Impact of Budget Deficit and Inflation on Stock Market Returns: An Empirical Study of Pakistan

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Abstract
This paper examines the impact of budget deficits and inflation on stock returns in the context of Pakistan. The paper further investigated whether the stock market is the true indicator of the economy and whether the economy is strongly affected by budget deficits and inflation. Budget deficit and inflation both correlate with each other (Laopodis, 2006) and harms stock market returns. This paper tested the effect of the past seventeen year's budget deficit and inflation on stock returns by using the unit root test and auto regressive distributive lag (ARDL) model, the results and findings of the research show a significant negative impact of budget deficit on stock returns and insignificant negative impact of inflation on stock market returns.
Keywords: Budget Deficit, Inflation, Stock Returns, Karachi Stock Market

1. Introduction

The paper investigates the interaction between real stock returns, budget deficit, and inflation with a special emphasis on how budget deficit and inflation affect stock market returns. According to Carig *et al.* (2007), a budget deficit occurs due to insufficient resources, which forces the government to borrow in a situation of higher expenses and lower returns. A great deal of empirical study has been committed to the efficiency of the stock market whether all the information reflects the economic problem or not. Although some early, studies reject the hypothesis (e.g., Sprinkel, 1964, Hamburger and Kochin, 1972), several more recent studies agree with this assumption (Rozeff, 1974 and Sorensen 1982), because an efficient capital market should have all reflection of the private as well as publically announced, information's (Fama, 1970).

Inflation can be defined as the increase in the prices of goods and services of households. Classical investment theory viewed inflation as the proportionate increase in price and income (J B Willimes 1938, Graham, Dodd and Cottle, 1962). The empirical intention of past researchers was primarily concerned with whether stock market prices reflect all fluctuations of monetary policy in particular or not. Very minute attention has been given to soughing out the effect of fiscal policy and inflation on stock prices. The past studies still have a theoretical ground in this respect (Tobin (1969) and Blanchard (1981)); both fiscal and monetary policy could have an important effect on the returns of the stock market (Ali, 2015; Banyen, 2022; Subhani et al., 2022; Olubiyi, 2023).

According to the economic theory and common scenario, stock returns are negatively related to both expected and unexpected government debts. However, it also shows the contemporaneous changes in expected deficits because they signal the chain of measures which results in a higher rate of monetary expansions. Exogenous shocks are real output, signaled by the stock market, bringing changes in tax revenue, deficits, and in the Federal Reserve 'monetization' of the increased debts. If a high budget deficit occurs then the government increases taxes with spending unchanged, which would decrease expected returns on assets, which discourages investors from investing in the stock market (Laopodis, 2006; Ali, 2018; Ali & Bibi, 2017; Ali & Audi, 2016; Ali & Rehman, 2015; Ali, 2018). While testing the impact of inflation on real stock market returns Bodie (1976), Fama and Schwert (1977), Jaffe and Mandelker (1976), and Nelson (1976) argue that expected and unexpected components of inflation harm stock market returns. Awan, Gulzar & Gulzar (2020) stated that fiscal deficit, public investment, and inflation have a significant negative impact on economic growth while debt to GDP and exchange rate have a significant positive impact on economic growth. Abbas & Wang (2020) examined the association between macroeconomic uncertainty and stock market return and volatility for China and USA and reported that volatility persistence in the stock markets and macroeconomic variables in both countries. Zaheer & Jahen (2021) reported that economic growth contributes to both savings and deficits. Dilawer, Aziz & Sadar-Ud-din (2022) concluded that GDP has a positive association with stock return while inflation has a negative and insignificant relationship with stock returns in Pakistan.

In the context of Pakistan, most of the previous studies showed a combined effect of macroeconomic variables (e.g. Monetary policy, inflation, budget deficit, and GDP) on stock market returns. In this paper, we argue whether the Pakistan stock market is affected by the volatility of the budget deficit and inflation.

2. Literature Review

A wide range of research is available on the behavior of stock market returns due to different government expenditures, deficits, inflation, and other macroeconomic liabilities. Continuous Budget deficits and inflation largely affect the economy of any country, which in turn creates price volatility in stock markets. The stock market and economy can best be understood through the bio-systems, feeding and interacting with each other in a continuous interacting process (Bulmah, 2002).

2.1. Budget Deficit and Stock Market Returns

Geske and Roll (1983) argue that the stock market returns signal the deficit process by the following economic conditions. Firstly, fluctuation in the economic condition of a country brings change in the stock returns, which leads to affect the individual and corporate incomes, indirectly the taxes are also affected which is the main principal revenue of any government. When the government owns resources by which it can earn revenue then there is no need to take loans and budget deficit decreases and market returns increase.

Secondly, if the government's expenditures exceeded from government's revenues and if there are not able to settle themselves in the rise and fall of the revenue, in the result will reveal in deficits. Thus, the budget of the Federal government experienced an

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increase in uncontrollable expenses. The budget deficit may affect the stock market in several ways (Schall and Roley, 1988). The growing budget deficit will be liable to depress stock prices from rising both discount rate and interest rate used by the investor to capitalize the future profit flows. If the economy is working below capacity, however, this effect may be balanced with the higher output level that may result from the fiscal stimulus (Devan and Steven, 1993). Leanne (1998), argues that the financial market is constrained due to the increase in government borrowing and debts, which leads to taxes, and liabilities affecting the private investment. Local exporters are crowded out by the government borrowing due to the rise in exchange rates.

Tobin (1969), by using a well-known general equilibrium model of the financial sector, he analyzes an important link between the real and financial sector of the economy. By using general equilibrium model Tobin, demonstrate how stock returns responds due to the change in fiscal policy (Budget deficit) and monetary policy variables of the model. Previous studies only focused on money growth to signify policy actions in their model and fiscal policy virtually ignored. Tobin theoretically checks the impact of fiscal policy on money growth and suggests that budget deficits significantly affect stock returns. Gupta and Porwal (2005) studied the hot issues of instability in the Indian stock market. The study was based on the daily price of S&P CNX Nifty for the period of 10 years. They found that 1996 was the most volatile year in the past 10 years; this is due to the political instability and the absence of proper regulations. Row (1997) examines the impact of macroeconomic variables like union budget and credit policy announcements on stock prices from 1991-1995. He found that the budget deficit increases the instability of the stock prices of the market portfolio. Awan, Gulzar & Gulzar (2020) stated that fiscal deficit, public investment, and inflation have a significant negative impact on economic growth while debt to GDP and exchange rate have a significant positive impact on economic growth. Zaheer & Jahen (2021) reported that economic growth contributes to both savings and deficits. Dilawer, Aziz & Sadar-Ud-din (2022) concluded that GDP has a positive association with stock return while inflation has a negative and insignificant relationship with stock returns in Pakistan.

Pakistan has experienced large fiscal deficits over the last 20 years. The fiscal deficit of federal and provincial governments averaged about 6.5% of GDP during the 1980s and fell slightly in 1990-91. According to the percentage of GDP, Pakistan's fiscal deficit is higher than that developing countries (Nadeem and Peter, 1993).

2.2. Inflation and Stock Market Returns

The past empirical researches about the interaction of stock market returns and the rate of inflation inspire future theoretical research. According to Kaul (1987), inflation occurs due to two factors. First, real factors like consumption, employment, and production create cost, which further drives inflation. Second, inflation occurs due to an unexpected increase in the money supply. While discussing return on capital Modigliani and Cohn (1979), suggest that during the periods of high inflation and low share price value investors fails to adjust corporate profit for the inflation premium mechanisms of interest expense and from the capitalization of corporate profit at standard rate interest. According to Feldstein (1981), the existing structure of the taxation law creates a sensitivity in the share prices of the nonfinancial corporation to change in the expected rate of inflation. The outcomes of his study analyze the effect of change in the expected rate of inflation on the firm's inventory cost, net monetary position, and real value of tax shield provided by depreciation, corporate deduction for interest rate. Carmicael (1985), suggests by applying the General equilibrium model that there is a negative correlation between the anticipated inflation and stock market prices. Several other empirical studies also documented a negative relationship between inflation and stock prices (Mukherjee and Naka (1995), Chen et al. (1986), Geske and Roll (1983), and Fama and Schwert (1977)).

Awan, Gulzar & Gulzar (2020) stated that fiscal deficit, public investment, and inflation have a significant negative impact on economic growth while debt to GDP and exchange rate have a significant positive impact on economic growth. Abbas & Wang (2020) examined the association between macroeconomic uncertainty and stock market return and volatility for China and USA and reported that volatility persistence in the stock markets and macroeconomic variables in both countries. Dilawer, Aziz & Sadar-Ud-din (2022) concluded that GDP has a positive association with stock return while inflation has a negative and insignificant relationship with stock returns in Pakistan.

However, if inflation is expected there is a possibility that the outcome will be positive. Marshall (1992), suggests that with the increase in expected inflation the expected return on money will decrease, thus demand for money will reduce cause increase in demand for equity, results a positive correlation among inflation and prices of equity. As stock exchange, market is the true indicator of the economy. In the light of past literature, being proved that the fluctuation in the economy of any country caused an effect on stock market, due to which stock returns are being disturbed, to see this effect we go through the following methodology.

3. Research Methodology and Results Discussions

For testing the hypothesis, annual data on budget deficit, inflation, and market returns were taken from 2006-2022 from the State Bank of Pakistan. Before going through the analysis because the data was longitudinal, the stationary test is applied so, that it can be ensured that there are no trends in the data. For this purpose, the following tests are applied.

4. Data Analysis and Results

4.1. Unit Root Test

Augmented Dickey-Fuller Unit root test applied to check whether the data is stationary or not. The results of the test showed that market returns are founds to be stationary on level, whereas budget deficit and inflation founded to be stationary on first difference. The test stats given in the table below:

As shown in the table above, the Augmented dickey fuller value of stock returns at level is (3.512817) which is well higher than the critical value at 5% (3.065585) which shows that the market returns are stationary on level. The ADF value of Budget deficit and inflation at level is (0.155303) and (1.63001) respectively, and the critical value at 5% on level is (3.065585) which shows that budget deficit and inflation are not stationary on level. To eliminate the unit root from this data, the unit root test was run again

this time on 1st difference. The tests result as shown in Table: 1 showed that the ADF value of budget deficit and inflation at first difference is (3.847974) and (4.657948) respectively, higher than the critical value at 5% (3.081002), showing it to be stationary.

Table 1: Augmented Dickey Fuller Test

Variable	ADF(Level)	ADF (1st Difference)	Critical Value at 5%(level)	Critical Value at 5% (1st diff)
Market Returns	(3.512817)	---------	(3.065585)	--------
Budget Deficit	(0.155303)	(3.847974)	(3.065585)	(3.081002)
Inflation	(1.632001)	(4.657948)	(3.065585)	(3.081002)

Moving in the direction of the unit root analysis, because one of the variables of the study got stationary on a level and the others on first difference, their order of integration was found to be different. In such a situation, the data needed to be analyzed using the Auto regressive distributed lag model (ARDL).

4.2. Auto Regressive Distributive Lag Model

For the representation of the variables in this model, MR denotes market return, whereas BD represents budget deficit. The following ARDL equation is used to test the hypothesis.

$$MR = \propto +\beta\Delta MR(-1) + \beta\Delta MR(-2) + \Delta BD + \beta\Delta BD(-1) + \beta\Delta BD(-2) + \Delta INF + \beta\Delta INF(-1) + \beta\Delta INF(-2) + MR(-1) + BD(-1) + INF(-1) + \mu$$

Due to the annual data, the study took two lags of each of the variables in ARDL. The above equation was applied to the two variables to calculate the coefficients of MR and BD.

Table 2: Autoregressive Distributive Lag (ARDL)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	(7.567745)	6.406034	(1.181346)	0.3589
D(STR(-1))	(1.966673)	1.252662	(1.569996)	0.2570
D(STR(-2))	(1.152817)	0.708398	(1.627358)	0.2452
D(BD)	(0.392233)	0.647116	(0.606125)	0.6061
D(BD(-1))	(1.411053)	0.651980	(2.164259)	0.1629
D(BD(-2))	(0.649084)	0.460532	(1.409422)	0.2941
D(INF)	(0.040152)	0.050319	(0.797954)	0.5086
D(INF(-1))	(0.021607)	0.062098	(0.347945)	0.7611
D(INF(-2))	(0.039056)	0.054987	(0.710270)	0.5512
STR(-1)	1.878320	1.345147	1.396368	0.2974
BD(-1)	0.657986	0.551220	1.193690	0.3550
INF(-1)	(0.059581)	0.082149	(0.725281)	0.5437

R^2=84%, Adjusted R^2= (3.94) %, Durbin Watson Value=2.91, F-Value=0.955, P-Value=0.616

4.3. Discussion of results before calculating ECM

The results of the above table show different outcomes at different lags. First, discussed stock market returns. The result of the coefficients of difference of market returns at lag 1 and 2 shows an insignificant negative relation with stock market returns. The coefficient of difference of budget deficit without lag, 1st and 2nd lags shows insignificant negative impact on stock returns. The coefficient of difference of inflation without lag, 1st and 2nd lags shows insignificant negative relation with stock market returns. The first lag of stock return, budget deficit and inflation shows a negative insignificant impact on stock returns.

The coefficient of determination (R^2) is 84%, which shows the significant fitness of the data, the adjusted R^2 is -3.94%. Durbin Watson's value shows no Autocorrelation among the variables. F value is also insignificant at 5%. After that, the study checked the long-term relationship between stock market returns and budget deficit by using Wald test.

Table 3: Wald Test to check the long-term relationship

Test Statistic	Value	df	Probability
t-statistic	-0.802987	14	0.4354
F-statistic	0.644788	(1, 14)	0.4354
Chi-square	0.644788	1	0.4220

The results of the above table show no short-term relationship between stock market returns budget deficit and inflation because the value of the F-stat is not greater than 1.96 and the p-value is no less than a 5% level of significance. The study further

examined the error correction in the long-term relationship of both the variables whether there is any correction of the errors among the variables and at what percent they adjusted to its equilibrium position after dispersion.

To complete the ARDL analysis, the equation above is analyzed again on the two variables including the ECM series. ECM was included in the equation with one lag. The equation was:

$$MR = \propto + \beta \Delta MR(-1) + \beta \Delta MR(-2) + \beta \Delta BD + \beta \Delta BD(-1) + \beta \Delta BD(-2) + \beta \Delta INF + \beta \Delta INF(-1) + \beta \Delta INF(-2) + ECM(-1) + \mu$$

The result of this equation reported in the following table:

Table 3: Autoregressive Distributive Lag (ARDL)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	(21.79207)	9.228549	(2.361375)	0.0775
D(STR(-1))	(1.967224)	0.711968	(2.763080)	0.0507
D(STR(-2))	(1.153015)	0.399433	(2.886629)	0.0447
D(BD)	(0.392433)	0.353586	(1.109867)	0.3293
D(BD(-1))	(1.411239)	0.382699	(3.687590)	0.0211
D(BD(-2))	(0.648957)	0.298564	(2.173596)	0.0954
D(INF)	(0.040182)	0.031416	(1.279041)	0.2700
D(INF(-1))	(0.021623)	0.029486	(0.733327)	0.5040
D(INF(-2))	(0.039066)	0.026075	(1.498222)	0.2084
ECM(-1)	1.879140	0.783893	2.397189	0.0746

R^2=84%, Adjusted R^2= 48 %, Durbin Watson Value=2.91, F-Value=2.33, P-Value=0.214

4.4. Discussion of results after Error Correction Mechanism (ECM)

The results of the above table after the addition of the error correction mechanism the coefficient of difference of stock market returns at the first lag and second lag has a significant negative impact on stock market returns. At level, the budget deficit shows insignificance and a negative impact on stock returns while on a difference of first and second lag budget deficit shows a highly significant negative impact on stock market returns. In addition, the results of the difference in inflation, the difference with the first lag, and the difference with the second lag show insignificant negative impacts on stock market returns. The result of ECM shows that in long-run relationship, the errors are adjusted 187% and according to t-value 2.39 show significance among variables. The resulting coefficient of determination R^2 is 84% showing the significance of the fitness of the data. Adjusted R^2 is also good as it explains 48% variation. The value of Durbin Watson 2.91 shows no auto-correlation among variables. The value of F-statistics is 2.33(0.214).

5. Conclusion

This paper aims to estimate the impact of budget deficit and inflation on stock returns concerning Pakistan. Annual data used in this research covers the period of 2006-2022, budget deficit, inflation, and stock market returns taken to capture the relationship. The underlying series was not integrated at the same level, so the study applied ARDL having annual data; two lags were selected for ARDL. The results suggest that budget deficit has a statistically significant negative impact on stock market returns and inflation has a statistically insignificant negative impact on stock market returns, stock market returns are also affected by various other macroeconomic variables. However, the study just focuses on investigating the budget deficit and inflation. Hence, based on our empirical analysis it might be possible to conclude that budget deficit and surplus are taken as a bad and good signal respectively for the stock market in Pakistan.

As discussed earlier, the stock market responds to various other macroeconomic situations/conditions, and the investors and policymakers may consider the budget deficit and surplus as the main indicator, which has impact on stock market. Future research might be possible by including some other microeconomic indicators like interest rate, money supply, GDP etc., in addition to budget deficit and inflation. Event study is also possible in the years of budget surplus/boom of economic growth and in the years of budget deficit.

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