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**Article**

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## RESEARCH ARTICLE

# How to obtain high returns with lower volatility in emerging markets?

Nipun Agarwal<sup>1\*</sup>

**Abstract:** Emerging markets equity indexes are usually seen as high return with a high degree of volatility associated with them. However, this should not be the case, if you choose high-quality firms that have increasing returns and lower volatility. The intent of this paper is to introduce the risk weighted alpha (RWA) indexation method that helps identify stocks that have stable increasing returns with lower volatility. In order to review this method in the context of emerging markets scenario, this paper takes the example of the Sensex index listed on the Bombay Stock Exchange (BSE) that comprises India's top 30 stocks by market capitalisation. Results show that some stocks like Hindustan Lever do show increasing returns and lower volatility. The RWA Sensex index outperforms the BSE Sensex index, while still maintaining a beta that is the same as that in the BSE Sensex index.

**Keywords:** investment management, equity indexation, emerging markets, passive investing, long/short strategies

## 1. Introduction

Emerging equity markets are seen to provide higher yields when global stock markets are increasing. However, there is an exodus of funds from emerging markets to developed country markets when systematic risk seems to increase globally. In this paper, we take an example of the Sensex index that is the main index for the Bombay Stock Market (BSE) in India. This is a market capitalisation index that comprises the top 30 stocks by market capitalisation listed on the Bombay Stock Exchange. Most of the major stock indexes globally, like the Dow Jones Industrial Average, S&P500 and FTSE100, are market capitalisation or price-weighted indexes. Market capitalisation and price-weighted indexes have been developed based on modern portfolio theory. These indexes are, therefore, considered to be the most efficient portfolios, and as a result are the main indexes on these exchanges.

However, Arnott and Hsu (2008), Arnott, Hsu, and Moore (2005) and Arnott, Kalesnik, Moghtader, and Scholl (2010) developed the fundamental index method stating that five fundamental factors (revenue, sales, cash flow, employment and book value) could help select stocks more efficiently to comprise an index compared to the market capitalisation and price-weighted index methods. Since then there have been numerous empirical studies that have differing views; however, it is inconclusive if the fundamental indexation method is superior to the market capitalisation and price-weighted indexes (see Basu & Forbes, 2013; Blitz & Swinkels, 2008; Blitz, van der Grient, & van Vliet, 2010; Chen, Chen, & Bassett, 2007; Estrada, 2006; Hemminki & Puttonen, 2008; Hsu & Campollo, 2006; Hsu, Kalesnik, & Xie, 2011; Kaplan, 2008; Mar, Bird, Casavecchia, & Yeung, 2009; Seigel, 2006). Instead, the fundamental index method is seen to have a value and small cap bias that may help it perform better at times than the market capitalisation weighted index.

Equal-weighted and risk-weighted indexes are the other index methods that are prominent. Equal-weighted index method simply applies an equal weight of each stock in the index. There are a myriad of risk-weighted indexes, minimum variance, equally weighted portfolio, maximum Sharpe ratio, most diversified portfolio, equally weighted risk distribution portfolio and semi-variance

portfolio (Demey, Maillard, & Roncalli, 2010). While the fundamental index method aims to increase the portfolio's alpha, the risk-weighted indexes look to reducing the portfolio's risk through diversification. The disadvantage of the equal-weighted index method is that it needs to be rebalanced frequently, has a high tracking error and it works as a take-profit strategy, where the stocks that have increased in price are sold and the stocks that have fallen in price are purchased to bring all the stocks to equal weight (Benartzi & Thaler, 2001; DeMiguel, Garlappi, & Uppal, 2009; Windcliff & Boyle, 2004).

Similarly, the risk-weighted index method has a disadvantage in that in some cases it could be concentrated in too few stocks or may require a covariance between stocks to be calculated; due to the higher dimensionality of this covariance matrix it is hard to use this method (Amenc, Goltz, Martellini, & Retkowsky, 2010; Chia, Melas, & Zhou, 2011; Chouiefaty & Coignard, 2008; Chow, Hsu, Kalesnik, & Little, 2011; Clarke, de Silva, & Thorley, 2006; Haugen & Baker, 1991). As emerging equity markets have high volatility, it would seem plausible that risk-weighted indexes would be a suitable index option. However, due to the diversification strategy used by these indexes, while unsystematic risk is reduced significant systematic risk remains. The intent of the risk weighted alpha (RWA) index method being introduced in this paper is to develop a method that selects stocks that have increasing returns and lower volatility. In effect, such an index will look to provide a higher return and have lower systematic risk than the market capitalisation weighted indexes.

## 2. RWA Index Construction for the BSE Index

RWA index method intends to provide higher weight to stocks that have higher returns and lower variance. In order to achieve this it uses Jensen's alpha to identify stocks that provide higher actual returns compared to their expected returns when considering systematic risk as derived by the capital asset pricing model. However, it is important that we find risk-weighted Jensen's alpha, as some of these stocks may take on higher risk in order to provide a higher return. As a result, the risk-weighted Jensen's alpha will identify stocks that provide the highest alpha per unit risk. The following formula explains the RWA index method:

$$\text{Risk Adjusted Jensen's Alpha} = \frac{R_i - [R_f + \beta_i(R_m - R_f)]}{\sigma_i}$$

where,

$R_i$  = actual return on the stock

$R_f$  = risk free rate

$R_m$  = return on the market index

$\beta_i$  = beta of the stock

$\sigma_i$  = standard deviation of the stock

In effect, once the RWA is obtained, this model assigns index weight to each stock based on this value. As it re-weights the BSE index, it is possible that some stocks have a negative RWA. As a result, these stocks will have a negative index weight, which would mean that the investor should short these stocks as they do not provide sufficient return compared to the risk associated with them. It is also noticed that stocks with a positive RWA over a significant period are those stocks that have consistently increasing stock prices over time with lower stock price volatility. This paper uses the BSE index as an example in the next section in order to explain the RWA index method. Financial data used in this paper were obtained from the Thomson Reuters Tick History database using daily price data for the BSE index from 2 January 2002–31 December 2012.

## 3. Performance Characteristics—RWA and BSE Index

BSE index is a market capitalisation weighted index comprised of the top 30 stocks listed on the Bombay Stock Exchange (BSE). This paper analyses if the RWA method will provide superior return and lower variance by re-weighting the stocks in the BSE index. Performance of the RWA against the market cap-weighted BSE index is provided in Table 1.

**Table 1. Performance—RWA Index**

Index	2003 (%)	2004 (%)	2005 (%)	2006 (%)	2007 (%)	2008 (%)	2009 (%)	2010 (%)	2011 (%)	2012 (%)	Index return (%)
BSE30 index	56.54	15.55	36.79	41.59	41.57	-64.27	65.30	17.34	-26.13	23.94	208.21
RWA BSE30 index	40.30	31.26	53.93	43.32	35.52	41.55	-26.84	-9.80	51.59	42.69	303.51

The RWA index seems to have provided a higher return (303.51%) from January 2002 to December 2012 compared to the BSE30 index, which is a market cap-weighted index, while the beta for both these indexes is close to .9. The reason why the RWA index has provided a higher return is due to the fact that it weighs stocks with increasing returns and lower volatility. Existing index methods do not specifically weight stocks based on their alpha while the fundamental indexation method uses five fundamental factors to increase the portfolio’s alpha. The RWA index method assumes that only high-performing stocks will consistently be able to provide a positive alpha per unit risk over an extended period of time. If a stock, however, does provide a higher alpha, but it also has a higher level of volatility in its returns, then it is unlikely that this stock will be provided an above-average weight due to the higher volatility.

Let us look at the profiles of the best- and worst-performing stocks in each of these methods (see Figures 1–10). Using the RWA index method, data show that the Hindustan Unilever stock performed well as it had a higher RWA. If you notice Figure 1, the stock price has steadily increased from 2002 to 2013. On the contrary, the worst-performing stock in the RWA index was Wipro, and the figure below shows that the stock price has high volatility over the sample period (2002–2012) and is less than half of what it was in January 2002.

You can see that the returns for Hindustan Unilever are steadily increasing compared to those of Wipro. Also, the volatility of the returns is lower for the Hindustan Unilever stocks compared to the Wipro stock.

Why don’t we analyse stocks within the same industry, for example let’s compare three banks that are part of the BSE30 index to explain why the RWA identifies stocks that perform well over a long term. Most importantly, however, we need to make sure that we take significant amount of sample data before calculating the RWA. Usually, 10 years of daily data or 30 years of monthly data will be suitable. Any shorter duration will not work as it will possibly not consider a complete business cycle and it will result in providing incorrect index weights for stocks.

The three banks that are part of the BSE30 index which are being analysed are: the State Bank of India (index weight of 4.6951%), ICICI Bank (index weight of 3.1285%) and HDFC Bank (index weight of 2.5781%). You will notice that stocks with lower weights have either lower returns or higher volatility. Compare the three figures below.

We have also compared the three Indian IT companies (see figures above): Tata Consultancy Services (TCS), Infosys and Wipro. You will notice that the TCS stock has an increasing and stable stock price compared to that of Infosys. On the other hand, the Wipro stock price is more volatile and has a smaller increase compared to the other two stocks (TCS and Infosys). In order to prove the point that the RWA helps identify stocks with increasing returns and lower volatility, we also consider the stocks of two auto manufacturers: Bajaj Auto (index weight of 1.8401%) and Hero MotoCorp Limited (index weight of .2937%). These figures prove that the Bajaj Auto stock has higher returns as it has increased from 500 Indian rupees to 2000 Indian rupees from 2008 to 2012 compared to the Hero MotoCorp stock where the stock price increased by the same amount but it took longer (2002–2012) for this increase to occur.

The risk-return characteristics for the RWA index are provided below. Table 2 shows that the stocks that perform better and have lower volatility have a higher weight in this index.

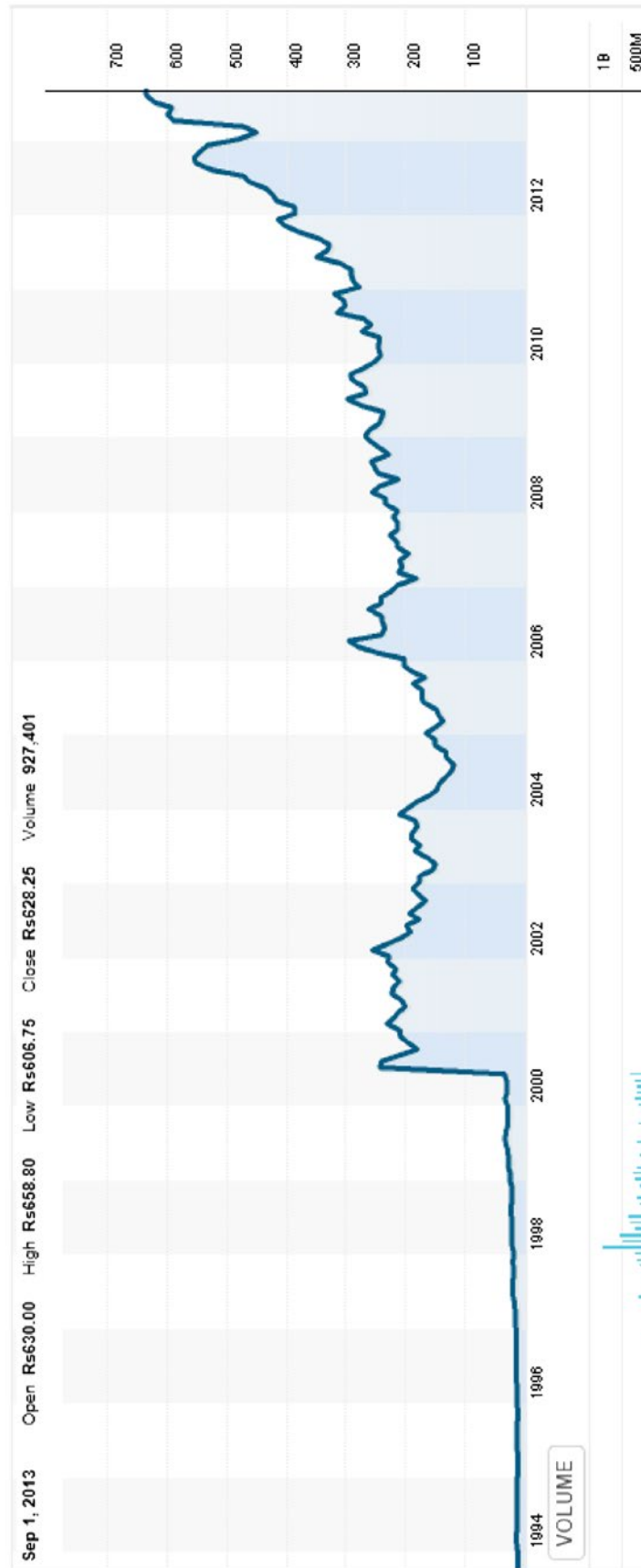


Figure 1. Hindustan Unilever Limited stock returns (1994 – 2013).

Source: Reuters

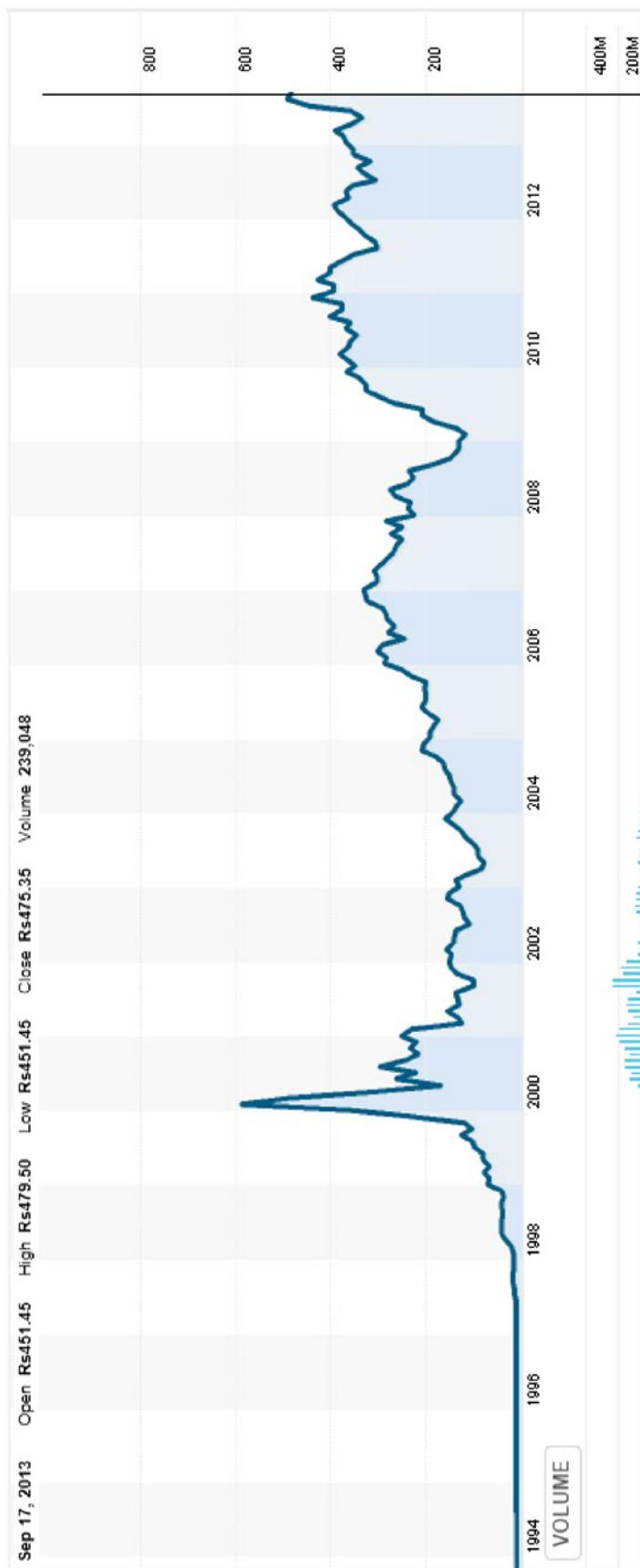


Figure 2. Wipro stock returns (1994 – 2013).

Source: Reuters

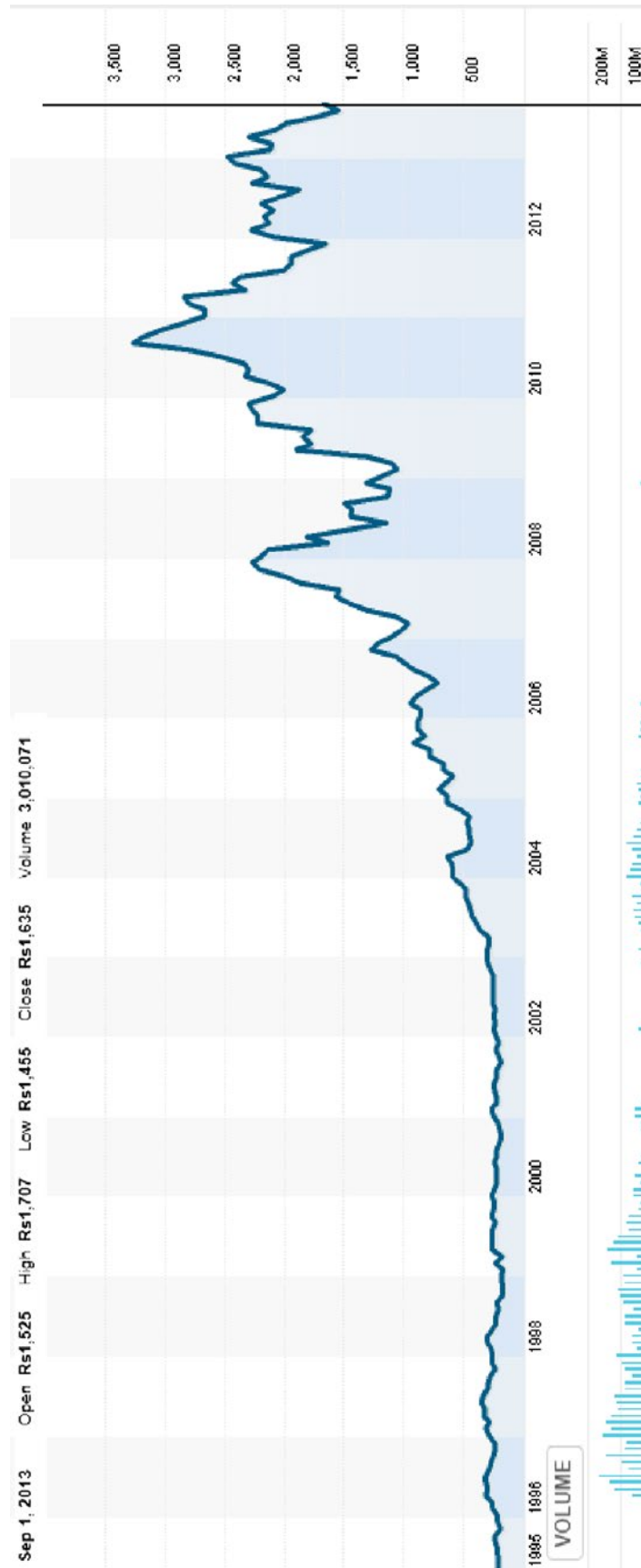


Figure 3. State Bank of India stock returns (1994 – 2013).

Source: Reuters

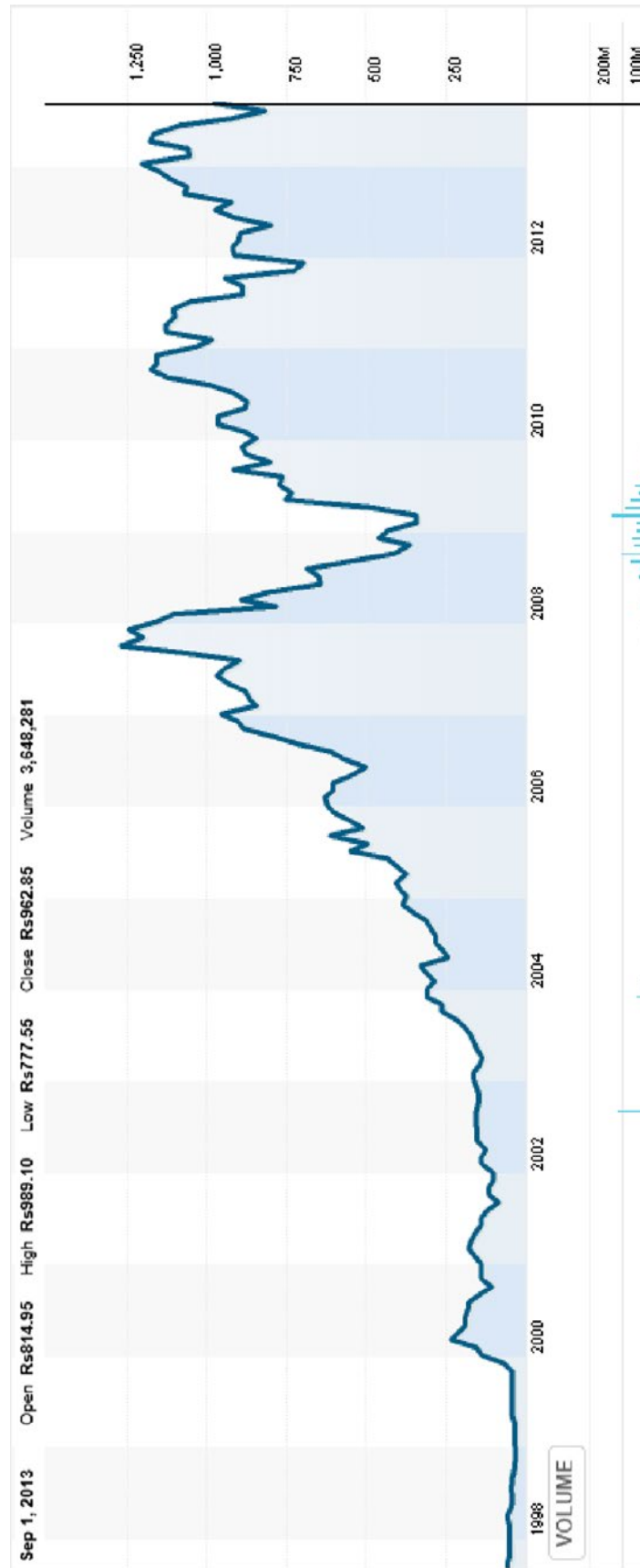


Figure 4. ICI Bank stock returns (1998 – 2013).

Source: Reuters



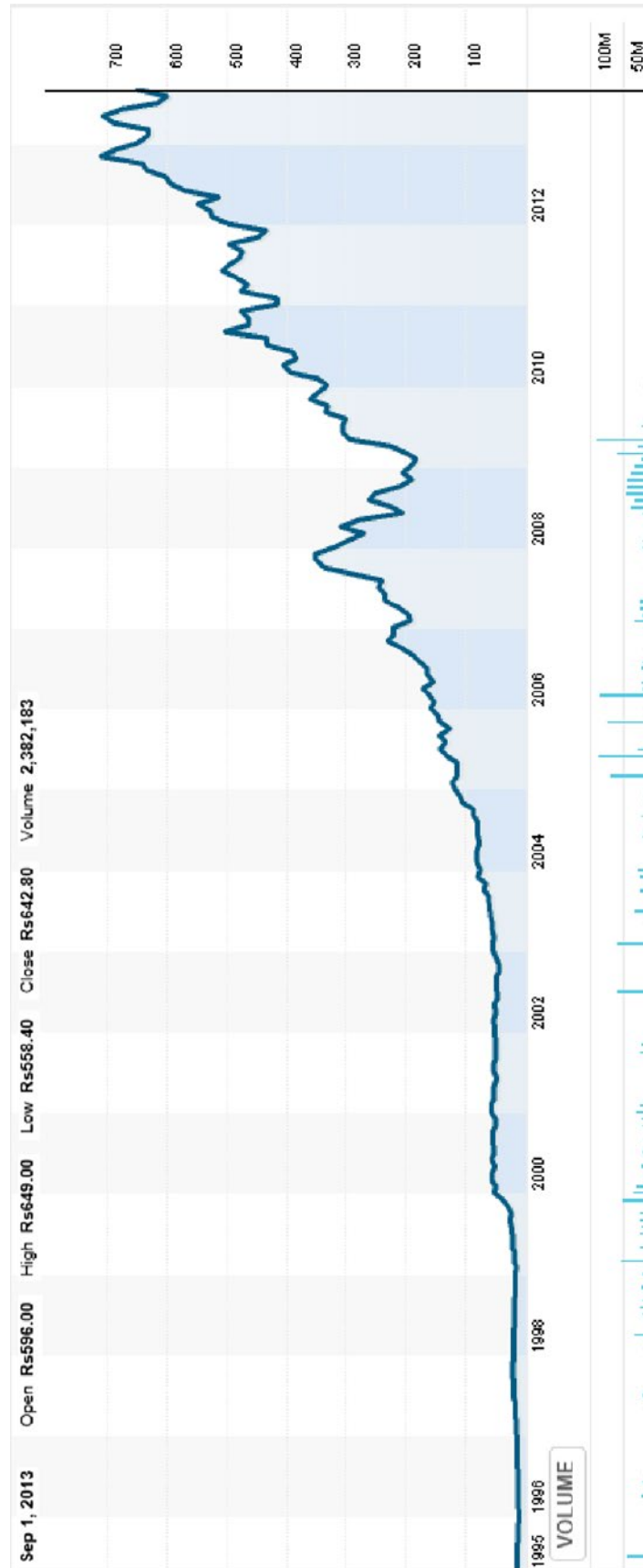


Figure 5. HDFC Bank stock returns (1995 – 2013).

Source: Reuters

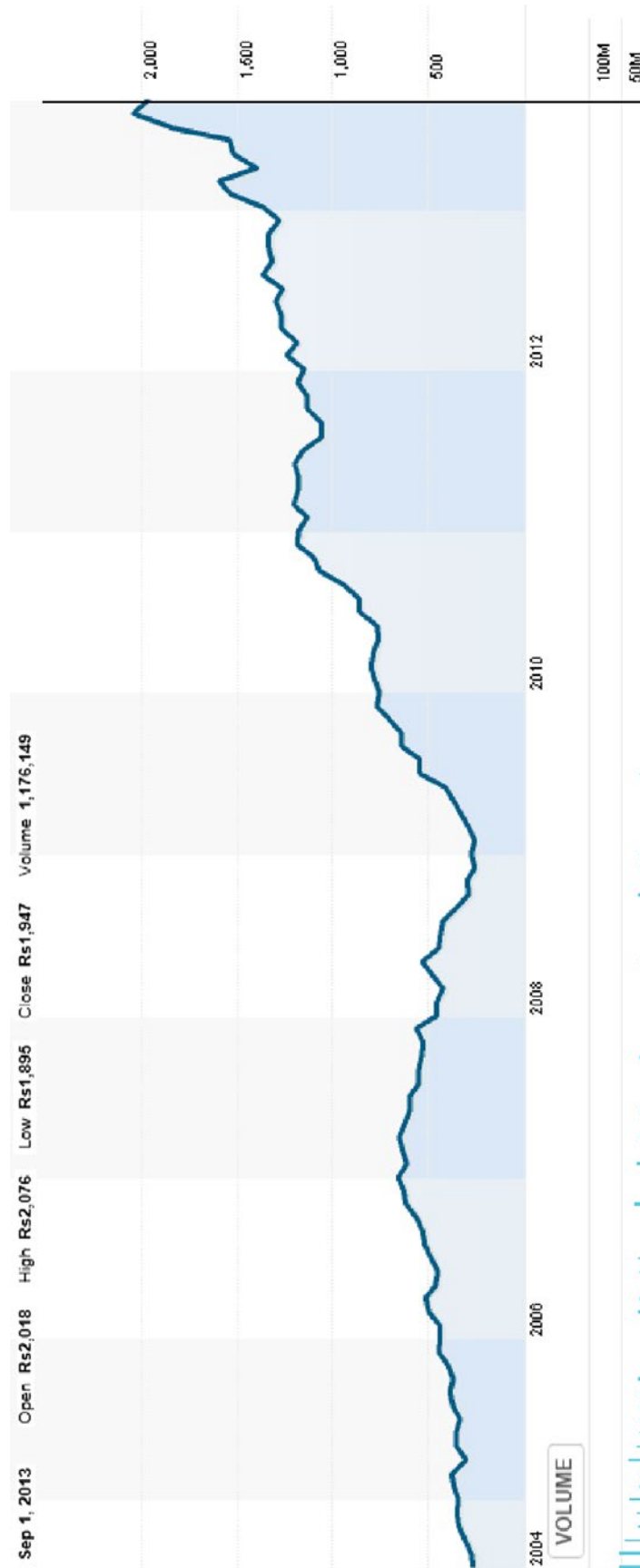


Figure 6. Tata Consultancy Service stock returns (2004 – 2013).

Source: Reuters

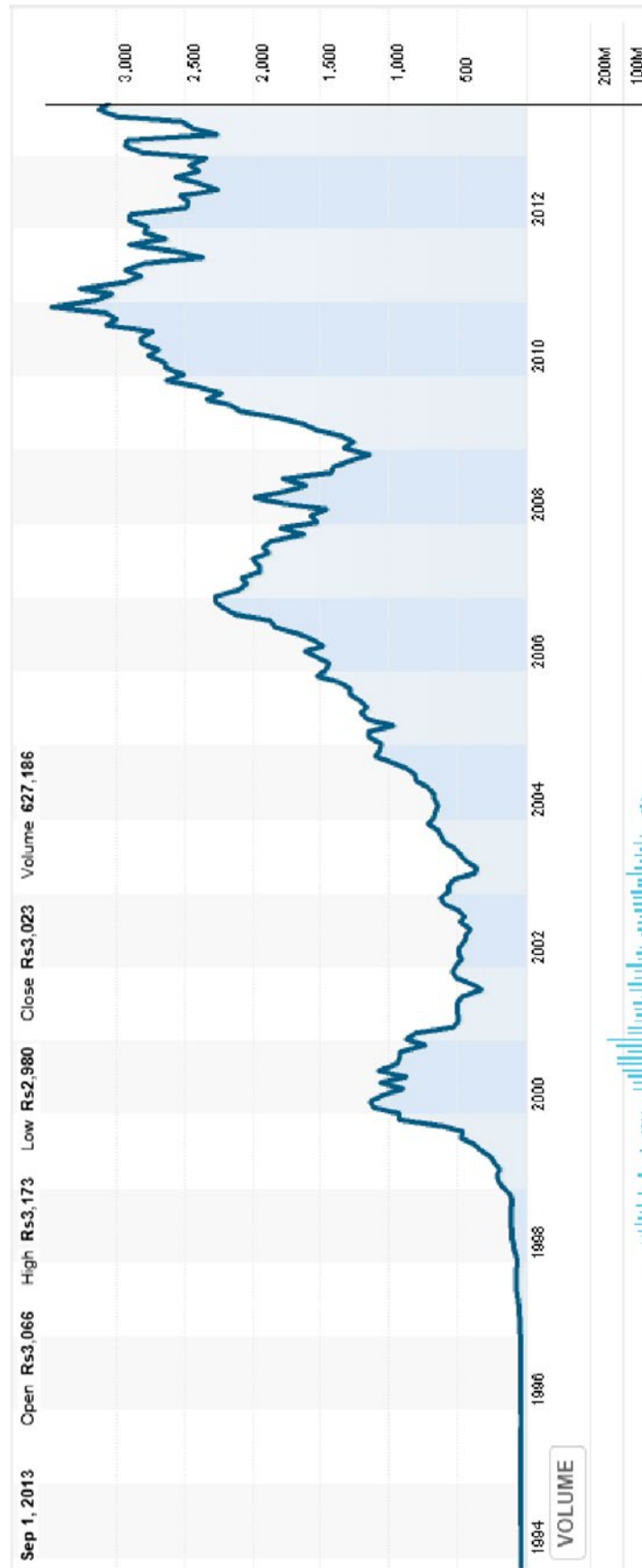


Figure 7. Infosys stock returns (1994 – 2013).

Source: Reuters

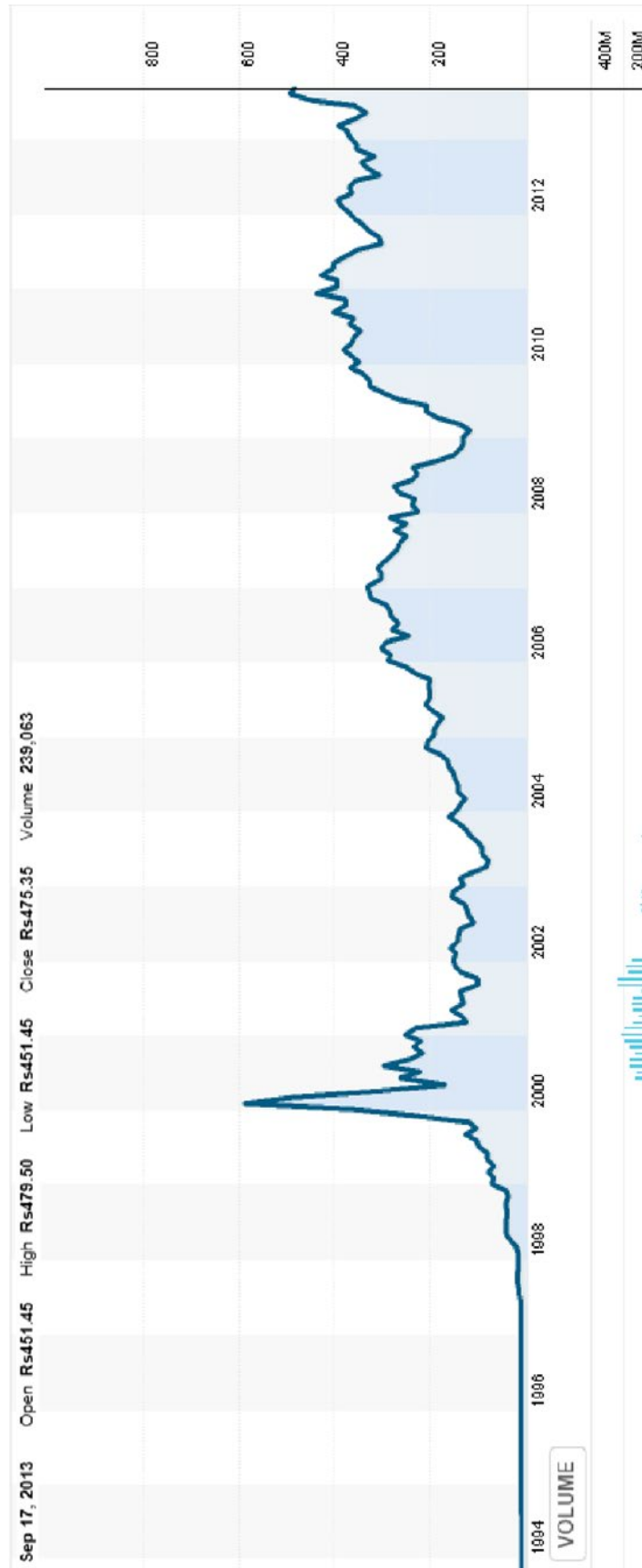


Figure 8. Wipro stock returns (1994 – 2013).

Source: Reuters

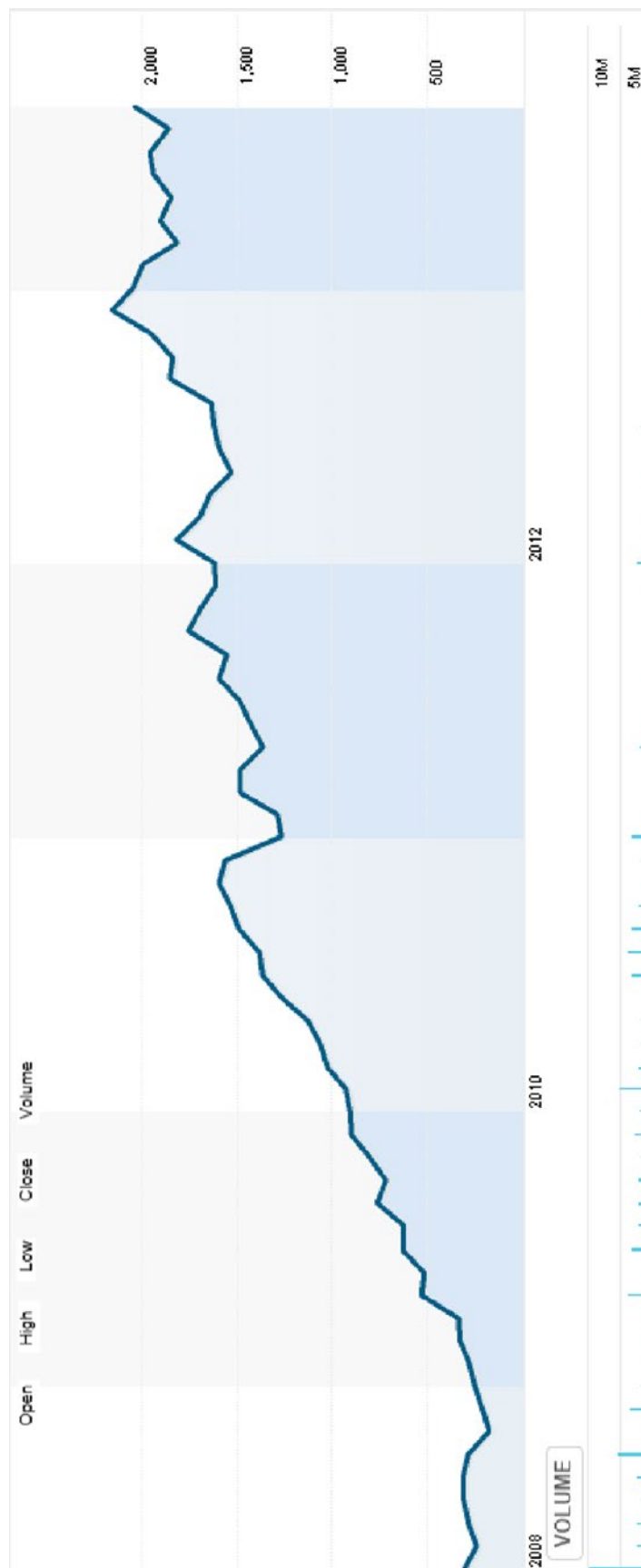


Figure 9. Bajaj Auto Limited stock returns (2008 – 2013).

Source: Reuters

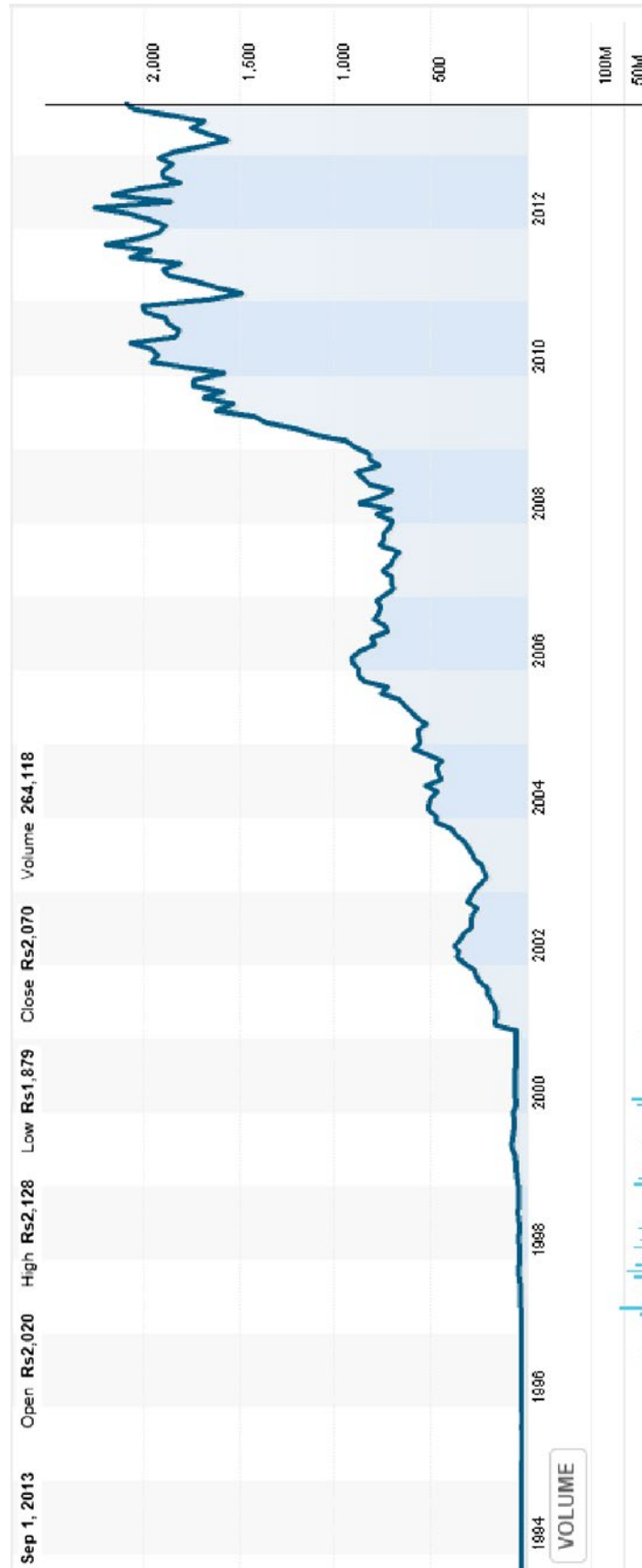


Figure 10. Hero MotoCorp Limited stock returns (1994 – 2013).

Source: Reuters

So, how does an investor obtain a higher return with lower volatility in emerging markets? We require the investor to carefully weigh the index with stocks that provide stable and higher returns over the longer term with lower volatility. This will prevent the investor from suffering significant downward revisions in stock prices.

Further, an index should have stocks that represent an efficient portfolio, which means that other portfolios should not have a higher return or lower risk than them. As a result, it seems that the price or market cap-weighted index may not perform as well as the RWA index within this sample period (2 January 2002–31 December 2012), as the RWA index has lower risk and higher return than the BSE index. Effectively, the RWA index should only have long positions, as these stocks would have the highest RWAs. However, as this paper was comparing the BSE index weights with the RWA index method, based on the RWAs, it seemed that some stocks did not provide sufficient return in relation

**Table 2. RWA Index—Risk/Return Characteristics (January 2002–December 2012)**

Stock name	Standard deviation	Beta	Expected return	Alpha	Risk adjusted alpha	RWA index weight	Absolute RWA index weight (%)
Hindustan Unilever Ltd	.1858	-.0792	-5.70%	1.5674	8.4346	49.9427%	18.5566
Sun Pharmaceutical Industries Ltd	.2286	.3059	70.64%	1.1830	5.1745	30.6392%	11.3842
Bharti Airtel Ltd	.6198	.5362	116.29%	2.4894	4.0166	23.7829%	8.8367
ITC Ltd	.3045	.2562	60.78%	.8987	2.9513	17.4752%	6.4931
State Bank of India	.4349	.9344	195.21%	.9282	2.1341	12.6361%	4.6951
Housing Development Finance Corporation Ltd	.4384	.8191	172.36%	.6485	1.4794	8.7599%	3.2548
ICICI Bank Ltd	.5074	1.1331	234.59%	.7215	1.4220	8.4200%	3.1285
Maruti Suzuki India Ltd	.5279	1.0718	222.44%	.6670	1.2634	7.4806%	2.7795
HDFC Bank Ltd	.4843	.9422	196.75%	.5675	1.1718	6.9386%	2.5781
NTPC Ltd	.2732	.4024	89.75%	.2436	.8917	5.2799%	1.9618
Bajaj Auto Ltd	.5238	.6225	1.3339	.4381	.8364	.0495	1.8401
Mahindra and Mahindra Ltd	.7128	1.3867	284.87%	.4384	.6150	3.6413%	1.3529
Coal India Ltd	.0681	.0028	10.56%	.0173	.2535	1.5008%	.5576
Dr.Reddy's Laboratories Ltd	.4136	.6297	134.81%	.0751	.1815	1.0749%	.3994
GAIL (India) Ltd	.6043	1.1586	239.65%	.0801	.1325	.7847%	.2916
Cipla Ltd	.3526	.3730	83.93%	.0384	.1089	.6450%	.2396
Jindal Steel And Power Ltd	.9283	1.7743	361.70%	.0963	.1037	.6142%	.2282
Sesa Goa Ltd	1.1355	2.3484	475.48%	-.0388	-.0341	-.2022%	.0751
Larsen & Toubro Ltd	.7813	1.6155	330.21%	-.0576	-.0737	-.4366%	.1622
Reliance Industries Ltd	.4787	.9477	197.85%	-.0522	-.1090	-.6456%	.2399
Tata Consultancy Services Ltd	.3754	.5511	119.23%	-.0463	-.1234	-.7304%	.2714
Hero MotoCorp Ltd	.0157	-.0122	7.58%	-.0021	-.1335	-.7903%	.2937
Tata Power Company Ltd	.7132	1.3076	269.19%	-.4708	-.6601	-3.9084%	1.4522
Bharat Heavy Electricals Ltd	.7188	1.3155	270.75%	-.6424	-.8936	-5.2911%	1.9660
Infosys Ltd	.3962	.5845	125.86%	-.5583	-1.4091	-8.3433%	3.1000
Tata Motors Ltd	.9336	1.9036	387.32%	-1.3783	-1.4764	-8.7417%	3.2481
Tata Steel Ltd	.7520	1.6414	335.34%	-1.1420	-1.5186	-8.9920%	3.3411
Oil and Natural Gas Corporation Ltd	.5299	1.0023	208.67%	-.9959	-1.8792	-11.1267%	4.1342
Hindalco Industries Ltd	.7853	1.4226	291.98%	-2.0359	-2.5925	-15.3508%	5.7037
Wipro Ltd	.4886	.8110	170.75%	-1.6512	-3.3793	-20.0091%	7.4345
<b>Total</b>	<b>.2437</b>	<b>.8548</b>	<b>55.10%</b>	<b>.1386</b>	<b>43.3260</b>	<b>100.0000%</b>	<b>100.0000</b>

to their risk unsystematic risk. The RWA index is designed to be a long only or long/short index and is based to improve investments into stocks with increasing returns and low volatility. While we have intended to develop the RWA index as a passive indexation method, regardless, it is possible to use this method in high frequency or algorithmic trading as this method automatically calculates RWAs for each stock every time the weights are recalibrated.

#### 4. Conclusion

This paper has introduced the RWA indexation methodology for index/portfolio construction. It argues that stocks with superior RWA will have lower volatility and increasing returns. RWA is calculated as Jensen's alpha divided by the standard deviation of the stock. Analysing the stocks that comprise the BSE index and re-weighting these stocks based on the RWA indexation method, it was seen that the RWA index provided nearly five times the return with approximately the same systematic risk as the BSE index through the duration of 2 January 2002–31 December 2012.

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