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Can Common Stocks Provide Hedge against Inflation? Evidence from SAARC Countries

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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. As Fisher Hypothesis (1930) concluded that nominal expected return on a 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 it depends on expected and unexpected nominal returns. According to Geske and Roll (1983) a positive relationship exists between stock returns and inflation, based on the assumption that securities represent claims on real assets. When there is an increase in rate of inflation, it is expected that prices of real assets will also rise, thereby improving the value of securities representing a claim on such real assets. We found that various studies in this area reported against the hypothesis, showing a negative relationship between the two. However, certain other studies support the theory asserting that the relationship existing between stock returns and inflation is positive. While the negative relationship between inflation and stock return is against the theory, negative results have led to formation of hypothesis such as tax augmented hypothesis. The tax augmented hypothesis states that when we deduct tax from the stock returns, their relationship with inflation tends to get negative as the quantum and rate of taxes also rise along with inflation. This hypothesis also opines that initial researcher did not consider the tax impact when they were empirically testing the relationship between stock returns 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 or not Fisher Hypothesis holds in SAARC countries. Our motive for carrying out this study was the lack of consensus on the empirically relationship between stock returns and inflation in the literature. While there have been numerous studies in developed economies which tested the relationship between the stock return and inflation like USA and European countries and found negative relationship, some studies have also reported positive relationship. To the best of

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my knowledge this relationship has not been explored in SAARC countries; additionally this study uses the most updated dataset. Many economists have held the belief for a long time that real stock returns and inflation should be positively, or at least non-negatively, related. Some authors hypothesise that returns on security depend on expected inflation. But, a lot of researchers have found that the returns on security do not have a positive relation between inflation and return after the war in the United States. Again, studies carried out in a number of developed economies like European countries and other developed economies in rest of world found negative relationship between security return and inflation in the post war era. Some studies found that pre-war there is a positive relationship between real stock return and inflation.

I believe that the most important aspect of this subject is the region. So far no formal research has been reported on the relationship between stock returns and inflation to verify the applicability of Fisher Hypothesis in SAARC countries. Considering the particular economic set prevailing in these countries, I felt that a formal research could produce useful observations that could help economic planners, investors and analysts understand the functionality of investment climate in this region better. The fact that researches in different parts of the world, and in countries in different stages of development have yielded different results over different time periods also provides a forceful reason for establishing the validity, or otherwise, of an important economic hypothesis in this part of the world in the current times.

Hence, I will say that there are three justifications for carrying out the present research:

(a) the region (SAARC countries) that has hitherto not been covered by any research in this aspect;
(b) the significance of establishing the validity of an important economic hypothesis for the current state of economy in the region; and
(c) the insight into investment functionality that it can provide to investors and economic planners.

LITERATURE REVIEW

The field of finance has some literature on the inflation and equity returns. It is among the most important issues 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 also increases, leaving real interest rate unaffected. When we transpose this hypothesis into stock markets it means stock return should reflect relationship between stock returns and inflation, i.e. an increase in inflation should lead to an increase in stock returns. This hypothesis is also supported by the Bodie (1976) who said security returns depend on expected nominal return and also unexpected nominal return, and also on expected and unexpected inflation rate. The idea that there should be positive relationship is given by the Geske and Roll who said in 1983 that stock returns and inflation should have a positive relationship because they represent claim on real assets. But in the literature there is lot of evidence available which shows that stock market performs poorly during inflationary times, failing to hedge share prices against inflation. Reilly, *et al.* (1970)

made a portfolio of common stock and found that common stocks are not hedged against inflation. Bodie (1976), Nelson (1976), Fama and Schewart (1977) and Adams, *et al*. (2004) analysed 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, thereby indicating a negative relationship equity returns and inflation.

Moosa (1979) found that common stock as a group is not hedged against inflation because other factors like uncertainty and income effect also have an effect on the stock prices. Fama (1981) hypothesised 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 realised inflation and realised 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 (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 realised 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

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

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

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

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

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

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

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

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

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.

$$\Delta(Stock\ Return)_t = \alpha + \beta\Delta(Inflation)_t + \mu_t \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (5)$$

Here change in Stock return is our dependent variable α is the real rate of return β is the Coefficient of inflation which is our independent variable. U_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 employee 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.

$$\Delta(Stock\ Return)_t = \alpha + \beta_1\Delta(Inflation)_{t-1} + \beta_2\Delta(Inflation)_t + \beta_3\Delta(Inflation)_{t-1} + \beta_4\Delta(Inflation)_{t-1} + \beta_4\Delta(Inflation)_{t-1} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (6)$$

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.

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

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 consists of stock price indices and consumer price indices which is monthly data taken from SAARC countries namely Pakistan, India, Sri Lanka and Bangladesh. Our data set covers a period starting from Month 1 of 1993 and ending on Month 12 of 2011. We took the monthly data because of the annual series is not available for a sufficient time period to justify a meaningful analysis. 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

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

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 ranges between 4.46 percent for Pakistan to 16/08 percent for Bangladesh, with India and Sri Lanka falling in between. 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 lie between them. Table shows that the data is negatively skewed. Average monthly inflation appears more stable than stock returns as it has less standard deviation as compared to the stock return inflation. Sri Lanka has 3.97 percent average monthly inflation where Pakistan has 8.27 percent and other countries have the values between them. Variability (standard deviation) ranges between 2.69 for Bangladesh and 6.16 for Sri Lanka. Data appears positively skewed except for Bangladesh which is a little bit negatively skewed. Graphic representation of data is also discussed in Index which is at the end of the paper. Graphic representation of data shows that there is much variation in the stock returns: with high peaks and very low valleys. However, 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 percent, 5 percent and at 10 percent.
** Shows that series is stationary at 5 percent and at 10 percent.
* Shows that series is stationary at 10 percent only.

Our decision is based on ADF at 5 percent significance level with trend and intercept. If at 5 percent 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 percent 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
Δ(SR(–1))	*Coefficient*	0.2561	–0.2623	–0.2985	0.2342
	t-Statistic	3.9007	–3.8550	–4.5583	3.4892
	Prob.	0.000	0.0002	0.0000	0.0006
Δ(INF)	*Coefficient*	0.2597	0.2813	0.0712	–1.706
	t-Statistic	0.3013	0.1842	0.0469	–2.4524
	Prob.	0.7634	0.8540	0.9626	0.0150
Δ(INF(–1))	*Coefficient*	0.1115	1.3340	1.6393	–0.6691
	t-Statistic	0.1274	0.8631	1.0769	–0.9422
	Prob.	0.8987	0.3891	0.2827	0.3472
SR(–1)	*Coefficient*	–0.094	–0.4052	–0.3202	–0.0646
	t-Statistic	–3.946	–5.7687	–5.1984	–2.931
	Prob.	0.000	0.0000	0.0000	0.0038
INF(–1)	*Coefficient*	–0.595	–0.9900	–1.0214	–0.2095
	t-Statistic	–2.853	–1.7142	–1.7764	–1.0638
	Prob.	0.004	0.0881	0.0771	0.2886

Table 5

Wald Test Result

Null Hypothesis: C(4) = 0, C(5) = 0				
Statistics Name	Pakistan	Sri Lanka	Bangladesh	India
F-statistics	8.2054	13.6892	7.2072	4.9330
Probability	0.0003	0.0000	0.0009	0.0080
Chi Square	16.410	27.378	14.414	9.8660
Probability	0.0002	0.0000	0.0007	0.0072

Table 6

ECM Result

Variable	Statistics name	Pakistan	Sri lanka	Bangladesh	India
Δ(SR(–1))	*Coefficient*	0.7303	0.0586	0.7213	0.9078
	t-Statistic	4.1567	0.5627	3.2750	4.2908
	Prob.	0.0001	0.5742	0.0012	0.0000
Δ(INF)	*Coefficient*	0.1711	0.1801	0.2510	–1.8781
	t-Statistic	0.1981	0.1233	0.2560	–2.7733
	Prob.	0.8431	0.9020	0.7982	0.0061
Δ(INF(–1))	*Coefficient*	–0.8751	0.4601	–2.207	0.5642
	t-Statistic	–1.0191	0.3160	–2.280	0.7024
	Prob.	0.8431	0.7523	0.0236	0.4832
ECM(–1)	*Coefficient*	–0.5747	–0.7358	–0.618	–0.7772
	t-Statistic	–3.0301	–5.8980	–2.668	–3.4979
	Prob.	0.0028	0.0000	0.0082	0.0006

RESULTS AND DISCUSSIONS

In all countries distributed stock return with lag value is significant. It means it has an impact on the stock return. In the case of India distributed inflation also impacts on stock return, meaning India's stock return is affected by the inflation. But as it has the negative coefficient it supports the result of Moosa (1979). Pakistan and Bangladesh also have negative coefficient but insignificant and the Sri Lanka has positive coefficient but this is also insignificant. Stock return with lag value of all countries also has significant results: it means this variable also impacts on the stock return. Change of inflation with lag value in Pakistan and Sri Lanka has positive coefficient which support the theory of Fisher hypothesis (1930) but Bangladesh and India show negative results. In case of Pakistan, inflation with lag value has a negative coefficient sign with significant t statistics value but other countries do not show such behaviour meaning their inflation with lag value is not significantly related with stock return. Some countries show positive coefficient sign and some countries show negative coefficient sign with inflation.

For establishing the long term relationship we used the Wald test, applying 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 determining the existence of short term relationship between stock

return and inflation, I applied ECM test which also shows that there exists a short term relationship between stock return and inflation. Firth (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

This paper examined the relationship between inflation and stock returns. The Fisher hypothesis states that in perfect market stock return should provide a hedge 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 the data to determine whether inflation and stock return have any relationship and to establish if investment in common stocks can provide a hedge for protecting the investors against inflation. Our empirical results show mixed results. In case of Pakistan, India and Bangladesh, our research shows a negative relationship but in case of Sri Lanka it shows a positive relationship. However, our Wald test result shows relationship does exist between inflation and stock returns in all countries.

Following could be the reasons for these results.

(a) Stock prices in SAARC countries in general and Pakistan in particular do not reflect economic realities *per se*. They are influenced by quantum of money available for investment at stock exchanges, rather than the state of economy. Events like recent legislation in Pakistan allowing black money to be invested in stocks can change the returns with or without inflation being a cause.

(b) Stock prices do not reflect the replacement value of inherent assets on which the stockholders have a claim. Again, inflation as computed on the basis of consumer price index cannot always be seen as a measure applicable to prices of long term assets.

(c) Stocks have a claim on assets but if a major portion of assets are monetary assets, as in case of financial institutions and trading companies, inflation actually erodes the value of assets. Hence a negative relationship in stock returns and inflation must be expected).

Implications

There are three main implications of the empirically analysis of this paper. Firstly, it contributed to the existing literature on the great puzzle regarding the potential of investment in stocks to cover a shield against inflation. Admittedly, it came up with mixed results as indeed was the case with several other studies carried out in developed economies. Secondly, we established that there was no empirical evidence (and analysis) on this important area of finance and investment in SAARC countries. Hence, this pioneer paper will hopefully make a major contribution in the field of research on finance in SAARC countries. Thirdly and perhaps most importantly, it will have significance for the investors who want to know whether the stock returns provide hedge during the inflationary regimes or not.

Recommendations

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.

It is also recommended that future research in this area should focus on a comparison between the developed economies and developing economies in the same period of time.

Graphical Representations of Data

Fig. 1.

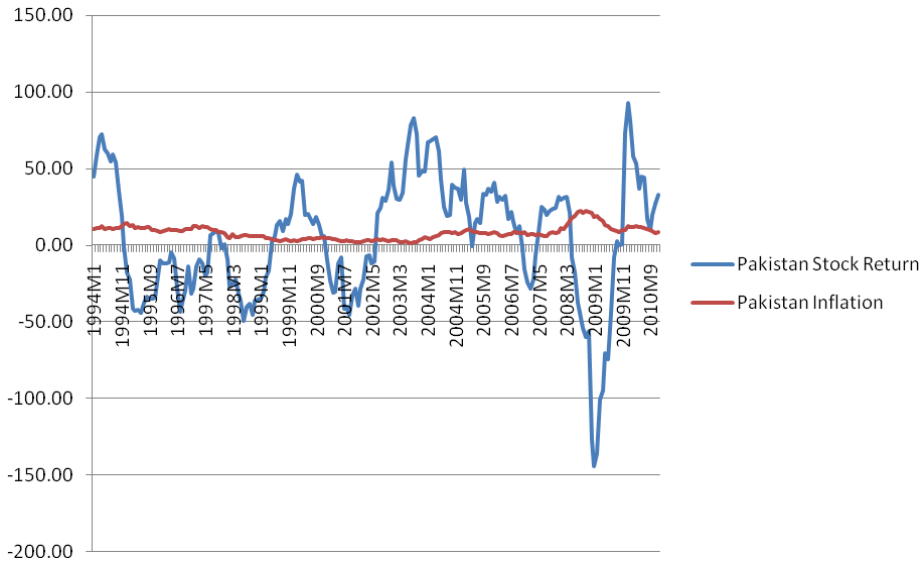


Fig. 2.

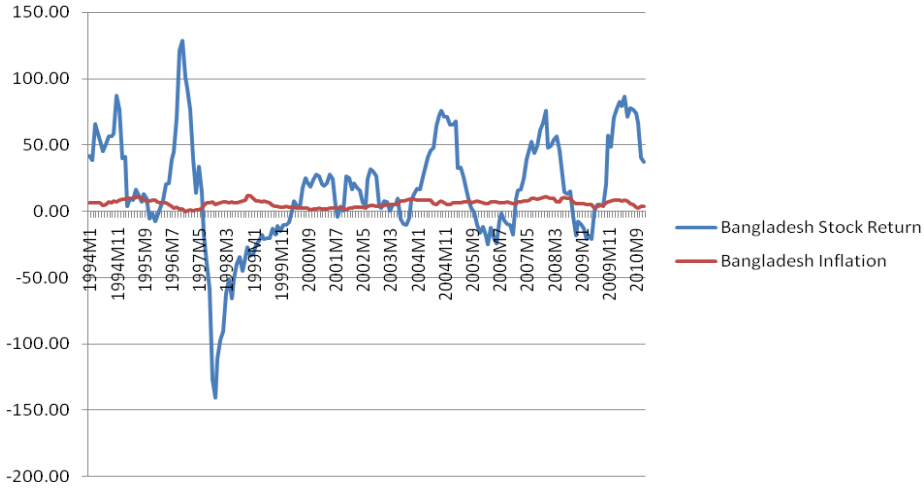


Fig. 3.

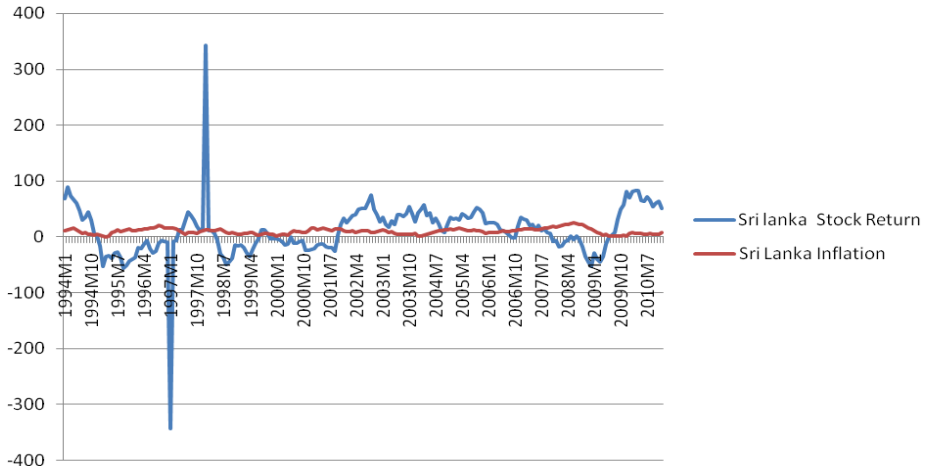
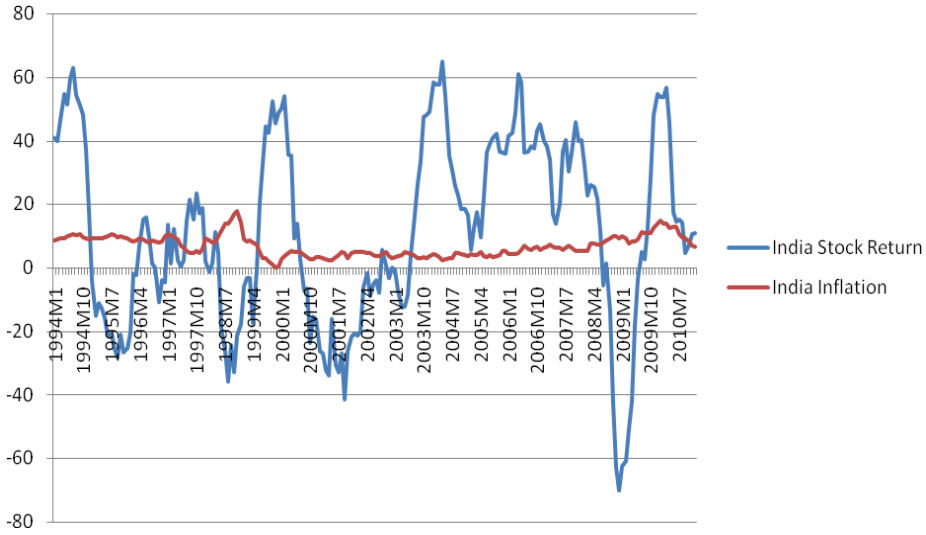


Fig. 4.



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