Market Valuation

Quantitative Strategy - 12/21/21

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Key Takeaways

- We use a residual income model to compute an intrinsic value for the market. This model considers forecasts for future earnings and for long-term earnings growth to estimate the equity risk premium for the S&P 500.
- We combine the equity risk premium with the risk-free rate to produce an equity yield, and compare the equity yield to the yield on investment grade bonds to classify the market as undervalued, overvalued or fairly-valued.
- When the equity market is overvalued relative to investment grade bonds, it tends to see smaller returns and higher volatility. Currently, we consider the market to be undervalued.

Market Valuation, Equity Yields and the Residual Income Model

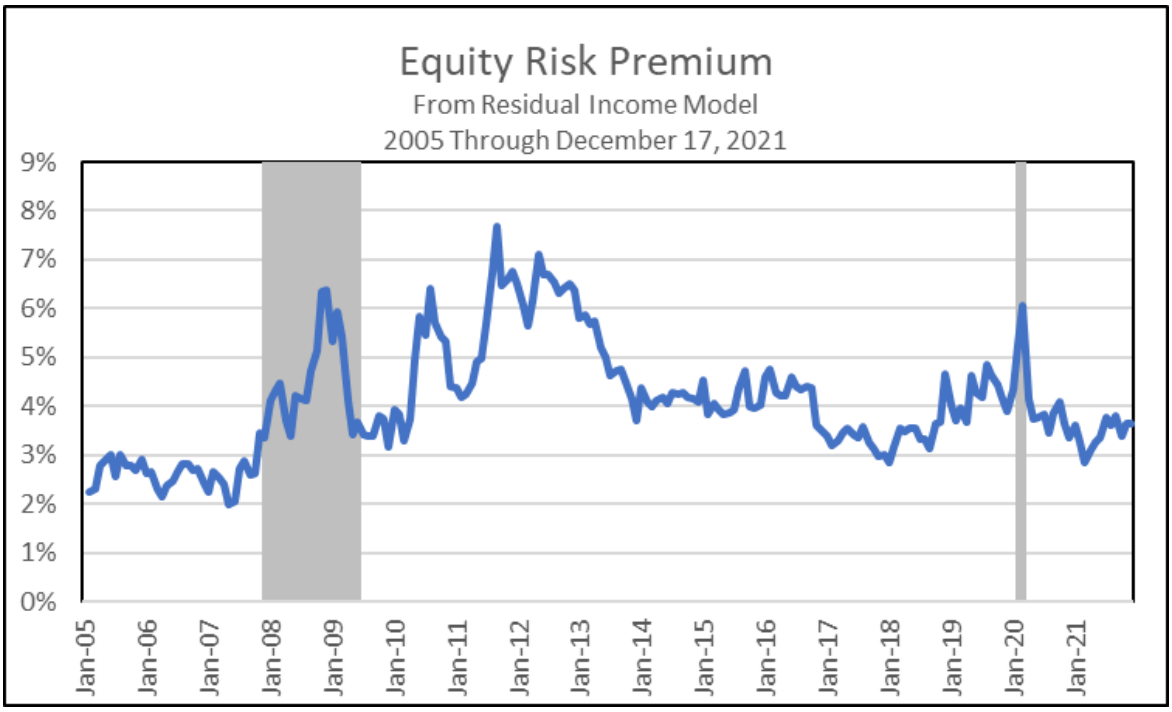
Many quantitative metrics have been put forth to evaluate the valuation level of the market, i.e. whether it is "cheap" or "expensive." The forward price-to-earnings ratio is one example of such a metric. In this note, we introduce a unique and differentiated method for computing the level of market valuation.

Our method makes use of a residual income model to estimate the equity risk premium. The residual income model works like a dividend discount model or discounted cash flow model in that it computes the current value of an asset (in this case, the S&P 500) as the sum of a series of discounted flows. Instead of discounting future dividends or cash flows, however, the model discounts future residual income, where the "residual" reflects the return a company earns above and beyond its cost of capital. By supplying forecasts for future earnings and for long-term earnings growth, the model computes the equity risk premium that is currently priced by the market. A full description of the residual income model can be found in Appendix I.

Fig. 1 below shows the historical equity risk premium as measured by the residual income model. The gray regions indicate recessions.

 For important disclosures, see Page 8

Fig. 1 – Equity Risk Premium from Residual Income Model

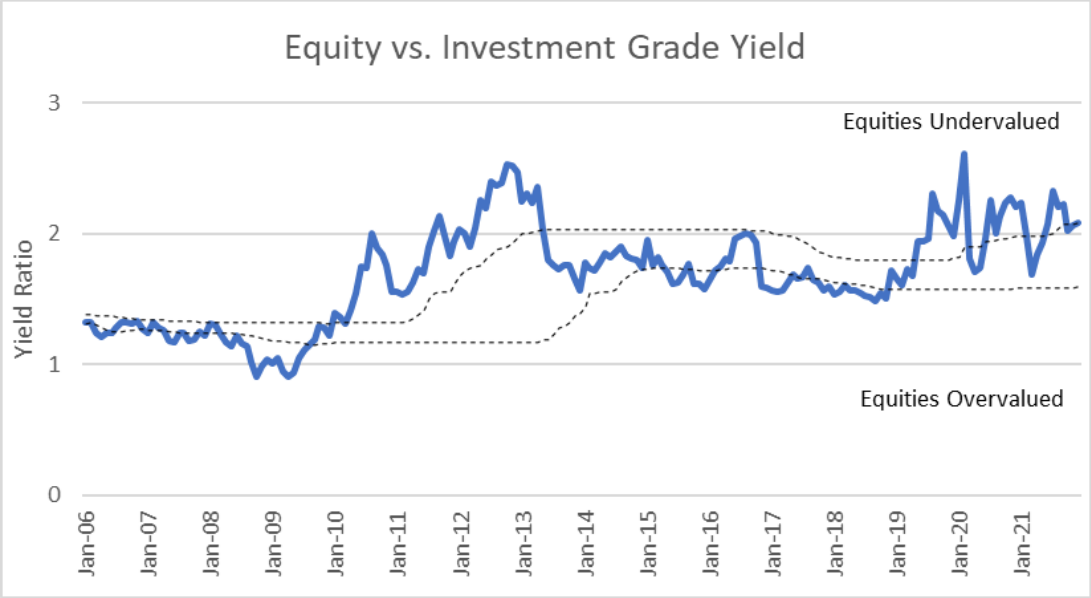


Note: Shows equity risk premium from a residual income model. Gray bars indicate recessions. Period of analysis is from January 2005 through December 17, 2021.
Source: S&P, FactSet, Fundstrat analysis.

The equity risk premium represents the amount of return an equity investor requires over the risk-free rate. We can compute the "equity yield" as the sum of the equity risk premium and the risk-free rate. We can then compare this equity yield to the yield on traditional fixed income instruments to determine whether the equity market is attractively valued when compared to other asset classes. We compute the yield ratio as the equity yield divided by the yield on investment grade corporate bonds.

In Fig. 2, we show the history of the yield ratio as the blue line. The dashed black lines are the upper and lower quartile values for the yield ratio. When the blue line rises (falls), equities are cheap (expensive) compared to investment grade bonds.

Fig. 2 – Equity vs. Investment Grade Yield Ratio



Note: Shows ratio of equity yield to investment grade yield (blue line). Equity yield is computed as the sum of the 10-year Treasury yield and the equity risk premium derived from a residual income model. Investment grade yield is computed as the sum of the 10-year Treasury yield and the ICE BofA US Corporate Index Option-Adjusted Spread. Upper (lower) dashed black line shows the 75th (25th) percentile observation using a rolling 60-month window. Period of analysis is from January 2006 through December 17, 2021.
Source: Ice Data Indices, LLC, retrieved from FRED, Federal Reserve Bank of St. Louis; December 17, 2021, S&P, FactSet, Fundstrat analysis.

Using the rolling upper/lower quartile value cutoffs (indicated by the dashed lines in Fig. 2), we can further segment the history of the yield ratio into 3 regimes:

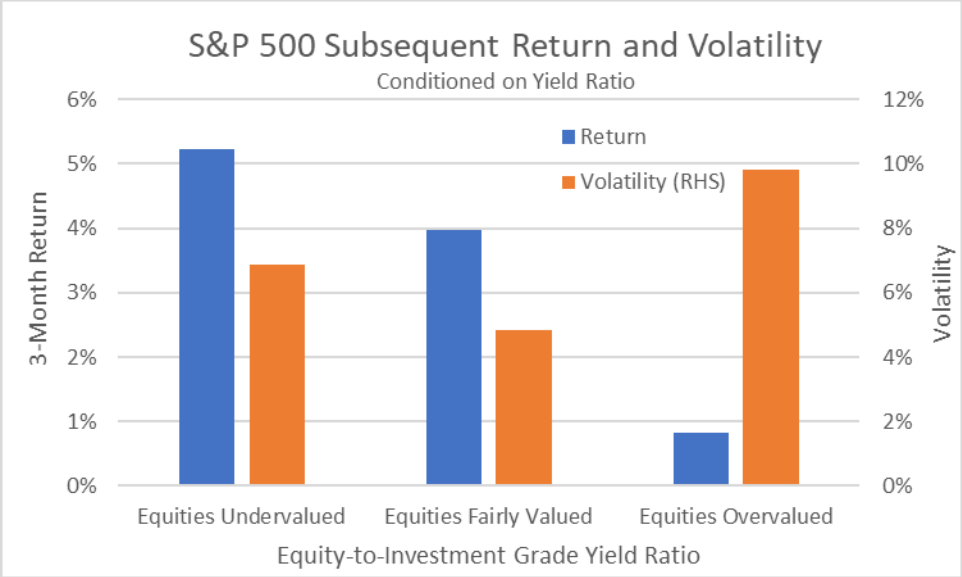
- High (above upper quartile value) – indicates equities are undervalued
- Middle (between lower and upper quartile values) – indicates equities are fairly-valued
- Low (below lower quartile value) – indicates equities are overvalued

For example, during the 2008-2009 timeframe, as well as during 2015, the yield ratio was below the lower quartile value, indicating the market was overvalued. On the other hand, from 2010-2013, the yield ratio was generally above the upper quartile value, indicating that equities were cheap compared to investment grade bonds.

The Yield Ratio and Market Performance

We next consider the market performance conditioned on the level of the yield ratio. For each month, we determine which yield ratio regime we currently occupy (high/middle/low) and measure the market performance in the subsequent 3-month period. Fig. 3 shows the results of this study – the blue bars indicate return (plotted on the left-hand axis) and the orange bars indicate volatility (on the right-hand axis).

Fig. 3 – Market Subsequent Return and Volatility Conditioned on Yield Ratio



Note: Shows subsequent 3-month S&P 500 return (blue bars) and volatility (orange bars, right-hand axis) conditioned on the ratio of equity-to-investment grade yield. Equities are undervalued (overvalued) when the equity-to-investment grade yield is above (below) the 75th (25th) percentile observation using a rolling 60-month window. Equities are fairly valued when the equity-to-investment grade yield is between the 25th and 75th percentile observations (using a rolling 60-month window). Period of analysis is from January 2006 through November 2021. Transaction costs are not considered.
Source: Ice Data Indices, LLC, retrieved from FRED, Federal Reserve Bank of St. Louis; December 13, 2021, S&P, FactSet, Fundstrat analysis.

The chart indicates that the market performs best when it is undervalued compared to investment grade bonds, as the S&P 500 subsequently gains 5.2%, on average, in this scenario. When the yield ratio indicates the market is fairly-valued, the S&P typically gains 4.0% in the following 3 months. When the yield ratio indicates that the market is overvalued, however, the market only returns 0.8%, with much higher volatility.

From Fig. 2, we see that recently, the market re-entered the undervalued state. The last time the yield ratio considered the market to be overvalued was November 2018. In the following 3 months, the market rallied, but by less than 1%. As of December 17, the yield ratio is 2.08, which places us in an undervalued regime.

Appendix I – Residual Income Model

We estimate the equity risk premium using a residual income model. The residual income approach has been used in the past to estimate valuation[1]. At the company level, the residual income model computes a valuation based on current book value and a sum of discounted residual income. The residual income component is derived from the return the company expects to generate in excess of its cost of capital.

We apply this methodology to the S&P 500 – a theoretical value for the S&P 500 is generated from the current book value for each S&P 500 constituent, along with a series of discounted residual income figures. We assume the sum of these theoretical values across all S&P 500 constituents should match the total market capitalization of the index. We use a two-stage approach to estimate the value for each firm:

$$V = \sum_{t=1}^{5} \frac{NI_t - rB_{t-1}}{(1+r)^t} + \sum_{t=6}^{\infty} \frac{(ROE_t - r)B_{t-1}}{(1+r)^t}$$

Where:

V = estimated theoretical value for firm
NI_t = net income at time *t*
r = cost of capital
B_{t-1} = book value at time *t-1*
ROE_t = return on equity at time *t*

Stage 1 (years 1-5)
We use the following approach to calculate net income for each year. For years 1 & 2, we use the mean of consensus forward earnings estimates.

NI_1 = mean of consensus forward net income estimates for months 1-12
NI_2 = mean of consensus forward net income estimates for months 13-24

For years 3-5, we apply an estimate for long-term growth rate to arrive at net income in year 5. We then use linear interpolation to estimate the net income values for years 3 & 4:

$$NI_5 = NI_1(1 + LTG)^4$$

$$NI_3 = \frac{2}{3}NI_2 + \frac{1}{3}NI_5$$

$$NI_4 = \frac{1}{3}NI_2 + \frac{2}{3}NI_5$$

[1] Frankel, R., & Lee, C.M. (1998). Accounting Valuation, Market Expectation, and Cross-Sectional Stock Returns. Journal of Accounting and Economics, 25, 283-319.

Where:

LTG = estimate for long-term earnings growth (we use an estimate of 6.5%, see below)

Stage 2 (years 6 and forward)

We assume the return on equity (*ROE*) converges toward the cost of capital following an exponential decay process with a half-life of 10 years (i.e. 10 years into stage 2). As such, we can express the excess of *ROE* over *r* in year *t* as:

$$ROE_t - r = (ROE_5 - r)e^{\frac{ln\,(0.5)}{10}(t-5)}$$

Where ROE_5 is the ROE in year 5 (i.e. last year of stage 1).

We assume a firm life of 100 years, so the original equation becomes:

$$V = \sum_{t=1}^{5} \frac{NI_t - rB_{t-1}}{(1+r)^t} + \sum_{t=6}^{100} \frac{(ROE_t - r)B_{t-1}}{(1+r)^t}$$

The book value in year t-1 (i.e. B_{t-1}) is computed as:

$$B_{t-1} = B_{t-2} + (1 - payout)NI_{t-1}$$

Where:

B_{t-2} = book value in year t-2
NI_{t-1} = net income in year t-1
payout = average dividend payout ratio over the past 10 years

With the net income in year t-1 (NI_{t-1}) during stage 2 being computed as:

$$NI_{t-1} = ROE_{t-1}B_{t-2}$$

The equity cost of capital (*r*) can be broken into two parts:

$$r = r_f + r_p$$

Where:

r_f = risk-free rate
r_p = equity risk premium

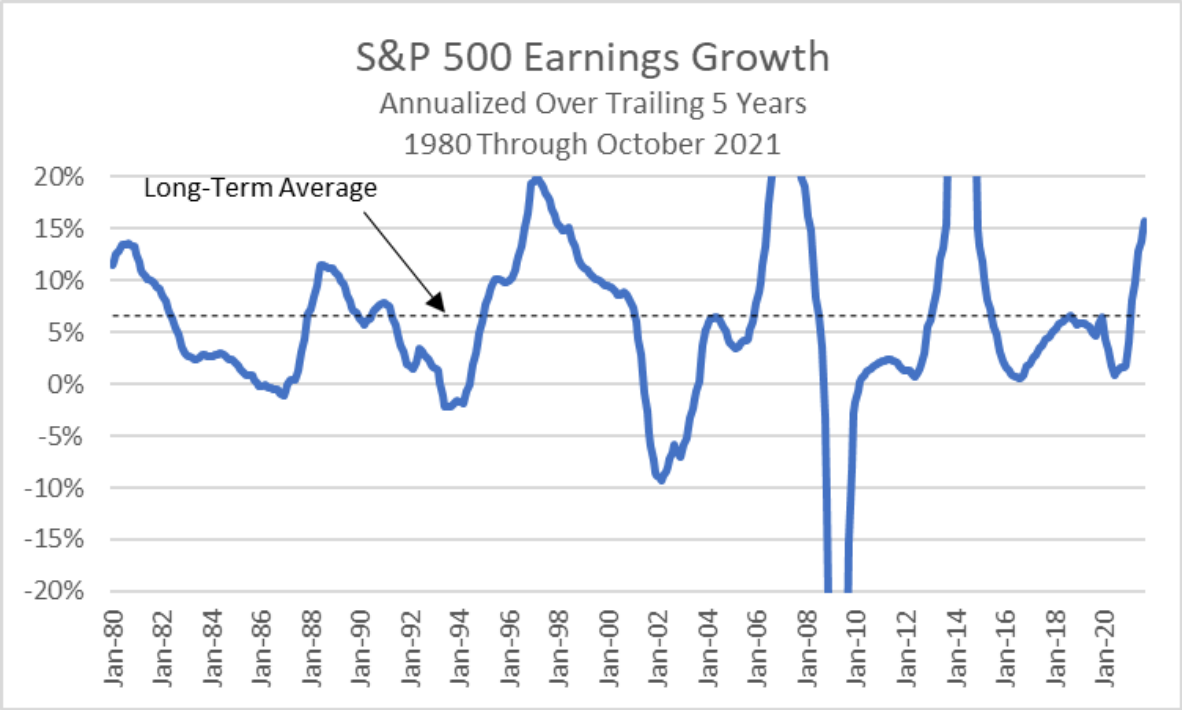
Using the yield on the 10-year Treasury note as the risk-free rate, we can back into the equity risk premium.

Estimate of long-term earnings growth rate (LTG)

To estimate the long-term growth rate for earnings, we analyze the historical growth rate of earnings for the S&P 500. As we are looking to proxy for the *long-term* growth rate in earnings, we consider the annualized growth rate in realized earnings, looking at overlapping 5-year

periods. Fig. 4 below shows the annualized 5-year earnings growth rate for the S&P 500, back to 1980.

Fig. 4 – S&P 500 Realized Earnings Growth Rate



Note: Shows the annualized trailing 5-year growth rate for S&P 500 earnings per share. Period of analysis is from 1980 through September 2021.
Source: Prof. Robert Shiller data (http://www.econ.yale.edu/~shiller/data.htm), S&P, Bloomberg, Fundstrat analysis.

The dashed black line in Fig. 4 shows the average realized earnings growth since 1980, which runs at 6.5%. Looking over different horizons, the average growth rate in earnings is 6.8% since 1990 and 6.3% since 2000. Taking this information into account, we use an estimate for the long-term growth rate of earnings of 6.5%.

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