

Can Common Stock Provide hedge against inflation or not? Evidence from SAARC Countries

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Abstract

The puzzle that common stocks can provide hedge against inflation or not has been empirically tested in this paper. The monthly data covering the period 1993 to 2010 from the SAARC countries is utilized for testing the relationship. We employed ADF and PP test for unit root testing. By applying the ARDL bound testing approach we found that all countries included in the study show the long run relationship between stock returns and inflation. The ECM result also show significance of our results. The evidence favors both long term relationship as well as the short term relationship between the inflation and stock return which is in-line with the theory.

JEL Classification: C20, E31

Key words: Stock Return, Inflation

Introduction:

The theory says that if stocks provide an effective hedge against inflation then the effect of expected inflation should be compensated in the form of nominal stock return. The Fisher Hypothesis (1930) concluded that nominal expected return on security is a function of expected inflation rate as well as expected real interest rate. Bodie (1976) worked on Fisher Hypothesis and found that actual nominal return depends on expected and unexpected inflation rates and also on expected and unexpected nominal returns. Geske and Roll (1983) also found positive relationship between stock returns and inflation because of the reason that

securities represent claims on real assets. Therefore when inflation rises, it is expected that prices of real assets also increase.

We found that various studies in this area reported against the hypothesis and found the relationship between the two is negative, and some studies support the theory that relationship exist stock returns and inflation is positive. The negative relationship between inflation and stock return is against the theory but negative result also leads to some hypothesis such as tax augmented hypothesis. The tax augmented hypothesis is that when we include tax in the return then it might produce negative because their hypothesis was that with the time tax also increase and the other reason of tax including is that beginner researcher do not include the tax when they were empirically testing the relationship between stock return and inflation.

The goal of this paper is to examine the relationship between stock returns and inflation in the SAARC countries and to examine whether Fisher hypothesis holds in SAARC countries or not. Motives behind this study was that, in the literature there is a lack of consensus on the empirically relationship between stock returns and inflation. While there have been numerous studies in developed economies which tests the relationship between the stock return and inflation like U.S.A and European countries and found negative relationship but some studies have reported positive relationship. To my best knowledge this relationship has not been explored in SAARC countries and this study also have update dataset. Long period of time many economists believed that real stock returns and inflation should be positively or at least non-negatively related. Some authors Hypothesize that returns on security depends on expected inflation. But, a lot of researchers conducted a research and found that the return on security has not a positive relation between inflation and return after the war the U.S. war and also number of developed economies like European countries and other developed economies in rest of world found negative relationship between security return and inflation. Some

studies found that pre war there is a positive relationship between real stock return and inflation.

Most important for this topic is that there are some studies which tests the validity of fisher hypothesis but not yet tested from SAARC countries, this study will test the fisher hypothesis in the context of stock market in the mentioned countries. This paper consists of three important findings to contribute in the literature. The first objective is to do comprehensive analysis of the relationship between and inflation stock returns. The second objective is because of no analysis was conducted on the SARRC countries, so to know whether the relationship exist between stock returns inflation and also to know the relationship in different time period. So this will be a good contribution in the literature. In the literature the puzzle exist that somewhere in the world show positive relationship and some where shows negative relationship between inflation and stock returns, so it is strongly required to know the relationship between inflation and stock returns in SSARC countries whether it support the theory or not. The third and very important contribution is that this study will help the investors who want to invest in the common stock on the basis of weather common stock prices increases or not the trend of inflation rate.

Literature Review:

The field of finance has some literature on the inflation and equity returns. It is most important issue in the finance, basically the hypothesis which is related to interest rate hypothesis commonly known as fisher hypothesis. Fisher (1930) argues that nominal interest rate is a function of real interest rate and inflation. In the long run when expected inflation increases then expected nominal interest rate is also increases means real interest rate unaffected. When we transpose this hypothesis into stock markets it means stock return should reflect relationship between stock returns and inflation means when inflation will

increase stock returns will also increase. This hypothesis is also supported by the Bodie (1976) said security returns depends on expected nominal return and also unexpected nominal return, it also depends on expected inflation rate and also unexpected inflation rate. The idea that there should be positive relationship is given by the Geske and Roll prompted (1983) said that stock returns and inflation should have a positive inflation because they represent claim on real assets. But in the literature there is lot of evidence is available which shows that stock market perform poor and does not hedge share prices against inflation. Reilly et al. (1970) made a portfolio of common stock and found that common stock are not hedged against inflation. Bodie (1976), Nelson (1976), Fama and schewart (1977) and Adams et al. (2004) analyzes the hedging properties of shares and found that there is a poor hedging of common stock against inflation not only unexpected inflation but also expected inflation it means there is negative relationship equity returns and inflation.

Moosa (1979) found that common stock as a group is not hedged against inflation because also other factors affect on the prices which are uncertainty and income effect. Fama (1981) hypothesize that there is negative relationship between inflation and returns. Day (1984) obtained the negative results and contradicts the theory and he argued that production function shows stochastic returns to scale this is the reason there is negative relationship. Prabhakaran (1989) found that equities have not provided a hedge against inflation. Erb et al. (1995) found negative relationship between realized inflation and realized asset returns. Chatrath et al. (1996) examine the study stock prices, inflation and output there results contradict the theory . Foort and Martin (1996) conducted the study whether real estate provides a hedge against inflation or not they found real estate did not hedge against inflation during the period. Tarbert (1996) found commercial property has not been a consistent hedge against inflation during the period of studied examined. Khil and Bong-Soob (2000) examine the relationship between stock prices and inflation on ten pacific-rim countries and on USA,

found contradictory results against the theory except the Malaysia where he find positive relationship. Francis and Tewari (2011) obtained results which contradict against the theory means there is no positive relationship between the two.

Firth, M. (1979) studied on UK data and found that there is positive relationship between common stock rate of return and inflation. Martina (1998) studied on the stock market's rate of return and expected rate of inflation and employed parametric and non-parametric test and found over all positive relationship between stock returns and inflation, they found mutual fund performance is through the whole period in which study is taken Crosby and otto (2000) find that empirical results support the view that the long-run level of the capital stock is invariant to permanent changes in the inflation rate. Schotman and Mark (2000) conclude that common stocks can be a hedge against inflation even they perform well when the inflation is persistent in long time horizon. Lee et al. (2000) find the fundamental relationship between stock returns and both realized and expected inflation is highly positive. Choudhary (2001) conducted study on the relationship between inflation and rate of return on stocks and find that common stocks hedge against inflation. Rapach (2002) examine the relationship between real stock prices and inflation and their result show that inflation does not corrode the long run real value of stocks means stocks are hedged against inflation. Luintel and Paudyal (2006) found in their study that stocks and inflation have positive relationship. Ding (2006) find the positive relationship between common stock returns and inflation this was due to strongly procyclical monetary policy, but they also found negative relationship between common stock return and inflation but this was due to supply shock. Hondroviannis and papapetrou (2006) find that inflation does not significantly influence real stock market return. Boucher (2006) find in his study that a temporary deviation from this common trend exhibit substantial out of sample forecasting abilities for excess returns at short and intermediate horizons. Bekaert and Engstorm (2010) find in his study that there is positive correlation is

often attributed to the fact that both bond and equity yields comove strongly and positively with expected inflation. Alagidede and Panagiotidis (2010) studied on 6 African countries employing parametric and non parametric co integration procedures found support for the hypothesis that common stocks hedge against inflation. Akash et al. (2011) found the positive and significant relationship between stock market index and inflation.

Barnes and Boyd (1999) find mixed result in low to moderate inflation economies there is no relationship between inflation and stock return but in high inflation economies they found positive relationship between inflation and stock returns. Kim and Francis (2005) also find mixed result they find positive relationship between stock returns and inflation at the shortest scale and the longest scale but they found negative relationship at the intermediate scale. Kolluri and Wahab (2008) examined the relationship between stock returns and inflation and found inverse relationship between stock returns and inflation, found positive relationship between stock returns and inflation during the high inflation period. Liflong et al. (2010) examine the statistical relationship of stock return and inflation and show that in short term UK stock market fails to hedge against inflation but in the medium term there is mixed results. Lee (2010) found post war negative relationship between stock return and inflation but after war there results supported the theory that positive relationship between stock returns and inflation in all the developed economies.

Theoretical Framework

According to Fisher hypothesis there is a relationship between interest rate and expected inflation. When it is assumed that real rate of interest rate is constant then nominal return is demanded which is the combination of forgone current consumption and reduction of purchasing power of money which is measured by inflation. So Fisher equation is

$$R_t = (E_{t-1}[r_t]) + (E_{t-1}[\pi_t]) + \mu_t \dots\dots\dots (1)$$

In equation one R_t is the nominal interest rate, $(E_{t-1}[r_t])$ is the expected real interest rate, $(E_{t-1}[\pi_t])$ is the expected inflation. When we forecast the inflation, the actual inflation rate may differ with forecasted inflation rate. The inflation equation will become as

$$\pi_t = E_{t-1}[\pi_t] + V_{1t} \dots\dots\dots (2)$$

π_t is the actual inflation rate, $E_{t-1}[\pi_t]$ is expected inflation rate and V_{1t} is the error term which arise due to forecasting error. Similarly the real interest rate equation become

$$r_t = E_{t-1}[r_t] + V_{2t} \dots\dots\dots (3)$$

r_t is the actual real interest rate, $E_{t-1}[r_t]$ is the expected real interest rate and V_{2t} is the error term which arises due to the forecasting error. So the real interest rate equation can be

$$r_t = R_t - \pi_t + v_t^* \dots\dots\dots (4)$$

$$*V_t = \mu_t - V_{1t} - V_{2t}$$

Empirical Model:

When we transpose the fisher hypothesis into stock exchange it means nominal return reflects real return and inflation. Assuming real interest rate constant then it means when one unit change in expected inflation there should also be one unit change in the stock return in same direction. Then we can say that stocks provide a complete hedge against inflation. The most basic empirical model or equation through which we can check the Relationship between stock return and inflation is given below.

$$\Delta(\text{Stock Return})_t = \alpha + \beta \Delta(\text{Inflation})_t + \mu_t \dots\dots\dots (5)$$

Here change in Stock return is our dependent variable α is the real rate of return β is the Co efficient of inflation which is our independent variable. μ_t is the residual error term. If there

is Unit Coefficient of inflation it means that stocks are complete hedge against inflation. As both series are at different level of stationary so we will employ the ARDL bounds test model. We will use the ARDL model in this paper to check the relationship between inflation and stock return is given below.

$$\Delta(\text{Stock Return})_t = \alpha + \beta_1 \Delta(\text{Stock Return})_{t-1} + \beta_2 \Delta(\text{Inflation})_t + \beta_3 \Delta(\text{Inflation})_{t-1} + \beta_4 (\text{Stock Return})_{t-1} + \beta_5 (\text{inflation})_{t-1} \dots\dots\dots(6)$$

This model shows which variable is significant and which variable is not significant. So checking the long run relationship between the two we will apply Wald Test. Here $\beta(4) = 0$ and $\beta(5) = 0$ will be imposed coefficient restriction. We will also check short run relationship between the stock return and inflation this task will be performed by employing ECM test. The ECM equation is written below

$$\Delta(\text{Stock Return})_t = \alpha + \beta_1 \Delta(\text{Stock Return})_{t-1} + \beta_2 \Delta(\text{Inflation})_t + \beta_3 \Delta(\text{Inflation})_{t-1} + ECM(-1) \dots\dots\dots (7)$$

Through this equation we will know the coefficient of ECM that how much adjustment process occurs. It will tell us the disequilibrium of previous month's errors or shocks will adjust back in the current month.

Data:

Our data is consists of stock price indices and consumer price indices which is monthly taken from SAARC countries namely Pakistan, India, Sri Lanka and Bangladesh. Our data set consists of from month one of 1993 to the 12 month of 2010. We take the monthly data because of the annual series is not available for a sufficient time period. This data set is taken from the International Financial Statistics data base of the International Monetary fund. The stock indexes are composed of the most actively traded stock in each country which represents the whole economy of the country and Consumer Price indices are composed of

the factors which are most representative of the consumer goods and services which are most actively consumed by the customer which means those fixed goods and services that indicate the inflation.

Descriptive Statistics of Data:

Table- 1 Stock Return

Stock Return				
Country	Mean	Std. Deviation	Skewness	Kurtosis
Pakistan	4.463333	40.31947	-0.574711	3.972876
Sri lanka	11.24477	47.40104	-0.331345	27.74259
Bangladesh	16.08147	40.72773	-0.455828	4.583476
India	11.53868	29.21087	-0.251301	2.443019

Table-2 Inflation

Inflation				
Country	Mean	Std. Deviation	Skewness	Kurtosis
Pakistan	8.271716	4.439506	0.917515	4.091729
Sri lanka	3.972876	5.167649	0.447880	3.028043
Bangladesh	5.979706	2.693780	-0.211802	2.270731
India	6.857255	3.305509	0.638455	3.116359

Average monthly stock return for Pakistan is 4.46 and for Bangladesh it is 16.08 and India and Sri Lanka also have the monthly stock return between them. Descriptive Statistics also tells us about the variability which is measured by the standard deviation. India has the standard deviation of 29.21 and Sri Lanka has the 47.40 and other countries lies between them. Table shows that the data is negatively skewed. Average monthly inflation shows more

stable than stock return it has less standard deviation as compared to the stock return inflation. Sri Lanka has 3.97 average monthly inflation where Pakistan has 8.27 other countries have the values between them. Variability (standard deviation) for Bangladesh is 2.69 and inflation of Sri Lanka is 5.16 and data shows positively skewed except for Bangladesh which shows little bit negatively skewed. Graphically representation of data is also discussed in Index which is at the end of the paper. Graphical representation of data shows that there is much variation in the stock returns sometimes it is at peak and sometimes it is at very lower side, when we draw the graph of inflation it shows little variation in all countries included in the study.

Table- 3 Unit Root Tests:

	No trend				Trend and intercept			
	ADF		PP		ADF		PP	
	Level	First diff	Level	First diff	Level	First diff	level	First diff
Bangladesh								
Return	-4.04***	-5.81***	-3.04**	-11.3***	-4.26***	-5.80***	-3.134	-11.3***
Inflation	-2.61*	-5.63***	-2.68*	-12.0***	-2.6017	-5.67***	-2.6725	-11.9***
Pakistan								
Return	-3.71***	-4.99***	-3.003**	-10.9***	-3.811**	-5.01***	-3.0434	-10.9***
Inflation	-2.701*	-5.05***	-1.9852	-12.8***	-2.7740	-5.04***	-2.0564	-12.8***
India								
Return	-4.23***	-5.14***	-3.163**	-11.4***	-4.37***	-5.15***	-3.225*	-11.3***
Inflation	-2.918**	-5.64***	-2.5771*	-9.92***	-2.890	-5.63***	-2.5654	-9.90***
Sri Lanka								
Return	-3.57***	-8.77***	-8.54***	-28.7***	-4.06***	-8.79***	-8.89***	-28.7***
Inflation	-3.59***	-5.34***	-3.017**	-11.7***	-3.605**	-5.32***	-3.0111	-11.7***

*** Shows that series is stationary at 1%, 5% and at 10%.

** Shows that series is stationary at 5% and at 10%.

* Shows that series is stationary at 10% only.

Our decision is based on ADF at 5% significance level with trend and intercept. If at 5% level of significance the ADF statistics is less than critical values then we will reject our null hypothesis which is that there is unit root in series. Rejecting null hypothesis it means series is stationary and there is no unit root problem. If ADF statistics is greater than at the 5% level of significance value then we will do at first difference. Our data is stationary at different level except Sri lanka which is not stationery at same level means both series are stationary at level other countries' data is stationary one series is at level and other is at first difference due to this reason we will apply the ARDL.

Table- 4 ARDL Result:

Variable	Statistics name	Pakistan	Sri lanka	Bangladesh	India
$\Delta(\text{SR}(-1))$	<i>Coefficient</i>	0.2584	-0.2623	0.2679	0.2392
	<i>t-Statistic</i>	3.8186	-3.8550	3.8652	3.4875
	<i>Prob.</i>	0.0002	0.0002	0.0002	0.0006
$\Delta(\text{INF})$	<i>Coefficient</i>	-0.4202	0.2813	-1.7397	-1.4718
	<i>t-Statistic</i>	-0.4179	0.1842	-1.6818	-2.0362
	<i>Prob.</i>	0.6764	0.8540	0.0942	0.0431
$\Delta(\text{INF}(-1))$	<i>Coefficient</i>	0.5306	1.3340	-0.9670	-0.8781
	<i>t-Statistic</i>	0.5200	0.8631	-0.9374	-1.1962
	<i>Prob.</i>	0.6036	0.3891	0.3497	0.2331
$\text{SR}(-1)$	<i>Coefficient</i>	-0.1026	-0.4052	-0.0715	-0.0674
	<i>t-Statistic</i>	-3.9721	-5.7687	-3.1349	-2.9941
	<i>Prob.</i>	0.0001	0.0000	0.0020	0.0031
$\text{INF}(-1)$	<i>Coefficient</i>	-0.6970	-0.9900	0.0471	-0.1657
	<i>t-Statistic</i>	-3.1455	-1.7142	0.1336	-0.8205
	<i>Prob.</i>	0.0019	0.0881	0.8938	0.4129

Table- 5 Wald Test Result:Null hypothesis: $C(4) = 0, C(5) = 0$

Statistics Name	Pakistan	Sri Lanka	Bangladesh	India
F-statistics	8.0874	16.699	5.3465	5.4403
Probability	0.0004	0.0000	0.0054	0.0050
Chi Square	16.174	33.398	10.693	10.880
Probability	0.0003	0.0000	0.0047	0.0043

Table- 6 ECM Result:

Variable	Statistics name	Pakistan	Sri lanka	Bangladesh	India
$\Delta(\text{SR}(-1))$	<i>Coefficient</i>	0.7084	0.0593	0.7018	0.8935
	<i>t-Statistic</i>	3.9608	0.5871	3.3332	4.3043
	<i>Prob.</i>	0.0001	0.5578	0.0010	0.0000
$\Delta(\text{INF})$	<i>Coefficient</i>	-0.6187	0.2910	-1.4420	-1.6700
	<i>t-Statistic</i>	-0.6134	0.1975	-1.4186	-2.3780
	<i>Prob.</i>	0.5403	0.8436	0.1576	0.0184
$\Delta(\text{INF}(-1))$	<i>Coefficient</i>	-0.2818	0.0086	-0.3212	0.2514
	<i>t-Statistic</i>	-0.2764	0.0058	-0.3088	0.3115
	<i>Prob.</i>	0.7825	0.9954	0.7578	0.7557
ECM(-1)	<i>Coefficient</i>	-0.5543	-0.7751	-0.5251	-0.7641
	<i>t-Statistic</i>	-2.8616	-6.2873	-2.3473	-3.4860
	<i>Prob.</i>	0.0047	0.0000	0.0199	0.0006

Results and Discussions:

In all countries distributed stock return with lag value is significant it means it has impact on the stock return. In the case of India distributed inflation also impact on stock return it means India's stock return is affected by the inflation but it has the negative coefficient it support the result of Moosa (1979). Pakistan and Bangladesh also have negative co-efficient but insignificant and the Sri Lanka has positive coefficient but this is also insignificant. Stock return with lag value of all countries also has the significant results it means this variable also impact on the stock return. Change of inflation with lag value Pakistan and Sri Lanka has positive coefficient which support the theory of Fisher hypothesis (1930) but Bangladesh and India shows negative results. In the case of Pakistan inflation with lag value has the negative coefficient sign with significant t statistics value but other countries do not show such behavior means there inflation with lag value is not significant with stock return. Some countries show positive coefficient sign and some countries show negative coefficient sign with inflation.

For knowing long term relationship we apply the wald test and apply coefficient restrictions of stock return and inflation with lag value. Wald test shows significant result which means that there exist long term relationship between stock return and inflation. For knowing the short term relationship between stock return and inflation applied ECM test which also shows that there exist a short term relationship between stock return and inflation. Firth, M. (1979), Hondroviannis and papapetrou (2006) and Akash et al. (2011) also found such results that there exists a long and short relationship between stock return and inflation.

Conclusion:

It is examined in this paper that the relationship between inflation and stock return. The fisher hypothesis states that in perfect market stock return should be hedged against inflation. As in

the literature there are more empirical studies which conclude that there is a negative relationship between stock returns and inflation. In this paper we extensively studied to check whether inflation and stock return have any relationship, to know either common stock can be best hedge for protecting the investors against inflation. Our empirical results shows mixed results in the case of Pakistan, India and Bangladesh it shows negative relationship but in the case of Sri Lanka it shows positive relationship. As our WALD test result shows relationship between inflation and stock return exists in all countries.

Implications:

There are three main implications due to the empirically analysis of this paper. First to some extent it resolved a great puzzle because in the literature positive and negative relationship found in developed economies between the stock return and inflation. Second it is found that there is no empirical evidence found earlier in SAARC countries, this paper has a major contribution in the field of finance regarding the mentioned countries. Third and most important contribution is for the investors who want to know whether the stock returns provide hedge during the inflationary regimes or not.

Recommendations:

1. It is recommended for future research that all countries in SAARC should be included for testing the relationship and sample period should also be expanded as much as possible.
2. It is also recommend for future research direction that one can do comparison between the developed economies and developing economies.

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Graphical Representations of Data:

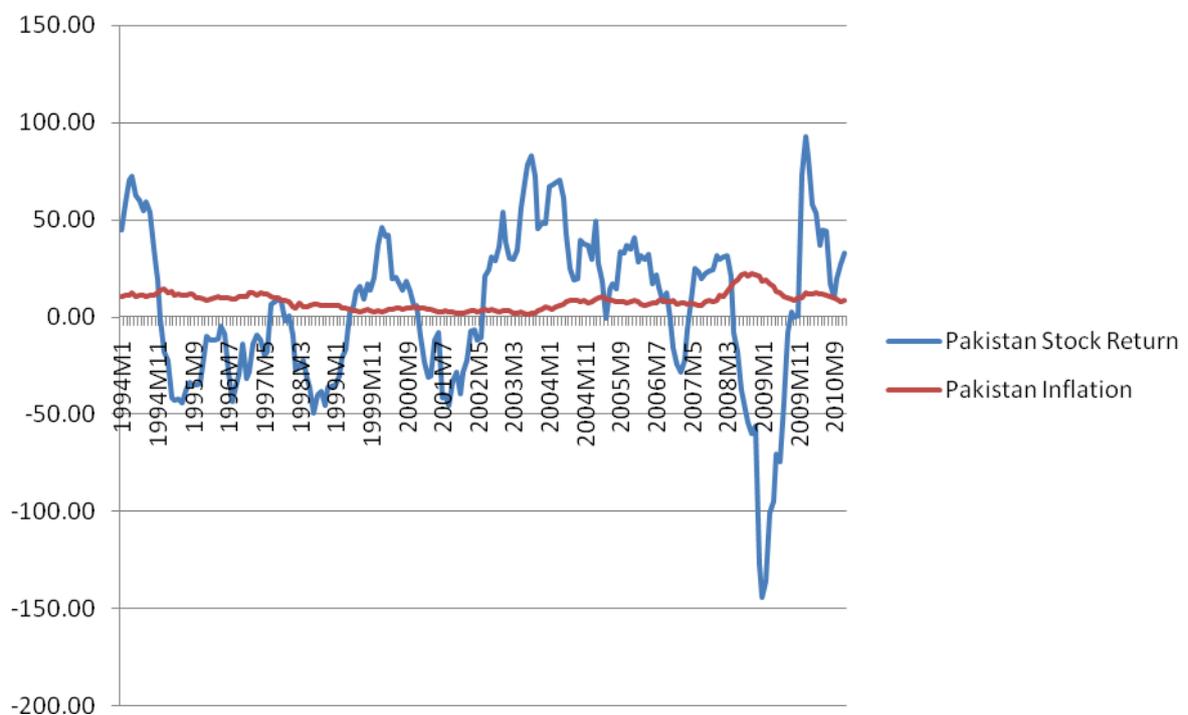


Figure 1

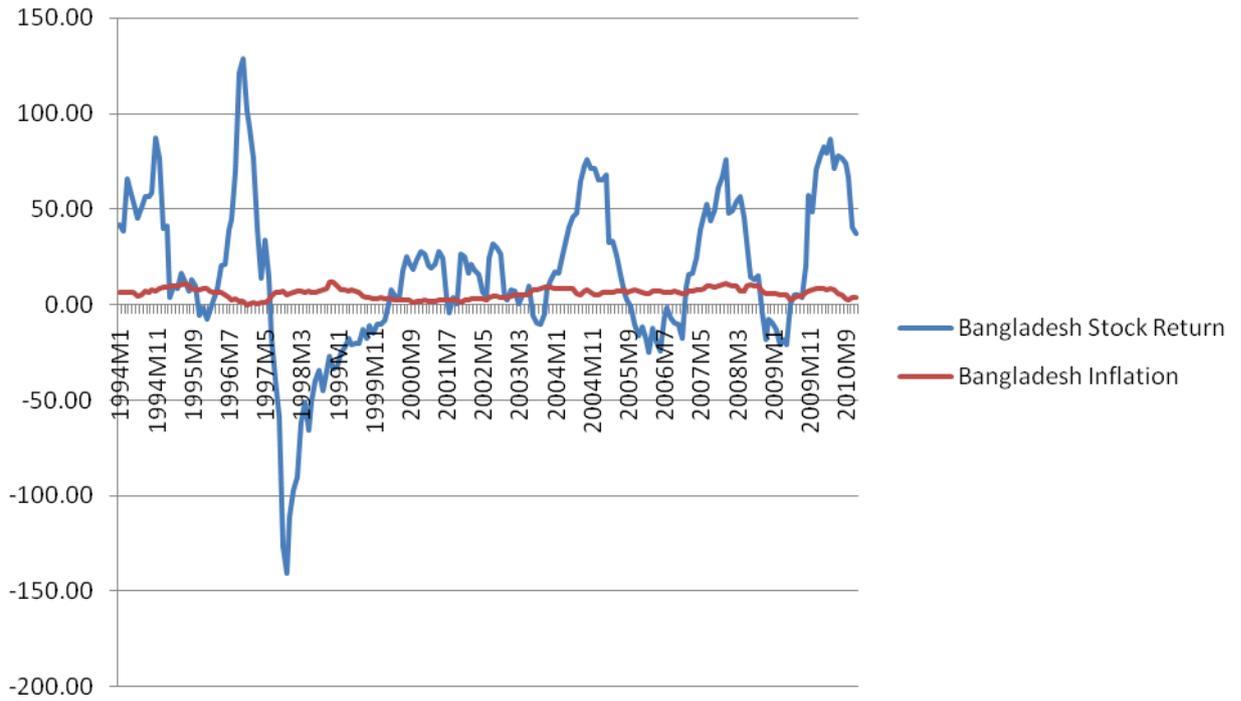


Figure 02

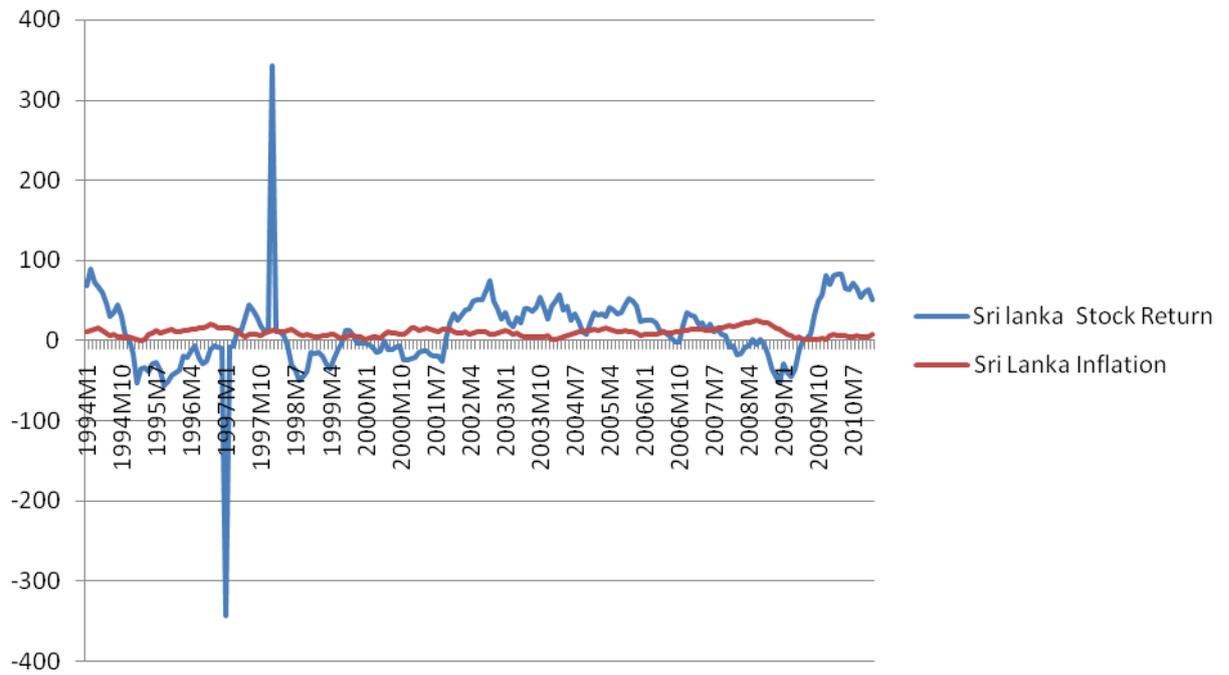


Figure 03

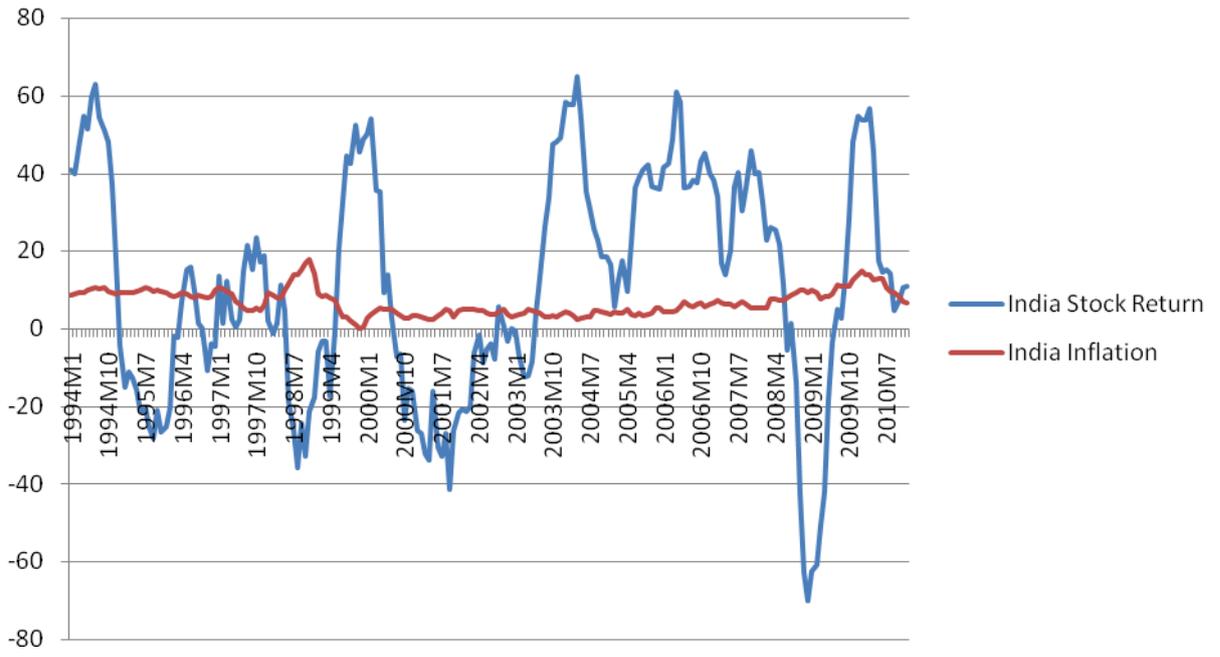


Figure 04