Does Budget Deficit Affect Stock Prices in Bangladesh?

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ABSTRACT

This study examines whether there is a long term relationship between budget deficit and stock price and if there is a causal flow between the variables in Bangladesh. Actual monthly budget deficit and monthly value of DSE general index data are considered here for the period January 2007 to September 2012 with 61 observations in total. This study discovered that past information about budget deficit can be used to explain fluctuation in current stock price, suggesting causal flow from former to the latter. Moreover, causal flow from stock price to budget deficit is also observed.

Keywords: Budget Deficit, Stock Price, Granger Causality Test

INTRODUCTION

The budget deficit is traditionally defined as the difference between total government outlays, including the interest on the national debt, and the government's revenue receipts (Feldstein, 2004). If resources in an economy are not fully employed, any increase in the deficit from a discretionary tax cut or an increase in government spending most likely stimulates economic activity (Roley & Schall, 1988). However, information of an increase in the deficit might also lead to: (1) an increase in expected future taxes to cover the spending shortfalls, (2) an increase in expected inflation due to expected debt monetization, (3) an expected increase in the interest rate as a result of an expected increase in government borrowing, and (4) an increase in various risk premia associated with deficit induced financial market uncertainty (Darrat & Brocato, 1994). A decreased interest rate because of budget deficits can also affect exchange rate (Ball & Mankiw, 1995). In any of the above scenario, stock prices will be affected. How?

First, increases in current and expected levels of economic activity should cause stock prices to rise (Roley & Schall, 1988). This rise reflects increases in the assessments about the expected future cash flows of corporations, since cash flows and economic activity are positively related. This link accounts for the stock market being used as a leading economic indicator.

Second, the idea that budget deficits put an upward pressure on interest rates is well recognized (Wachtel & Young, 1987; Cebula, 1990). And, an increase in the overall level of interest rates should cause stock price to decline (Waud, 1970; Christie, 1981; Jensen & Johnson, 1995). If the risk premium is constant, a rise in interest rates increases the rate used to discount a firm's cash flows. The higher discount rate reduces current stock prices.

Third, budget deficits affect the competitiveness of domestic products on the world market, thus affecting the share market. A decreased interest rate because of budget deficits indicates that financial assets become less attractive abroad and the demand for the domestic currency declines (Ball & Mankiw, 1995). Hence, the exchange value of the domestic currency goes down. However, local products will become more competitive abroad and stock prices should increase as demand for local products rises. Aggarwal (1981) also argues that stock prices of both domestic and multinational firms are affected by the exchange rate. For example, variations in the exchange rate will affect the foreign and domestic profits via cost and revenues. Once the profit or loss is announced, stock prices respond consequently.

Fourth, budget deficits will have to be eventually monetized, thus, large deficits risk high inflation (Sargent & Wallace, 1981). Greenspan (1995) argued that an increase in the deficit will enhance inflationary expectations. And, an increase in expected inflation should cause stock prices to fall (Modigliani & Cohn, 1979). One reason is that increases in inflation have been related historically to declines in future economic activity. So, increases in inflation are taken as signals of declines in the real value of future cash flows. Another reason of inflation that causes lower stock prices stems from the interaction between inflation and tax system.

Fifth, budget deficits also affect stock prices through expected future taxes, especially if tax rates are below their revenue-maximizing levels. For example, budget deficits forecast future tax increases, which may reduce current consumption and thus harm stock prices. This explanation is backed by the notion of Ricardian Equivalence. Hall and Taylor (1993) and Ball and Mankiw (1995) claimed that deficit reduction will cut expected future taxes. According to the idea of Ricardian Equivalence, households rationally will increase current consumption because their future tax burden has been reduced. Corporate earnings and, therefore, stock prices are likely to increase.

Finally, variation in the budget deficit could lead to more uncertainty about economic activity, interest rates, and inflation which could cause the equity risk premium to increase (Darrat & Brocato, 1994). If more volatile inflation leads to greater uncertainty, for example, the risk premium for stocks may rise. Similarly increased interest rates volatility could also raise the risk premium and thus the rate used for discounting future cash flows. Because higher discount rates reduce the present value of expected future cash flows, stock prices fall in response to increases in risk.

Section 2 of this study lists previous studies related to January anomaly in the U. S. and around the globe. Section 3 describes nature of the data. Section 4 explains methodology and discusses results of the research. Lastly, section 5 provides concluding remarks on the study with a note on media accountability.

LITERATURE REVIEW

Government can finance its budget deficit by either one of the following five methods: (1) increasing money supply; (2) borrowing from the public; (3) borrowing from the external sources; (4) drawing on external reserves and (5) combination of the above four options (Burney & Akhtar, 1992). Regardless of policy options picked, a budget deficit can ultimately be translated into either future inflation or future tax increases. However, Friedman (1986) believes that how the financing of government budget deficits affects the expected returns of an asset depends on assets' relative substitutabilities in investors' aggregate portfolio, and these substitutabilities in turn depend on how investors perceive the risks associated with the respective asset returns. He shows that government's deficit financing raises expected debt returns relative to expected equity returns, regardless of the maturity of the government's financing.

Roley and Schall (1988) posits that the effect of federal budget deficits on the stock market depends on the condition of the economy. In particular, stimulative fiscal actions are most likely to raise output and corporate cash flows when the economy is in a recession. During such periods, higher budget deficits are likely to boost stock prices. However, when the economy is near full employment, the positive output effects are likely to be negated by higher interest rates and inflation that cause a decline in stock prices. In their analysis, Roley and Schall did not rule out the possibility of increasing concerns about the implications of high budget deficits for interest rates and inflation contributed to the stock market crash in October 1987.

Darrat and Brocato (1994) argue that federal budget deficits in the U.S. exert a significant lagged impact on the current stock return, even when information on industrial production, inflation, base money and default risk rate taken into account. Ewing (1998) shows that past budget deficits contain information regarding future movements in the stock markets in Australia and France.

Using impulse response analysis, Adrangi and Allender (1998) verifies that deficit reductions in the U.S. have an inverse impact on equity returns. However, in France, Germany, and Japan, changes in deficits did not seem to affect equity prices. Their finding implies that as deficits fall, future tax burden, interest rates, and the dollar's value fall, leading to an increase in corporate profits in the U.S. because of strong domestic as well as export revenues. The stronger sales are likely to lead to higher net earnings, thus, rising equity prices. In the rest of the markets in the sample, tax effects may not be present because taxes are likely to be at their revenue-maximizing levels.

One of the reports by Standard and Poor's (2011) confirmed that stocks in the U.S. have actually performed better, on average, during periods when the federal government has run a budget deficit, earning 14.59% during all 12-month periods since 1947 with a budget deficit, as compared with 12.38% in all 12-month periods overall.

A study conducted by Saleem, Yasir, Shehzad, Ahmed, and Sehrish (2012) revealed that, in Pakistan, a long run positive causal relationship between budget deficit and stock prices exists. Reasons for this positive relationship are the economic condition; economy is not fully employed and development expenditures are also too high as compared to the current expenditures. The evidence also suggests that increases in the structural deficit have historically led to slight increases in stock prices. The structural deficit has typically risen during recessions, and then decreased early in the subsequent expansions. However, in India, because of high current expenditures, a long run negative relationship between budget deficit and stock prices is observed. The findings for India implies that as budget deficits increase, future tax burden, interest rates, and the dollar's value increase, leading to a decrease in corporate profits and thus, lower equity prices.

DATA

The empirical investigation is to see whether there is a long term relationship between budget deficit (deficit) and stock price (index) and if there is a causal flow between the variables. Monthly data are considered here for the period

January 2007 to September 2012 with 61 observations in total. Actual budget deficit (deficit) for every month, measured in crore taka, is obtained from Finance Division, Ministry of Finance, Bangladesh. Closing stock index value to represent stock price (DSE general index is taken) at the end of every month is collected from Dhaka stock exchange library.

FRAMEWORK AND RESULTS

To test causality, using Granger's (1987) causality test, it is a pre-requisite to establish whether there is a statistically significant relationship between budget deficit and stock price in the long run by testing for co-integration between the two variables. This process comprises first testing for stationarity through Augmented Dickey-Fuller (1981) unit roots test. Non-stationary data are checked for order of integration, brought to the same level removing serial correlation (by taking first difference of that variable) if required. Then following Johansen's (1988) approach cointegration can be detected.

Stationarity implies that the mean, variance and autocorrelation functions are constant, therefore, the possibility of spurious regression is minimized given the right theoretical approach is taken. It is very easy to infer to a false relationship as a true one as Hendry (1980) showed that if one simply carries out a linear regression based on mere assumption, whereas, in reality it might be the case in the long run that they diverge significantly as the relationship is not true. It is a pre condition for testing cointegration that the series considered must not be serially correlated or has auto-correlation.

The Augmented Dickey Fuller (ADF) regression (1981) is used in this paper, to determine the existence of unit root using the equation below:

$$\Delta z_t = \alpha_0 + \theta z_{t-1} + \alpha_1 \Delta z_{t-1} + \alpha_2 \Delta z_{t-2} + \cdots + \alpha_p \Delta z_{t-p} + \alpha_t$$

The presence of unit root is determined following the ADF regressions above, and the null hypothesis is tested if $\theta_{-1}=0$. The equation is tested for both the variables with a constant but without a time trend (no signs of deterministic trend is observed when graphed), if the hypothesis cannot be rejected the second equation is used for the differenced series. The calculated t ratio from the ADF test is checked against the critical value from Mackinnon (1991) table. Rejection of the null with the first regression indicates the series to be I(0), if this is not the case, the series is differenced and ADF test is carried on the differenced series to see if stationarity is achieved with the series being I(1). The value of k, the lag

length that reduces serial correlation is based on the Schwartz Bayesian criteria, with choosing a large value for the maximum m and testing it down until the t ratio for the last lag excluded shows insignificant value.

Table I: ADF Test for Stationarity

	ADF test statistic on levels	ADF test statistic on first difference
Index	1.108 (-2.964)	-3.098 (-2.964)**
Deficit	-5.118 (-2.924)**	

Notes: *(**) Significant at 1% (5%) level. Mackinnon critical values are used.

The numbers of augmenting lags are tested down from 24 lags to 17 for Index and 2 for Deficit using Schwartz Baysesian information criterion. Deficit is found to be stationary in the level series whereas, the first difference needs to be taken to make Index stationary (table I). Having confirmed the stationarity of the variables they can be used for testing for cointegration (first difference of Index is to be used and level series for deficit is used).

The Johansen (1988, 1995) technique estimates an error correction representation as shown in the equation below:

$$\Delta y_t = \Pi y_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta y_{t-i} + \varepsilon_t$$

Y_t is a 2x1 vector of the variables index and deficit. Value of p is determined for which ξt is a white noise. The Π is a product of α and в' which are vectors of 2xr and rx2 matrices. The linearly independent rows of the в gives the number of cointegrating vectors, r. This number is calculated by estimating models with different values of r and their likelihoods are calculated which are used to find the right number of cointegrating vectors. The likelihood ratio test here depends upon the number of lags chosen which removes serial correlation. The Schwartz bayesian criterion is used to find the optimum lag length to ɔe 17. Finding at least one cointegrating vector statistically significant could imply a long run relationship between the two variables considered.

Table II: Johansen Cointegration Test-Deficit and Index

Maximum No. of CE	LL	Trace statistic	5% critical Value	1% critical Value
0	-314.8276	26.47	15.41	20.04
1*	-304.1332	5.08*	3.76	6.65

As the table II shows above at least one cointegrating equation is found to be significant (at 5% significance level) using trace statistic.

$$\Delta y_t = c + \sum_{i=1}^{k} \alpha_i \Delta y_{t-i} + \sum_{i=1}^{k} \beta_i \Delta x_{t-1} + \varepsilon_t$$

The long run relationship between deficit and index being established, it can be represented as an error correction mechanism where lags (past values) of the variables are included - slightly different from the standard linear regression approach. Using the equation above Granger causality is tested, whether X_t deficit) causes Y_t (index). The coefficients of β (lags of the dependent variable) are jointly tested to see if they are zero. The Wald test chi-squared values indicate whether βs are significantly different from zero, if the null hypothesis is rejected. The dependent variable is switched with the independent variable to check if Y_t also causes X_t.

Table III: Granger Causality Wald Test

Equation	Excluded	Chi-Square	Prob > Chi-Square
Deficit	Index	97.523	0.000
Index	Deficit	294.19	0.000

Notes: chi-χ^2 statistic from Wald test is used to test null hypothesis of joint significance of the lagged terms at 1% significant level.

The lag length using Bayesian information criterion and Akaike information criterion is found to be 17 which remove serial correlation.

The result for causality test is given in table III, showing evidence of bi-directional causality. It is to be noted that causality test merely suggests a possible flow of information from one variable to another but not causality in strict sense.

CONCLUSION

This paper investigates whether budget deficit in Bangladesh affects stock prices. Existing literature (Roley & Schall, 1988; Saleem, Yasir, Shehzad, Ahmed, & Sehrish, 2012) shows that past information about budget deficit can be used to explain fluctuation in current stock price. This paper also discovers similar findings for Bangladesh for the time period considered. A causal flow (bi-directional) from budget deficit to stock price and vice-versa has been detected.

Findings of this paper, i.e., past budget deficits influence movements of current stock prices, suggest that the stock market in Bangladesh may be inefficient with respect to past budget deficit information.

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