INSTITUTE OF ACTURIAL AND QUANTITATIVE FINANCE (IAQS)

RELATIONSHIP BETWEEN STOCK PRICES AND INFLATION RATE IN INDIA

Jash Poonatar

Roll No.:- 18

PAGE OF CONTENTS

ABSTRACT

The relationship between inflation and stock market returns has been investigated by several researchers around the world. The findings of investigations have recognized the existence of connection between stock market performance and inflation. However there has been various conflicting results. The specific objective of this investigation was to determine the influence that inflation has on returns of stock market. Using statistical tests and empirical evidences I have tried to assess the relationship between stock prices and rate of inflation in our country. Investors need to have perfect knowledge of the factors affecting the stocks price's and thus a detailed explanation regarding of the same has been presented here.

Using statistical tests I can conclude that inflation is a average indicator stock prices in I ndia due to its random nature which could explain certain indexes very strongly while having no correlation with some.

INTRODUCTION

The financial landscape of the modern is highly complex. With more information available to investors due to the penetration of the internet in most rural areas, investor sentiment is now driven by analysis and data is opposed to an emotion drive response. A classic example of this is inflation which was historically considered as a sign of an unhealthy economy but with rise in awareness among investors due to better understanding of economic cycles and prudent investing is now a good indicator of the stock prices.

The price of a share in Indian market is determined through by its demand and supply i.e. free forces of market which in turn is affected by various factors like social, political, economic, cultural,etc. Anything can have a impact on the share price and inflation is one of such factor. Thus we try and explain the relationship between inflation and stock prices through the following research.

WHAT IS INFLATION ?

Inflation rate is the increase in the overall price levels of commodities which remains steady over a given period of time in a country. Low or medium inflation levels in nation positively influence the business sector since it provides production incentives. Inflation is the persistent growth in the generally accepted price levels which causes the rise in cost of living in a country thus reducing the living standards of the general public rendering them poor. High rate of inflation creates uncertainties in the economy, due to which the investors are afraid of investing on capital goods.

There are 2 primary reason for an increase in inflation rate in the country.

1. Demand > Supply - There are times when the average income of people in an economy increases and they wany to buy more products and services. During such times the demand can increase above the supply of the product/services. Hence there rises a case of scarcity that causes buyers to pay more for the same product/service. This phenomenon which led to rise in prices is inflation.
2. Increase in cost of production - The inflation rate also increases if the cost of production of goods increases due to external factors such as increase in cost of raw materials, manpower, taxes,etc thus to cover their expenses sellers tend to increase the prices while also reducing supply causing the prices to increase very quickly.

Types of inflation: -

1. Creeping inflation- when there is general rise in prices at very low rates, which is 2-4% annually
2. Trotting inflation- when there is rise in price to almost 5%
3. Galloping inflation- when rate is increased with a noticeable speed and at a remarkable rate usually from 10-20%
4. Hyper inflation-when the inflation rate rise to over 20%

INFLATION IN INDIA

The annualized inflation rate in India is 5.37% as of February 2015, as per the Indian ministry of statistics and programme implementation. This represents a modest reduction from the previous annual figure of 9.6% for June 2011. Inflation rates in India are usually quoted as changes in the Wholesale Price Index, for all commodities.

Many developing countries use changes in the Consumer Price Index (CPI) as their central measure of inflation. India used WPI as the measure for inflation but new CPI(combined) is declared as the new standard for measuring inflation. CPI numbers are typically measured monthly, and with a significant lag, making them unsuitable for policy use. Instead, India uses changes in the Wholesale Price Index (WPI) to measure its rate of inflation.

The WPI measures the price of a representative basket of wholesale goods. In India, this basket is composed of three groups: Primary Articles (20.1% of total weight), Fuel and Power (14.9%) and Manufactured Products (65%). Food Articles from the Primary Articles Group account for 14.3% of the total weight. The most important components of the Manufactured Products Group are Chemicals and Chemical products (12%); Basic Metals, Alloys and Metal Products (10.8%); Machinery and Machine Tools (8.9%); Textiles (7.3%) and Transport, Equipment and Parts (5.2%).

WHAT ARE THE EFFECTS OF INFLATION ON AN ECONOMY?

Inflation has both Negative and Positive points which are as follows.

1. Negative
    - Add inefficiencies in the market, and make it difficult for companies to budget or plan longterm
    - Can impose hidden tax increases, as inflated earnings push taxpayers into higher income tax rates.
    - Cost-push inflation - Rising inflation can prompt employees to demand higher wages, to keep up with consumer prices. Rising wages in turn can help fuel inflation.
    - Hoarding - People buy consumer durables as stores of wealth in the absence of viable Alternatives as a means of getting rid of excess cash before it is devalued, creating shortages of the Hoarded objects.
    - Hyperinflation - If inflation gets totally out of control (in the upward direction), it caN grossly interfere with the normal workings of the economy, hurting its ability to supply.
2. Positive
    - Labor-market adjustments - Inflation would lower the real wage if nominal wages are kept constant, Keynesians argue that some inflation is good for the economy, as it would allow labor markets to reach equilibrium faster.
    - Debt relief - Debtors who have debts with a fixed nominal rate of interest will see a reduction in the "real" interest rate as the inflation rate rises

HOW ARE STOCK PRICES DETERMINED ?

Equity markets are known for creating wealth over a longer period of time. Hence it attracts a lot of interest from people looking to invest their saving and generate returns on their investments. Stock prices are largely determined by the forces of demand and supply. Demand is the amount of shares that people want to purchase while supply is the amount of shares that people want to sell. The price discovery happens where demand and supply meet at a particular price level (equilibrium) i.e. both the buyer and seller agree to trade at a particular price point.

Demand and supply of a company is influenced by its underlying business. If the business of the company is doing well, demand for it rises as more investors want to own a part of the company. The increase in demand leads the buyers to bid up the prices of the stock to entice sellers to sell them. As a result the stock price increases. Conversely, if the company isn't performing well investors want to sell their shares in the company thereby increasing supply. The increase in supply leads the sellers to bid down the prices hoping to attract buyers to buy the stock thereby reducing the price. Since quality of the business determines the investor demand and supply in the market, it is therefore important for us to understand the factors that impact the fundamentals of a company.

LITERATURE REVIEW

Over the years, there have been numerous studies analyzing the effect of inflation and related macro-economic events on the financial market. Some studies, such as Fisher (1930) expected nominal return of stock to be equal to expected inflation plus the real rate of return. Fisher's hypothesis also predicts a positive relationship between stock return and inflation. Another school of thought (Fama 1981) says that the stock market is not affected by inflation. However, there has been empirical work showing changes in the expected inflation are negatively affecting the stock return. Nelson (1976), Jaffe and Mandelker (1976), Bodie (1976), Fama and William Schwert (1977), Modiglian and Cohn (1979), Geske and Roll (1983) and Kaul (1987) supported the negative relationship between stock return and inflation. Several reasons put forth for this negative relationship was taxation-relationship, dividend price ratios, and price-earnings ratios, negative relationship between inflation and real economic activity, etc. According to Knif, Kolari, and Pynnönen (2008), stock market reaction can provide a different result for both positive and negative inflation shock depending on the state of the economy, i.e., the effect of inflation on stock returns depends on how investors perceive inflation in different economic state. Wei (2009) further supported the study and found equity returns respond negatively to unexpected inflation during contraction than expansion.

For India, Chatrath et al. (1997) found stock returns to be a perfect hedge for the expected component of inflation but showed a negative relationship for the unexpected component of inflation.

RELATIONSHIP BETWEEN STOCK PRICES AND INFLATION RATE

1. Purchasing power of investors – Since inflation is increase in prices of the goods/services it also serves as an indicator for decreasing value of money. So with subsequent rise in inflation the same amount of money is worth less in future reducing the purchase power of the investor i.e. the amount of shares bought is reduced leading to reduction in demand and prices.
2. Interest rates – When inflation rises Reserve Bank of India (RBI) increases interest rates for depositing loans and deposits with an aim to incentivize people to curb money spending and reducing liquidity to bring inflation rate down. Also since loans get costlier the cost of capital increases for companies thus the projected cashflows are valued lower resulting in lower equity valuations.
3. Impact on stocks – As inflation rises speculation about future prices increase resulting in a volatile market. Investors expecting drop in prices will sell off their holdings leading to drop in prices while optimistic investors will buy such shares leading to volatile environment. Value stocks are strongly impacted in such conditions and can be predicted to be directly proportional to the rate of inflation. Thus with rise in inflation certain stock performs better while growth stocks which have minimal cashflows tend to drop in prices

Inflation is not the devil it is assumed to be and a controlled rise in inflation is a sign of growing economy. Using previous data we can see that rising inflation is a indicator of improvement in Gross Domestic Product (GDP). But we also need to keep in mind that high inflation erodes the purchasing power of a investor while low inflation stunts the growth thus a investor need to compare inflation rate over the years to determine whether it a gradual increase or sudden movement leading to losses.

METHODOLOGY

Using the report made by Rohit Kumar on relationship between inflation and stock prices in India, this report tries to explain its result while also adding to it. The study adopted a descriptive case study design.

The objective of this research is to find out the relationship between Inflation Rate and Indian Stock Market because Inflation Rate has a considerable influence on on Stock Market. To find out the relation we select indices (E.g.- BSE Sensex, NSE Nifty, BSE Bankex, Bank Nifty, BSE Consumer Durables and BSE FMCG). Sensex and Nifty are the major stock indices of India, if inflation rate affect these stock indices than it affect whole stock market. The inflation data is based on Consumer Price Index

The purpose is to check here the degree of association between Inflation and all the indices mentioned here as to know what kind of relationship exist between and so correlation analysis is used as it is an appropriate statistical tool for discovering and measuring the relationship between Inflation and Indian Stock Market. As explained in this research methodology, the data has been taken serial wise wherein inflation is compared against the various indexes to know the nature of relationship between them. The hypothesis thus stated would be regarding the effectiveness of inflation in our country to the Indian Stock Market.
Hypothesis- (Yearly Data of Inflation and BSE Sensex)

1. Ho(Null Hypothesis)-Performance of BSE SENSEX does not depend on performance of inflation rate
2. H1(Alternate Hypothesis)- performance of BSE SENSEX depends on performance of inflation rate

We use such hypothesis for all the other indexes and and conduct test of correlation and regression.

The results are:-

1. Correlation between inflation and BSE Sensex

Descriptive Statistics

	Mean	Std. Deviation	N
Inflation_Rate	6.9160	3.33938	15
BSE_Sensex	13179.8767	7742.37221	15

Correlations

		Inflation_Rate	BSE_Sensex
Inflation_Rate	Pearson Correlation	1	.541*
	Sig. (2-tailed)		.037
	N	15	15
BSE_Sensex	Pearson Correlation	.541*	1
	Sig. (2-tailed)	.037	
	N	15	15

*. Correlation is significant at the 0.05 level (2-tailed).

- The level of significance is 0.037 which is less than 5% and so we can say that the level of correlation between inflation and BSE Sensex is significant and also the Pearson Correlation value of "0.541" shows that there is a strong degree of positive correlation between Inflation and BSE Sensex
- There is a positive correlation between them, it signifies increase in inflation rate always give positive impact on BSE Sensex

2. Regression between inflation and BSE Sensex

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.541[a]	.293	.239	6754.78031

a. Predictors: (Constant), Inflation_Rate

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	246068843.705	1	246068843.705	5.393	.037[b]
	Residual	593151741.429	13	45627057.033		
	Total	839220585.134	14			

a. Dependent Variable: BSE_Sensex

b. Predictors: (Constant), Inflation_Rate

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4497.196	4125.617		1.090	.295
	Inflation_Rate	1255.448	540.607	.541	2.322	.037

a. Dependent Variable: BSE_Sensex

The level of significance 0.037 which is less than 5% significance level value so we can say that model is fit and R^2 value of "0.293" shows that 29.3% variation in the value of BSE Sensex is explained by a given change in Inflation Rate.

3. Correlation between Inflation and Bank Nifty

Descriptive Statistics

	Mean	Std. Deviation	N
Inflation_Rate	8.4400	3.05773	10
Bank_Nifty	9679.3700	4248.23609	10

Correlations

		Inflation_Rate	Bank_Nifty
Inflation_Rate	Pearson Correlation	1	.018
	Sig. (2-tailed)		.962
	N	10	10
Bank_Nifty	Pearson Correlation	.018	1
	Sig. (2-tailed)	.962	
	N	10	10

- The level of significance is 0.962 which is more than 5% and so we can say that the level of correlation between inflation and Bank Nifty is not significant and also the Pearson Correlation value of "0.018" shows that there is a very weak positive or no correlation between Inflation and Bank Nifty
- There is a very weak positive correlation between inflation rate and Bank Nifty.

4. Regression between Inflation and Bank Nifty

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.018[a]	.000	-.125	4505.24129

a. Predictors: (Constant), Inflation_Rate

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	49996.196	1	49996.196	.002	.962[b]
	Residual	162377592.365	8	20297199.046		
	Total	162427588.561	9			

a. Dependent Variable: Bank_Nifty

b. Predictors: (Constant), Inflation_Rate

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	9473.643	4383.152		2.161	.063
	Inflation_Rate	24.375	491.132	.018	.050	.962

a. Dependent Variable: Bank_Nifty

The level of significance 0.962 which is more than 5% significance level and so we can say that the model is not fit and also the R^2 value of 0.00 shows that 0% variation can be explained a given change in inflation.

CONCLUSION

So, on the basis of the result of both the test i.e. Test of Correlation and Test of Regression conducted above, we could make out that- The correlation coefficient of Inflation with major stock indices is sometimes highly positively or sometimes very low positive. This show the degree of association between Inflation and Various Stock Market Indices is very uncertain and random and hence stock market return cannot be predicted. So, by using above statements we can safely conclude that stock market prices follow a random walk such that outperforming the stock market is not possible.

The regression coefficient of Inflation with major stock market indices is always positive. This shows that inflation can be used to explain the variation in the movement of the the stock market and hence Indian Stock Market can be affected by the change in the inflation rate in Indian economy.

So, in the light of the all observation in all the above cases the results are:

1. In HYPOTHESIS 1 Null hypothesis is rejected and Alternate hypothesis is accepted. So, it signifies that there is significant relationship between inflation and BSE Sensex, which means that increase or decrease in inflation will increase or decrease the Sensex.
2. In HYPOTHESIS 2 Null hypothesis is accepted and Alternate hypothesis is rejected. So, it signifies that there is no significant relationship between Inflation and Bank Nifty.

The purpose of study was to find out the effectiveness, Impact and relationship of Inflation with the Indian Stock Market and to uncover the impact of inflation on Stock Market. There were many objectives behind conducting the study but the main objective was to find out the nature of relationship that Indian Stock Market has with Inflation because inflation has considerable influence on economy and Stock Market

The project was begin with an extensive introduction about the inflation, stock market and how inflation affect stock market and economy. In this research the data were taken on yearly basis. The inflation data is taken on annual basis according to CPI (Consumer Price Index). The data of all the indices also taken on annual basis, the data of index is taken on closing price for all years.

The final result goes in favor of the study that Inflation has relationship with Indian Stock Market because Inflation shows a positive effect on most of the indices. So, the end result is that Inflation always leave positive impact on Indian Stock Market.

BIBLIOGRAPHY

Research Papers Used:-

1. Rohit Kumar (University of Delhi)
2. Gurmeet Singh
3. Stephen Oyugu (Nigeria University)
4. Sumit Agrawal

Websites Used: -

1. www.wikipedia.com
2. www.investopedia.com
3. www.bseindia.com
4. www.moneycontrol.com
5. www.economictimes.indiatimes.com
6. www.nseindia.com
7. www.inflation.eu