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Single Index Model: An Implication on Bankex Stocks

Tarun Gupta

Nishant Sinha

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Abstract

The objective of the study is to find out whether the Bankex stocks (17 bank stocks) are undervalued or overvalued with respect to the current Sensex high levels using Single Index Model. It also aims at finding out the future expectations from these stocks.

In the financial economics literature, it is generally assumed that risk-averse investors expect higher returns for investing in relatively riskier assets and therefore, the risk premium represents the compensation to the investor for assuming risk. The non-zero risk premiums are not only directly unobservable but also vary substantially over time. Apart from the 'animal spirits' driving investor exuberance, short-term volatility in risk premiums could result from shifts in inflation expectations, monetary policy shocks, changes in market perceptions relating to the underlying 'fundamentals', all of which cause frequent corrections in expectations about future cash flows.

The relationship between premiums or excess returns, representing the excess of expected returns over risk free returns and risk, measured by the volatility of market prices of assets is an intensely debated theme in the literature. In particular, the focus of empirical investigation has been on the dynamics of the risk-return relationship in equity markets. This paper undertakes an empirical verification of the rational markets excess returns and stock excess return based on Single Index Model.

THEORETICAL FRAMEWORK

Single factor model, given by Sharpe, of the economy classifies sources of uncertainty as systematic (macroeconomic factors) or firm specific (microeconomic factors). The index model assumes that the macro factors can be represented by the broad index of stock returns.

The single index model drastically reduces the necessary inputs in the Markowitz portfolio construction procedure. According to the index model, we can separate the actual or realized rate of return on a security into macro (systematic) and micro (firm specific) components. We can write the rate of return on each security as a sum of three components.

The characteristic line, summarizing the relationship between the two excess returns i.e. market excess return and stock excess return.

$$(r_i - r_f) = \alpha_i + \beta_i(r_m - r_f) + e_i$$

where

α_i The stock's expected return if the market is neutral, that is, if the market's excess return $r_m - r_f$ is zero.

β_i $(r_m - r_f)$ The component of return due to movement in the overall market; βi is the security's responsiveness to market movement.

e_i The unexpected component due to unexpected events that are relevant only to this security (firm specific)

A higher beta indicates that a stock is relatively volatile while a lower beta indicates more stability. A stock with a Beta of 0.90 would, on average, be expected to rise or fall only 90% as much as the market. So if the market dropped 1.0%, such a stock might rise or fall 0.9% On the other hand, a stock with a Beta of 1.10 would, on average, rise or fall 10% more than the market. So a 1.0% market move, up or down, should spur a 1.1% move for the stock. As far as the present study is concerned, the risk-free rate has been assumed as 5.5% with continuous compounding.

We write the index model in terms of the excess returns over rf rather than in terms of the total return because the level of the stock market return represents the state of the macro economy only to the extent that it exceeds or falls short of the rate of return on risk free T-bills.

The value of α_i is the expected value of the non market component of the security's excess return. Thus the value of alpha is the difference between the security's total expected excess return and the market excess return.

If the value of alpha is positive then the security is considered to be under priced whereas the negative value of alpha indicates that the security is overpriced.

We can also write the above mentioned model equation in the following form

$$R_i = \alpha_i + \beta_i R_m + e_i$$

$$Ri = r_i - r_f$$

$$Rm = r_m - r_f$$

The equation says that each security has two sources of risk; market risk or systematic risk attributable to its sensitivity to macroeconomic factors as reflected in R_m and firm specific factors as reflected in e_i. If we denote the variance of the excess return on the market as σ^2 then we can break the variance of the rate of return on each stock into two components.

1. The variance attributable to the uncertainty of the common macroeconomic factors is $\beta_i^2 \sigma_m^2$

2. The variance attributable to firm specific uncertainty is $\sigma_{e_i}^2$

METHODOLOGY AND DATABASE

The modus operandi adopted in the study consists of the following steps

■ Collecting the monthly returns of the 17 stocks, constituent of Bankex, for the time period of 2002-2005.

■ Collecting the monthly returns of the Bankex for the time period of 2002-2005.

■ Collecting the monthly returns of the Sensex for the time period of 2002-2005.

■ Calculating monthly excess returns over risk free rate of return (T-Bills) for stocks, Sensex and Bankex returns.

Applying regression on the excess market return and excess security returns.

The regression methodology is a convenient way of compressing large amounts of data into one equation that captures the relationship between excess

market return and excess security returns. The basic regression assumes linear relationship between excess market return and excess security returns.

Regression technique has been used to check the efficiency of the model. The R^2 value is analyzed whether it is good fit model or not. If the value of R^2 is · very high which means that the excess market return is explaining the high proportion of variability in stock returns.

The entire data for the calculation has been collected from CMIE databases Prowess and Business Beacon.

EMPIRICAL RESULTS

The results that I have found by regressing Sensex excess returns with Bankex excess returns and individual security excess return are very surprising and can give useful insight for future investment opportunities.

As it is known that the banking industry is an important constituent of the Indian economy. Any activity in the banking system has a direct effect on the economy. Sensex is the broad indicator of Indian economy. Some of the banking stocks (PSU and PRIVATE) are part of the 30 stocks comprising the Sensex. Another index, Bankex represents the entire banking industry. It contains 17 banking stocks.

Bankex vs Sensex

On regressing Sensex excess returns on Bankex excess return it is found that the Bankex return explain 55% variation in the Sensex returns in a positive manner. The intercept value is negative which means that the Bankex is Overvalued in current market situation. The regression also revealed that the percentage of variability explanation of Sensex return by Bankex has been increased to 74% in the year 2005. The yearly regression for 2005 shows that the Bankex is undervalued with respect to the Sensex.

Bank Stocks vs Sensex

The study has taken 17 bank stocks (PSU and Private) into consideration out of which State Bank of India, ICICI bank, HDFC bank are the three major that are banks are part of the BSE Sensex. ICICI has been a major mover of the Sensex. The regression result shows that ICICI was a major influencer in the

year 2002 and 2003. In the year 2005 its influence on Sensex has been reduced. On the other side it is an undervalued stock despite the current high level of Sensex. This is a good indication for investors; they can invest more in this stock in the near future. ICICI is not an aggressive stock it is very defensive (as beta suggests) and has very less non-systematic risk (firm specific).

State Bank of India the major PSU bank also has shown similar kind of results. It has been an influencer in the Sensex in the year 2002-2003. The regression results show that SBI is an undervalued stock despite the current high Sensex levels. This stock is fundamentally very strong and has very small firm specific risk. This stock is an aggressive stock since its beta is high. The stock is undervalued and could be a better pick for the future.

HDFC bank is also an undervalued stock but it has been a good performer in the year 2003-2004. It is also an under valued stock at current high market levels. This stock has the minimum standard deviation. The stock has the lowest market specific risk because of its different business style (not as traditional as followed by other banks) i.e. a conservative bank with strong backup of HDFC Ltd. The stock is not very aggressive (as beta shows), also it shows very less value fluctuations.

The study reveals that the Karnataka bank stock is the most aggressive stock of the Bankex Index because of its very high beta value. This stock has high market specific risk rather firm specific risk.

STOCK	STD DEV	VARIANCE	BETA	ei (firm specific)	Market Risk
	σ_i		β_i	$\sigma_i^2-(\beta_i^2\sigma_m^2)$	$(\beta i2\sigma m2)$
Allahabad Bank	13.9959	195.88522	2.8	13.79337577	15.7584
Andhra Bank	16.40217	269.03114	2.75	16.23279515	15.200625
Bank Of Baroda	15.57443	242.56302	2.51	15.41161643	12.663201
Bank Of India	14.91753	222.53278	1.61	14.80866903	5.210121
Canara Bank	13.38067	179.04244	1.05	13.30157663	2.216025
Centurion Bank Of Punjab Ltd.	21.1136	445.78395	-2.3	21.22279309	10.6329

H D F C Bank Ltd.	7.400146	54.762156	0.14	7.38110807	0.039396
I C I C I Bank Ltd.	12.07151	145.72135	-0.69	12.12881883	0.956961
Indian Overseas Bank	14.57724	212.49582	1.9	14.4456505	7.2561
Indusind Bank Ltd.	15.39743	237.08085	-1.2	15.47555652	2.8944
Karnataka Bank Ltd.	21.09851	445.14693	3.47	20.93256397	24.202209
Kotak Mahindra Bank Ltd.	18.14782	329.34329	-1.16	18.21194371	2.704656
Oriental Bank Of Commerce	13.45186	180.95247	2.47	13.26603812	12.262809
Punjab National Bank	17.48531	305.73595	1.14	17.41965986	2.612196
State Bank Of India	10.1771	103.57339	1.25	10.05290476	3.140625
U T I Bank Ltd.	15.97601	255.23302	-1.2	16.05132449	2.8944
Union Bank Of India	14.30276	204.56896	1.4	14.20404745	3.9396
B S E SENSEX	1.417194	2.0084381	1		

In general, the results show that mostly all the stocks have high firm specific risk rather than market risk. So, it is recommended that investors should look into the fundamental details of the company in order to take the right decision for their investments.

The study suggests that the Centurion Bank, IndusInd bank, Kotak Mahindra bank, UTI bank all have a high negative beta which indicates that these stocks move opposite to the market i.e. if the market goes up these stocks will move down and vice-versa. These stocks are a good blend for any portfolio in adverse situations. They have high firm specific risk rather than market risk. So one should be very careful (fundamental knowledge) while investing in these stocks.

CONCLUSION

Banking industry is the most important and prominent industry for the Indian economy. Thus, it is important to know the status and contribution of the banking stocks in the BSE Sensex. Another aspect is to check which bank stock is currently overvalued or undervalued with respect to the current Sensex levels. We hope that this paper will give some useful insight to the investors who are interested in investing in bank stocks.

The study also reveals that major banking stocks are undervalued with respect to the current market levels. Investors can thus ,still pick these stocks for their portfolio.