account of the country. However, the success of the country's expenditure management policies and relevant systems are questioned in many ways.

Having such background, the main focus of this study is surrounded by public expenditure, growth, and poverty in Bangladesh because it is commonly acknowledged that public expenditure can play a significant role in economic lift-up and poverty reduction in the context of developing countries. Therefore, now-a-days, a vision of

ensuring sustainable development and reducing mass poverty at a meaningful magnitude is enshrined in national expenditure strategy of many developing nations including Bangladesh today (Tanzi, 1994; CPD, 2006).

Nevertheless, our attention for this study is paid to the link among public expenditure, economic growth, employment, and wages because theoretically the latter three factors are the fundamental sources that relate poverty and public expenditure in developing societies of many low income countries like Bangladesh. To give an explanation, an increase in expenditure puts a ripple effect in the economy by raising aggregate demand and productivity, which eventually leads to a higher level of employment and wages and thus reduces poverty by accumulating wealth with a favor to the poor people (Hassan, 2007).

STUDY OBJECTIVES AND RESEARCH QUESTIONS

The first and foremost objective of this study is to review and analyze the trends in government expenditure and its compositions in a Bangladesh perspective, and to develop an analytical framework in order to empirically determine differential impacts of various public investments on economic growth and poverty alleviation. Another important objective of this study is to trace a relationship between public expenditure and poverty reduction in the context of Bangladesh. The level of growth in real GDP which is considered as an indicator of economic growth is defined as a bridge between them while employment and wages are seen to be the stimulating factors behind poverty reduction. We emphasize that government expenditure in some important sectors can reduce poverty by affecting three major variables: growth, employment and wage. In this regard, for the present study sectors such as education, health, infrastructure, power and energy and agriculture have been highlighted in the econometric analysis.

Annual budget account shows that substantial increase in public expenditure with the support of donors and development partners had taken place in Bangladesh since 1990s when the democratic regime had established in the country. This study will thoroughly examine the Bangladesh Government's declared public investments under its development budget expenditure, the Annual Development Program (ADP), World Bank Public Expenditure Reviews (PER), and other published documents regarding State financed spending of the country. Then it seeks to answer the next core question: *has public expenditure in Bangladesh successfully contributed to economic growth and poverty alleviation of the country?* Under this broader one, efforts will be made to answer other relevant questions, such as: (1) How does government expenditure and intervention make an impact on economic growth and poverty in Bangladesh? and (2) Does an increase in spending on key sectors of the Bangladesh economy significantly contribute to raise income of the poor people?

We try to test the study's hypothesis by the results of some econometric tests and regression analysis. Such an analysis has been based upon the measurement of marginal effects of various expenditures in some key sectors in the Bangladesh economy. Here we try to answer some challenging questions that are crucial for the fulfillment of the study's goals. We try to make a conclusion of the paper through answering and justifying the above questions. We apply both qualitative judgments and quantitative estimations from a dynamic macro-econometric model and time series analysis by utilizing an Ordinary Least Square (OLS) Estimate. Since the link is complex in many aspects, this study makes an effort to utilize both analytical (qualitative) explanations and econometric analysis to untangle the relationship. Efforts will be made using a set of 31 years' time series data to see the impact of various components of government spending on poverty through real GDP, wage, and employment growth by estimating a linear equation.

PUBLIC EXPENDITURE IN BANGLADESH

Economic policy reforms in Bangladesh during the last few decades redefined the developmental functions of the government by giving more emphasis on public expenditure. Agricultural and food subsidies were at first reduced gradually and then eliminated completely. Reforms also included a withdrawal of direct public investment in productive economic sectors. Instead the government played its developmental role by providing provision of essential public goods like education, healthcare services and infrastructure building. In addition, cost-effective poverty alleviating programs were implemented since the country's transition to a democratic regime from a semi-autocratic rulling in the early 1990s. Here Bangladesh's revised budget figures at current prices and sector-wise

allocations as percentages of development expenditure for the last three decades (19980-2010) are presented below (Table 1). Some points need to be mentioned in this regard.

The annual budget of Bangladesh contains two important components—the current or revenue budget and the Annual Development Plan (ADP). Whilst the regular day-to-day expenditure on public administration (including the recurrent expenditures in social sectors) and defense are met by the current or revenue budget, the ADP takes care of expenditures needed for project-oriented development programs. A comparison of government expenditure in Bangladesh during the last three decades indicates that current expenditure has risen from 4.6 percent to 9.8 percent of annual GDP, but the size of development expenditure or ADP expenses declined substantially falling from 6.6 percent of GDP in 1980s to 4.2 percent in 2000s (Bhattacharya, 2003).

Table 1: Bangladesh Government's Budget at a Glance (As percentage of GDP)

	FY '80/81-84/85	FY '85/86-89/90	FY '90/91-94/95	FY '95/96-99/00	FY '00/01-04/05	FY '05/06-09/10
Total Revenue	6.3	6.7	8.8	9.2	10.2	10.9
Tax revenue	5.2	5.4	7.0	7.5	8.2	8.8
Current expenditure	4.6	6.0	6.7	7.3	8.5	9.8
Revenue surplus	1.7	0.7	2.1	1.9	1.7	1.1
Development expenditure	6.6	5.4	5.4	5.9	5.7	4.2
Total expenditure	12.9	12.2	13.8	13.6	14.8	15.5
Budget deficit	6.6	5.5	5.0	4.4	4.5	4.5
Domestic borrowing	1.0	0.5	1.2	1.9	2.2	2.3
Foreign financing	5.6	5.0	3.8	2.5	2.2	1.8

Sources: The annual budgetary figures are adapted from Osmani (2008) and GOB (2010)

Table 2: Sectoral Shares in Development Expenditure (Percentages)

Sectors	FY '80/81-84/85	FY '85/86-89/90	FY '90/91-94/95	FY '95/96-99/00	FY '00/01-04/05	FY '05/06-09/10
Agriculture	13.09	5.48	5.93	4.72	3.77	6.10
Rural Development	3.51	2.59	5.40	9.14	12.85	15.89
Water Resources	13.99	12.63	8.76	7.16	4.75	3.52
Industry	9.57	11.60	1.59	1.24	2.25	1.62
Energy	21.87	23.33	17.74	17.08	16.49	12.69
Transport & Communication	15.34	10.71	18.82	21.96	21.63	14.32
Physical Planning & Housing	5.32	3.77	5.48	5.50	6.41	8.92
Education &Religious Affairs	3.97	4.40	8.14	13.08	12.73	15.63
Health and Family Planning	5.18	4.71	7.73	8.04	7.70	10.41
Others	7.47	17.45	21.60	12.10	11.42	10.90
Total	100.00	100.00	100.00	100.00	100.00	100.00

Sources: The annual figures are from the statistical appendices of GOB (2002), GOB (2010) and adapted from Osmani (2004)

Data provided in Table 1 reveals that although total public expenditure is rising in Bangladesh, development expenditure actually squeezed to maintain rising current expenditures along with a greater control on government's budget deficit. Data presented in Table 2 shows that sector-wise allocations of public resources have been reduced for some key sectors that are directly productive in nature like agriculture, manufacturing industry, water resources and energy. At the same time increased proportional allocations of resources to sectors like education and health, transport and communication and rural development have been realized.

Figures 1 and 2 below show the correlations among public expenditure, economic growth and poverty trends in Bangladesh although the trend in GDP growth rate since 1980 until 2010 does not show any clear or distinct relationship with various sector specific public expenditures in the country. While there were variations and fluctuations in sector wise ADP expenditures in Bangladesh, GDP has grown showing a linear trend. Similarly, poverty and disaggregated ADP expenditure also show moderate and very low or even no correlations.

Figure 1: GDP Growth and Sector-wise Disaggregated ADP Expenditure in Bangladesh
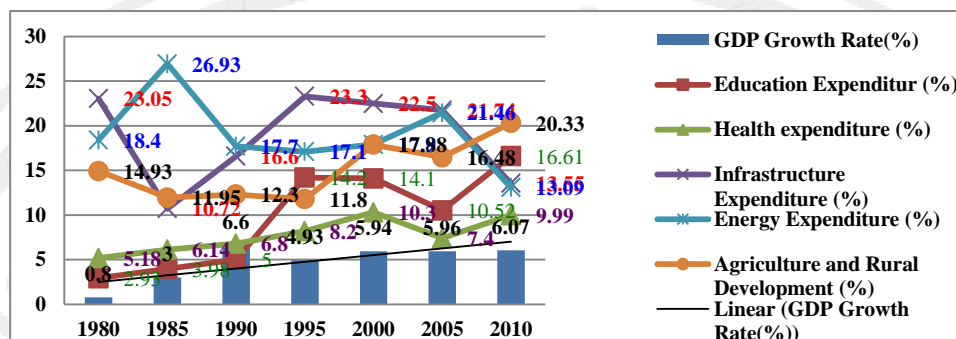
Source: BBS (2010), MOF(2011) and World Bank (1981)

Figure 2: Poverty (HCR) and Sector-wise Disaggregated ADP Expenditure (%)
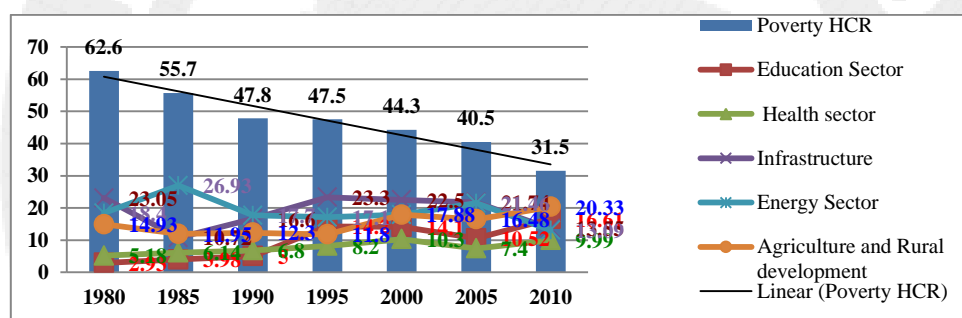
Source: BBS (2010), MOF(2011) and World Bank (1981)

TRENDS OF POVERTY AND INEQUALITY

We present the trends of poverty (i.e. Poverty Head Count Rates of Incidence, HCR) estimated and presented in a regional basis. HCR of national, rural and urban areas are listed from 1991/92 to 2010 in two broad categories of upper and lower poverty lines (see figure 3). A comparison of long-term poverty trends in Bangladesh shows a remarkable progress. Using the upper poverty line the latest survey of 2010 by the Bangladesh Bureau of Statistics (BBS, 2011 ??) estimated HCRs are 31.5 percent in national level, 35.2 percent for rural areas and 21.3 percent in urban areas whilst in 2005 these rates were recorded at 40.0 percent, 43.8 percent, and 28.4 percent respectively. These are indicative to a clear reduction of HCR by 8.5 percentage points in national level, 8.6 percentage points in rural areas, and 7.1 percentage points for urban people within these five years. Compared to poverty HCR in 1985 and 1991/92 of 55.7 percent and 56.7 percent respectively, in 2010 the rate was less than 25.2 percent. Hence, poverty HCR in Bangladesh has been reduced by more than 1.5 percentage points annually since the middle of 1980s.

On the other hand, using the lower poverty line the HCR of incidence of poverty in 2010 is estimated at 17.6 percent, 21.1 percent, and 7.7 percent in national, rural, and urban areas respectively. These rates were 25.1 percent, 28.6 percent, and 14.6 percent in 2005. Thus, the alleviation rates of poverty were 7.5 percent in national level, 7.5 percent in rural areas, and 6.9 percent in urban level. Measuring by the lower poverty line, the country was able to reduce national level HCR by more than half of that was prevailed in 1991/92 within the last two decades.

According to some opponents, it seems that the pace and rate of poverty alleviation in Bangladesh are considerably lower than that of some high-performing East and South-East Asian countries (Westergaard and Hossain, 2000). However, some other scholars like Siddiki (2002) think that it is an impressive and commendable achievement of the country especially if considered from the viewpoint of a decade-long slow and stagnated growth records of the domestic economy after Independence.

Figure 3: Poverty Head Count Rates (%) Estimated by the Cost of Basic Needs (CBN) Method (1991-92 to 2010)
Source: GOB (2011)
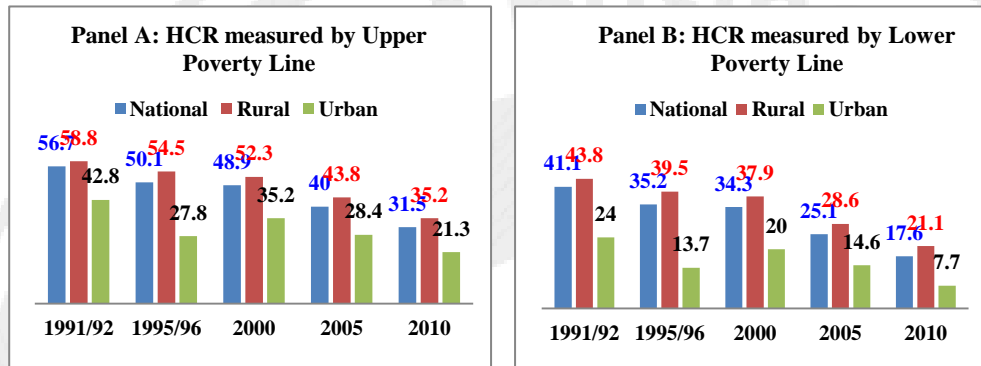
On the other hand, Income inequality was reported to be high in Bangladesh and has been deteriorated during the period of 1995-2010. Total Gini coefficients were measured to be 0.432, 0.451, 0.467, and 0.458 for 1995, 2000, 2005, and 2010 respectively. While income inequality within rural households have been increasing continuously from 0.385 in 1995 to 0.393 in 2000 to 0.428 in 2005 to 0.430 in 2010, urban households saw income inequality fluctuations as Gini indices increased from 0.444 in 1995 to 0.497 in 2000, then stagnated and finally decreased to 0.452 in 2010. Distribution of income to the lower 5% of population declined from 0.88 percent in 1995 to 0.78 percent in 2010. Combined share of income accrued to the lower 20 percent of the population also decreased from 5.71 percent in 1995 to 5.22 percent in 2010. Similarly the situation of income distribution for lower 20 percent of the population in both rural and urban areas also experienced a negative shift (see table).

Table 3: Percentage Distribution of Income and Gini Co-Efficient in Bangladesh

Household Income Group	2010			2005			2000			1995		
	Total	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban
National	100	100	100	100	100	100	100	100	100	100	100	100
Lower 5%	0.78	0.88	0.76	0.77	0.88	0.67	0.93	1.07	0.79	0.88	1.00	0.74
Decile 1	2.00	2.23	1.98	2.00	2.25	1.80	2.41	2.80	2.02	2.24	2.56	1.92
Decile 2	3.22	3.53	3.09	3.26	3.63	3.02	3.76	4.31	3.07	3.47	3.93	3.20
Decile 3	4.10	4.49	3.95	4.10	4.54	3.87	4.57	5.25	3.84	4.46	4.97	4.06
Decile 4	5.00	5.43	5.01	5.00	5.42	4.61	5.22	5.95	4.68	5.37	5.97	4.98
Decile 5	6.01	6.43	6.31	5.96	6.43	5.66	6.10	6.84	5.60	6.35	6.98	5.97
Decile 6	7.32	7.65	7.64	7.17	7.63	6.78	7.09	7.88	6.74	7.53	8.16	7.20
Decile 7	9.06	9.31	9.30	8.73	9.27	8.53	8.45	9.09	8.24	9.15	9.75	8.98
Decile 8	11.50	11.50	11.87	11.06	11.49	10.18	10.39	10.97	10.46	11.35	11.87	11.35
Decile 9	15.94	15.54	16.08	15.07	15.43	14.48	14.00	14.09	14.04	15.40	15.58	16.29
Decile 10	35.84	33.89	34.77	37.64	33.92	41.08	38.01	32.81	41.32	34.68	30.32	36.05
Top 5%	24.61	22.93	23.39	26.93	23.03	30.37	28.34	23.52	31.32	23.62	19.73	24.30
Gini Index	0.458	0.430	0.452	0.467	0.428	0.497	0.451	0.393	0.497	0.432	0.385	0.444

Source: BBS, HIES-2005 and 2010; Dev et al. (2008)

MODEL DESCRIPTION

The empirical model for this study is obtained using the equation mentioned below:

$$Log(P) = \alpha_0 + \alpha_1 Log(GGDP) + \alpha_2 Log(EMPT) + \alpha_3 Log(WAGER) + \alpha_4 Log(EDEX) + \alpha_5 Log(HLEX) + \alpha_6 Log(INFEX) + \alpha_7 Log(ENEX) + \alpha_8 Log(AREX) + \varepsilon_0$$

In the above equation, the model intends to hypothesize poverty as a function of GDP growth *(GGDP)*, employment rate in the economy *(EMPT)*, national real wage levels *(WAGER)*, and government expenditure in five key sectors: (a) education and religious affairs *(EDEX)*, (b) health and family welfare *(HLEX)*, (c) infrastructure building like transport and communication *(INFEX)*, (d) power and energy *(ENEX)* and (e) agriculture and rural development *(AREX)*. The *a priorie* expected signs of the coefficients are hypothesized as: $\alpha_1, \alpha_2, and \ \alpha_3 > 0$; *while* $\alpha_4, \alpha_1, \alpha_5, \alpha_6 \ and \ \alpha_7 > or < 0$. The scope of this paper covers an annual time series data set ranging from 1980 to 2011 in estimating the specified model. The Bangladesh Government Ministry of Finance (MOF), Bangladesh Bureau of Statistics (BBS), Bangladesh Government Ministry of Primary and Mass Education (MPME) and the World Bank Data act as the main sources of data. Other sources that were utilized are the International Financial Statistics (IFS) and The Bangladesh Bank Statistics Department. The Ordinary Least Square (OLS) regression technique was used to estimate the specified model.

Before going to the regression analysis the nature of the data distribution is examined by utilizing the descriptive statistics and various diagnostics tests. One important assumption of the OLS is that residuals behave normal. Therefore, a normality test by the Karnel Density Estimation Technique has been followed. Then the time series property (stationarity) of the data is checked with the help of the Augmented Dickey-Fuller (ADF) Unit Root Test following Dickey and Fuller (1981) . Cointegration, which is the tendency for variables to move together in the long run, is checked using the Engle Granger and Augmented Dickey-Fuller (EG-ADF) test following Engle and Granger (1987) . The following regression is utilized for the ADF test:

$$\Delta y_t = \alpha + \beta t + \gamma y_{t-1} + \delta_1 \Delta y_{t-1} + \cdots + \delta_{p-1} \Delta y_{t-p+1} + \varepsilon_t$$

Where α is a constant, β is the coefficient on a time trend and *p* is the lag order of the autoregressive process. Assuming $\alpha = 0$ and $\beta = 0$ corresponds to modeling with a random walk and in the case only $\beta = 0$ implies modeling a random walk with a drift. In order to trace the associated causality among the variables a Granger Causality Wald Test is performed using a Vector Auto-Regressive (VAR) model with the help of Stock and Watson (2007) and Green (2008). For this, we use the following equations:

$$Y_t = \alpha_0 + \alpha_1 Y_{t-1} + \cdots + \alpha_p Y_{t-p} + b_1 X_{t-1} + \cdots + b_p X_{t-p} + u_t$$
$$X_t = c_0 + c_1 X_{t-1} + \cdots + c_p X_{t-p} + d_1 Y_{t-1} + \cdots + d_p Y_{t-p} + v_t$$

Where *Y* and *X* correspond to dependent and independent variables for the original equation respectively. We test the null hypothesis H_0: $b_1 = b_2 = \cdots = b_p = 0$, against H_A: *'Not H_0'*, to check if *X does not Granger-cause Y*. Similarly, testing H_0: $d_1 = d_2 = \cdots = d_p = 0$, against H_A: *'Not H_0'*, allows us to test if *Y does not* Granger-cause *X*. In each case, a *rejection* of the null implies that there is granger causality for the concerned variable.

It is obvious that economic growth can bring increase in income of citizens, which eventually raises wages and reduces poverty by pushing many households out of the so called poverty trap in poor countries. An empirical work done by Dollar and Kraay (2002) has checked the relationship between average income of the total population and average income of the poorest quintile of a number of developing countries worldwide. They turned a conclusion that GDP growth of a developing country is good for the poor because, as they argued, there is a one-to-one correlation between the entire GDP growth of the country and the growth of income of the poor segment of the population. Bhalla (2003) and many other researchers have supported Dollar and Kraay (2002)'s hypothesis.

However, some other scholars denied to accept the above claims without criticism because, according to their views, economic growth cannot be a sufficient condition for poverty reduction. They have rather proclaimed that there is no invariant relationship between the rates of GDP growth and poverty reduction in low income developing countries (examples: Datt and Ravallion, 1992; Kakwani and Pernia, 2002). They advanced that there are three fundamental factors that can affect income of the poor citizens in a developing country. These are namely the growth factor, the elasticity factor and the integrability factor. Growth factors bring a positive or upward shift in

the production possibility frontier of the economy due to an expansion of production possibilities/economic activities. Next, the elasticity factor stimulates the economy to achieve an enhanced employment potential for the people especially for the poor segment of the population. Finally, the integrating ability factor makes poor people more capable of taking advantage of an improved economic environment in terms of quality and quantity in the employment structure as well as the labor market of the country (Osmani, 2002; 2003).

Kakwani (1993) and Bourguignon (2002), on the other hand, proposed that high rate of growth does not automatically lead to high rate in poverty reduction. They advanced that only a 'pro-poor' growth can achieve poverty reduction by affecting levels of wages and income in a developing country because such growth can increase income level of the poor people more than that of the rich.

Khan (2001) has suggested a model of poverty reduction in Bangladesh that incorporates five explanatory variables. GDP growth ranked to be the first element that helps create more employment in the economy by expanding economic activities. Next were two growth factors that allow an increase in per capita income and also cause an upward shift in the rate of wages. The fourth element was described as the extent to which poor people are benefited from newly created employment opportunities in their favor. Finally, the fifth factor was a distribution of national income which can confirm an increase in total share of the poor people in the nation's aggregate income account.

For achieving an increase in GDP and a reduction in poverty a rise in productivity of labor and capital is to be achieved simultaneously in the economy. Effectiveness of government's education and health expenditures are necessary conditions for that purpose because such spending can acquire human capital that ultimately helps to produce skilled labor. On the other hand, government expenditure in sectors like infrastructure building, power and energy as well as rural development, and agriculture contributes to achieve higher physical capital. According to researches by Ratner (1983), Aschauer (1989a and 1989b), and Mitsui and Inoue (1995), substantial macroeconomic productivity can be gained by causing improvement for areas like capital (both physical and human) and infrastructure. Many other empirical studies including Easterly and Rebelo (1993), Barro (1997), and Swaroop and Zou (1996) utilized economic growth theory in their models. It was reported that in the context of a developing country like Bangladesh various public expenditures along with investment, population growth (which acts as a proxy for growth in labor force) play significant role to shift the aggregate production to a new higher level.

EMPIRICAL RESULTS

Summary Statistics

The mean, standard deviations, minimum and maximum for the variables *P, GGDP, EMPT, WAGER, EDEX, HLEX, INFEX, ENEX,* and *AREX* are shown in table below. *P* (Poverty head count rate, %) varied from 31.5 percent to 70.4 percent indicating a Coefficient of Variance (CV) of 19.23 percent. *GGDP* or the annual GDP growth rate (in constant prices, %) presented a minimum and maximum value of 0.8 percent to 6.7 percent having a CV value of 32.52 percent. In the case of *EMPT* or employment to total population ratio (%), the estimated CV is 3.77 percent (the lowest among the variables). The rest of the variables namely *WAGER* (Real Wage Rate), , *EDEX* (Education Expenditure as a share of total ADP Expenditure, %), *HLEX* (Health Expenditure as a share of total ADP Expenditure, %), *INFEX* (Infrastructure Expenditure, %), *ENEX* (Expenditure for power development and energy, %), and *AREX* (Agriculture and Rural development Expenditure, %) showed a CV value of 21.8 percent, 17 percent, 19.8 percent, 49.5 percent (the highest among the variables), 24.16 percent, 27.28 percent, 25.63 percent, and 29.58 percent respectively.

Table1: Descriptive Statistics of Variables

Variable	Mean	Std. Dev.	Minimum	Maximum
P	48.3471	9.303031	31.5	70.4
GGDP	4.730323	1.538476	0.8	6.7
EMPT	70.78484	2.666398	67.4	75.87
WAGER	118.9355	25.93702	82	181

EDEX	9.552581	0.360285	2.93	16.61
HLEX	7.746774	1.873232	4.56	11.35
INFEX	17.59806	4.809403	9.82	26
ENEX	19.27516	4.94021	12.74	33.52
AREX	14.77645	4.372393	6.88	23

Testing for Normality

The variables were found normally distributed. Referring to the normality test, the Karnel Density Estimation Technique shows evidences of normally distributed data. The standardized normal probability plot confirms no non-normality in the middle range of residuals. However, the Quintile-normal plot could not ensure normality in the extreme of the data. Therefore, we also utilized the non-graphical test for normality (the Shapiro-Wilk test) which checks the hypothesis that the distribution is normal. In this model the p-value of 0.67109 indicates that the null hypothesis that the distribution of the residuals is normal cannot be rejected. The Breush-Goodfrey as well as the Durbin-Watson tests for serial correlation confirmed no serial correlation in the data. Therefore, it was unnecessary to correct it by utilizing Cochrane-Orchutt regression. Both the graphical and the Breusch-Pagan test could not detect heteroskedasticity in the model (prob>chi^2=0.2489). The problem for heteroskedasticity is that the model may have wrong estimates of the standard errors for the coefficients and therefore their t-values. The model was also checked for an omitted variable bias. Testing for such a bias is important as it tests whether the assumption that the error terms and the independent variable in the model are not correlated (E(e/X)=0). The p-value (p = 0.1099) is higher than the usual threshold and reports no omitted variable bias in our model. Another important assumption is that independent variables are not perfectly multicolinear or in other words, one regressor should not be a linear function of another. The variance inflation factor (VIF) test detected no multi-colinearity in the adopted model.

Stationary Test

An Augmented Dickey Fuller (ADF) test shows that most of the variables except *GGDP* are found stationary at their first difference (see Table 2). The test statistics for all the regressors with and without trend became significant at 1% level and they clearly reject the null hypothesis of having a unit root. Hence, variables namely *Log(EMPT), Log(WAGER), Log(EDEX), Log(HLEX), Log(INFEX), Log(ENEX) and Log(AREX)* decisively confirm stationarity with an order of I (1). Only one regressior namely *Log(GGDP)* became stationary at its level. The outcome variable *Log(P)* is also found to be stationary at its first difference with and without trend and depicts I (1) order of integration.

Table 2: Augmented Dickey Fuller Unit Root Test (for Stationarity).

Variables	*Level*		*First Difference*		Comment
	Without Trend	With Trend	Without Trend	With Trend	
Log(P)	-0.457	-1.856	-6.217***	-6.102***	Stationary at first difference
Log(GGDP)	-5.550***	-8.075***			Stationary at level
Log(EMPT)	-1.241	-1.245	-6.330***	-6.978***	Stationary at first difference
Log(WAGER)	-0.430	-1.729	-4.859***	-4.975***	Stationary at first difference
Log(EDEX)	-1.239	-1.665	-6.008***	-5.901***	Stationary at first difference
Log(HLEX)	-1.483	-2.564	-5.926***	-5.820***	Stationary at first difference
Log(INFEX)	-2.699	-2.718	-6.918***	-6.784***	Stationary at first difference
Log(ENEX)	-1.572	-2.426	-5.199***	-5.383***	Stationary at first difference

Log(AREX)	-1.307	-1.937	-5.058***	-5.126***	Stationary at first difference

Cointegration Test.

The EG-ADF test indicates no cointegration in the data. This implies no long run equilibrium relationship among variables. Therefore, we need not to follow a Vector Error Correction Model (VECM). The result is shown in the appendix where the Mackinnon approximate p-value for z (t) was estimated to be 0.2350. The test statistic appeared to be -2.124 where the critical values are -3.750, -3.000, and -2.630 for 1%, 5% and 10% significant level respectively.

Granger Causality

The null hypothesis in the Granger Causality Wald test for this model (*var1* does not Granger-cause *var2*) can be rejected at 1% and 5% significant level respectively for two regressors namely *WAGER* and A*REX* (prob> chi^2 values are: 0.001 and 0.015 respectively). This indicates that Real Wage Rate (*WAGER)* and Agriculture and Rural Development Expenditure (A*REX)* granger cause Poverty (*P).* Other explanatory variables namely GDP Growth (*GGDP),* Employment *(EMPT),* Education Expenditure *(EDEX),* Health Expenditure *(HLEX),* Infrastructure Expenditure *(INFEX)* and Expenditure for Power and Energy Sector (*ENEX)* have been estimated not to granger cause the outcome variable Poverty (*P).* Test statistics (prob> chi^2 values) for the latter six regressors were: 0.471, 0.122, 0.505, 0.612, 0.805 and 0.842 respectively. On the other hand, the test statistics (p-values = 0.010, 0.362, 0.229, 0.067, 0.073, 0.481, 0.007, 0.100) for the dependent variable *P* show that Poverty *(P)* granger causes only two explanatory variables namely *GGDP* and *ENEX*. *P* does not granger cause rest of the variables namely *EMPT, WAGER, EDEX, HLEX, INFEX, AREX*. Test outcomes for the above empirical results are reported in the appendix section.

FINDINGS AND DISCUSSIONS

The estimated results for the Ordinary Least Square (OLS) Regression have been reported in Tables 3 below. It was found that none of the explanatory variables could appear to impose significant impact on poverty in Bangladesh. Three variables such as Employment as a percentage of total working age population *(EMPT)*, Real Wage Rate *(WAGER)* and Government's Health Expenditure *(HLEX)* had a proper sign but they appeared to have only an insignificant impact on poverty. According to the results, it was revealed that for a rise of one unit in employment rate, the real wage rate index and government health expenditure in the country's poverty head count can be reduced by 0.1886482%, 0.3547846% and 0.056689% respectively. GDP growth *(GGDP)* and sector-wise expenditure for Education *(EDEX)*, Infrastructure *(INFEX)*, Power and energy *(ENEX)*, Agriculture and rural development *(AREX)* showed a coefficient with opposite sign and at the same time they became insignificant.

Table 3: Result Summary of OLS Estimates

Dependent variable, *Log(P)*				
Variable	Coefficient	Std. Err.	t-value	p>t
Log(GGDP)	0.0292344	0.0216604	1.35	0.899
Log(EMPT)	-0.1886482	1.471189	-0.13	0.668
Log(WAGER)	-0.3547846	0.2157878	-1.64	0.115
Log(EDEX)	0.0875255	0.0547444	1.60	0.125
Log(HLEX)	-0.056689	0.0864983	-0.66	0.519
Log(INFEX)	0.0501204	0.0286345	1.75	0.095
Log(ENEX)	0.082343	0.0543666	1.51	0.145

Log(AREX)	0.0809314	0.0155924	1.31	0.204

Clearly, expenditure shares as a percentage of total spending in all of the five thrust sectors have been emerged not to have any meaningful and/or significant impact in poverty reduction in Bangladesh. Hence, according to the study's findings, Bangladesh needs to improve expenditure effectiveness in all these sectors.

Although public spending in Bangladesh would probably have been wasted and frittered away, according to our analysis, expenditure in health sector yet has been regarded as one of the important factors. Findings suggest that the impact elasticity of health spending was -0.056689 which indicates a reduction of poverty by 0.056689% for an increased share of 1% in health spending of the government. This finding for the health sector has very important policy implications for a developing economy like Bangladesh.

First, within the last three decades Bangladesh has achieved remarkable progress in some social development indicators. To be more specific, the nation has gained more than most developing countries in improving the status of women. This was happened through: (a) woman entrepreneurship with the help of microcredit finance and other tiny loans provided by several leading Non-Government Organizations (NGOs), (b) fertility reduction as a result of successful family planning programs, and (c) increased employment and income for women, thanks to the country's rapid growing textile industry.[1] Therefore, both women income and status in rural as well as urban areas were improved enormously. At present women can contribute to the betterment of their family for the purposes of education, health and meals of their children. In this process child welfare is increased and finally poverty is reduced within the families (J.P., 2012).

Second, Bangladesh has been showing unusually good performance at raising incomes within the country through the adoption of Green Revolution mechanism and overseas income sent by its expatriate population. Provided that the deepest poverty in the country tends to be rural, such achievements of the economy has helped the very poorest segment of the population and enabled them to spend more resources for the purposes of education and health of their children. The ultimate result is: life standards in poor families have been increased and poverty was reduced.

CONCLUSION

Findings of the study shows that public expenditure in Bangladesh has not been a determinant of economic development and poverty reduction. Rather valuable public resources would have been wasted in the country. Only a few of the variables that were utilized in our model have been proved to contribute positively. Therefore, our findings of the present study have very important policy implications for the government of Bangladesh and its broad strategic priorities regarding public spending. While the country is featured to have achieved notable progress over the last 20 years, major outcomes of public expenditure (more specifically ADP expenditure) in key sectors such as education and religious affairs, health and family welfare, infrastructure building, power and energy, and agriculture and rural development indicate inefficiencies and a number of structural issues. In order to escape from the trap the country needs to address these challenges in formulating future expenditure policies and provisioning/financing public goods and services through various programs.

Firstly, throughout the discussion it was revealed that in Bangladesh public expenditure allocation and distribution in the highlighted sectors indicate a common characteristic that these are skewed towards the non-poor. Moreover management structure, system, and budget planning in the said sectors are fragmented in nature, which in most cases, lowered the effectiveness and efficiency of sector policies in the country.

Secondly, public expenditure in Bangladesh is not pro-poor because only a tiny portion of government resources reach to the poor. For an example, 40 percent of the total school-age children come from poor households and they receive only 32 percent of the total education spending by the government. Moreover, the situation is less pro-poor in secondary and tertiary education. Recent data shows that although total allocated amounts have been raised since independence, there has been no remarkable shift in public expenditure towards the poor. We suggest that focusing on the needs of poor people must be taken care of and additional attention needs to be given to the portion of citizens who are poor so that their life standards can improve.

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[1] In the RMG and Textile industry in Bangladesh, more than 80% workers are women.

Thirdly, service provision to the poor must be improved as a first task in the health sector. This is because reaching the poor and improving their health status remain a big challenge for the government of Bangladesh. Therefore better planning, allocation, and targeting of sector activities and resources are needed. The share of public health spending in poorest districts should be increased and affirmative actions need to be taken in a favor to the poor. Funding share provided by the State at upazila level and below in rural areas needs to be raised so that rural people can get enough access to proper health care facilities.

Fourthly, sector policy frameworks in Bangladesh do not play their proper roles in government expenditure allocations and uses. For an example, the objective of the infrastructure sector's transport strategy is to build up a balanced and integrated transport system, however in practice, the governments in all levels focus mainly on road expansion. Allocation of resources should be matched by an expenditure policy that emphasizes on quality of road services by improving road safety and maintenance. Another example comes from the health sector. While government spending on the administration of health and family welfare related services is continuously rising, expenditure amount in curative care needs of the people is getting continuous shrinkages. On the other hand, present management of the power and energy sector use valuable public resources to cover their operational losses only. The sector receives funds from the government, injects them in loss projects, and contributes to build up contingent liabilities for the people instead of creating meaningful economic values. We suggest that improving quality of large capital investment portfolios in sectors such as transport and communication, power and energy, and agriculture and rural development require particular attention so that realignment of expenditure allocations with pre-designed policies in major sectors can be achieved.

Fifthly and finally, achieving improvement in equity levels for public spending is needed in Bangladesh. One example can be turned in the education sector. Quality of education and greater access to schooling, especially at primary and secondary stages, require higher overall allocation of funds for the sector. It is acknowledged that demand-side interventions are necessary, but the equity goals of the State should not be ignored. Government's ongoing funding norms should be revisd in order to provide more equity in public expenditure and financing. In this regard, similar incentive programs should be offered to teachers in all government and non-government registered primary schools. A similar postulation is necessarily true for the health and family welfare sector as well as the power and energy sector where equity is not maintained because poor people are discriminated and have less access to these public services.

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