A Comparison of the Effects of Key Determinants on Share Prices of India's Largest Public and Private Sector Banks

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Abstract : The banking sector in India has come under the scanner following some key changes in monetary policy. The recent quarterly reports of several banks have clearly showed a rise in non-performing assets (NPAs) and deteriorating asset quality. With the Reserve Bank of India (RBI) lowering interest rates following slower economic growth, bank share prices have risen sharply. The share price of banks is impacted by both internal and external factors. This paper is an attempt to compare the key drivers of the stock prices of India's largest public and private sector banks. Bank specific metrics were important drivers of profits at both banks. Risk factors such as gross and net NPAs and capital adequacy ratio were also important for both banks, suggesting that bank share price appreciation could come at the expense of asset quality. Productivity measures were key drivers of the stock price of India's largest public sector bank SBI, but had no effect on the share price of India's largest private sector bank, HDFC bank. Asset usage efficiency measures were key determinants of the share price of HDFC bank but not of SBI. The single most important determinant of the share price of SBI proved to be business per employee, a productivity measure while total assets and its key component advances along with deposits were key drivers of profits at HDFC bank. Managers at both banks and their shareholders thus can look at these drivers to develop a broad understanding of what influences stock prices of these two benchmark Indian banks.

Keywords : Stock Price, Determinants, Key Performance Indicators, Indian Bank, Step-wise Multiple Regression

JEL Codes: G00,G20, G21, P34

# 1.	Introduction

The Reserve Bank of India (RBI) has recently embarked on a cycle of monetary easing following sluggish growth in the Indian economy. This has caused banking stocks in India to rally sharply. However, all is not well in the banking sector. Recent quarterly reports of most banks suggest rising non-performing assets (NPAs) and deteriorating asset quality. Efforts to adopt international banking norms such as Basel 3 have further forced banks to come under severe margin pressure. Given that the banking sector is the lifeblood of the Indian economy, it is of paramount interest to understand what drives bank profits and ultimately their stock prices.

The profitability of a bank is predominantly driven by a series of internal and external factors. The internal determinants of bank profitability include but are not limited to bank size, capital, risk management procedures adopted, expenses, and diversification strategies adopted (Molyneux and Thornton, (1992); Goddard et al., (2004); Bodla and Verma, (2006). External determinants of bank profitability include both industry structural determinants such as market concentration, industry size and ownership, and macroeconomic determinants such as inflation, interest rates, money supply and Gross Domestic Product (GDP) (Athanasoglou et al., (2008); Chirwa, (2003). Profitability in turn will impact stock price performance.

The stock prices of banks are influenced by several of the above mentioned and other factors. These include but are not limited to changes in bank profitability (Chu and Lim, 1998), bank specific risks (Adenso-Diaz and Gascon, 1997), microeconomic factors such as net asset value per share, dividend percentage, and earnings per share (Uddin, 2009), changes in operating and cost efficiency (Beccalli et al., 2006) and earnings announcements (Seetharaman and Raj, 2011).

In the current study we compare the relationship between the selected group of internal factors and the stock price of India's largest public and private sector banks, State bank of India (SBI) and Housing Development Finance Corporation (HDFC) bank. These factors include key bank metrics such as deposits, advances and total assets, risk factors such as the capital adequacy ratio, gross and net NPAs, productivity measures such as business per employee and profit per employee, and asset usage efficiency measures such as the return on assets, interest income/ average working funds, non-interest income/average working funds and operating profit/average working funds. The effect of these factors on bank stock prices was examined over a 10 year period from 2004-2013 through correlation, univariate and step-wise multiple regression analysis.

2.   Literature Review

There are several factors that impact the profitability of banks (Sufian and Habibullah, (2010); Dietrich and Wanzenried, (2011). These factors can be broadly classified as either internal determinants that originate within the firm such as bank size, capital, risk management, expenses management, and diversification (Molyneux and Thornton, (1992); Goddard et al., (2004); Ben Naceur and Goaied, (2008) or external determinants that impact the firm from outside like market concentration, industry size and ownership, inflation, interest rates, money supply and Gross Domestic Product (GDP) (Athanasoglou et al., (2008); Chirwa, (2003). Profitability in turn has been shown to strongly influence the share price of banks (Seetharaman and Raj, 2011).

Adenso-Diaz and Gascon, (1997) tried to establish a relationship between stock performance and four different measures of partial efficiency namely production costs, branch network distribution, systematic risk and specific risk for Spanish banks using Data Envelopment Analysis (DEA). Their findings suggest that bank-specific risks are most influential in determining stock performance. Using DEA, Chu and Lim, (1998) evaluated the relative cost and profit efficiency of six Singapore-listed Banks from 1992 to 1996. They found that share price performance was influenced by changes in profits rather than cost efficiency.

Uddin, (2009) studied the impact of micro and macro-economic factors on share price performance of bank leasing and insurance companies in the Dhaka stock exchange in Bangladesh through multiple regression analysis. He found linear relationship between market returns and some micro-economic factors such as net asset value per share, dividend percentage, and earnings per share. The relationship between market returns and macro-economic factors was however not statistically significant.

Beccalli et al., (2006) studied the relationship between cost efficiency and share price performance of selected European Banks. They found that changes in operating efficiency resulted in changes in stock prices. They also found that share price performance of cost efficient banks was significantly better than their inefficient peers. Menaje, Jr, (2012) studied the impact of variables such as Earnings per Share, Cash Flows per Share, Cash Dividend per Share, Inflation Rate and the 3-month T-bill rate on the share price of 10 publicly listed banks in the Philippines with multiple regression analysis. He found that only the 3-month Treasury bill had a negative impact on share price. All other variables did not have any significant effect on bank share prices.

Seetharaman and Raj, (2011) studied the impact of Earnings per share (EPS) and earnings announcements on the share price performance of a Malaysian bank. They found a very strong positive correlation between the Bank's EPS and share price. They also found earnings announcements had a significant impact on the share price performance of the bank. Ali and Chowdhury, (2010) find no significant responses in the share prices of 25 listed Private Commercial Banks (PCBs) in Bangladesh to dividend announcements. Thus, we attempt to add to the existing body of literature by studying a wider range of potential determinants of bank share prices over a larger time frame.

3. Methodology

This study used historical data to compare the relationship exhibited by a series of independent variables on the share price of India's largest public sector bank SBI and India's largest private sector bank HDFC. The following variables were chosen after a careful review of available literature on the determinants of profit and share price performance both in an Indian and global context:

Key bank metrics - Deposits, advances and total assets
Risk factors - The capital adequacy ratio, gross and net NPAs
Productivity measures - Business per employee and profit per employee

Asset usage efficiency measures -The return on assets, interest income/average working funds, non-interest income/average working funds and operating profit/ average working funds.

The study was conducted with annual data for the ten year period spanning from the financial years 2004 to 2013. Historical data on all of the above were obtained from the Capitaline financial database (www.capitaline.com) and the Reserve Bank of India (www.rbi.gov.in). The relationship between the variables was analyzed with the SPSS 18.0 package. Q-Q plots were used to ascertain normality of the data. Correlation coefficients were determined to study the relationship between the respective variables. F values and Significant F values from ANOVA analysis were used to assess the statistical significance of the correlations observed at 95% confidence intervals. Then univariate and step-wise multiple regression analysis were used to study the impact of all the independent variables taken individually and together on the stock prices of the banks.Variance Inflation Factor (VIF) was used to detect multi-collinearity. Durbin Watson coefficient was used to detect auto correlation in the data.

4. Observations:

Table 1: SBI and HDFC Bank, Some Key Metrics (Billion Rupees)

Bank	Market Capitalization	Net Interest Income	Net Profit	Total Assets
SBI	2257	1364	109	17922
HDFC	2686	411	85	4916

Source: moneycontrol.com as on 20-2-2015

Table 1 summarizes some key parameters at both banks. The key metrics chosen include market capitalization, net interest income generated, net profit of the last fiscal year and total assets.

Table 2: Relationship between Share Price and Performance Indicators of SBI: Results of Correlation Analysis, Regression Analysis and ANOVA

Dependent Variable (Profitability)	Independent Variable (Performance Indicators)	Relationship	Correlation Coefficient (R)	Coefficient of Determination (R2)	F Value	Sig. F Value
Share Price	Deposits	+	0.836	0.699	18.62	0.003
Share Price	Advances	+	0.844	0.712	19.80	0.002
Share Price	Total Assets	+	0.845	0.714	19.99	0.002
Share Price	Gross NPA	+	0.655	0.429	6.02	0.040
Share Price	Net NPA	+	0.725	0.525	8.84	0.018
Share Price	Capital Adequacy Ratio	-	0.686	0.470	7.10	0.029
Share Price	Business-per-Employee	+	0.849	0.720	20.58	0.002
Share Price	Profit-per-Employee	+	0.685	0.469	7.06	0.029
Share Price	Return on Assets	-	0.609	0.371	4.72	0.062
Share Price	Interest Income / Average Working Funds	-	0.329	0.108	0.35	0.428
Share Price	Non-Interest Income / Average Working Funds	-	0.572	0.327	3.89	0.084
Share Price	Operating Profit / Average Working Funds	-	0.399	0.160	1.52	0.253

Table 2 shows the results of correlation analysis, linear regression analysis and Anova for SBI.

The share price of SBI is considered as the dependent variable while the independent variables are deposits, advances, net NPAs, gross NPAs, return on assets, the capital adequacy ratio, business per employee, profit per employee, interest income/average working funds, non-interest income/average working funds and operating profit/average working funds.Among these variables,deposits, advances, total assets, business per employee, profit per employee, Net NPAs, and Gross NPAs were found to be positively correlated with the share price. The return on assets and the capital adequacy ratio were found to be negatively correlated with the share price. The correlations observed were also statistically significant at the 95% confidence level for most of the variables studied. The relationship between the stock price and the other variables were not statistically significant at the 95% confidence level.

Table 3: Relationship between Share Price of SBI and Performance Indicators: Step-wise Multiple Regression Analysis

Dependent Variable	Independent Variable	Correlation Coefficient R	Correlation Coefficient R	Coefficient of Determination (R2)	F Value	Sig. F Value	VIF	Durbin Watson
Share Price	Business per Employee	0.849	0.849	0.720	20.58	0.002	1.0	2.301

Table 3 shows the results of a step-wise multiple regression performed taking SBI's stock price as the dependent variable and performance indicators mentioned in Table 2 were chosen as independent variables. The step-wise regression eliminated most variables due to multi-collinearity issues and chose business per employee (VIF<5) as the most significant independent variable.

Table 4: Relationship between Share Price and Performance Indicators of HDFC Bank: Results of Correlation Analysis, Regression Analysis and ANOVA

Dependent Variable (Profitability)	Independent Variable (Performance Indicators)	Relationship	Correlation Coefficient (R)	Coefficient of Determination (R2)	F Value	Sig. F Value
Share Price	Deposits	+	0.973	0.946	140.35	0.000
Share Price	Advances	+	0.975	0.951	156.77	0.000
Share Price	Total Assets	+	0.976	0.952	159.71	0.000
Share Price	Gross NPA	+	0.848	0.720	20.55	0.002
Share Price	Net NPA	+	0.566	0.320	3.76	0.088

Share Price	Capital Adequacy Ratio	+	0.837	0.701	18.78	0.002
Share Price	Business-per-Employee	-	0.150	0.023	0.18	0.679
Share Price	Profit-per-Employee	+	0.237	0.056	0.48	0.509
Share Price	Return on Assets	+	0.837	0.700	18.66	0.003
Share Price	Interest Income / Average Working Funds	+	0.776	0.602	12.08	0.008
Share Price	Non-Interest Income / Average Working Funds	+	0.681	0.463	6.91	0.03
Share Price	Operating Profit / Average Working Funds	+	0.836	0.699	18.56	0.003

Table 4 shows the results of correlation analysis, linear regression analysis and Anova for HDFC bank. The share price of HDFC bank is considered as the dependent variable while the independent variables are deposits, advances, net NPAs, gross NPAs, return on assets, the capital adequacy ratio, business per employee, profit per employee, interest income/average working funds, non-interest income/average working funds and operating profit/average working funds. Among these variables, deposits, advances, total assets, bank size, gross NPA, the capital adequacy ratio, return on assets, interest income / average working funds, non-interest income / average working funds and operating profit / average working funds were found to be positively correlated with the stock price. The correlations observed were statistically significant at the 95% confidence level for most of the above variables. The relationship between the share price and the other variables were not statistically significant at the 95% confidence level.

Table 5: Relationship between Share Price of HDFC Bank and Performance Indicators: Step-wise Multiple Regression Analysis

Dependent Variable	Independent Variable	Correlation Coefficient R	Coefficient of Determination (R2)	F Value	Sig. F Value	VIF	Durbin Watson
Share Price	Total Assets	0.976	0.952	159.71	0.000	1.00	2.493

Table 5 shows the results of a step-wise multiple regression performed taking HDFC bank's stock price as the dependent variable and performance indicators mentioned in **Table 4** were chosen as independent variables. The step-wise regression eliminated most variables due to multi-collinearity issues and chose total assets (VIF<5) as the most influential independent variable.

5.   Discussion and Analysis:

SBI is India's largest public sector bank having profits in excess of 100 billion rupees, net interest income of over a trillion rupees and a total asset base exceeding 17.5 trillion rupees. HDFC bank is India's largest private sector bank having profits worth of 80 billion rupees, net interest income of over 400 billion rupees with a total asset base well over 4.9 trillion rupees. Both banks have market capitalization in excess of 2 trillion rupees (Table 1). An understanding of what drives share prices of these benchmark Indian banks can prove to be very important. In the current study we focus on the relationship between a set of key bank metrics such as deposits, advances and total assets, risk factors such as the capital adequacy ratio, gross and net NPAs, productivity measures such as business per employee and profit per employee, and asset usage efficiency measures such as the return on assets, interest income/average working funds, non-interest income/average working funds and operating profit/average working funds with the stock prices of India's largest public and private sector banks .

We find a strong positive correlation between the key bank metrics such as deposits, advances, total assets and the stock prices of both banks (Table 2, 4). Deposits are often seen as a barometer of a bank's financial health and stability. Smirlock & Brown (1986), found a strong positive relationship between demand deposits and bank profitability. Ganesan (2001) also found a strong correlation between deposits and profitability for a group of public sector banks in India. Profitability in turn has been shown to be strongly correlated with the share price of banks (Seetharaman and Raj, 2011). Given that advances are a major component of the bank's total assets and its correlation with the share price is almost equal to that observed with the bank's total assets (Table 2, 4), both banks must focus on maximizing this key metric and reduce their focus on other assets. Ganesan, (2001) found a strong relationship between priority sector advances and profitability for a group of Indian public sector banks.

We also find a strong positive relationship between the risk factors as measured by gross and net NPAs and the share price of both banks (Table 2, 4). This suggests that as the bank's stock price increases the non-performing assets also increases. Thus share price appreciation may be accompanied by deteriorating asset quality which could eventually result in lowered profitability and subsequently lower share prices. This in fact is clearly evident in the quarterly reports released by banks for the most recently concluded quarter ending December 2014. Non-performing assets are charge offs against profits and therefore can negatively impact performance. In an earlier study Miller and Noulas, (1997) found that loan loss provision and net charge offs had a significant negative effect on the profitability of large banks. Bodla and Verma, (2006) have also indicated that provisioning for

bad loans significantly impacted profits of public sector banks in India. The capital adequacy ratio was observed to be positively correlated to the stock price of HDFC bank but negatively correlated with the share price of SBI. The capital adequacy ratio can be used to gauge the credit risk of the bank. A higher ratio would imply lesser risk from the banks credit exposure. Sufian, (2009) found that Malaysian banks with higher credit risk and loan concentration exhibited lower profitability levels. Further banks that had a higher level of capitalization, higher proportion of income from non-interest sources, and high operational expenses proved to be relatively more profitable.

We find a strong positive correlation between productivity measures such as business per employee and profit per employee and the stock price of SBI but this was not observed in the case of HDFC bank (Table 2, 4). Thus productivity of the workforce was important for India's largest public bank but not for India's largest private bank. These two indicators help in assessing the productivity of the work force and the extent of their contribution to the operational efficiency of banks. Ben Naceur and Goaied, (2001) found that the best performing Tunisian banks are those that improve labor and capital productivity.

We find a significant positive relationship between asset usage efficiency measures such as the return on assets, interest income/average working funds, non-interest income/average working funds and operating profit/average working funds with the stock price of HDFC bank but this was not observed for SBI. For SBI, there was actually a negative relationship between its stock price and its return on assets (Table 2, 4). Taken together the data suggests that, while SBI must be careful in deploying its assets, HDFC bank can generate substantial incomes from deploying its funds in interest and non-interest generating sources. Sufian, (2009) found that Malaysian banks that generate higher proportion of income from non-interest sources tend to be relatively more profitable.

Step-wise multiple regression analysis (Table 3, 5) showing the combined effect of all the variables on stock prices was carried out in the study. Multi-collinearity and auto correlation issues were mostly accounted for as indicated by the VIF and Durbin Watson co-efficient. The results showed that the key determinant of the share price of SBI was business per employee while the key determinant of the share price of HDFC bank was total assets. However, the relationship of deposits and advances with the share price of HDFC bank cannot be ignored. Thus while traditional bank specific metrics were drivers of HDFC banks stock price, productivity measures influenced the stock price of SBI. Managers and shareholders of the two banks may focus on these metrics to try and understand what drives the share prices of these two benchmark Indian banks. With a multi-

variate analysis Bodla and Verma, (2006) found that variables such as non-interest income, operating expenses, provisions, contingencies and spread had significant relationships with bank profitability.

Conclusion

This paper is a comparative study, which attempts to understand the key drivers of the share price of India's largest public and private sector banks. Bank specific metrics were drivers of stock prices of both banks. Risk factors were also important influencers of stock prices of both banks.

Productivity measures were key drivers of the stock price of India's largest public sector bank SBI but had no effect on the stock price of India's largest private sector bank, HDFC bank. The reverse was true of asset usage efficiency measures which were determinants of the stock price of HDFC bank but not at SBI. Risk Factors were also important drivers of the stock prices of both banks.

The single most important determinant of the stock price of SBI proved to be business per employee, a productivity measure while total assets a traditional bank metric was the key driver of the stock price of HDFC bank. Thus, the stock prices of both banks are driven by a different set of determinants. Managers at both banks and their shareholders thus can look at these drivers to develop a broad understanding of the stock price performance of these two important Indian banks.

Limitations:

The study only considered a select group of internal determinants. External determinants like macro-economic factors and exchange rates are not considered. Additionally qualitative factors such as customer preferences and customer service are not considered. The impact of technology is also not considered.

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