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Review of Literature on Macroeconomic Determinants of Equity Share Prices

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REVIEW OF LITERATURE ON MACROECONOMIC DETERMINANTS OF EQUITY SHARE PRICES

Shefali Sharma*

Abstract

The present study attempts to examine the relationship found in empirical studies of macroeconomic variables namely, exchange rate, money supply, inflation, industrial production, foreign exchange reserves and interest rate with stock market indices in the post-reform era of liberalization. Classical economists argued that the exchange rates lead stock prices with positive correlation whereas the proponents of portfolio-balance model argue that, being part of wealth, equity may affect the exchange rates through demand for money implying that stock prices lead exchange rates with negative correlation. Money supply was found to have negative and positive impact on stock prices. Several studies have found negative relationship between inflation and share prices. Industrial production would lead to a rise in stock prices thus implying positive relationship. Increase in foreign exchange reserves lead to a positive effect on stock market movements. In majority of studies interest rate was found to be negatively related with stock prices.

Keywords: Determinants, Financial reforms, Macroeconomic variables, Share Price

INTRODUCTION

Managers make investment decisions on the basis of whether the investment will improve the future value of the firm. As share prices are forward looking variables which condense information regarding a firm's expected value, movements in share prices and investment should, in theory, be correlated [Anderson (1996)]. Increasingly, however, it has been recognized that share markets may not be efficient processors of information and may deviate from their fundamental value for extended periods *[Fama (1970, 1991), Poterba and Summers (1988), De Long, Shleifer, Summers and Waldmann (1990), Cutler, Poterba and Summers (1990a, 1990b), Claessens, Dasgupta and Glen (1995) and Kortian (1995)].* Depending on the extent to which there is a causal relationship between share prices and investment, share prices which are not based on fundamentals may distort investment decisions.

A number of empirical studies have been conducted in India and abroad on relationship between equity share prices and macroeconomic factors. These studies

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have been reviewed to understand the research methodology, research findings and to identify the gap that exists in the literature in this area.

According to stock valuation models, the current price of an equity share is equal to the present value of all future cash flows to that share. Changes in macroeconomic environment affect the expected cash flows and/or the required rate of return to the share, which in turn affect the current price of a share *[Wickremasinghe (2006)]*. Further, the Arbitrage Pricing Theory (APT) of Ross (1976) posits relations between stock prices and certain macroeconomic variables. Friedman (1988) and Mishkin (1998) also argue for the roles of equity markets in the specification of money demand and in monetary transmission mechanisms, respectively.

The following review of literature provides a representative sample of studies conducted into the relationship between stock market returns and macroeconomic factors and is intended to reveal the common factors, methodology and statistical testing of the various studies conducted in this area of research. Table 1 gives an overview of studies on macroeconomic factors affecting equity share prices. Further discussion has been divided into two sections. Section one appraises the review of studies conducted in India and abroad. Section two concludes the findings.

REVIEW OF LITERATURE

A number of empirical studies in developed and developing countries have employed different macroeconomic variables to examine relationship with stock prices. A few notable studies for developed countries found that factors such as slope of the yield curve, risk premia, industrial production, money supply and interest rate are important determinants of stock prices *[Fama (1981, 1990), Chen (1986), Hamao (1988), Asprem (1989), Chen (1991), Thornton (1993), Naka (1995), Kaneko and Lee (1995), Cheung and Ng (1998), Darrat and Dickens (1999), Lamont (2001), Flannery (2002) and Humpe (2005)]*.

In relation to developing countries, a few studies include those by Oyama (1997) for Zimbabwe, Kwon and Shin (1999) for South Korea, Wongbangpo and Sharma (2002) for Indonesia, Malaysia, Philippines, Singapore and Thailand, Ibrahim and Aziz (2003) for Malaysia, Tsoukalas (2003) for Cyprus. These studies found significant interactions between exchange rate, money supply, interest rate, oil price and dividend yield. Gunasekarage (2004) and Wickremasinghe (2006) for Sri Lankan economy found consumer price index, money supply and Treasury bill rate as significant determinants of share prices.

Table 1
Empirical Evidence on Macroeconomic Determinants of Equity Share Prices

	AUTHOR (COUNTRY)	YEAR	SAMPLE VARIABLES	SAMPLE SIZE	SIGNIFICANT VARIABLES
1	Kraft and Kraft (U.S.A)	1977	Money supply, rate of change in money supply, corporate interest rate & a measure of risk	S&P 500 Index	Money supply (-)
2	Chen (U.S.A)	1986	Inflation, treasury bill rate, industrial production, changes in risk premium	NYSE Index	Industrial production (+), changes in risk premium (+) and inflation (-)
3	Cutler (U.S.A)	1988	Real dividends, industrial production, real money supply, long term interest rate, short term interest rates, inflation and stock market volatility	NYSE Index	Inflation (-), market volatility, real dividends (+) & industrial production (+)
4	Taylor and Poon (U.K)	1991	Index of industrial production, consumer price index, long term interest rates, short term interest rates and risk premium	LSE Index	Long term interest rates (-), index of industrial production (-) and Consumer Price Index (+)
5	Jung (U.K)	1996	Index of industrial production, gross domestic product & short term interest rate	LSE Index	Gross Domestic Product (+) & short term interest rate (+)
6	Groenewold (Australia)	1997	Inflation, interest rates, output and employment	19 Sectors	Inflation (-) and Interest rates (-)
7	Oyama (Zimbabwe)	1997	Stock market index, non-fuel commodity prices, real interest rates, real money and one market index	17 Sectors	Money supply (-) and market interest rates (+)
8	Mehar (Pakistan)	1998	Budget deficit, foreign exchange reserves, banks credit to public sectors, external borrowings and money supply	KSE Index	Money supply (+), foreign exchange reserves (+) and credit to public sector (-)
9	Errunza & Hogan (Europe)	1998	Industrial production, money supply and consumer price index	KSE Index	Monthly stock returns of Eight countries

10	Gjerde (Norway)	1999	Short term interest rate, consumer price index, index of industrial production, exchange rate and oil prices	OSE Index	Short term interest rate (+) and oil prices (+)
11	Ibrahim (Malaysia)	1999	Industrial production index, consumer prices, money supply, credit aggregates, foreign reserves and exchange rates	KLCI Index	Foreign reserves (+) & Exchange rates (-)
12	Kwon and Shin (South Korea)	1999	Trade balance, foreign exchange, industrial production and money supply (M1)	KOSPI & SMLS	Trade balance (+), foreign exchange (+), industrial production (+) and money supply (-)
13	Tsoukalas & Sil (U.K)	1999	Dividend price ratio (D/P), dividend growth rate and short-term interest rate	U.K. Stock Price Index	Dividend price ratio (+)
14	Grossman (U.S.A)	2000	Economic growth, interest rates, dividends, changes in Dow Jones 12 stock index and publicly reported events	2 Companies	Interest rates, economic growth & publicly reported events
15	Abhay & Karnik (India)	2000	Exchange rate of rupee, prime lending rate, narrow money supply (M1), broad money supply (M3) and index of industrial production (IIP)	Sensex & Nifty	Exchange Rate (-)
16	Gupta (Indonesia)	2000	Exchange rate and interest rate	JSX Index	Exchange rate (+) and interest rate(-)
17	Rao (India)	2000	Product, money and capital market factors	Sensex and BSE-100	Inflation (-), interest rates (-) and foreign exchange rates (+)
18	Maysami & Koh (Singapore)	2000	Exchange rate, short and long-term interest rates, inflation, money supply, domestic exports and industrial production	Singapore Stock Index	Exchange rate (+), short term interest rate (+), long-term interest rates (-) and money supply (+)
19	Ibrahim & Yusoff (Malaysia)	2001	Exchange rate, industrial production, money supply and consumer price index	KLCI Index	Money supply (-) and Exchange rate (-)

20	Lamont (U.S.A)	2001	Industrial production, real consumption growth, real labor income growth, inflation, excess stock returns, excess bond returns and treasury bill returns	13 Companies	Industrial production (+), real consumption growth (-) and real labor income growth (+)
21	Flannery (U.S.A)	2002	17 macro series announcements	NYSE Index	Consumer price index (-), Producer price index (-) and money supply (-)
22	Maghayereh (Jordan)	2002	Industrial production, inflation, interest rates, domestic exports, foreign reserves & money supply	ASE Index	Interest rates (-), inflation (-), exports (+), foreign reserves (+), industrial production (+) & money supply (-)
23	Pandey (India)	2002	Share price, consumer price index, wholesale price index, government consumption expenditure, gross domestic product, money market rate and population	9 Asian Countries	Money market rate (-) and returns (+)
24	Madsen (Copenhagen)	2002	Inflation, capital gains, dividend, yield, gross domestic product and growth	18 OECD Countries	Inflation (-) and GDP (+)
25	Balke (U.S.A)	2002	Price dividend ratio, real dividend growth, short and long term interest rates and inflation	S&P 500 Index	Expectations of future real dividend growth and future excess returns
26	Bhattacharya and Mukherjee (India)	2002	Broad money (M3), national income (gross national product at constant prices), index of industrial production, interest rate (364-days Treasury bill rate) and the rate of inflation	Sensex	Index of industrial production (+) and the rate of inflation (-)
27	Bhattacharya and Mukherjee (India)	2003	Exchange Rate, Foreign Exchange Reserves and value of trade balance	Sensex	None of the variables found significant

28	Tsoukalas (Cyprus)	2003	Industrial production, the consumer price index, money supply and exchange rates	Stock prices at Cypriot stock market	Industrial production (+), consumer price index (-), money supply (+) and exchange rates (+)
29	Adel (Jordan)	2004	Money supply, Consumer Price Index (CPI), Index of Industrial Production (IIP) and Treasury Bill rate	ASE Index	Money supply (+), consumer price index (-), index of industrial production (+) and treasury bill rate (-)
30	Dritsaki (Athens)	2004	Inflation rate, interest rate and industrial production	ASE Index	Inflation (-), interest rates (-) and industrial production (+)
31	Giovannini (U.S.A)	2004	Stock price series, relevant stock index of country, spread between future price and spot price, exchange rate	6 Oil Companies	Stock market index (+) and volatility of stock returns
32	Gunasekarage (Sri Lanka)	2004	Money supply, interest rate, consumer price index and the foreign exchange rate.	CSE Index	Consumer price index (-), money supply (+) and treasury bill rate (-)
33	Nishat (Pakistan)	2004	Index of industrial production, consumer price index, money supply and money market rate	KSE Index	Index of industrial production (+) and consumer price index (-)
34	Humpe (U.S.A & Japan)	2005	Industrial production, Consumer price index, money supply, long term interest rate and short term interest rate	S&P 500 Index and Nikkei 225	Industrial production (+), Consumer price index (+), short term interest rate (+) and long term interest rate (-)
35	Venkateshw-arlu (India)	2005	Exchange Rate	Sensex and Nifty	Exchange rate (+)
36	Narayan (India, Pakistan, Bangladesh and Sri Lanka)	2005	Exchange Rate	Share Price Index of four countries	Exchange rate (+) for India and Pakistan
37	Ahmad (India)	2005	Foreign Institutional Investment flows	Nifty	Foreign Institutional Investment flows (+)

38	Wong (Singapore & U.S.A)	2005	Interest rate and money supply	S&P 500 Index (U.S.A)	Interest rate (-) and money supply (-)
			Interest rate and money supply	Straits Times Index (Singapore)	Interest rate (-) and money supply (-)
39	Agrawalla (India)	2006	Industrial production, money supply, credit to the private sector, exchange rate, wholesale price index and money market rate.	Sensex	Industrial Production (+)
40	Ray (India)	2006	The national output, fiscal deficit, interest rate, inflation, exchange rate, money supply, foreign institutional investment	Sensex	Interest rate (-), output (+), money supply (+), inflation rate (-) and the exchange rate (+)
41	Naka (India)	2006	Index of industrial production, Consumer Price Index, Money Supply (M1) and Interest Rate.	Sensex	Index of industrial production (+) and Consumer Price Index (-)
42	Chakravarty (India)	2006	Money supply (M3), Exchange Rate, Index of industrial production, inflation and gold price	Sensex	Money supply (+), index of industrial production (+) and inflation (-)
43	Gan (New Zealand)	2006	Consumer price index, exchange rate, Gross Domestic Product (GDP), Money Supply (M1), long-term interest rate, short-term interest rate and Domestic retail oil price	NZSE Index	Interest rate (-), Money supply (-) and GDP (+)
44	Wickremsin-ghe (Sri Lanka)	2006	Exchange rate, three-month fixed deposit rate, Consumer price index, US stock market index, money supply and gross domestic product	CSE Index	Gross domestic product (+), money supply (-), exchange rate (-) and consumer price index (-)
45	Saini (Malaysia)	2007	Exchange rate	KLCI Index and S&P 500 Index	Exchange Rate (-)

46	Sharma & Singh (India)	2007	Foreign exchange reserves, claims on private sector, wholesale price index, call money rate, index of industrial production, exchange rate and broad money (M3)	Sensex	Foreign exchange reserves (+), exchange rate (-), index of industrial production (-), money supply (-) and claims (+)
47	Gay (U.S.A)	2008	Consumer price index, money supply, foreign exchange rate, gross domestic production and oil price	Share Price Index of four countries	Inflation (-), exchange rate (-)

Where: ASE = Amman Stock Exchange, **ASE** = Athens Stock Exchange, **BSE** = Bombay Stock Exchange, **CSE** = Colombo Stock Exchange, **JSX** = Jakarta Stock Exchange, **KLCI** = Kuala Lumpur Stock Exchange, **KOSPI** = Korea Composite Stock Price Index, **KSE** = Karachi Stock Exchange, **LSE** = London Stock Exchange, **NYSE** = New York Stock Exchange, **NZSE** = New Zealand Stock Exchange, **OSE** = Oslo Stock Exchange, **OECD** = Organization for Economic Cooperation and Development **S&P 500** = Standard and Poor's 500 composite index, **Sensex** = Sensitive Index, **SMLS** = Small-Size Stock Price Index, **U.K.** = United Kingdom, **U.S.A.** = United States of America. (+) indicates positive relationship with equity share prices and (-) indicates negative relationship with equity share prices.

Source: Compiled from Various Studies.

Engle and Granger (1987) and Granger (1986) suggested that the validity of long term equilibrium between variables can be examined using cointegration techniques.In almost all the studies both Indian and foreign, stock return index has been used to predict its relationship with various macroeconomic variables The relationship of stock market returns with macroeconomic variables as found in various studies is explained below:

STOCK PRICES AND EXCHANGE RATE

The causal nexus between stock prices and macroeconomic variables received a lot of attention from academics. There were two views on relationship between stock prices and exchange rates. Classical economists argued that currency appreciation would affect products international competitiveness and trade balance position. As a result, firm's profit would be affected due to output contraction and this in turn would affect stock prices *[Saini (2007)]*. This is suggestive that the exchange rates lead stock prices with positive correlation *[Aggarwal (1981), Kao (1990), Abdalla and Murinde (1997), Gupta (2000), Granger (2000), Narayan (2005)]*.

However, the proponents of portfolio-balance model argue that, being part of wealth, equity may affect the exchange rates through demand for money. Higher stock prices, may lead to a higher demand for money with ensuring higher interest rates *[Saini (2007)]*. With relatively higher interest rates, foreign capital inflows results in an appreciation of domestic currency, implying that stock prices lead exchange rates with negative correlation *[Soenen and Hennigan (1988), Bahmani-Oskooee and Sohrabian (1992), Ajayi (1998), Ibrahim (1999,2001), Maysami (2000), Rao (2000), Nishant (2002), Narayan (2005), Venkateshwarlu (2005), Wickremasinghe (2006)]*. While theoretical explanation was clear, empirical support was mixed.

Exchange rate was found to be significant variable that affected stock prices in most of the studies *[Ibrahim (1999, 2001), Kwon (1999), Maysami (2000), Gupta (2000), Tsoukalas (2003), Narayan (2005), Wickremasinghe (2006) and Saini (2007)]*. The results revealed that a fall in the exchange rate would lead to more exports and more foreign exchange into the economy, which would increase the money supply and inflation in the economy.

Some studies showed bi-directional causality between stock prices and exchange rates in the short run but not in the long run *[Bahmani-Oskoee and Sohrabian (1992), Jae-Kwang-Hwang (1998)]*. When the domestic currency depreciates against foreign currencies, export product prices would decrease and consequently, the volume of the country's exports would increase, assuming the demand for the product was elastic [Gan (2006)]. However, this positive relationship existed in Japan and Indonesia both large exporting countries *[Mukherjee, (1995) and Achsani (2002)*. However, an increase in stock price had a negative short-term effect on domestic currency values but in the long-term this effect was positive, while currency depreciation had a negative short and long-term effect on stock market *[Ajayi (1998)]*.

Exchange rates and stock prices have an important role in influencing the development of emerging markets which have expanding corporate sectors with listed firms and growing tradable sectors sensitive to exchange rate policies *[Abdalla and Murinde (1997)]*. Whether the country was export or import dominant lead to the mixed nature of results of exchange rate with stock prices in some of industrial countries *[Ma and Kao (1990), Smith (1992), Ajayi (1998), Granger (2000)]*. In most of the industrialized countries, where a firm was a user of imported inputs, currency devaluation would raise costs, and lower profits resulting in decrease of firm's stock price *[Venkateshwarlu (2005), Narayan (2005)]*. Morley and Pentecost (2000) in their study on G-7 countries, argued that the reason for the lack of strong relationship between exchange rates and stock prices was due to the exchange controls that were in effect in the 1980.

Ajayi et al (1998) found that in Philippines and Indonesia Granger causality ran from the stock market to the currency market, in South Korea causality ran from the currency to the stock market and that in Hong Kong, Singapore, Malaysia and Thailand there was no significant casual relationship. Narayan (2005) in their study

on four Asian countries found that exchange rates, granger affected stock prices in India in both the long-run and short-run whereas in Pakistan it was a short run relationship. For Singapore *[Maysami & Koh (2000)]* and Greece *[Diacogiannis, Tsiritakis & Manolas (2001)]*, their respective foreign exchange rates were determined to be cointegrated into stock market prices, indicating a weak-efficiency for both markets. For the nineteen emerging countries in their sample, Muradoglu, Tasking & Bigan (2000) showed exchange rates preceded stock returns in the six countries of Brazil, Colombia, Greece, Korea, Mexico and Nigeria. Wongbanpo & Sharma (2002) observed that competition in the world exporting market was seen to explain the positive interrelationship between the exchange rate and stock prices for Indonesia, Malaysia and the Philippines and was adversely effecting asset prices for Singapore and Thailand.

Work in this area had not progressed much in India because the exchange market was controlled and monitored by Central Bank till early 1990s. Most of the studies in India have tested the relationship between stock prices and exchange rate by applying the cointegration, granger causality test and Vector Autoregression *[Abhay Pete and Ajit Karnik (2000), Rao (2000), Bhattacharya and Mukherjee (2003), Venkateshwarlu (2005), Agrawalla (2006), Ray (2006), Chakravarty (2006)]*. However, in the present study autoregressive integrated moving average model has been applied to find out the effect of independent variables on dependent variables.

STOCK PRICES AND MONEY SUPPLY

The relationship between money supply and stock prices has been widely studied. Money supply changes had important direct effects through portfolio changes, and indirect effects through their effect on real economic activity, which in turn postulated to be the fundamental determinants of stock prices *[Bhattacharya (2002)]*. Theoretically, the money supply had a negative impact on stock prices because, as money growth rate increased, the inflation increased leading to a fall in stock prices *[Kraft and Kraft (1977), Fama (1982), Oyama (1997), Ibrahim, M.H. (2001), Flannery (2002), Maghayereh (2002),Wong, W.K. (2005), Chakravarty (2006), Gan (2006), Wickremasinghe (2006)]*.

However, an increase in the money supply would also stimulate the economy, resulting in increased corporate earnings and increased stock prices implying positive relationship *[Friedman and Schwartz (1963), Bulmash and Trivoli (1991), Mukherjee and Naka (1995), Mehar (1998), Kwon and Shin (1999), Maysami and Koh (2000), Flannery (2002), Tsoukalas (2003), Gunasekarage (2004), Adel (2004), Humpe (2005), Ray (2006)]*. The causal link from stock prices to money supply reflected the importance of the stock market on money demand. It indicated the policy reactions of the monetary authorities to the fluctuations in stock prices *[Ibrahim (1999)]*.

Therefore, money supply and stock prices interact through portfolio substitution with a change in the money supply causing a change in the equilibrium position of money in relation to other assets in the portfolio, altering the demand for other assets competing with money balances. Thus, *ceteris paribus,* an increase in the money supply creates an excess supply of money balances and an excess demand for equity, resulting in an increase in equity prices. However, due to inflationary pressure, a negative effect of money supply on stock prices is also conceivable *[Gay (2008)].*

STOCK PRICES AND INFLATION

The hypothesis that changes in macroeconomic variables has a pervasive impact on asset prices have been subjected to extensive research. Early US studies *[Bodie (1976), Fama and Schwert (1977), Jaffe and Mandelker (1977), Linter (1973), Nelson (1976), and Oudet (1973)]* examined whether the financial assets were hedge against inflation, have reported negative relation between stock returns and changes in the general price level.

The traditional view that expected nominal rates of return on assets should move with expected inflation was first attributed to Irving Fisher (1930). Financial economists have also argued that, because stocks are claims on physical, or "real", assets, stock returns ought to co-vary positively with actual inflation, thereby making them a possible hedge against unexpected inflation *[Sharpe, S.A. (2000)].*

The earliest studies mainly document the negative covariation between actual equity returns and actual inflation *[Linter (1975), Bodie (1976)* Hess and Lee (1997)]. With some identifying assumptions, Fama and Schwert (1977) divided inflation into expected and unexpected inflation and found both pieces to be negatively related to stock returns. Other early studies focused on the apparent negative relationship between inflation and the level of real equity prices, as reflected in dividend yields and price-earnings ratios. Feldstein (1980a, 1980b) argued that much of inflation's negative valuation effect could be explained by interactions between inflation and the tax code, such as those arising from inflation-related distortions to accounting profits. To the contrary, Modigliani and Cohn (1979) and Summers (1983) argued that such an explanation could not account for the styled facts. Instead, they suggested that stock prices may have been distorted by money illusion, that is, stocks were priced as if investors mistakenly used nominal interest rates to discount real earnings.

During high inflation people were laid off work, which would cause production to decrease. When people were laid off, they bought only the essential items causing a further cut in production leading to a fall in the corporate profits. When dividends decreased, the expected return on the stocks too decreased, causing stocks to depreciate in value. This leads to negative relation between stock returns and inflation *[Fama (1981), Geske and Roll (1983), James et al (1985), Chen, Roll and Ross (1986), Kaul (1987), Mukherjee and Naka (1995), Groenewold (1997),*

Hess and lee (1997), Madsen (2002), Maghayereh (2002), Bhattacharya (2002), Tsoukalas (2003), Dritsaki (2004), Gunasekarage (2004), Adel (2004), Nishat (2004), Ray (2006), Naka (2006), Chakravarty (2006), Wickremasinghe (2006)]. The interrelationship between stock prices and the price level was hypothesized to be negative in nature.

In a competitive economy, inflation raises a firm's production costs, leading to a decrease in expected cash flows, and lower corporate revenues and profits. However, it was recognized through hedging, in which equities served as a hedge against inflation since they represent claims on real assets, the relationship between inflation and stock prices could be positive *[Gay (2008)].*

Since the rate of inflation was positively related to money growth *[Fama (1981)],* an increase in the money supply lead to an increase in the discount rate and lower stock prices. However, this negative effect could be countered by the economic stimulus provided by money growth, which would likely increase cash flows and stock prices *[Mukherjee & Naka (1995)].*

One pattern that shows up among the various empirical studies is that the anomalous negative effect of expected inflation on returns tends to diminish at longer horizons. The expected inflation had positive effect on five-year nominal stock returns *[Boudoukh and Richardson (1993)].* Boudoukh, Richardson, and Whitelaw (1994) found that the negative effect of both expected and unexpected inflation on stock returns tends to be largest for industries whose output was most cyclical and most negatively correlated with expected inflation. An unexpected rise in inflation may raise the risk of countercyclical monetary policy, which is likely to reduce expected real earnings growth and raise investors' discount rates. Indeed, Thorbecke (1997) provides compelling evidence that tighter monetary policy has a significant negative effect on stock prices, though whether this reflects on earnings channel or discount rate channel remains unresolved *[Patelis (1997) and Jensen, Mercer, & Johnson (1996)].*

STOCK PRICES AND INDUSTRIAL PRODUCTION

Industrial production presents a measure of overall economic activity in the economy and affects stock prices through its influence on expected future cash flows *[Fama (1990)].* It would increase the corporate earnings, enhancing the present value of the firm, leading to more retail investment in the stock market and this would lead to a rise in stock prices *[Chen (1986), Cutler (1988), Fama (1990) Taylor (1991), Mukherjee and Naka (1995), Errunza (1998), Kwon (1999), Abhay (2000), Lamont (2001), Bhattacharya (2002), Maghayereh (2002) Tsoukalas (2003), Adel (2004), Dritsaki (2004), Nishat (2004), Humpe (2005), Agrawalla (2006), Ray (2006), Naka (2006), Chakravarty (2006)].*

STOCK PRICES AND FOREIGN EXCHANGE RESERVES

Increase in foreign exchange reserves lead to a positive effect on stock market movements *[Mehar (1998), Ibrahim (1999), Maghayereh (2002)]*. The process of liberalization followed by inflows from foreign investors lead to an appreciation in stock price *[Bekaert and Harvey (1998), Henry (1997)]*. The stock market became more receptive to foreign investment as the economy liberalized with the increase in foreign reserves *[Ahmad (2005), Ray (2006)]*.

Rising reserves lower the rate of interest and that in turn causes investment and output to rise. The process will not yield substantially positive results for the aggregate economy if the rate of interest does not fall and/or investment is remarkably insensitive to real interest changes. Healthy reserves have other benefits as well. For a net debtor country, periodic repayment of the principal amount to the foreign creditors increases the prospect of easy credit for future needs *[Marjit (2004)]*.

When there is a deficiency in foreign exchange reserves, an economy should give priorities to accumulating reserves. Under such circumstances, higher capital inflow could be of great help to replenish the foreign exchange reserves without incurring any loss, which would otherwise be incurred if quantitative controls are levied on imports thereby leading to distortionary consequences. It can also avoid the losses due to a fall in gross domestic supply or an increase in poverty, brought about by contractionary fiscal and monetary policies required to generate the current account surplus. However, when the reserves are at the optimum level, further accumulation involves some costs. The usual function of capital inflow is to finance private investment and thereby to increase factor productivity. In a demand deficient economy, where in the macro sense the opportunity cost of domestic production at the margin is zero, a higher capital inflow puts pressure on effective demand by appreciating exchange rate. Holding excessive reserves also implies a loss in net national product when the domestic interest rate is higher than the rate prevailing in the world market. *[Rakshit (2003), Marjit (2004)]*.

Higher public investment in the infrastructure and social sector could increase output through a multiplier effect as well as by crowding- in effect which will in turn reduce the gap between potential and actual output. Increase in demand increases imports and thereby leads to a current account deficit which provides the economy an opportunity to utilize its foreign exchange reserves. Government can also handle the situation by proper management of exchange rate whenever necessary *[Rakshit (2003)]*.

STOCK PRICES AND INTEREST RATE

Interest rate has a negative relationship with stock market for two reasons: Firstly, lower the interest rate; lower the cost of capital for the corporate sector and higher the corporate earnings leading to rise in stock prices. Secondly, lower the interest rate in

the fixed income segment, higher the incentive for the investors to flock the stock market to get better returns and thus stock market gets a boost *[Taylor (1991), Groenewold (1997), Oyama (1997), Gjerde (1999), Grossman (2000), Rao (2000), Maysami (2000), Gupta (2000), Pandey (2002), Maghayereh (2002), Adel (2004), Dritsaki (2004), Wong, W.K. (2005), Humpe (2005), Ray (2006), Gan (2006)]*. Short-term interest rates appeared with positive coefficients while long-term interest rates had a negative influence on share prices in various studies *[Jung (1996), Gjerde (1999), Maysami (2000), Humpe (2005)]*.

The volatility of interest rates was critical for asset pricing and revolved around the discount rate and the computation of the present value of asset prices. The hypothesized interrelationship between interest rates and equity prices was negative *[Abdullah and Hayworth (1993) and Chen et al (1986)]*. An increase in interest rates would raise the required rate of return, which affected the value of the asset inversely. Representing opportunity cost, the nominal interest rate would motivate investors to reallocate their asset portfolio allocation and substitute equity shares for other assets in the portfolio. Also, an increase in interest rates could reduce corporate profitability due to increase in cost of financing and discourage merger, acquisition and buyout activity *[Gay (2008)]*.

Intuitively, a negative effect of interest rates was expected due to the direct effect on the discount rate. However, short rates were used by central banks as a growth stimulus. Thus, falling short-term interest rates lead central banks response to an economic downturn and rising short-term interest rates response to an economic upturn *[Humpe (2005)]*. Therefore, the positive coefficient could be explained by counter cyclical central banks response to economic fluctuations. On the other hand, the long-term interest rate directly reflected the discount rate and therefore had a negative coefficient in most of the studies.

CONCLUSION

The foregoing review of studies reveals that many research studies have been conducted in this area abroad but not in India and these have not provided sound theoretical and empirical explanation regarding the impact of macroeconomic factors on equity share prices. Most of these studies were based on a small sample with a limited number of variables and analyzed different forms of relationships without comparing their relative performance. Classical economists argued that the exchange rates lead stock prices with positive correlation whereas the proponents of portfolio-balance model argue that, being part of wealth, equity may affect the exchange rates through demand for money implying that stock prices lead exchange rates with negative correlation. Money supply was found to have negative and positive impact on stock prices. Several studies have found negative relationship between inflation and share prices. Industrial production would lead to a rise in stock prices thus implying positive relationship. Increase in foreign exchange reserves lead to a positive effect on stock market movements. In majority of studies interest rate was found to be negatively related with stock prices.

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