India Index Services & Products Limited

WHITE PAPER

SERIES #13

NIFTY100 Low Volatility30

Lower risk need not necessarily mean lower returns

June 2018

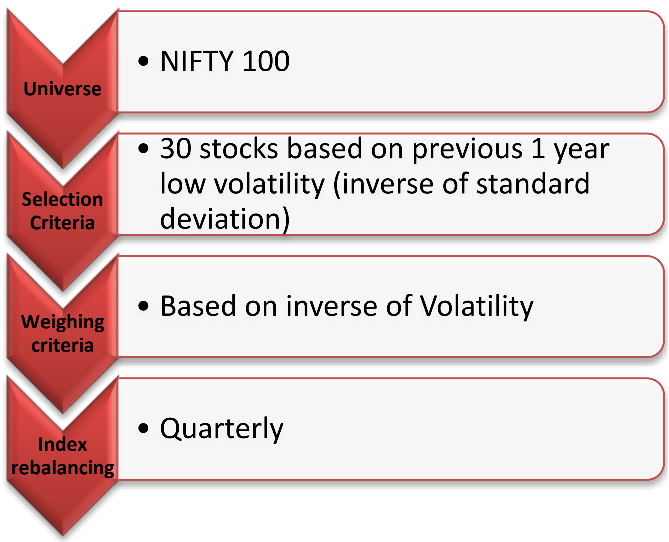
Introduction:

In an environment of sustained uncertainty and stormy markets, investors typically grapple with a common question – how can one potentially reduce market risk while maintaining long term return benefits that equity generally provide? That's like having best of two worlds – high returns but with lower volatility. The NIFTY100 Low Volatility 30 Index – a focused equity index that tracks performance of 30 least volatile companies in the NIFTY 100 Index. The low volatility index, in back-tested results, has given higher returns and lower risk as compared to NIFTY 100 – its parent index, over longer time horizons. Low-volatility investing has lot of popularity within the global investment community. It works on the idea that low-volatility stocks cushion the potential damage during any sudden market downturn due to any catastrophic event. The prospect of achieving higher returns without taking the comparable risk associated with traditional market cap weighted strategies is one of the prominent reasons that low volatility based factor investing is gaining popularity globally. The assets under management of ETFs benchmarked to low volatility strategy currently stand in excess of $55 Bn. USD globally which is ~1.45% of the total AUM linked to equity ETFs. *(source: BlackRock Global ETP Landscape April 2018).* The higher historical returns of low-volatility index strategy is however a puzzle as it is apparently at odds with one of the most basic principles in finance: that higher volatility is typically associated with higher returns. According to the highly celebrated single factor pricing model – the Capital Asset Pricing Model (CAPM), one should expect lower return for taking lesser risk (volatility). NIFTY100 Low Volatility 30 index strategy has defied this principle – at least in historical performance.

About NIFTY100 Low Volatility 30 Index

The NIFTY100 Low Volatility 30 index measures performance of the 30 least volatile stocks in the NIFTY 100. Volatility is measured as standard deviation of stock returns over previous one year period. Constituents are weighted relative to the inverse of their corresponding volatility, with the least volatile stocks receiving the highest weights. The Index is designed to serve as a transparent benchmark for minimum volatility equity strategies.

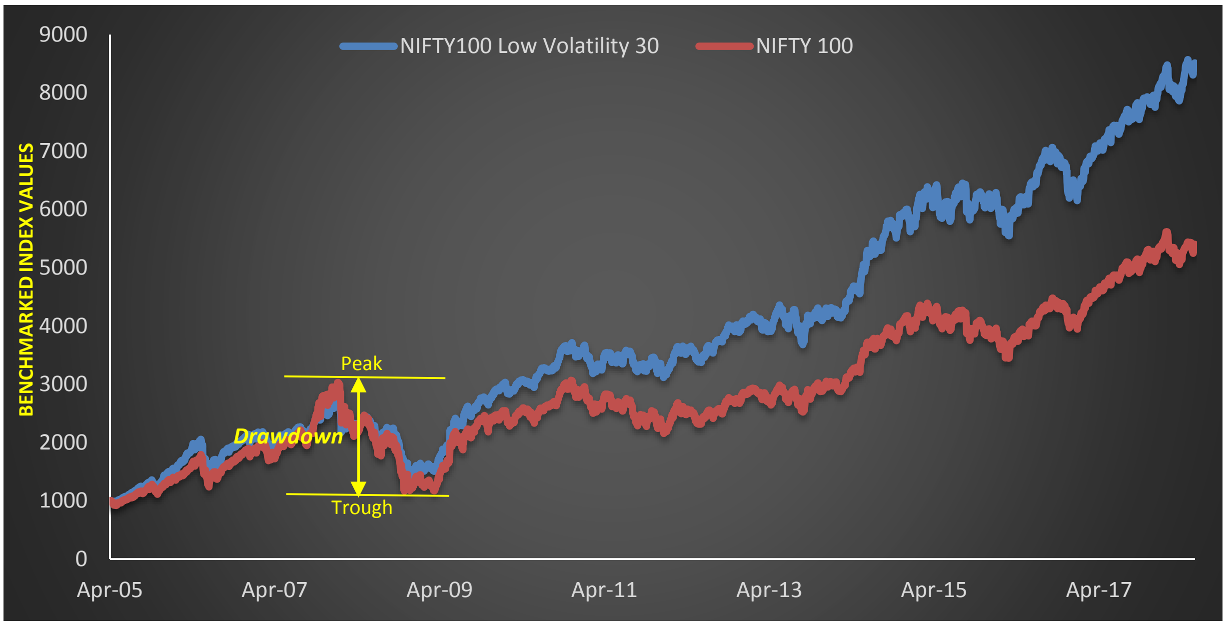
Exhibit 1: Aspects of NIFTY100 Low Volatility 30 Index



NIFTY100 Low Volatility 30 achieved higher risk-adjusted returns as compared to its parent NIFTY 100 and witnessed lower drawdowns during phases of market downturn

Exhibit 2 below shows the historical price return index performance of NIFTY100 Low Volatility 30 index along with that of its parent index - NIFTY 100.

Exhibit 2: Benchmarked performance comparison of NIFTY100 Low Volatility 30 Index vis-à-vis NIFTY 100



Drawdown refers to the peak to trough decline during a specific period of investment. It is reported as the drop from peak to subsequent trough in percentage terms. For instance in calendar year 2008, NIFTY100 Low Volatility 30 index dropped from peak value of 2774.9 in January 2, 2008 to trough of 1401.9 in October 27, 2008 and hence the drawdown for the calendar year 2008 is -49.5%.

Exhibit 3: Annualized returns, volatility and return-risk ratio of NIFTY100 Low Volatility index and NIFTY 100

Annualized Returns			Annualized Volatility		Return - Risk Ratio	
Period	**NIFTY100 Low Volatility 30**	**NIFTY 100**	**NIFTY100 Low Volatility 30**	**NIFTY 100**	**NIFTY100 Low Volatility 30**	**NIFTY 100**
Since inception (April 1, 2005)	17.66%	13.66%	18.18%	22.62%	0.97	0.60
10 years	13.71%	9.01%	16.26%	21.33%	0.84	0.42
7 years	13.65%	10.50%	12.56%	15.16%	1.09	0.69
5 years	14.77%	12.88%	12.68%	14.44%	1.17	0.89
3 years	11.57%	9.17%	11.56%	13.29%	1.00	0.69
1 year	15.89%	11.65%	8.34%	10.27%	1.90	1.13

**As on May 31, 2018*

Note: Returns for more than 1 year are CAGR returns

Exhibit 3 above captures the annualized returns, volatility and return-risk ratio of NIFTY100 Low Volatility 30 and its parent NIFTY 100 index. While not indicative of future performance, the NIFTY100 Low Volatility 30 index outpaced its parent NIFTY 100 index by a cumulative 400 bps per annum since its inception date in April 2005. This is in spite of witnessing a significantly lower standard deviation at 18.18% as against 22.62% of the parent NIFTY 100 index over the same period. A similar outperformance in returns is also observed for investment period of 10, 7, 5, 3 years and 1 year where NIFTY100 Low Volatility 30 has consistently generated an alpha in the range of 190 - 470 bps over NIFTY 100. Higher returns of NIFTY100 Low Volatility 30 coupled with lower volatility in comparison to NIFTY 100 has resulted in higher return-risk ratio of NIFTY100 Low Volatility 30 across all investment horizons (highlighted in 'green' in Exhibit 3).

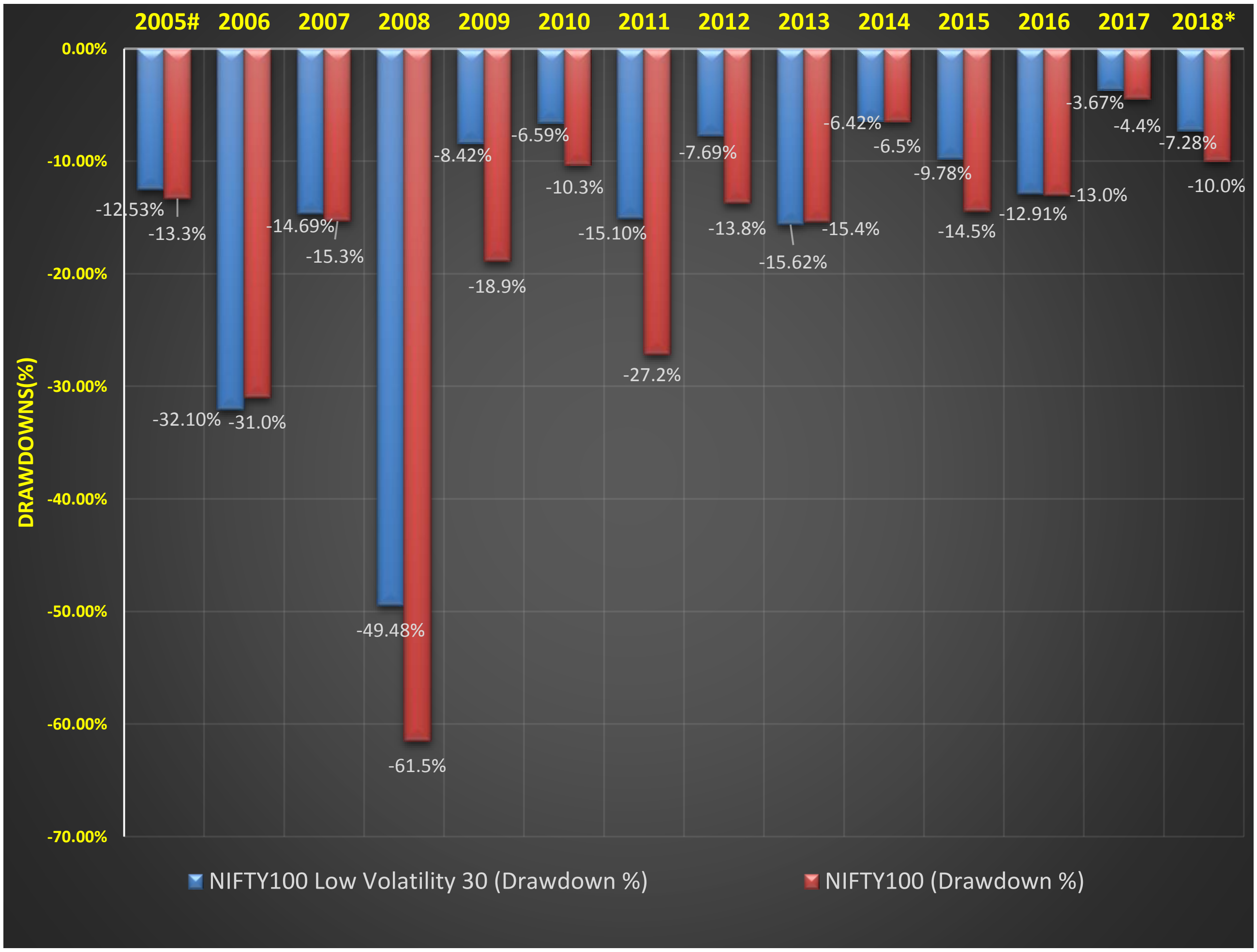
Exhibit 4: Calendar year returns and volatility of NIFTY100 Low Volatility 30 index and NIFTY 100

Calendar Year Returns			Calendar Year Volatility	
Year	**NIFTY100 Low Volatility 30**	**NIFTY 100**	**NIFTY100 Low Volatility 30**	**NIFTY 100**
2005*	50.2%	35.8%	15.7%	16.8%
2006	41.2%	38.0%	26.5%	26.3%
2007	29.4%	57.5%	20.5%	25.2%
2008	-43.3%	-53.7%	33.7%	44.6%
2009	89.8%	82.7%	24.1%	34.4%
2010	23.5%	17.9%	11.1%	16.0%
2011	-13.3%	-25.8%	14.4%	20.4%
2012	29.8%	30.6%	11.1%	15.1%
2013	4.9%	6.5%	15.0%	17.7%
2014	34.8%	33.2%	12.2%	13.0%
2015	8.1%	-2.4%	14.4%	16.2%
2016	1.4%	3.6%	13.5%	15.3%
2017	28.2%	31.0%	7.8%	9.3%
2018#	4.3%	0.7%	9.5%	11.5%

**Since April 1, 2005. #Data as on May 31, 2018*

Exhibit 4 above shows the calendar year wise returns and volatility of the low volatility index and its parent index. As can be seen, the NIFTY100 Low Volatility 30 outperforms the NIFTY 100 index in 9 out of 14 year. Further, analysis of calendar year-wise performance highlights that not only low volatility strategy performs well in bear market but also in the recovery phase of the equity market. During the financial crisis of 2008, NIFTY100 Low Volatility 30 fell 10.4% lesser than NIFTY 100 with 10.9% lower volatility. Similarly in 2011, NIFTY100 Low Volatility 30 fell 12.50% lesser than NIFTY 100 with 6.0% lower volatility. In recovery phase of 2009, low volatility index gave 7.1% higher returns with substantially lower volatility of 10.1%. For a prudent investor, who is not only conscious about returns but equally about risk adjusted returns, the low volatility based style may be a good investment strategy.

Exhibit 5: Calendar year-wise drawdowns of NIFTY 100 Low Volatility 30 and NIFTY 100



*# Inception date: April 1, 2005 *Data as on May 31, 2018*

Exhibit 5 above shows the calendar year-wise drawdowns of NIFTY100 Low Volatility 30 and its parent (NIFTY 100). Highest drawdown recorded by NIFTY100 Low Volatility 30 index was -49.5% during financial crisis of 2008 as against -61.5% of NIFTY 100 which was observed during the same period. Similar instance is also observed during 2011 when NIFTY100 Low Volatility 30 fell ~12% lesser than NIFTY 100. On overall basis, out of 14 calendar years, NIFTY100 Low Volatility 30 recorded lower drawdowns compared to NIFTY 100 in 12 instances indicating relatively robust performance of NIFTY100 Low Volatility 30 during periods of market correction/downturn.

On rolling return basis, NIFTY100 Low Volatility 30 portfolio has consistently outperformed its parent NIFTY 100 index across all investment horizons

Rolling return analysis was conducted to eliminate recency bias in performance. Figures in Exhibit 6 below shows number of instances of outperformance of NIFTY100 Low Volatility 30 index with respect to NIFTY 100 index.

Exhibit 6: Rolling year returns comparison of NIFTY100 Low Volatility 30 and NIFTY 100

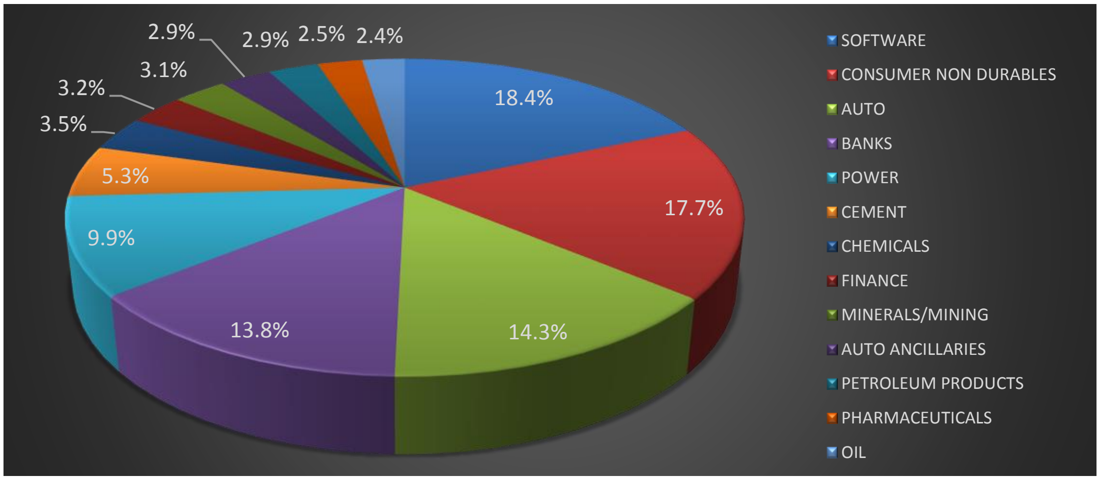
Rolling returns comparison between NIFTY100 Low Volatility 30 and NIFTY 100						
Investment period	**NIFTY100 Low Volatility 30 outperforming NIFTY 100 (% instances)**					**Total Instances of Outperformance**
	Outperformance: (>8%)	**Outperformance: (5%-8%)**	**Outperformance: (3% -5%)**	**Outperformance: (1% -3%)**	**Outperformance: (0% -1%)**	
10 years	*0%*	*13%*	*87%*	*0%*	*0%*	***100%***
7 years	*0%*	*39%*	*58%*	*3%*	*0%*	***100%***
5 years	*7%*	*27%*	*40%*	*23%*	*3%*	***100%***
3 years	*13%*	*22%*	*22%*	*31%*	*8%*	***95%***
2 years	*18%*	*23%*	*11%*	*13%*	*10%*	***76%***
1 year	*26%*	*14%*	*11%*	*11%*	*4%*	***66%***

**Data as on May 31, 2018*

As can be observed, NIFTY100 Low Volatility 30 index has always (100% of the times) outperformed NIFTY 100 index for an investment horizon of 5, 7 and 10 years. Specifically for 10 year horizon, 87% of the times such outperformance in returns is in the range of 3 – 5%. For shorter time horizon (1, 2 and 3 years), NIFTY100 Low Volatility 30 index has managed to outperform NIFTY 100 comfortably for more than 65% of the times.

NIFTY100 Low Volatility 30 index is fairly diversified across industries

Exhibit 7: Sector composition of NIFTY100 Low Volatility 30 portfolio



**Composition as on May 31, 2018*

Exhibit 7 above shows the industry exposure of NIFTY100 Low Volatility 30 index as on May 31, 2018. The index has a fairly diversified portfolio spread across 13 industries. It has Software (18.4%), Consumer Non Durables (17.7%), Automobiles (14.3%), Banks (13.8%) and Power (9.9%) as the top 5 industries with a combined weight of 74.1%. The remaining weight of 25.9% is fairly distributed amongst 8 sectors, each having weight of lower than 5.4%.

Exhibit 8: Top 10 stocks based on weights in NIFTY100 Low Volatility 30 and NIFTY 100 index

NIFTY100 Low Volatility 30		NIFTY 100	
Company Name	**Weight (%)**	**Company Name**	**Weight (%)**
HDFC Bank Ltd.	5.1	HDFC Bank Ltd.	8.9
Power Grid Corporation of India Ltd.	3.9	Reliance Industries Ltd.	6.5
Kotak Mahindra Bank Ltd.	3.9	Housing Development Finance	6.2
Hindustan Unilever Ltd.	3.8	Infosys Ltd.	4.8
NTPC Ltd.	3.8	I T C Ltd.	4.7
Maruti Suzuki India Ltd.	3.8	ICICI Bank Ltd.	3.7
Asian Paints Ltd.	3.7	Kotak Mahindra Bank Ltd.	3.6
Bajaj Auto Ltd.	3.7	Tata Consultancy Services Ltd.	3.5
IndusInd Bank Ltd.	3.7	Larsen & Toubro Ltd.	3.4
Hero MotoCorp Ltd.	3.6	Hindustan Unilever Ltd.	2.3
Total weight of top 10 stocks	**38.9**	**Total weight of top 10 stocks**	**47.7**
Herfindahl - Hirschman Score	**341.3**	**Herfindahl - Hirschman Score**	**310.6**

**Composition as on May 31, 2018*

Exhibit 9: Range in Full Market Capitalization of stocks in NIFTY100 Low Volatility 30 and NIFTY 100 portfolio

Parameter	NIFTY100 Low Volatility 30	NIFTY 100
Largest Stock	Tata Consultancy Services Ltd.	Tata Consultancy Services Ltd.
Smallest Stock	Oil India Ltd.	Cummins India Ltd.
Median Stock	IndusInd Bank Ltd.	ICICI Prudential Life Insurance Company Ltd.

**Composition as on May 31, 2018*

Stock level weights of NIFTY100 Low Volatility 30 and its parent (NIFTY 100) are provided in Exhibit 8. As on May 31, 2018, top 10 stocks in a 30-stock portfolio of NIFTY100 Low Volatility 30 index contribute 38.9% of weight (with individual weights within a narrow range of 3.6% to 5.1%) whereas those in a 100-stock portfolio of NIFTY 100 contribute 47.7% of weight (with individual weights varying in a range of 2.3% to 8.9%).

The Herfindahl - Hirschman Index (HHI)[2] value explains the degree of diversification in a portfolio, where a lower value signifies a more diversified portfolio. The HHI scores of NIFTY100 Low Volatility 30 and NIFTY 100 remain fairly comparable despite former being a 30-stock index and later a 100-stock parent index. The NIFTY100 Low Volatility 30 index has HHI value of 341.3 whereas that of NIFTY 100 index is 310.6.

[2]*: Herfindahl Hirschman Index (HHI) measures the concentration of weights in a portfolio. Calculated as sum of squares of percentage weight of each stock in the portfolio*

Signing off…

The bottom-line is that each index strategy has its unique strengths and limitation. There can seldom be a single investment strategy that would outshine other strategies consistently in all market conditions. If we believe markets are informationally efficient and thus beating the market is difficult in long run, then traditional market capitalization based index strategies are expected to outperform others. However, if we believe that markets may not necessarily be informationally efficient in practice and that there are opportunities available to exploit pricing discrepancies based on certain risk factors (say volatility), then alternative index strategies like low volatility may outperform, especially during turbulent times.

Low volatility factor is one of the few factors that has performed well during turbulent markets, providing capital protection when it is needed most. It continues to remain an anomaly as it has produced better-than-market returns over long time periods while offering lesser risk. Using 13 years of available data as well as the 1 years of history since the index has been live, the index has produced considerably lower volatility than the market, behaved defensively in market downturns and outperformed the market during these periods. Over the long term, this index has generated superior performance and also benefited from low volatility. The analysis of NIFTY Low volatility 30 shows that index not only provides higher risk adjusted returns but has also given higher absolute returns in several periods than traditional Market cap based indices. When this is clubbed with the fact that NIFTY100 Low Volatility 30 has lower stock and sector concentration risk, the index becomes an ideal passive investment tool for prudent investors who are concerned about risk-adjusted returns.

For information on Index methodology and factsheet, please visit us at www.niftyindices.com

About India Index Services & Products Ltd. (IISL):

India Index Services & Products Ltd. (IISL), a subsidiary of NSE, provides a variety of indices and index related services for the capital markets. IISL focuses upon the index as a core product. IISL owns and manages a portfolio of indices under the NIFTY brand of NSE, including the flagship index, the NIFTY 50. IISL equity Indices comprises of broad-based benchmark indices, sectoral indices, strategy indices, thematic indices and customised indices. IISL also maintains fixed income indices based on Government of India securities, corporate bonds and money market instruments. Many investment products based on IISL indices have been developed within India and abroad. These include index based derivatives traded on NSE, Singapore Exchange Ltd. (SGX), Chicago Mercantile Exchange Inc. (CME), Osaka Exchange Inc. (OSE), Taiwan Futures Exchange (TAIFEX) and a number of index funds and exchange traded funds. The flagship 'NIFTY 50' index is widely tracked and traded as the benchmark for Indian Capital Markets.

Contact Details

Analytical contact

Aman Singhania, CFA, FRM

Head – Products (IISL)

+91-22-26598214

asinghania@nse.co.in

Business Development contact

Rohit Kumar, FRM

Chief Manager – Business Development

+91-22- 26598386

rohitk@nse.co.in

Contact:
Email: iisl@nse.co.in
Tel: +91 22 26598386
Address: Exchange Plaza, Bandra Kurla Complex,
Bandra (East), Mumbai– 400 051(India)