Are Stocks Overvalued? A Survey of Equity Valuation Models

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It should come as no surprise in one of the longest-running bull markets in U.S. history that the question "Are stocks overvalued?" is ever present in the minds of both investors and investment professionals. A Google search of this simple phrase returns 551,000 results, and an Amazon book search for "equity valuation" finds 3,411 listings. For better or worse, the topic is even periodically broached at the highest levels of the Federal Reserve:

> I would highlight that equity market valuations at this point generally are quite high…. They are not so high when you compare the returns on equities to the returns on safe assets like bonds, which are also very low, but there are potential dangers there.
> — *Federal Reserve Chairperson*
> *Janet Yellen* (2015)

> [H]ow do we know when irrational exuberance has unduly escalated asset values, which then become subject to unexpected and prolonged contractions…?
> — *Former Federal Reserve Chairperson*
> *Alan Greenspan* (2008)

An attempt to answer this deceptively simple question is aided by various equity valuation models and tools, all of which can be extraordinarily useful in estimating the expected long-term return of the market. These tools cannot consistently tell us, however, with any accuracy, *when* market prices will be heading up or down, although they may occasionally get lucky.

Figure 1, which shows a box plot of returns for the S&P 500 Index over different investment horizons, helps explain why this is the case.[1] Take, for example, the five-year investment-horizon box. It shows the historical distribution of annualized returns for every five-year period in the history of the S&P 500. Notice that as the investment horizon increases from 1 to 10 years, the median return (i.e., the horizontal line across the center of the box) remains pretty stable, while the variance of returns narrows dramatically. Said another way, short-term forecasters must contend with a lot of uncertainty. Of course, given a large enough number of forecasts, based on a sufficiently broad set of indicators, a few short-term forecasts will eventually hit the mark, but in general, it's a losing game. Thus, for those engaged in short-term forecasting, we can only say, "Good luck with that!"

We do not mean to imply that equity market valuation is a hopeless endeavor. On the contrary, over the long run it can be of enormous benefit to the patient investor. Just as with valuing individual companies, the tools we use to value entire stock markets fall into two categories. The first includes absolute valuation models that directly estimate expected returns by using an approximation of discounted cash flows condensed into a building-block type of model, such as the Gordon growth model.[2] The second category includes relative valuation models based on price multiples that are compared against a steady-state level. Although we could write reams discussing every model and ratio that has ever been documented on equity valuation, we restrict our focus to the more popular metrics.

We use real returns in our analysis because returns after inflation are what build wealth.

Absolute Valuation Models

We begin with a discussion of the two absolute valuation models named in **Table 1**: Model 1, the average of dividend yield and earnings yield; and Model 2, dividend yield plus historical average real growth.

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Model 1, the simple average of dividend yield and earnings yield, is a quick and easy method to calculate the expected return of the equity market. This model accounts not only for income received by investors, but also captures growth from reinvested earnings and recognizes historically documented share dilution (i.e., the difference between new share issuances and buybacks).

The short-term and long-term return forecasts of the U.S. equity market, using Model 1, are plotted in Figure 2. Recall that Figure 1 illustrates the much greater uncertainty of shorter term forecasts compared to longer term forecasts. Therefore, as we would expect, **Figure 2** shows that over a one-year horizon the model has almost zero predictive power, with an R^2 of 3%, but when the horizon is lengthened to 10 years, the explanatory power jumps to 31% (56% correlation).

As of June 2015, Model 1 forecasts the one-year U.S. equity yield to be 3.7%, the average of 5.4%, the trailing S&P 500 one-year earnings yield,[4] and 2.0%, the trailing S&P 500 one-year dividend yield.

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Model 2 is widely known as the dividend growth model. This model is based on the belief that dividend yields are constant over time; that is, equity prices rise in lockstep with cash flows to maintain a constant yield. The second input in the model, historical average real growth, can be neatly estimated using the recent historic trend in real earnings per share (EPS) growth. Long-term real EPS growth in the United States has been relatively constant at about 1.5% a year. Combining this value with the current dividend yield of 2.0% results in a forward one-year expected yield of 3.5%, not dramatically different from the return forecast by Model 1. And like Model 1, the dividend growth model is all but useless over a short time horizon, as is painfully obvious in Figure 2, but it does have merit at longer horizons.

Relative Valuation Models

The two absolute valuation models work well when yields remain constant, but in the real world prices can vary wildly around slower-moving fundamentals, such as dividends and earnings. As a result, it is also important to pay attention to *relative* valuations. Model 3 uses price divided by average 10-year real earnings, also called the cyclically adjusted PE ratio, or CAPE, to model expected returns. CAPE, or its inverse, the cyclically adjusted earnings yield plotted in Figure 2, captures equity prices relative to a smoothed economic anchor. Countless other relative valuation metrics relate prices to other anchors, and they all tell a similar story. We focus our attention on four of the most commonly cited, as listed in Table 1.

Converting each of these models into a return forecast requires comparing the equity market's current price level to a benchmark, typically the long-term average value of the respective ratio. **Figure 3**, **Panel A**, shows each of the four metrics compared to its long-term average for the period 1871–2015. **Panel B** provides the same four-ratio comparison focused on the last 15 years. Values greater than zero indicate that the market is overvalued, or expensive, and values less than zero indicate that the market is undervalued, or cheap. The figures succinctly illustrate that these four metrics often tell the same story—and today that story is that the U.S. equity market is overvalued!

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The charts in Figure 3 also highlight two distinct shortcomings of valuation ratios. The first is that they cannot be relied on for guidance in timing the market. Take, for example, the early 1990s. All of these measures would have indicated that the market was becoming overvalued. That may very well have been the case, but anyone jumping ship then would have missed out on one heck of a bull market! As Paul Marsh, Professor Emeritus at the London School of Business, points out, "The exact timing of it [a market reversal] is extraordinarily elusive" (Pleven, 2015). Simply knowing a market is overvalued tells us nothing about when it is expected to revert to reality.

A second shortcoming of relative valuation metrics is the benchmark that is used, typically the metric's long-term historical average. Incorporating the entire history of the U.S. stock market, these metrics have identified an overvalued market for all of the last 20+ years, except for the months spanning the depth of the 2008 global financial crisis. Is it really the case that equity prices were overly optimistic throughout the past two decades, and that the fear and despair in the darkest moments of the crisis corrected the market to "normal" price levels? It seems doubtful. One way to adjust for the higher price levels would be to simply shorten the look-back period in calculating the average, or benchmark, but we view this as an exercise in confirming the story being told (i.e., that the market is not overvalued or has established a new valuation regime).

A more informative approach is to control for the economic climate. A simple example is to use the CAPE while controlling for the level of interest rates and inflation. We've written before about the valuation mountain (Arnott, 2011) that emerges across the spectrum of real interest rates, which we define as the 10-year Treasury yield minus the prior 3-year CPI. When real rates are either low or high, we tend to see low levels of Shiller CAPE. At more moderate levels of real rates, such as between 2% and 5%, higher valuation levels are the norm.

Figure 4, **Panel A**, is a heat map of the frequency of various CAPE and real interest rate combinations. For example, of the 298 months when real rates were in their lowest quintile, there were only 27 in which CAPE was also in its highest quintile. Compare that to the 116 months—more than four times as frequent—in which CAPE was at its lowest in that low real-rate environment. Follow those blue-tinted boxes as they arc up toward high valuations at moderate real rates and back down again to lower valuations at high rates. This blue arc in Panel A is what we call the valuation mountain.

We currently occupy the box outlined in orange—a higher equity price than might be expected in the current low-rate environment. In fact, prices would have to drop over 37% to reach CAPE levels typically experienced at such low interest rates. Should we expect such a drop over the coming year or two? It's not entirely out of the question, but the average 10-year subsequent returns reported in **Panel B** tell a different story. Historically, markets have experienced a 3% annual real return in the 10 years following the valuation and rate relationship (high CAPE and low real rate) that we are seeing now. Although a projected annual real return of 3% is lower than the long-term average, it is hardly worthy of panic, provided investors can temper their expectations. It is notable that relatively low real rates are not guaranteed to fuel the stock market and don't seem to have any effect at all unless they are in the bottom quintile. Even then it is difficult to overcome elevated price levels. The bottom line is that all valuation metrics are blunt instruments and should be viewed as such. Relative valuations are important and useful for forming expectations over the long term, but investors should avoid the temptation to use them as a crystal ball.

Price ratios, such as CAPE, have two ways of reverting. The most obvious is via a change in price, which we know can happen quickly and unexpectedly, and the second is via a change in the ratio's denominator—in this case, earnings. Earnings growth, a key component in the absolute valuation models we have described, is also an important consideration in relative valuation models. But because real earnings in the United States are at an all-time high, it is unlikely that growth will be our path off the valuation mountain.

Which Metric Is Correct?

The metrics we discuss in this article produce a diverse assortment of 10-year real return forecasts for the U.S. equity market, as **Figure 5** shows. The simplest metric, the average real return over the past 100 years, produces the rosiest outlook of more than 7%. The absolute valuation metrics, which incorporate dividend yield and earnings growth, also lead to a positive, but scant, forecast of around 3.5% after inflation. The relative valuation metrics, such as market cap/GDP, CAPE, Tobin's Q, and Hussman's PE which need to be added to dividend yield and growth to capture total return, generate forecasts that are less optimistic. With the current lofty equity prices, all predict contraction of their specific multiple.

Each metric has its merits. Dividends and growth tell us what to expect companies to produce for their shareholders, and relative prices tell us what to expect from mean reversion in the price of that production. Together, they present a more complete picture of equity valuation levels, although certainly not the only one. That is why we estimate long-term equity valuation by combining both types of metrics: relative value and absolute value. We value global equity markets as the sum of dividend yield and growth in earnings, capturing market return in a constant-yield environment, as well as considering the reversion of CAPE to its long-term average.[3]

The choice of CAPE is not without its critics, who are quick to point out that changes in accounting rules and changes to the CPI calculation, along with the timing and benchmark issues inherent in relative valuation measures make CAPE an unreliable metric. All of these are valid criticisms, but as we've shown, all the relative valuation metrics tell the same story. And for those who shy away from choosing a metric because they all have blemishes, don't forget that "in the valley of the blind, the one-eyed man is king,"[6] even if everyone around him is skeptical.

Our answer to the question "Are stocks overvalued?" in the U.S. market is a resounding "Yes!" Our forecast for core U.S. equities is a 0.8% annualized real return over the next decade. The 10-year expected real return for emerging markets equity, however, is much higher at 5.9% a year. The return potential of the nondeveloped markets is so high, in fact, that the valuation models, warts and all, paint a very clear picture.

For readers interested in more details, please visit our Asset Allocation site.

Endnotes

[1] In a box plot, the box represents the range of the middle quartiles (25th to 75th percentile) of returns. The whiskers extending from the top and bottom of each box show the maximum and minimum returns, respectively.

[2] The Gordon growth model is represented as $r = D/P + g$, where D/P is dividend yield and g is capital gain (i.e., appreciation yield).

[3] For readers interested in more details, our equity methodology document is available in the Asset Allocation section of our website.

[4] A better estimate of earnings yield would incorporate average earnings over time, as does the CAPE (Shiller P/E) ratio; a discussion of CAPE appears later in this article.

[5] Relative metrics are anchored to their long-term historical levels and assume a 50% return to those levels over the next 10 years via a change in price only.

[6] The character Nunez appears in H.G. Wells' *The Country of the Blind, and Other Stories*. Nunez was an explorer who discovered a village where everyone was blind, but over the generations had been able to hone their other senses. In addition, they developed stories about how the world "looks." When Nunez arrived and described the world as he—a man with vision—saw it, the villagers scorned him as a liar.

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