S&P BSE Sensex Vs CNX Nifty – Yield Comparison

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Abstract

This study aims at making a comparison between CNX NIFTY and S&P BSE SENSEX, the two most popular large cap indices of Indian stock market, using monthly closing values from 3rd November 1995 till 31st march 2014. The performance has been evaluated using annualized return, annualized standard deviation, annualized Sharpe ratio and capital asset pricing model. Based on analysis, it was found that statistically, there is no significant difference in the relative risk and return of both the indices. The non-rejection of joint hypothesis shows that both of them can be used in reciprocity to each other. Considering the economic significance, higher annualized return, slightly lower annualized standard deviation, positive value of alpha, relatively lesser beta and superior Sharpe ratio of CNX NIFTY suggest that it is a better index to invest than S&P BSE SENSEX for a long term

Keywords: Index, India, CNX Nifty, S&P BSE SENSEX, Performance comparison

Introduction

S&P BSE SENSEX and CNX NIFTY are two popular indices in Indian stock market. They are owned and operated by two largest Indian stock exchanges namely BSE (Bombay Stock Exchange) and NSE (National Stock Exchange). Bombay stock exchange, established in 1875, is Asia's oldest stock exchange with more than 5000 listed companies. Under a 50-50 partnership venture with S&P Dow Jones Indices LLC. (known as Asia Index Pvt. Ltd), it is managing 36 indexes focusing on different sectors, themes, investment strategies and fixed income securities. Of all these indices, S&P BSE SENSEX is the most popular and widely followed. It is designed to measure the performance of the 30 largest, most liquid and financially sound companies across key sectors of the Indian economy.

National Stock Exchange, incorporated in 1992, is the first exchange in India to provide a modern, fully automated screen-based electronic trading system. NSE enjoys the highest market share with 77.8 percent of total turnover (volumes in cash market, equity derivatives, and currency derivatives) in 2013–2014 (ISMR, 2014). As on 31 December 2014, there are 47 indexes at NSE, maintained and managed by IISL (India Index Service Ltd, a subsidiary of NSE). They are broadly classified by NSE into five categories, namely broad market, sectoral, thematic, strategy and fixed income indexes. Among them,

CNX NIFTY is their flagship index, representing about 66.85% of the free float market capitalization of the stocks listed on NSE as on 30 June 2014. It is a well-diversified stock index comprising 50 stocks, accounting for 23 sectors of the economy.

Both S&P BSE SENSEX and CNX NIFTY represent large capitalized companies stocks and are widely tracked by the investment community worldwide. They have multiple uses. Asset management companies use them to develop index portfolios. Fund Managers make use of them as a benchmark in evaluating their periodic performance. Investors follow them to know overall daily market performance. Economists use them as a leading indicator of the performance of the overall economy. Academicians use them as market proxy in determining systematic risk. Chartists plot them to predict future price movements. Being two separate broad based indices used for various purposes, there is a need to determine which is the better index out the two. Hence, this study aims to compare these two indexes and suggest the superior index to all users. The main questions that are investigated in this study are:

1.Is CNX NIFTY outperforming S&P BSE SENSEX?

2.Is CNX NIFTY having same risk as S&P BSE SENSEX?

3.Can CNX NIFTY be replicated by S&P BSE SENSEX?

Literature Review

Most of the literature on indices primarily focuses on determining inter linkages between the international markets. Using data of various indices world over, they have found existence of inter market linkage at global level (Wheatley (1988), Dwyer and Hafer (1988), Eun and Shim (1989), Hamao et al. (1990), Fischer and Palasvirta (1990), Becker et al. (1990), Malkamäki (1992), Chan et al. (1992), Cheung and Mak (1992) , Smith et al. (1993), Park and Fatemi (1993), Blackman et al. (1994), Arshanapalli et al. (1995), Sewell et al. (1996), Palac-McMiken (1997) , Kanas (1998), Liu et al. (1998), Ramchand and Susmel (1998), Gerrits and Yuce (1999), Christofi and Pericli (1999), Smith (1999), Johnson and Soenen (2002), Baharumshah et al. (2003), Click and Plummer (2005), Mukherjee and Mishra (2007) , Siddiqui(2009)).

However, Elyasiani et al. (1998), Roca and Selvanathan (2001), Scheicher (2001), Ng (2002), Hatemi and Roca (2004), Maghyereh (2006), Wong, Agrawal and Du (2004) disagree on existence of any inter market linkages.

In Indian context, there are mixed results. While Narayan et al. (2004) and Rajhans & Singh (2013) have found significant integration of Indian stock markets with world markets, Rao & Naik (1990), Kumar (2002), Mishra (2002) , Nath and Verma (2003), Ahmad, Ashraf and Ahmed (2005) and Janak, Raj, Sarat Dhal (2008) have found absence of such integration. However, we have come across only one study of Suresh and Tiwari (2012), who have found presence of short term and long term linkages among the sectoral indexes at Bombay Stock Exchange in India.

Contrary to the vast majority of research on market integration, very few studies have been conducted on performance of various indices. They are as follows:

Narasimhan and Balasubramanian (1999) compared risk-return characteristics of Sensex, Natex and BSE 200 using mean difference test and variance difference test. They found statistically insignificant difference in the risk-return characteristics of these indices. Statman (2000) analyzed the performance of the Domini social index (DSI) against S&P500 in US from May 1990 to September 1998 and found that it failed to generate risk adjusted superior returns. Ahmad and Ibrahim (2002) compared performance of KLSI with KLCI over the period from 1999 to 2002 in Malaysian stock market. Although, means were found to be statistically insignificant, KLSI slightly outperformed KLCI on risk adjusted basis.

Hakim and Rashidian (2004) investigated risk-return characteristics of Dow Jones Islamic Stock Market Indices (DJIM) from 1999 to 2002. They found that both Islamic Index and Wilshire 5000 stock market index failed to generate superior returns over three month T-bill. However, return and risk of Islamic index was found to be less than Wilshire 5000.

Hussein (2004) tested whether returns of FTSE Global Islamic Index are significantly different from their index counterpart (FTSE All- World Index). The sample period was divided into two sub-periods, bull period (July 1996 –March 2000) and bear period (April 2000 - August 2003). It was found that while Islamic index yielded statistically significant positive abnormal returns in bull market period, it underperformed in bear market period.

Hussein (2005) made an effort to test whether monthly returns of Financial Time Stock Exchange (FTSE) Global Islamic index and Dow Jones Islamic Market Index are significantly different from their common index for the period January 1996 to December 2004. It was found that they performed in similar manner.

Hussein and Omran (2005) studied the performance of the Islamic index against the Dow Jones index from 1995 to 2003 using monthly data and suggested that the Islamic index outperformed the non-Islamic index both over the entire period and the bull period, while the vice-versa was true for the bear period.

Schroeder (2007) compared performance characteristics of SRI equity indices with benchmark indices and found no statistical difference between them. Using T-test, Albaity

and Ahmad (2008) found that there was no statistically significant difference in mean returns of KLSI and KLCI in the Malaysian stock market. Chan et. al. (2009) assessed merits of popular performance evaluation procedures adopted by academicians to a sample of active money managers and passive indexes. They found negative and statistically significant alpha for Russell 2000 growth index.

Dharani and Natarajan (2011) compared risk and return of the Nifty Shariah index and Nifty index for each day of the week, month and quarter using daily closing values from 2nd January 2007 to 31st December 2010. They tested the difference in the mean returns of both the indices using t- test and found that there was no statistical difference between average day-wise returns of both the indexes. However, there existed significant difference between average return of both the indexes in the month of July and September. Cremers et. al. (2013) found that standard fama-french and cahart models produce economically and statistically significant non-zero alpha for passive benchmark indexes like S&P 500 and Russell 2000.

Thus, it can be seen that the review of literature gives mixed results. While, majority of the studies found that there is insignificant difference in the returns of indices, however, only two studies namely, Chan et. al. (2009) and Cremers et. al. (2013) exclusively concluded that few indices show statistically significant different performance from others.

Compared to the above mentioned studies on Indices, our study extends the research in two aspects. Firstly, we analyze risk-return characteristics of two popular broad based indices of Indian stock market namely S&P BSE SENSEX and CNX NIFTY, on which the authors have not come across any study. Secondly, the study is done for a longer period i.e. from 3rd november 1995 till 31st march 2014, spanning over more than 18 years. This leads to relatively more comprehensive analysis of risk-return characteristics of the indices.

Data and Methodology

The universe of study comprises of the monthly closing values of S&P BSE SENSEX and CNX NIFTY from 3rd November 1995 till 31st March 2014. The data of indexes is collected from the official website of National Stock Exchange and Bombay stock exchange. The research is done by taking monthly log returns of S&P BSE SENSEX and CNX NIFTY. The implicit yield of 91-day treasury bills of Government of India is taken as a proxy of risk free rate (Connors and Sehgal, 2001). The data of risk free rates is taken from the website of Reserve Bank of India (www.rbi.gov.in). The performance of indexes is evaluated using annualized return, annualized standard deviation,Sharpe ratio and capital asset pricing model.

The annualized return is the annual compounded return earned by an investor over a period by investing in an asset. It is useful in comparing returns over different lengths of time as returns are rescaled to one year. It is calculated as follows:

$$R = \left(\left(\left(\frac{X_t}{X_0}\right) \wedge \left(\frac{1}{t}\right)\right) - 1\right) X\ 100 \quad \text{(I)}$$

Where, R is annualized return (expressed as percentage), Xt is terminal value, Xo is initial value and t is number of years.

Annualized Standard Deviation is a measure of volatility. A portfolio with higher annualized standard deviation is considered more volatile and hence, more risky. It is calculated as follows:

$$\sigma_A = \sigma_d\ X \sqrt{T}$$

Where, σA is annualized standard deviation, σd is standard deviation computed using monthly returns, T is number of months in a year.

The Sharpe Ratio measures the risk premium return earned per unit of total risk. It is calculated by dividing the difference of average monthly portfolio return and average monthly risk free rate with the standard deviation of excess portfolio returns. It is stated as follows:

$$S_i = \frac{\overline{R_i} - \overline{RFR}}{\sigma(\overline{R_i} - \overline{RFR})} \quad \text{(III)}$$

Where: Si is Sharpe ratio for a portfolio, Rt is mean return on the portfolio, RFR is mean return on 91-day RBI Treasury bills (proxy for risk-free rate of interest) and Oi (Rt-RFR) is standard deviation of the excess returns of the portfolio.

The Sharpe ratio shows the excess return earned by an investor for per unit of risk to which they were exposed to. A portfolio with highest positive Sharpe ratio is considered best for investment while the one having negative Sharpe ratio indicates that it failed to generate any superior return over risk free rate (Sharpe, 1994).

Capital Asset Pricing Model (CAPM) is used to find the difference between the actual returns and the returns estimated by the model. The difference is called Jensen alpha, which is estimated as follows:

$$\alpha_i = \overline{R_i} - [\overline{RFR} + \beta_i(\overline{R_m} - \overline{RFR})]$$

Where: a_i is Jensen Alpha, R_j is mean return on the portfolio, R_m is mean return of S&P BSE SENSEX (proxy for market), RFR is mean return on 91-day RBI Treasury bills (proxy for risk-free rate of interest) and B_i is the beta of the portfolio.

The objectives of the study are attained by using CAPM

model. The null hypotheses framed to test them are as follows:

Objective I: Is CNX NIFTY outperforming S&P BSE SENSEX?

H0 = CNX Nifty doesnot generate significant excess return than S&P BSE SENSEX i.e.

$$= 0$$

Objective II: Is CNX NIFTY having same risk as S&P BSE SENSEX?

H0= There is no significant difference in the relative risk of CNX NIFTY and S&P BSE SENSEX i.e.

$$\beta = 1$$

Objective III: Can CNX NIFTY be replicated by S&P BSE SENSEX?

H0= CNX NIFTY can be replicated by S&P BSE SENSEX, using joint hypothesis i.e.

$\alpha = 0$ and $\beta = 1$

If a stock/portfolio/fund generates a better return than its beta would predict, it has a positive Jensen Alpha, and if it returns less than the amount predicted by beta, it has a negative Jensen Alpha. An investment manager yields a statistically significant positive Jensen alpha, if he has a superior stock picking or market timing ability in excess of the benchmark. Similarly, a portfolio whose beta is more than 1 is considered more volatile and hence, more risky than the market. On the contrary, a portfolio with beta less than 1 is considered less risky than the market. Also, the joint hypothesis H0: ($\alpha = 0$ and $\beta = 1$) is tested to check if a portfolio can be replicated by the benchmark index. If the null hypothesis is not rejected, then investing in the benchmark index, on average, is equivalent to investing in the portfolio, without any significant difference in return or risk.

Analysis

The table I discusses performance of the two indices using annualized return, annualized standard deviation and annualized Sharpe ratio across the period of 18 years and five months. The annualized return of CNX NIFTY is higher than S&P BSE SENSEX for nine financial years i.e. 1995-1996, 1998-1999, 1999-2000, 2000-2001, 2001-2002, 2007-2008, 2008-2009, 2010-2011 and 2011-2012. On the contrary, the S&P BSE SENSEX generated superior return over CNX NIFTY in ten financial years i.e. 1996-1997, 1997-1998, 2002-2003, 2003-2004, 2004-2005, 2005-2006, 2006-2007, 2009-2010, 2012-2013 and 2013-2014. However, across the period from 3rd November 1995 to 31st March 2014, the combined annualized return of the CNX Nifty (10.88) is higher than S&P BSE SENSEX (10.65) by 23 basis points, thereby making it more profitable.

Table 1: Year -wise Performance statistics of CNX NIFTY and S&P BSE SENSEX from 3 rd November 1995 to 31st March 2014.

Financial Year	Annualized Return		Annualized Standard Deviation		Annualized Sharpe Ratio	
	CNX NIFTY	S&P BSE SENSEX	CNX NIFTY	S&P BSE SENSEX	CNX NIFTY	S&P BSE SENSEX
3 nov 1995- 31 march 1996	-0.61515	-1.24532	40.27529	37.85524	-0.36852	-0.4885
1996-1997	-1.72536	-0.1699	24.1029	26.46278	-0.44214	-0.34319
1997-1998	15.34648	15.82497	27.63593	30.26161	0.284123	0.272978
1998-1999	-3.47838	-3.92499	26.99974	27.21533	-0.42861	-0.44247
1999-2000	41.77914	33.72549	25.97734	29.18274	1.011638	0.699486
2000-2001	-24.8781	-27.9308	27.82584	28.39844	-1.34267	-1.46175
2001-2002	-1.62428	-3.74628	21.59827	22.31244	-0.38461	-0.46996
2002-2003	-13.3991	-12.1242	20.74891	20.32125	-0.96277	-0.91154
2003-2004	81.13883	83.37532	23.20576	21.18016	2.36507	2.650433
2004-2005	14.88515	16.13816	25.7314	24.09433	0.352598	0.421707
2005-2006	67.14809	73.72975	22.13017	20.91966	2.078752	2.383304
2006-2007	12.31429	15.88782	22.31527	22.95072	0.236513	0.366219
2007-2008	23.88952	19.67809	31.63625	28.83983	0.459468	0.384201
2008-2009	-36.1928	-37.9428	41.37262	40.17899	-1.24366	-1.34978
2009-2010	73.7566	80.54045	31.25117	31.64869	1.658475	1.758559
2010-2011	11.1381	10.9395	20.38055	20.5494	0.22319	0.212661
2011-2012	-9.22563	-10.4963	21.53253	20.47354	-0.82332	-0.93476
2012-2013	7.308023	8.225428	15.29101	14.86459	-0.05251	0.00317
2013-2014	17.97872	18.84977	15.17591	13.19163	0.528382	0.663444
1995-2014	**10.88416**	**10.65399**	**25.96943**	**25.98494**	**0.133748**	**0.125671**

The annualized standard deviation shows that CNX NIFTY is more risky than S&P BSE SENSEX in ten financial years i.e. 1995-1996, 2002-2003, 2003-2004, 2004-2005, 2005-2006, 2007-2008, 2008-2009, 2011-2012, 2012-2013 and 2013-2014. But S&P BSE SENSEX showed higher volatility than CNX NIFTY in nine financial years i.e. 1996-1997, 1997-1998, 1998-1999, 1999-2000, 2000-2001, 2001-2002, 2006-2007, 2009-2010 and 2010-2011. Thus, across the period of 18 years and five months, annualized standard deviation of CNX NIFTY (25.97) is slightly lower than S&P BSE SENSEX (25.98), making it little less risky.

From table I, it can be seen that the annualized Sharpe ratio of CNX NIFTY was greater than S&P BSE SENSEX in ten financial years i.e. 1995-1996, 1997-1998, 1998-1999, 1999-2000, 2000-2001, 2001-2002, 2007-2008, 2008-2009, 2010-2011 and 2011-2012. On the other hand, S&P BSE SENSEX yielded superior annualized Sharpe ratio than CNX NIFTY in nine financial years i.e. 1996-1997, 2002-2003, 2003-2004, 2004-2005, 2005-2006, 2006-2007, 2009-2010, 2012-2013 and 2013-2014. Thus, over the selected period, both the indices have positive annualized Sharpe ratio and hence, are successful in yielding superior returns over risk free rate. Since, CNX NIFTY (0.133748) has higher annualized Sharpe ratio, it is considered better for investment than S&P BSE SENSEX (0.125671).

Table II: Results using CAPM Model: Regression-Based Tests

	Adjusted R^2	$H_0 : \alpha = 0$	$H_0 : \beta = 1$	Test of Joint Hypothesis $H_0 : (\alpha = 0 \text{ and } \beta = 1)$
CNX NIFTY	0.977048	0.0206 (0.7020)	0.9879 (0.4162)	Not rejected (0.6646)

The table reports the regression coefficients and their significance value, in the capital asset pricing model, computed using OLS regression. Autocorrelation and heteroskedasticity-consistent standard errors are used to compute the significance values. The dependent variable was excess returns of CNX NIFTY over risk free rate and the independent variable was excess returns of S&P BSE SENSEX over risk free rate.

The table 2 compares the performance of CNX NIFTY with S&P BSE SENSEX using CAPM model. The results are estimated using ordinary least squares method. The variance-covariance matrix of residuals is corrected for autocorrelation and heteroskedasticity using the Newey and West (1987) approach. The adjusted R-square is .977048, showing that 97.70 per cent of variation is explained by the model, meaning that CNX NIFTY can be approximated using S&P BSE SENSEX. The null hypothesis that CNX NIFTY does not generate statistically significant excess returns over S&P BSE SENSEX is not rejected as the significance value of jensen alpha is more than 0.05. Thus, it shows that Jensen alpha, the measure of relative risk adjusted performance, is not significantly different from 0. However, the positive value of Jensen alpha (0.206) indicates that the CNX NIFTY generates economically significant (though statistically insignificant) risk adjusted excess returns over S&P BSE SENSEX.

The null hypothesis, $\beta = 1$, used to test that there is no statistically significant difference in the relative risk of CNX NIFTY and S&P BSE SENSEX is also not rejected as the significance value of Beta (0.9879, 0.4162) is more than 0.05. Although statistically insignificant, the beta (0.9879) is still less than 1, thereby showing economic significance of CNX NIFTY being relatively little less riskier than S&P BSE SENSEX.

The last column of table II shows results of the test of joint hypothesis H0: ($\alpha = 0$ and $\beta = 1$). The null hypothesis is not rejected as the F-Value (0.6646) is more than 0.05. It means that both indices on average have similar risk and return characterstics. Thus, CNX NIFTY can be replicated by S&P BSE SENSEX.

Summary and Conclusion

The present study aims at finding a better index between S&P BSE Sensex and CNX NIFTY by using their monthly closing values from 3rd November 1995 till 31st March 2014. The comparison between them is done using annualized return, annualized standard deviation, Sharpe ratio and capital asset pricing model. The insignificant values of Jensen alpha and beta indicate that there is no statistical significant difference between the relative return

and risk of S&P BSE SENSEX and CNX NIFTY. The results of joint hypothesis, used to test reciprocity of CNX NIFTY with S&P BSE SENSEX, show that the economists, academicians and technicians can use either of them as a market proxy for their respective purposes. However, CNX NIFTY seems to be a better index for investment due to higher annualized return (10.884), slightly lower annualized standard deviation (25.969), superior Sharpe ratio (0.1337), positive value of alpha (0.977) and relatively lesser beta (0.9879). Hence, it is recommended to invest in index funds replicating CNX NIFTY and fund managers should use it as their benchmark.

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