LONG RUN RELATIONSHIP BETWEEN INFLATION AND STOCK RETURN: EVIDENCE FROM PAKISTAN

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ABSTRACT

This study is an important attempt to understand the complex process of inflation which become than just a problem all around the world and its impact on the money earn from the investment on stock returns. The objective of this research study is to investigate a long run relationship between KSE 100 index return and inflation rate in Pakistani economy. Quarterly data from January 1996 to December 2011 has been used. The study investigates whether change in inflation causes changes in stock returns and if so, in what direction. Augmented Dickey Fuller (ADF) unit root test has been used to find out the stationarity of the data at level or at first differences, Johansen Cointegration Technique has been used to determine the long term equilibrium relationship between inflation rate and stock prices. Finally Granger Causality Test has been used to find out the causal relationship between said variables. The evidence from cointegration test shows a negative relationship between KSE 100 index return and inflation rate because Pakistan is an under develop country when inflation occur it badly affect the economy which will ultimately affect the stock return and the reasons are economic condition and budget deficit along with some other factors and the Granger causality tests shows that there is no causality between KSE 100 index return and inflation rate in any direction.

Keywords: Inflation, stock return, Cointegration, causality

INTRODUCTION

Stock market plays an essential role in economic growth and development of a country. Stock prices are the prices of securities traded on the stock exchange which is also called as stock market; it plays an important role in economic prosperity and fostering capital formation and sustaining economic growth (Charles and Adjasi 2008) (Hamrita 2009) (Quayes 2010). The stock market Cointegration had been examined by different researchers in different economies (Masih and Masih 1999) (Fraser and Oyefeso 2000) (Pascual 2002).

The prices of the securities traded on the stock market are changed on a daily basis and these are determined by demand and supply. Some of the factors behind decreases or increases in the demand and supply of a stock could comprise market behavior, company fundamentals and external factors (Kurihara 2006). From all external factors one of the factors is the inflation and the investor took inflation as a hedge against stock return. Normally inflation is defined as, increase in general price level. Increase in inflation increase the income of an individual but with that the prices of consumers good also increases with which buyer purchase few good with higher prices. The reasons for inflation in any country are, the inverse relation between demand and supply, increase supply of money, devaluation of currency, budget deficit, increase prices of food, increase in taxes and interest rate, energy crises, increase in wages and salary, foreign remittances, infra-structure problem etc. Some economist thinks that, increase in prices are just the indicator to inflation, basically inflation

is the term give expansion of money supply. Inflation is the most important and widely talks about concept in the world. It creates many problems in the life of the masses.

In financial theory, inflation rate is represented by consumer price index (CPI) which is actually signifies an overall increase in prices of goods and services. Inflation occurs when prices of goods increase or when it needs more money to purchase the same items. Most of the researchers believe that the rate of inflation will influence the stock market volatility and its risk in any economy.

There are two type of inflation rate expected inflation and unexpected inflation. Expected inflation rate is a consequence that economists and consumers plan on year to year. If inflation is expected, people are less likely to hold cash, over time the money value decreases due to inflation. However, the unexpected inflation is beyond what was expected by economics and consumers. In general, the effects of unexpected inflation are much more harmful than the effects of expected inflation. The main effect of unexpected inflation is a redistribution of wealth either from borrowers to lenders. Inflation creates a major problem for analyzing stock market returns over a long period of time. In the United States where inflation has averaged between 2 percent and 5 percent for most years since World War II, the inflation creates a natural bias in the performance of the stock market. Almost every country in the world suffered from worst stock market declines as measured in real values, because during a period of high inflation or hyperinflation the stocks and the other financial assets failed to keep up with the increases in the prices of goods and finally become a reason for extreme volatility in stock market returns. If the government is unable to control inflation then the stock will collapse over 95 percent of their real value. Moreover, history has shown that in periods of inflation, dividends rarely keep with increase in consumer prices and dividend decline in real term, further reducing investor total return as argued by (Taylor 1996). High inflation can affect the assets return in to two ways: first, it may slow down the economic activities in future. And cut down the corporate profit. If we fix the real discount rate then it negatively affects the assets return. Secondly, whenever inflation increase the risk also increases. When risk is high then the investor get return beyond their expectation.

So the objective of this research study is to examine whether the KSE 100 index return in Pakistan is influenced by inflation in long run or not and is there any causal between inflation and stock return.

The remainder of this paper is organized as follows. Section 2 discusses the review of literature; section 3 discusses the research methodology. Emperical results and their discussion are presented in section 4. A brief summary, conclusion and recommendation are the subject of the final section.

LITERATURE REVIEW

The previous research studies justified that when inflation occur in a country, it will affect the stock market returns because the stock markets in a country plays an important role in economic prosperity and fostering capital formation and sustaining economic growth (Charles et al; 2008; Hamrita et al, 2009; Donatas, 2009; Shakil, 2010), the reason is that whenever the price of consumer goods increase or decrease it will affect the stock market return positively, negatively or may not affect due to some other factors. Some of the related studies are as follows.

Inflation rate affect stock prices in different economies but the relationship between unexpected inflation and stock prices is unclear. (Fama and Schwert 1977) and (Fama 1981) found a significant negative relationship between stock market and inflation. However, (Hardouvelis 1988) found no significant relationship between the two variables. Since the

relationship between inflation and stock prices is not clear, it is important for researcher to find out the behavior of different variables. (Fisher 1930) studied that the expected rate of inflation is composed of real return and expected rate of inflation. The Fisher hypothesis concludes that there is no relationship between real return and monetary sector. The Fisher hypothesis was applied to stock returns and most of the studies give an inverse relationship between stock return to expected and unexpected inflation (Nelson 1976) (Geske and Roll 1981). Results from previous research study conclude that there is a negative relationship between stock returns and inflation (Fama and Schwert 1977); (Fama 1981). (Fama 1981) discusses that stock return are negatively related to inflation due to the reason that stock return are positively related to the real activity and the real activity is negatively related to the change in the level of prices. Though, the theory suggests that equities are a good hedge against inflation that's why the rate of return may be unaffected by inflation.

(Bakshi and Chen 1996) discuss that a negative correlation between inflation and stock prices has become one of the most commonly recognized practical facts. But (Caporale and Jung 1997) test a causal relationship between both expected and unexpected inflation and real stock returns, and find that a positive relationship does exist. As they conclude that the negative effects of inflation on stock return do not disappear after controlling for output shocks. This is opposite to Fama's view.

A positive relationship between stock market returns and inflation rate was investigated by (Choudhry 1998) in four high inflation countries (Argentina, Chile, Mexico and Venezuela) and therefore it is concluded that the stock returns act as a hedge against inflation. Also,(Chatrath, Ramchander et al. 1997) check whether the negative stock return and inflation relationship is explained in the Indian economy. The results indicate a partial support to Fama's hypothesis. On the other hand, (Zhao 1999) finds a significant negative relationship between stock prices and inflation in Chinese economy. This result is consistent with (Fama 1981).(Hess and Lee 1999) they claim that the sign of the correlation between stock prices and inflation depends on the nature of the shock creating inflation. They find that a positive monetary shock has a positive effect on stock prices and inflation. Also, (Graham 1996) discovers a positive relationship between inflation and stock returns.

Furthermore, (Spyrou 2001) examines the relationship between stock returns and inflation rate in Greek by using monthly data from January 1990 to June 2000. The result for the period 1995-2000 show a negative but insignificant relationship, while for the period 1990-1995 there is a significantly negative relationship. A possible explanation is that there is a negative correlation between inflation and real output growth (Fama 1981). (Omran and Pointon 2001) use cointegration analysis and error correction model to analyse the impact of the inflation rate on the Egyptian stock market. The results show that the inflation rate has a definite impact on the stock market in Egyptian. (Greenspan and Allen 1995) examined that the inflationary expectations may have countervailing effects on equity prices. For example, an increase in inflationary expectations may benefit equity prices by decreasing the real value of corporate debt, thus increasing the firm's value. This may be particularly true because private debt is rarely effectively indexed to inflation. Conversely, decrease in the future inflation rate may reduce equity values because the real value of debt rises, reducing the firm's value. Furthermore, decrease in inflationary expectations decreases nominal interest rates which may cause stock prices to go up because lower rates mean a higher present value of the future stream of corporate earnings. But lower inflationary expectations may also lower the expected future stream of earnings which could lower stock prices. So the inflationary expectation effect on stock prices may be neutral or indeterminate. . Finally, (Gallagher and Taylor 2002) describe the hypothesis of (Fama 1981) by looking at the relationship between

stock return and inflation using multivariate innovation decomposition. The results show a strong support to the hypothesis in the US.

The above literature shows that stock return and inflation are interconnected, whenever prices increase in the country it affect the stock market as well as return of the investor, inflation is consider as strong macro economical factor that surely influence the assets return, but from above literature it is concluded that when inflation occurs it definitely affect the stock market, mostly negatively and rarely positively. This paper examines the relationship between stock returns and inflation for Pakistan. Also, in this study we test for cointegration and causality among these variables. The main goal of this paper is to analyse the above relationship for a recent period, considering quarterly data from January 1996 to December 2011. So, we convert daily data of KSE-100 index obtained from yahoo finance to quarterly values and also take data of Inflation on quarterly basis from State Bank of Pakistan web site.

METHODOLOGY

This study use secondary data collected on quarterly basis from Yahoo Finance for KSE-100 Index and from State Bank of Pakistan for Consumer Price Index from January 1996 to December 2011.The study applied descriptive statistics, the Augmented Dickey Fuller (ADF) Unit Root test proposed by (Dickey and Fuller 1979) (Dickey and Fuller 1979, 1981), Johansen's co-integration test proposed by (Johansen 1990) and Granger-causality test proposed by (Granger 1988), (Engle and Granger 1987) and (Granger, Huang et al. 1998). E-Views 7 statistical package was used for these analyses. Similar types of test analysis techniques have been used by (Geetha, Mohidin et al. 2011) for measuring long run causal relationship between inflation and stock market for the case of Malaysia, United State and China respectively.

Procedure

The quarterly data collected for KSE-100 Index and Consumer Price Index was entered into MS Excel sheet which was then transferred to E-Views software for analysis purposes. Firstly, the descriptive analyses were conducted through E-Views to know the mean, median, standard deviation, skewness, kurtosis and the like statistics. Then unit root (ADF) test was applied to check the stationary status of data, in order to have good analysis. After which Johansen's co-integration test was applied to check the cointegration between variables. At the end the Granger causality test was applied to measure the causal relationship between inflation and stock prices in Pakistan.

RESULTS AND DISCUSSION

The results obtained from descriptive statistics, Augmented Dickey Fuller test, Johansen's Co-integration test and Granger causality test are presented and discussed in detail in this section.

Descriptive Statistics

Table 1 provides self-explanatory descriptive statistics analysis done through E-Views statistical software. Inflation (CPI) has the mean of 8.719365 with standard deviation of 5.082242. KSE-100 index Return has the mean of 4.035824 and standard deviation of 14.47809.The values of median, maximum, minimum, skewness, kurtosis, jarque-bera, probability and observations are also given for these two variables in the Table 1.

Table 1. Descriptive Statistics

	CPI	KSE-100 Index Return
Mean	8.71937	4.03582
Median	8.20000	3.08170
Maximum	24.52000	47.16300
Minimum	1.80000	-34.10300
Std. Dev.	5.08224	14.47809
Skewness	1.10233	0.24806
Kurtosis	4.28266	4.11621
Jarque-Bera	17.07764	3.91666
Probability	0.00020	0.14109
Observations	63	63

Augmented Dickey Fuller test (ADF)

Augmented Dickey Fuller test has been used to find out the stationary status of the data at level or at first difference. Table 2 shows the Inflation (CPI) and KSE-100 index return is stationary at 1st difference and the order of integration is I(1). Lag length for all the variable is based on the Schwarz Info criteria (SIC). The test results reject the null hypothesis that there is a unit root in the first difference for inflation rate and stock prices. The value of the Durbin-Watson statistics is also acceptable for Pakistan.

Table 2. Results of Augmented Dickey Fuller Test

Variables	ADF Test Statistics		Critical Values	Order of Integration
ADF test statistic-CPI	-4.847791	1% critical value	-3.5504	
		5% critical value	-2.9135	I(1)
		10% critical value	-2.5945	
ADF test statistic-KSE-100 Index Return	-12.16224	1% critical value	-3.5402	
		5% critical value	-2.9092	I(1)
		10% critical value	-2.5922	
Variable	Coefficient	Std.error	t- Statistics	Prob.
D(CPI(-1))	-0.5772	0.1191	-4.8478	0.0000
D(KSE_100_INDEX(-1))	-1.4218	0.1169	-12.1622	0.0000

Johansen Co-integration Test

After finding the stationarity of data through ADF unit root test the cointegration tests was applied between inflation rate and stock return to identify any possible long-run equilibrium between them. The null of no cointegrating vector can be rejected for the given variables used in the study (see Table 3) and the empirical findings support the conclusions about the presence of long run relationship between stock prices and inflation rate. The results from this test indicate that the null hypothesis is rejected because the value of both Trace statistics and Max-Eigen statistic is greater than the critical value at five percent level of significance. This indicates that the quarterly data for this study from 1996 to 2011 support the intention that in Pakistan there exist a long term relationship between inflation rate and stock prices.

Table 3 Results of Johansen Co-integration Test

Hypothesized Number of CE(s)	Eigenvalue	Trace Statistics	Max-Eigen Statistics	5 Percent Critical Value
r =0*	0.308542	28.59992	21.76823	15.49471**
r< 1*	0.109339	6.831697	6.831697	3.841466**
Normalized Co integrating Coefficients				
KSE-100 Index Return		CPI		C
1.0000		0.267552		-6.059298
		(0.43162)		
		[0.61988]		

Trace test and Maximum Eigen value indicates 2 cointegrating equations at the 5% level and * denotes the rejection of null hypothesis at the 0.05 level of significance.

So the normalized cointegration equation for this model is:

$SP = \alpha + \beta_1\ CPI + \varepsilon$ -- (1)

SP = 6.059298 - 0.267552CPI

The equation (1) indicates that a 1 percent increase in the inflation rate, the stock prices is predicted to decrease by 0.267552 percent by holding all other factors constant. This shows that there is negative relationship between inflation rate and stock prices in Pakistan.

The result are supported from the work of (Geske and Roll 1981); (Chatrath, Ramchander et al. 1997; Adrangi, Chatrath et al. 1999), they all explored negative relationship between inflation rate and stock prices in US, their result shows that stock prices are negatively affected by both expected and unexpected inflation in the US.

Granger Causality Test

This test tells us about the direction of causality, and table 4 shows the result of Pairwise causality. The two null hypothesis are: (a) does Stock Prices cause Inflation Rate? (b) does Inflation Rate cause Stock Prices ?

Table 4 Results of Granger Causality Test

Null Hypothesis:	Obs	F-Statistic	Prob.
KSE_100_INDEX does not Granger Cause CPI	59	1.33077	0.2728
CPI does not Granger Cause KSE_100_INDEX		3.22625	0.0475

The results of Granger causality reveal no causalities in any direction. This result confirms our previous finding that no cointegrating relationship exists between stock prices with inflation rate.

CONCLUSION

The objective of this research study is to investigate a long run causal relationship between inflation and KSE 100 index return for Pakistan. This study uses quarterly data on inflation which is measured as consumer price index (CPI) and KSE 100 index return. Augmented Dickey Fuller (ADF) test, Johansen Cointegration technique and Granger causality tests has been used to assess the relationships; between these two variables.

Inflation is very important issue of any economy; it affects all the segments of the country's economy. Capital markets in a country are also acts as a backbone of any country. So there must be a strong relationship between capital market and inflation. As previous literature and theory suggested that increase in inflation in Pakistan have a negative impact on the performance of capital market in Pakistan. The aim of this study is also to determine the impact of high inflation of Pakistan on stock market returns. As Pakistan is in under developing country and high budget deficit is one of the reasons of changing in economic variables such as inflation which will ultimately affect the whole system including stock market prices and returns as well. High inflation discourages the investment in stock market because an increase in inflation has been expected to increase the nominal risk-free rate, which in turn will raise the discount rates used in valuating stocks.

Our results are in line with the literature and show that there is a negative and significant impact of inflation on KSE- 100 index return. One important factor in the downfall of our stock market return is uncontrollable inflation. The economists and researchers are agreed on this fact that if we want to improve the performance of our capital markets then we have to think how to control the inflation in Pakistan.

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