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A Study on Stock Co-Movement's Analysis of Select Bank and IT Company Stocks

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ABSTRACT

The risk of a portfolio depends on the co- movement between the security returns forming the portfolio. The coefficient of correlation is an important measure for studying co movement between securities. Banking and IT company's shares represent sizable share of market portfolio of common investors. In this perspective the present study has been undertaken to help small retail investors who commonly invest in these two major sectors to understand the co movement of returns among Banking and IT industry stocks. This study covers correlation co movement calculation between selected four Banking shares and four IT companies' shares for a period from 16th June 2014 to 15th June 2015. The correlation between banking shares are more positive compared to correlation between IT company shares. This implies that the banking stocks return more or less move in the same direction. The correlation between Banking and IT Company stocks are either zero or negative which implies that these two sectors shares are not related or move in the

opposite direction in terms of return. This implies that banking and IT industry shares are good combinations for portfolio construction which substantially reduces the risk of that particular portfolio.

Key words*: co movement, correlation, portfolio, return, risk.*

Introduction:

Banks and IT company stocks represent sizable share of market portfolio of each investor in the stock market. It is said that banking sector reflects the economy's health. The sector acts as a funnel providing the funds the corporate need to expand their business. When the economy is expanding, as is happening in India currently, banks lend more and hence profit more. The investment in banking stocks is very common among investors and it represent major portion of their portfolio investment.

IT industry is another important sector of our economy which receives substantial funding from our investors because of its attractive profits and promising prospects. These companies stocks had given very good returns to the investors in the past which attracts many investors towards it. If we look at the portfolio of a common investor major portion of his investment will be either in Banking stocks or IT company stocks. Thus a study on co movements between returns of banking and IT company stocks felt significant in this perspective.

Risk and return represent two faces of the investment coin. Any rational investor before making his investment analyses the return and risk associated with the particular stock. It is common among investors to diversify his investment by constructing a portfolio through investment in different company's securities. The diversification of investment is based on the principal of "do not put all eggs in one basket". Through proper diversification the investors can minimize their total portfolio risk substantially. The expected return on a portfolio is simply the weighted average of the expected return on the individual securities in the portfolio but the portfolio risk is not the weighted average of the risk of the individual securities in the portfolio (except when the returns are uncorrelated).This is because diversification reduces the risk of the portfolio. The risk of the portfolio intern depends on how a security price moves with respect to other securities in the portfolio which is nothing but co movement between securities. The coefficient of correlation is an important measure of co movement among security returns and also important consideration for selection of good combinations of stocks for portfolio investment.

Correlation represents the relation between the returns of two individual securities. It represents the direction and magnitude of relationship. The correlation coefficient might range from -1 to +1. -1 represents perfect negative correlation or perfect co movement in the opposite direction. +1 represents perfect positive correlation or perfect co movement in the same direction. A value of 0 means no correlation or co movement returns. The portfolio risk can be reduced to zero if the securities are perfectly negatively correlated. While selecting stocks for portfolio construction, the correlation among them is very important consideration. If correlation

is more positive among securities such a combination is more risky because their returns move in the same direction. The security with negative correlation is best and zero correlation is better combinations for portfolio construction. Because negatively correlated securities move in opposite direction and zero correlation securities are unrelated to each other in terms of returns.

Review of Literature:

In a research by **Gallant, Rosi & Tauchen (1992),** on stock price and volume co movements using daily NYSE data they found that generally large price movements were associated with unusually high volume, leading to increase in both mean and variability of volume.

Mukherjee and Naka (1995) investigated the relationship between Tokyo stock prices and six macro economic variables using a vector error correlation model (VECM). Their study showed that the relationship between Tokyo stock prices, the exchange rate, money supply and industrial production is positive. Whereas the relationship between Tokyo stock prices and inflation and interest rate mixed.

Green Wood (2005) studied a cross sectional analysis of the excess co movement of stock returns using Nikkei 225 index Japan. He found that a strong positive correlation between overweighting and the co movement of a stock with other stocks in the index, and a negative relationship between index overweighting and co movement with stocks outside the index. He concluded that overweighed stocks have high betas.

Baele, Bekaert and Inghelbrecht (2007) studied the economic sources of stock-bond return co movement and its time working paper Variation using a dynamic factor model. They identified the economic factors employing structural and non-structural vector autoregressive models for economic state variables such as interest rates, (expected) inflation, output growth and dividend payouts. They also viewed risk aversion, and uncertainty about inflation and output as additional potential factors. Even the best-fitting economic factor model fits the dynamics of stock-bond return correlations poorly. Alternative factors, such as liquidity proxies, help explain the residual correlations not explained by the economic models.

In a study by **Dutt and Mihov (2008)** on stock market co movement and industrial structure , they studied monthly stock market indices for 58 countries to construct pair wise correlations of returns and explain these in the industrial structure across countries. They found that countries with similar industries have stock markets that exhibit high correlation of returns.

Meric, Patil and Meric (2011) studied the co movement of the Indian stock market with other stock markets and its implications for portfolio diversification with respect to the effects of 2008 global financial crisis.. They found that there is considerable time varying volatility in the correlation of the Indian stock market with the other stock markets. The trend analysis results showed the correlation between

Indian stock market and other national markets increased substantially and the benefit of global portfolio diversification decreased considerably post crisis period.

Objectives of the Study:

1. To assess the degree of co movements of return between Banking and IT industry stocks.
2. To analyze the co movement of return among selected Banking Industry stocks.
3. To study the co movement of return among selected IT Industry stocks.

Scope of the Study:

The study covers correlation co movement's analysis among security returns of four selected banking companies and four IT companies stocks. . The banks and IT companies stock prices for a period of 16th June 2014 to 15th June 2015 has been considered for calculation of correlation between securities. The correlation co movement among stocks in the same industry and between two different industries (i.e. banking and IT industry) was analyzed.

Limitations of the Study:

1. The study was based purely on secondary data collected from NSE website.
2. The study was restricted to a sample of four banking and four IT company stocks.
3. This study is limited to one fiscal year (from 16th June 2015 to 15th June 2015).

Research Methodology:

To address the objectives of the study, the Indian banking and IT industry was taken as universe and a sample of eight companies which includes four banks and four IT companies were selected purposefully based on top companies in the respective industry in terms of revenue generation. The study was purely based on secondary data that is 243 daily stock prices from 16th June 2014 to 15th July 2015 were collected from NSE website. From daily stock prices NAV of the stocks on daily basis were calculated using the following formula.

$$NAV = \frac{Closing\ Price - Opening\ Price}{Opening\ Price}$$

The NAVs were used for calculation of Correlation between stocks to measure the co movement between them. The following correlation formula was used.

$$r_{yx} = \frac{cov\ (y,x)}{\sqrt{var}(y) * var(x)}$$

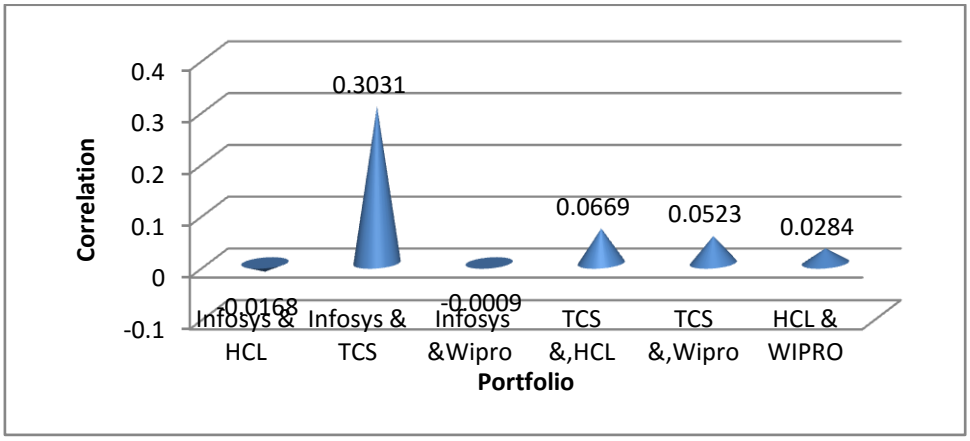
Data Analysis:

Table No. 1

Correlation among IT company stocks.

Portfolio	Correlation
Infosys & HCL	-0.0168
Infosys & TCS	0.3031
Infosys &Wipro	-0.0009
TCS &,HCL	0.0669
TCS &,Wipro	0.0523
HCL & WIPRO	0.0284

Graph No.: 1



Analysis and Interpretation:

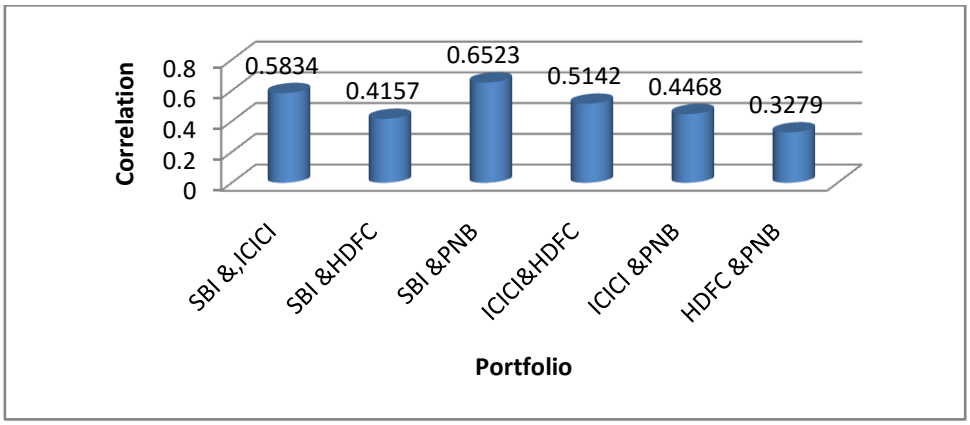
There is negative correlation between returns of (Infosys, HCL) and (Infosys, Wipro) even though they belong to the same industry. Investors can include these two combinations in their portfolio as they are the best combinations with negative correlations which reduce substantial risk in their portfolio. There is slight positive correlation among returns of other combinations such as (TCS, HCL), (TCS, Wipro), (HCL, Wipro) and the correlation between (Infosys, TCS) is more positive. So it is not a good combination to include these two stocks in the same portfolio as they move in the same direction which increases the risk of the portfolio.

Table No.: 2

Correlation between Equity Returns of Banking Companies

Portfolio	Correlation(r)
SBI &,ICICI	0.5834
SBI &HDFC	0.4157
SBI &PNB	0.6523
ICICI&HDFC	0.5142
ICICI &PNB	0.4468
HDFC &PNB	0.3279

Graph No.: 2



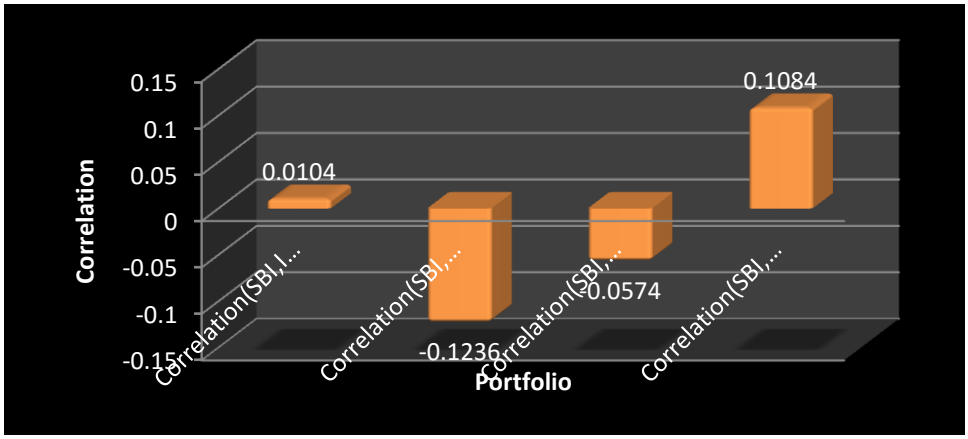
Analysis and Interpretation:

The correlation among banking companies are positive as they belong to the same industry and their returns are varying in the same direction. Among them the combination of SBI and Punjab national bank is showing highest positive correlation of 0.6 which means 60% of these companies' returns vary in the same direction which substantially increases the risk of the portfolio. The other two combinations (SBI, ICICI) & (ICICI, HDFC) are also having 0.5 correlation which means 50% of their returns vary in the same direction. These combinations are not appropriate to include in the same portfolio.

Table No.: 3
Correlation between SBI and IT company stocks

Portfolio	Correlation (r)
Correlation(SBI,INFY)	0.0104
Correlation(SBI,TCS)	-0.1236
Correlation(SBI,HCL)	-0.0574
Correlation(SBI,WIPRO)	0.1084

Graph No.: 3



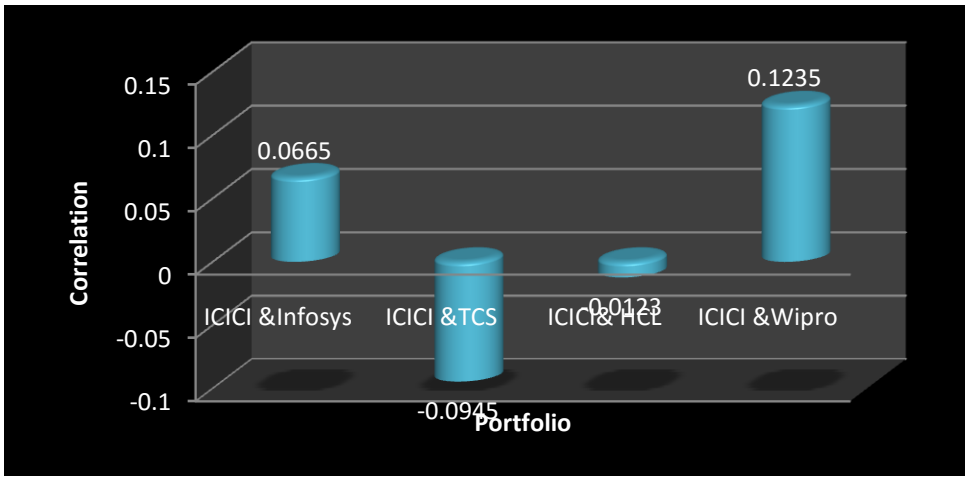
Analysis and Interpretation:

The correlation between SBI and other IT companies are either negative or zero which indicates they are the best combinations to include in ones portfolio as their returns are not correlated or moves in opposite direction which substantially reduces the risk of such portfolios.

Table No.: 4
Correlation between ICICI and IT company stocks

Portfolio	Correlation
ICICI &Infosys	0.0665
ICICI &TCS	-0.0945
ICICI& HCL	-0.0123
ICICI &Wipro	0.1235

Graph No.: 4



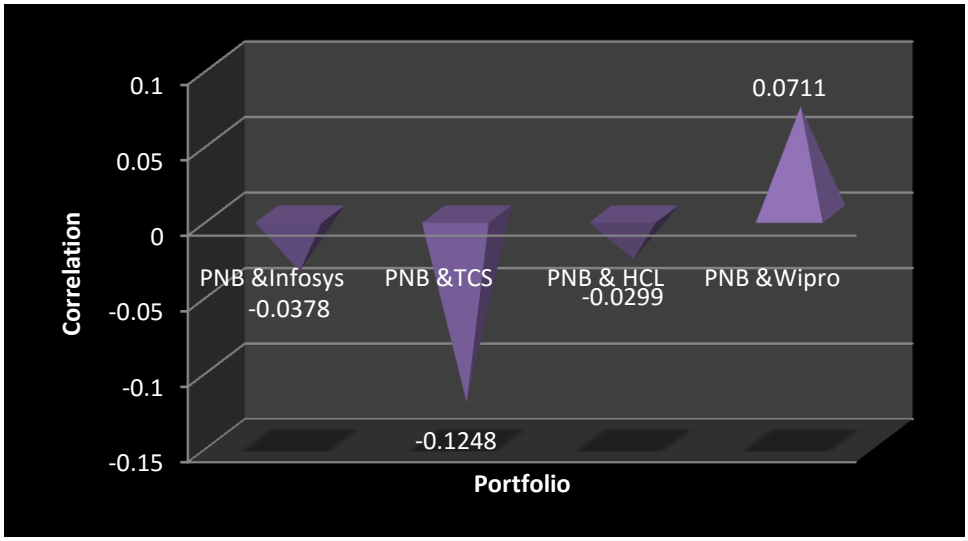
Analysis and Interpretation:

The correlation between ICICI bank and IT companies are also either negative or close to zero which indicates these combinations are less risky except the combination (ICICI, Wipro) which shows a slightly positive correlation of 0.12 which means 12% of these company returns move in the same direction.

Table No.: 5
Correlation between Punjab national bank and IT company stocks

Portfolio	Correlation(r)
PNB &Infosys	-0.0378
PNB &TCS	-0.1248
PNB & HCL	-0.0299
PNB &Wipro	0.0711

Graph No.: 5



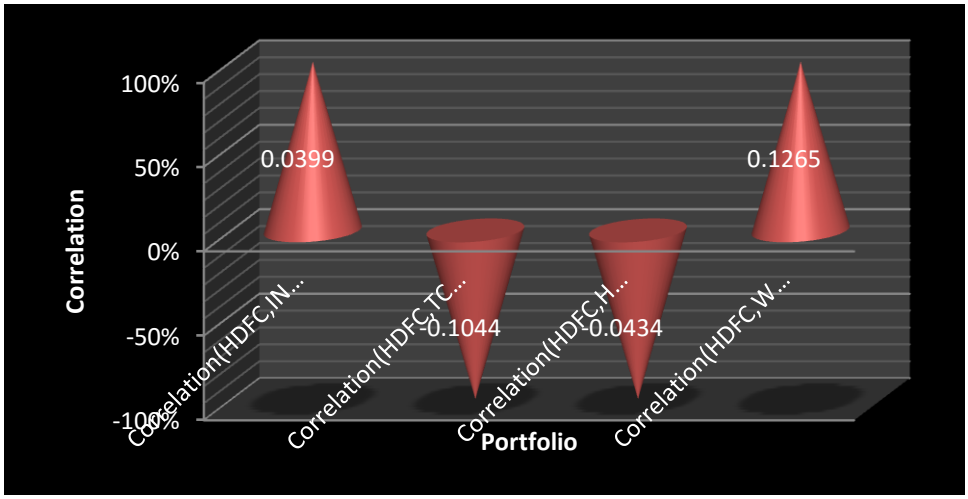
Analysis & Interpretation:

The correlation between Punjab national bank and IT companies are negative except in case of Wipro which shows close to zero correlation. The negative or zero correlated securities are very good combinations to include in ones portfolio.

Table No.:6
Correlation between HDFC and IT company stocks

Portfolio	Correlation
Correlation(HDFC,INFY)	0.0399
Correlation(HDFC,TCS)	-0.1044
Correlation(HDFC,HCL)	-0.0434
Correlation(HDFC,WIPRO)	0.1265

Graph No.: 6



Analysis and Interpretation:

The correlation between (HDFC, TCS) and (HDFC, HCL) are negative which implies these security returns move in the opposite directions and they are the best combinations to include in investor's portfolio. The correlation among (HDFC, Infosys) is almost close to zero which implies these companies' stocks returns are not related. While there is slight positive correlation of 0.12 between (HDFC, Wipro) which implies 12% of their returns move in the same direction.

Findings:

1. The correlation among Infosys &HCL shares and Infosys & Wipro shares are negative and they are good combinations for portfolio investment.
2. There is positive correlation among TCS & HCL, TCS &Wipro, and HCL &Wipro these combinations should be avoided in the same portfolio.
3. The correlation among banking stocks are more positive compared to correlation among IT company stocks.
4. There is negative correlation between banking and IT company stocks such as SBI& TCS, SBI&HCL, ICICI &TCS, ICICI & HCL, Punjab national bank (PNB) &Infosys, PNB &TCS and PNB &HCL. These combinations are less risky for investment.
5. There is almost close to zero correlation between returns of SBI & Infosys, SBI & Wipro, ICICI &Infosys, ICICI &Wipro, PNB & Wipro HDFC &Infosys, and HDFC &Wipro. Even these shares represent good combinations for investment as their returns are unrelated to each other.

Conclusion:

The co-movements between returns of selected banks and IT companies were analyzed and compared by calculating coefficient of correlation .The study includes correlation between eight companies, which includes four banking company stocks such as SBI, ICICI ,PNB, HDFC and four IT company stocks such as Infosys, TCS,HCL and Wipro.

The correlation values varied from -0.1247(PNB &TCS) to +0.6523(SBI &PNB).There is more positive correlation of 0.65 between SBI & PNB banks which represent a risky combination for portfolio construction . On the other hand there is more negative correlation of -0.125 between stocks of Punjab national bank (PNB) & Tata consultancy services (TCS) which represent a less risky combination for investment and there is close to zero correlation of 0.0104 among stocks of State bank of India (SBI) & Infosys which is another good combination for less risky portfolio.

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