Shiller P/Es and Predicting Returns
Some Additional Thoughts

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This is a follow-up to my September 1 article, and it explores the issue of how best to use the Shiller P/Es in setting asset allocation strategies. Reader Bryan Zink, CPA of Tampa, Florida asked "how the Shiller P/Es might be used to beat the 11.09% stock market average—for example, utilizing a portfolio that is 100% stocks until the P/E reaches a certain level, and then switching some percentage to bonds."

The purpose of the original article was to highlight the value of using Shiller P/Es because of their historic relationship to long-term stock market returns. I used an example to show how the P/Es might be incorporated in an asset allocation strategy, but I did not evaluate specific strategies. Here I extend my earlier work to show results for a selection of alternative strategies.

I want to offer a caution at the outset about the limitations of this kind of analysis. I'm using historic annual data from 1928-2008, and while 81 years may seem like a long time, it's not a lot of data points. There may be issues of statistical significance and related "data mining" effects—if you try a bunch of different things on a limited set of data, you'll likely uncover some significant-looking relationships that just happened by chance. Also, of course, there's no guarantee that the future will be like the past, so even having loads of historic data may not be enough to point the way forward.

With those cautions in mind, let's proceed. All of the conclusions in this article relate to the data shown in Chart 1 below. This chart shows the results for seven different asset allocation strategies which involve using Shiller P/Es to annually rebalance investment portfolios. For each strategy, the chart shows the following:

- ROR: Average annualized rate of return for overlapping 10-year time periods beginning in 1928.
- 10 Yr. Std. Dev.: Standard deviation of the ROR's measured over rolling 10-year periods.
- One Yr. Std. Dev.: Standard deviation of one-year returns. (Clients may be concerned about how much annual volatility they will experience.)

- Added Return: Difference between the expected ROR for the strategy vs. the expected ROR from holding an all-Treasury-bond portfolio.

- Added Risk: Increase in standard deviation compared to the all-Treasury-bond portfolio.

- Efficiency: Calculated as the Added Return minus 2X the Added Risk—based on a 95% confidence interval and measures the amount that downside risk is improved versus an all-bond strategy.

First let's focus on the all-bond and all-stock portfolios. The bond and stock average returns are 5.16% and 10.81% respectively. These numbers are lower than the 5.44% (bond) and 11.09% (stock) returns from my earlier article, which were arithmetic average returns. These are geometric returns based on combining 10 years of annual returns. The goal is to move the returns up close to the all-stock level, but keep the variability of returns as close as possible to the all-bond standard deviation.

I applied a number of different strategies, all of which involved annual rebalancing based on Shiller P/Es, and ran each strategy for overlapping 10-year periods beginning in 1928. The "base strategy" (1) on the chart is the one I used in the September 1 article. The particular algorithm involves holding 100% stocks at P/Es 7 or 8, 75% at 12, 50% at 17, 25% at 24, and zero above 33. The exact formula is: % Stocks = -.7213*(ln(P/E)-ln(17))+.4537. The formula uses logarithms to reflect the much larger historic range of above average values vs. below average values, and was calibrated so stock holdings would average 50%. Values are restricted to 0% - 100%.

Strategy 2 starts with the base strategy and simply moves all-the stock allocations higher so that the allocation to stocks averages 75% instead of 50%. Since stock returns are higher than bond returns, this increases expected returns, but also adds more than 1% to the 10-year standard deviation. The efficiency measure falls short of what we were able to achieve with the base strategy.

For strategy 3 I've tried an all-or-nothing approach—100% stocks when the P/E is below 16.5 and zero when it's above. The P/E 16.5 was chosen so that stock holdings would average 50% like in the base strategy, but the efficiency falls short of the base.

Strategies 4-7 try various approaches using a P/E of 12 as a break point. I chose 12 because it was significantly below the average P/E of 17, but not so low that it rarely occurred. Note that the 80% and 100% strategies did best on the efficiency measures. (The three strategies with the best efficiency ratings are shown in bold.) The 120% and 160% strategies, which would involve leveraging to boost stock holdings over 100%, did increase expected returns, but knocked down efficiency.

I could have tested using thresholds other than a P/E of 12 and likely found some improved results, but I would be suspicious of data mining effects. I expect that there are a number of strategies like numbers 1, 4 and 5 that can significantly raise expected returns (although not to the all-stock level) and keep the risk level close to the all-bond level. I doubt there are any viable "magic bullet" strategies that can dramatically raise returns without increasing risk.

These results are based on running strategies for 10-year periods. Shiller P/Es are more predictive of future returns over longer time horizons. These R-squared values show how much of the variation in return is explained by the beginning P/E: 1-year (.08), 5-year (.32), 10-year (.48), 20-year (.59). At one year the P/E explains less than 10% of the return, but by 10 years it's close to 50% and climbing

Planners should be mindful of the Shiller P/Es in making long-term investment recommendations, but there isn't much to be gained by too much refinement in allocation strategies.

Chart 1:Asset Allocation Experiments Based on the Shiller P/Es (using data from 1928-2008)

	Allocation Strategy	ROR	10 Yr. Std. Dev.	One Yr. Std. Dev.	Added Return	Added Risk	Efficiency
	All Bond Portfolio	5.16%	3.30%	7.61%	0.00%	0.00%	0.00%
	All Stock Portfolio	10.81%	5.64%	20.39%	5.65%	2.34%	0.97%
1	**Base Strategy**	**9.67%**	**3.33%**	**12.54%**	**4.51%**	**0.03%**	**4.45%**
2	Raise Average Stock Allocation from 50% to 75%	10.81%	4.40%	16.43%	5.65%	1.10%	3.45%
3	100% Stocks when P/E<16.5, 0% otherwise	10.15%	4.83%	16.35%	4.99%	1.53%	1.93%
4	**80% Stocks when P/E<12, 40% otherwise**	**9.53%**	**3.25%**	**12.04%**	**4.37%**	**-0.05%**	**4.47%**
5	**100% Stocks when P/E<12, 30% otherwise**	**10.16%**	**3.57%**	**13.32%**	**5.00%**	**0.27%**	**4.46%**
6	120% Stocks when P/E<12, 20% otherwise	10.75%	4.22%	15.13%	5.59%	0.92%	3.75%
7	160% Stocks when P/E<12, 0% otherwise	11.76%	6.02%	19.77%	6.60%	2.72%	1.16%

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