VALUATION OF S&P 500

Approach and Methodology Paper

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Context

1.1 Introduction

As US is expecting recession in the near future, there is a fear amongst the investors.

This calls for revisiting the valuation of S&P 500. This whitepaper discusses approach and methodology for valuing index by considering dividends, buybacks, earnings growth of S&P 500 sectors, equity risk premium, and 10 years US government bond yield. The valuation of S&P 500 in this deck is based on the methodology used by Prof. Aswath Damodaran (Dean of Valuation – NYU) and his teachings on the Discounted Cash Flow (DCF) method. The said methodology has been improvised to calculate the value of the index in the context of US capital market practices.

Alike other valuation, this paper also used assumptions and understanding, which makes it subjective for interpretation and it should be used to gauge broader idea on under/overvaluation of the index and ***should not be used as investment/disinvestment rationale.***

Approach and Methodology

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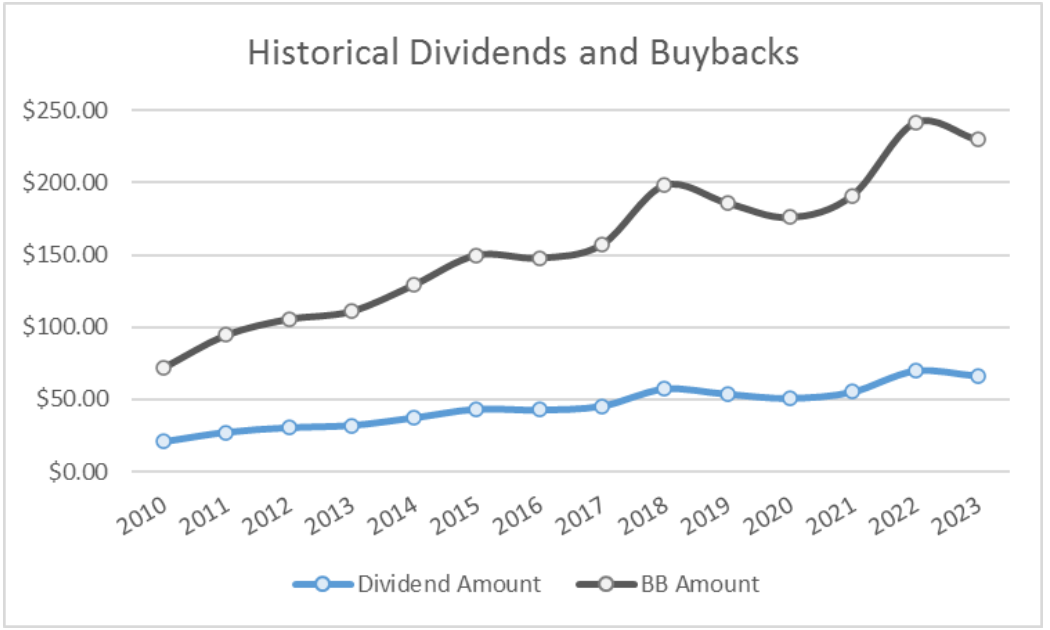
Approach and Methodology

2.1 Expected Dividends and Buybacks

In DCF, valuation is derived by discounting Free Cash Flows to Equity (FCFE) at an appropriate discounting rate. However, it is tedious to calculate FCFE of each company in S&P 500 to calculate its value. However, the estimation of expected dividends and buybacks based on historical data as it is synonymous with FCFE.

While historical data of dividends and the buyback data are readily available in the developed markets like US. Buyback data consolidated by professor Damodaran was analyzed to calculate buyback yield on Total earnings and dividend yield.

Compounded Years	Dividend Yield	Buyback Yield	Total Yield
10 Years	1.80%	6.25%	8.05%
7 Years	1.71%	5.92%	7.63%
5 Years	1.61%	5.57%	7.18%
3 Years	1.54%	5.35%	6.89%



Approach and Methodology

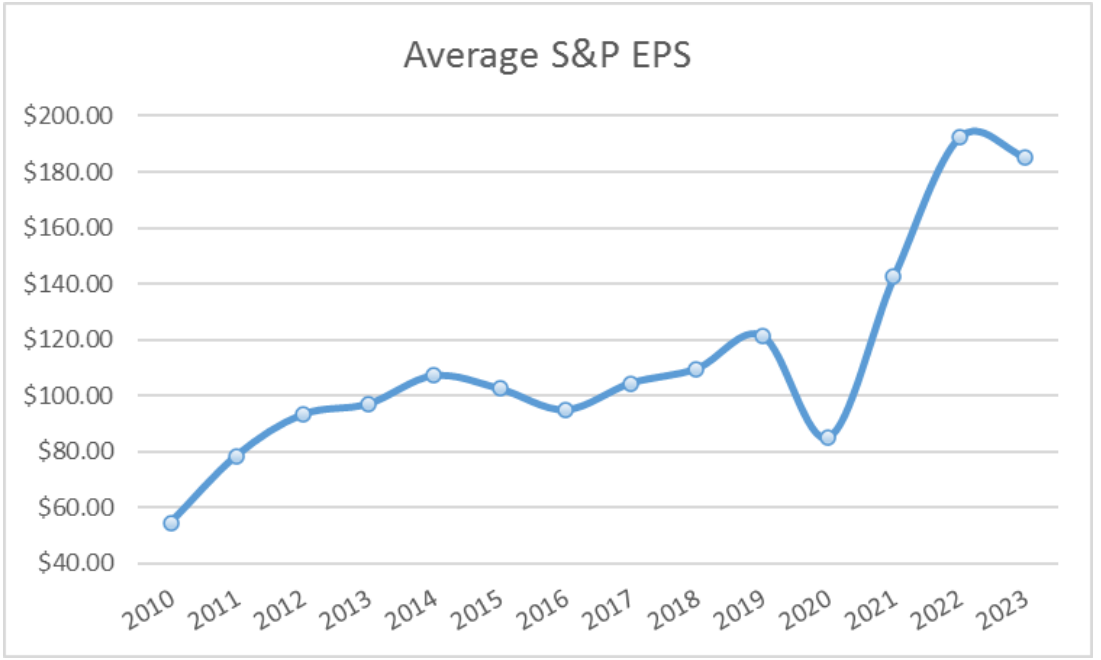
2.2 Expected Growth in S&P 500 Earnings

Earnings of S&P 500 can be derived by dividing the PE Ratio of an index with its absolute level.

PE Ratio and Index levels are obtained from the Nasdaq Data Link website and Yahoo Finance, respectively, and with minimal analysis, earnings and its growth can be obtained.

There could be an argument on which growth rate should be considered for the purpose of valuation. Since there is not much difference between 3 years & 10 years average compounded growth % (+/- 2.20%), considering valuation to remain forward-looking and based on the current financial scenario, earnings growth compounded for 3 years is used for purpose of valuation in this paper.

Compounded Years	Earnings Growth (%)
10 Years	6.21%
7 Years	5.73%
5 Years	5.93%
3 Years	8.47%



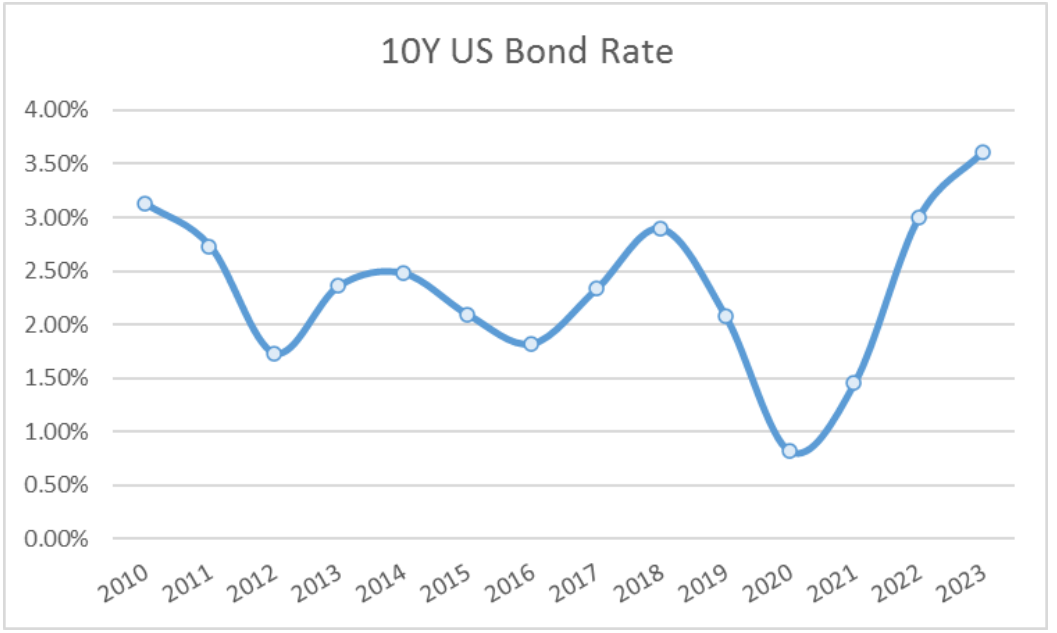
Approach and Methodology

2.3 Risk Free Rate – 10 years US Govt bond yield

The risk-free rate is the basic driver for DCF valuation and is metric of opportunity cost. It is a convention to use 10 years of government bond yield as the risk-free rate. However, it can be further adjusted for country risk and default risk. But, US is considered to have no default risk and no country risk. So, there is no need for the adjustment in the risk free rate.

There could be an argument on which rate should be considered for the purpose of valuation. To ensure that valuation should be forward-looking, the most recent rate (April 2023) is used for the purpose of valuation in this paper.

Compounded Years	10 Year US Govt Bond Yield
10 Years	2.26%
7 Years	2.31%
5 Years	2.19%
As on April 24, 2023	3.49%



Approach and Methodology

2.4 Implied Equity Risk Premium

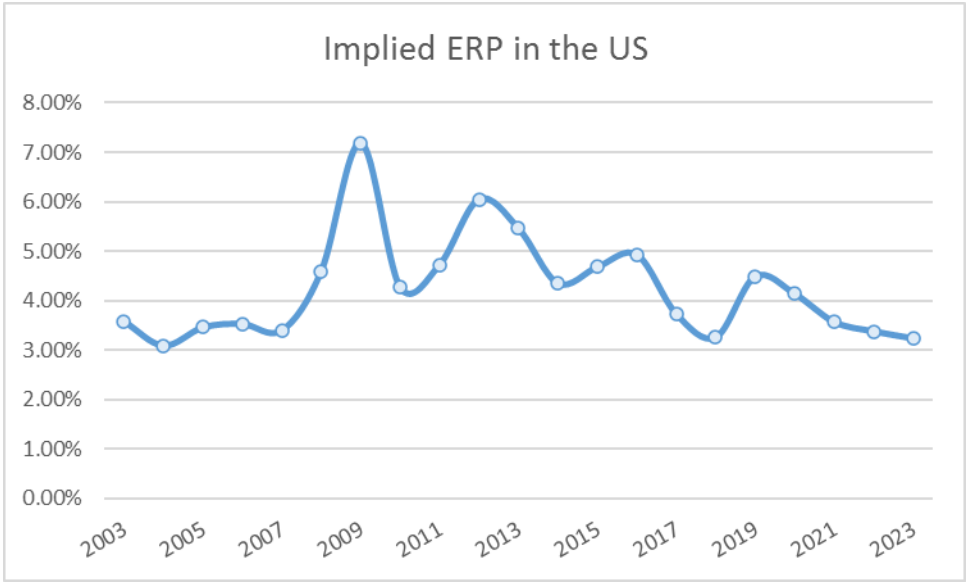
The equity risk premium (ERP) is the additional return that is expected on an index or portfolio of investments above the given risk-free rate. The equity risk premium is equal to the slope of the security market line (SML).

It is incentives for assuming risk beyond government bonds over equity markets 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 flows and earnings.

Implied ERP is reverse calculated by considering current index value and expected FCFEs. .

Average Years	Implied Equity Risk Premium
20	4.28%
15	4.50%
7	3.69%
5	3.76%
1	3.38%



Valuation

Valuation

Valuing the S&P 500			13563.56
Key Inputs		Assumptions	Undervalued
Date	24-04-2023	24-04-2023	The market implied fair value of S&P 500 is 13564. The S&P 500 is currently trading at 4129. A 228.57% appreciation is expected from this level.
Current S&P 500 Level	4128.12	4128.12	
Total Yield	10 Years	8.05%	
Expected Growth	10 Years	6.21%	
Risk-free Rate	Latest	3.53%	
Equity Risk Premium	Latest	3.24%	
Cost of Equity		6.77%	

Year	Expected Dividends and Buybacks	Cumulative PV Factor (Risk-free Rate + Equity Risk Premium)	Present Value of Expected Dividends and Buybacks
2022	₹ 352.89	0.9366	₹ 330.51
2023	₹ 374.81	0.8772	₹ 328.78
2024	₹ 398.09	0.8216	₹ 327.06
2025	₹ 422.81	0.7695	₹ 325.35
2026	₹ 449.08	0.7207	₹ 323.65
2027	₹ 476.97	0.6750	₹ 321.96
2028	₹ 506.60	0.6322	₹ 320.27
2029	₹ 538.07	0.5921	₹ 318.60
2030	₹ 571.49	0.5546	₹ 316.93
2031	₹ 606.99	0.5194	₹ 315.28
2031 - ∞	₹ 19,898.02	0.5194	₹ 10,335.17

Sources and Disclaimer

Sources and Disclaimer

4.1 – Reference & Sources

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https://pages.stern.nyu.edu/~adamodar/

https://www.investing.com/

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4.2 – Disclaimer

This information is for educational purposes and is not a investment recommendation nor to be representative of professional expertise, but to be used as a forum for opening discussions around trading. All examples and analysis used herein are for illustration purposes only, and of the personal opinions of the Author. All examples and analysis are intended for these purposes and should not be considered as specific investment advice. The risk of loss in trading can be substantial. User of this paper must consider all relevant risk factors including their own personal financial situation before trading. You understand and acknowledge that there is a very high degree of risk involved in trading securities. The author assumes no responsibility or liability for your trading and investment results. Further, It should not be assumed that the methods, techniques, or indicators presented in these products will be profitable or that they will not result in losses.

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