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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

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<td>Consumer price index, money supply, foreign exchange rate, gross domestic production and oil price</td>
<td>Share Price Index of four countries</td>
</tr>
</tbody>
</table>


**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 Sohravian (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), Tsoukas (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-Oskooee and Sohravian (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 have 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)],

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**

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 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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