S&P BSE SENSEX

Valuation Report

As on June 30, 2023

Prepared by: Gaurang Shakreja
Guided by: Parth Verma

1. Introduction

1.1 Background

- S&P BSE Sensex is a benchmark index of 30 of India's largest and most liquid public companies.
- The Sensex was launched by the Bombay Stock Exchange (BSE) on January 1, 1986.
- The companies that make up the Sensex are drawn from the Bombay Stock Exchange (BSE), which is the largest in India and one of the largest stock exchanges in the world.

1.2 Key Stats

- S&P BSE Sensex is valued using a free float market cap.
- The average historical CAGR returns provided by the Index for various periods are:
    a) 15-Year CAGR Return – 10.30%
    b) 10-Year CAGR Return – 9.30%
    c) 7-Year CAGR Return – 9.99%
    d) 5-Year CAGR Return – 9.41%

1. Introduction

1.3 Composition of Sensex

- S&P BSE Sensex has a stock of 30 companies.
- Few notable companies are – Reliance Industries Ltd, HDFC Bank, Infosys, ICICI Bank, TCS, HDFC, HUL, SBI, Kotak Mahindra, Bharti Airtel, Bajaj Finance, L&T, M&M and so on.
- The index comprises a wide range of sectors such as Automobiles, Banking, Cement, Consumer Durables, FMCG, Healthcare, IT, Metal, Oil & Gas, Power, Realty, and Telecom.

1.4 Sector wise contribution in Sensex

Sectors	Weightage (%)
Banks	30.91%
IT Consulting & Software	14.55%
Integrated Oil & Gas	12.02%
Personal Products	6.96%
Cigarettes,Tobacco Products	5.53%
Construction & Engineering	4.09%
Housing Finance	3.32%
Telecom Services	2.97%
Holding Companies	2.63%

Sectors	Weightage (%)
Cars & Utility Vehicles	3.60%
Electric Utilities	2.44%
Pharmaceuticals	2.33%
Furniture,Furnishing,Paints	2.05%
Other Apparels & Accessories	1.74%
Cement & Cement Products	1.32%
Iron & Steel/Interm.Products	1.26%
Finance (including NBFCs)	1.14%
Packaged Foods	1.13%

2. Context of Valuation

2.1 Context

- The FY 2022-23 entailed a lot of uncertain events posing economic risks to almost all parts of the globe ranging from tightening interest rates to the Russia-Ukraine war.
- The global uncertainties posed its repercussion on Indian Equity Markets largely where the S&P BSE Sensex appreciated by a meagre 0.72% for the FY 22-23.
- The top movers on the Sensex index were Reliance Industries, Tech Mahindra, M&M, L&T, ITC, Adani, HDFC, Tata Motors and so on.
- The valuation report aims to determine the valuation of the index in the above context.
- The index has been valued considering buyback yield, dividend yield, future earnings growth, equity risk premium and 10-year government bond yield of India that serves as an appropriate proxy for the risk-free rate. The valuation of the index is based on the methodology used by Prof. Aswath Damodaran (Dean of Valuation – NYU Stern) and his pronouncement on the Discounted Cash Flow Approach. However, certain aspects of the methodology have been modified to suit the Indian Capital Markets and general macroeconomic scenario.
- The report is prepared using assumptions. Thus, the interpretation of results shall be subjective and based on the user's requirements. The report provides a broader idea of whether the Sensex index is Overvalued, Undervalued or Fairly Valued which are derived primarily from the cash flows (Dividend and Buyback) in the hand of investors / Shareholders.
- The index valuation date shall be 30th June 2023 and all the data used for valuation are till 30th June 2023.

3. Approaches & Methodology

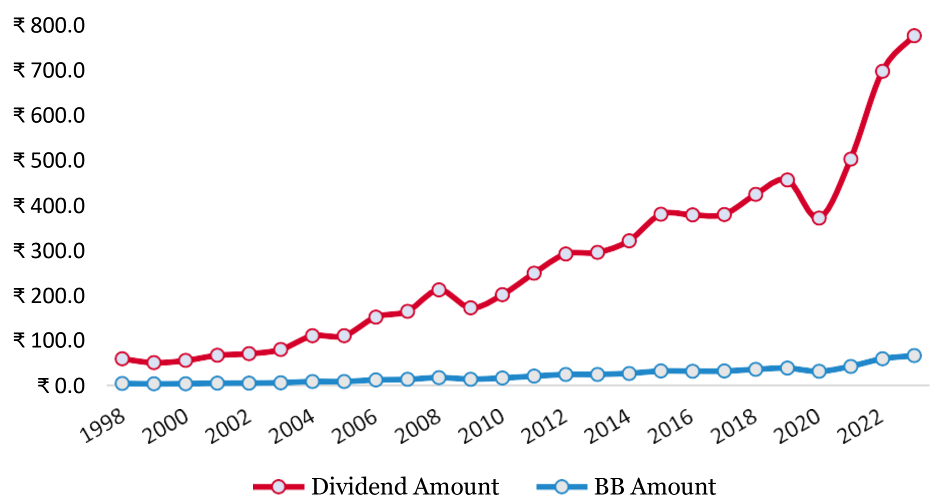
3.1 Free Cash Flow to Equity Holders

- Cash Flows being one of the key ingredients in DCF valuation implies the extent of the equity holder's right to the cash flows. Cash Flows implies Free Cash Flow to Equity holders (FCFE). However, it becomes a laborious task to derive the FCFE of all the companies in the index and hence, a convenient and effective approach has been followed where the dividend pay-outs and buybacks are substituted for FCFE.
- The rationale behind the above consideration is that whatever the cash a firm generates, it shall be ultimately paid to the shareholders in the long run either on liquidation or after the firm has attained maturity in its business verticals either through dividends or buybacks.
- The dividend yield has been sourced from the BSE website and since the buybacks in emerging economies are minuscule, they are not readily available. Hence, the buyback data has been sourced from Prof. Aswath Damodaran's website which has been consolidated based on the sectoral buybacks conducted. As buybacks do not contribute a big chunk of cash flows, using the sectoral buyback yield doesn't cause a major fluctuation in the valuation result.

Historical Average Yield of Sensex

Years	Dividend Yield (%)	Buyback Yield (%)	Total Yield (%)
20 Years	1.32%	0.11%	1.43%
15 Years	1.27%	0.11%	1.38%
10 Years	1.21%	0.10%	1.31%
5 Years	1.12%	0.10%	1.21%
2023	1.28%	0.11%	1.39%

Historical Dividends and Buybacks



3. Approaches & Methodology

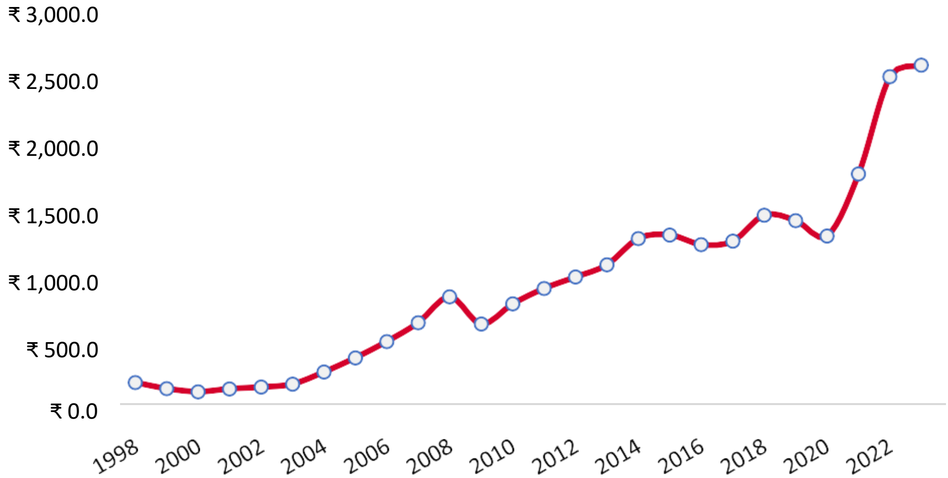
3.2 Earning Growth

- Earnings of Sensex are based on the EPS and Price of Sensex.
- Earnings of Sensex can be derived by dividing the absolute price level by the Price to Earnings (P/E) ratio of the index.
- The P/E ratio and index levels are obtained from the BSE website and by doing a basic analysis EPS growth can be obtained.
- There could be an argument on which growth rate should be considered for the purpose of valuation. Multiple Growth rates could be used since there is no big difference between 3-year & 15-year average compounded growth %.
- Considering valuation to remain forward-looking and based on the current financial scenario, earning growth compounded for 3 years is used for the purpose of valuation in this paper because it provides the best representation of the current market trends along with factoring the slowdown caused by Covid-19, geopolitical tensions, distressed supply chains.

Historical Average CAGR of EPS

Years	Avg EPS CAGR
15 Years	10.75%
10 Years	11.00%
7 Years	11.24%
5 Years	11.12%
3 Years	11.25%

SENSEX Average EPS



3. Approaches & Methodology

3.3 Risk-Free Rate

- The risk-free rate is the basic driver for DCF valuation and is a metric of opportunity cost.
- It is a convention to use a 10-year government bond yield as the risk-free rate. However, it can be further adjusted for country risk and default risk. But, since there is a lack of data for emerging markets, it is a tedious task to account for the same and hence India's 10Y Government Bond Yield has been considered as the Risk-Free rate.
- India's 10Y Government Bond Yield has varied largely from 12% to 7%, for the purpose of valuation, the latest Risk-free rate as on June 30, 2023, has been considered to satisfy the objectives that valuation should be forward-looking.

Historical Average Rate of 10Y Govt Bond

Years	10Y Govt Yield
15 Years	7.41%
10 Years	7.15%
7 Years	6.86%
5 Years	6.71%
2023	7.21%

10Y Indian Govt Bond Yield Avg Return

3. Approaches & Methodology

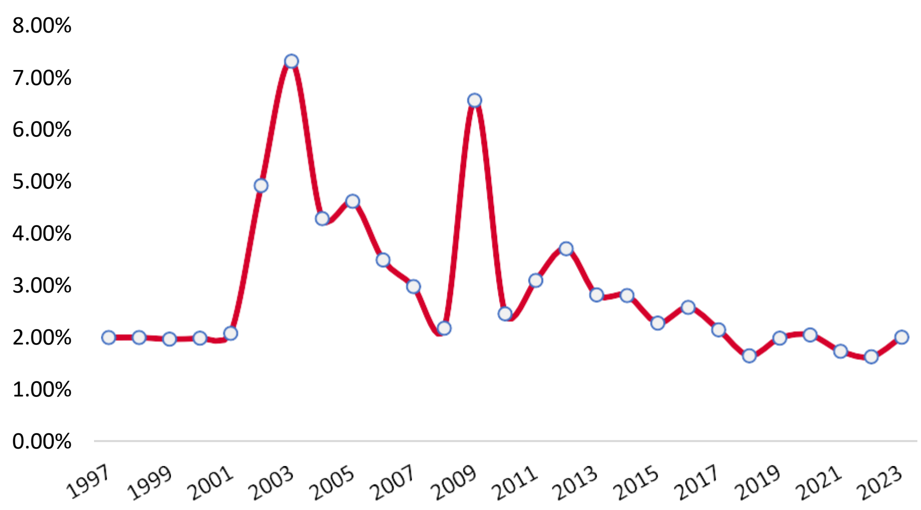
3.4 Equity Risk Premium

- The market risk premium is the additional return that's expected on an index or portfolio of investments above the given risk-free rate. The market risk premium is equal to the slope of the Security Market Line (SML).
- It is an incentive for assuming risk beyond govt bonds over the equity market in general.
- A higher ERP indicates a cautious market where the investors are defensive while investing in equities and represent their willingness to pay a lower price for the same cash flow and earnings.
- The data of Market Risk premium for the valuation has been sourced from Market Premia website.
- For the purpose of our Valuation, we have considered the latest Market Risk Premium to account for the latest developments in Indian Equity markets.

Average Implied ERP

Years	Avg Implied ERP
15 Years	2.61%
10 Years	2.05%
7 Years	1.84%
5 Years	1.81%
2023	2.01%

Implied ERP in India



4. Valuation

4.1 Original Case Valuation Result

Total Yield	Expected Growth	Risk-free Rate	Market Risk Premium	Sensex Valuation	Current Price	Result
5 Years	3 Years	Latest	Latest	60,922	64,719	Overvalued

Valuation of S&P BSE Sensex			60922.09
Key Inputs		Assumptions	Overvalued
Date	30-06-23	30-06-23	The market-implied fair value of Sensex is 60923. The Sensex is currently trading at 64719. A 5.87% correction is expected from this level.
Current Sensex Level	64718.56	64718.56	
Total Yield	5 Years	1.21%	
Expected Growth	3 Years	11.25%	
Risk-free Rate	Latest	7.21%	
Equity Risk Premium	Latest	2.01%	
Cost of Equity		9.22%	

4. Valuation

4.2 Maximum Case Valuation Result

Total Yield	Expected Growth	Risk-free Rate	Market Risk Premium	Sensex Valuation	Current Price	Result
20 Years	15 Years	Latest	Latest	68,684	64,719	Undervalued

Valuation of S&P BSE Sensex			68683.72
Key Inputs		Assumptions	Undervalued
Date	30-06-23	30-06-23	The market-implied fair value of Sensex is 68684. The Sensex is currently trading at 64719. A 6.13% appreciation is expected from this level.
Current Sensex Level	64718.56	64718.56	
Total Yield	20 Years	1.43%	
Expected Growth	15 Years	10.75%	
Risk-free Rate	Latest	7.21%	
Equity Risk Premium	Latest	2.01%	
Cost of Equity		9.22%	

5. Source & Disclaimer

5.1 Source

- BSE Official Website
- Market Premia Website
- Prof. Aswath Damodaran Website
- A White Paper on Equity Market Valuation Index by Dr.Jay Desai :: SSRN

5.2 Disclaimer

- This information is for educational purposes and is not an investment recommendation nor to be a representation of professional expertise.
- All analyses used herein are for illustration purposes only, and of the personal opinion of the author. This should not be considered specific investment advice. The risk of loss in trading can be substantial.
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- The author assumes no responsibility or liability for your trading and investment results. Further, it should not be assumed that the method, techniques, or indicators presented in these products will be profitable or that they will not result in losses.

5. Source & Disclaimer

5.3 End Note

I Would like to thank the readers for their time dedicated towards reading the report.

Please feel free to get in touch at gaurangg@tcd.ie for any questions or feedback.

Thanks for Reading!