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Chasing Down the Rebalancing Premium

By Anson J. Glacy, Jr.

One day, Albert Einstein was walking across the quad having just given a test to his grad students. His assistant asked him, "Herr Professor, didn't you just use last year's test?" He responded, "Ja, ja, ja." The assistant said, "I'm shocked that you would use the exact same test with the exact same questions." Einstein said, "The answers have changed."

In developing long-range investment strategies, investors conduct strategic asset allocation (SAA) exercises in pursuit of the asset allocations that optimally balance risk and return. They reach conclusions of optimality by using utility-like measures of subjectivity to identify "sleep-well-at-night" portfolios. Investors then rebalance these portfolios on a quarterly or annual basis in order to maintain the desired constant mix. Mechanical rebalancing strategies like these help investors control their risk exposures and remove uncertainty and emotion from the ongoing investing process.

For example, rebalancing to a traditional 60 percent stock/40 percent bond constant mix requires the purchase of stocks as they fall in value. This is known as a **concave** strategy because of the shape of its payoff profile and it tends to do well in conditions of market volatility. (In contrast, **convex** strategies that sell stocks as they fall in value (e.g., portfolio insurance, momentum strategies) tend to do less well in oscillating markets.) Concave strategies are also thought to deliver incremental returns (called a **rebalancing premium**) resulting from the buy-low-sell-high trading done to achieve the rebalancing.

For example, investors who rebalanced on March 31, 2020, during those turbulent market conditions would have sold a portion of their bond positions as Treasury note rates declined precipitously towards 0.50 percent, realizing capital gains, and then redeployed proceeds into stocks at depressed prices. These investors increased their stock holdings at a local bottom of the market, thereby increasing their participation in the market recovery that followed. They probably will finish the year 2020 showing superior returns compared to "buy and hold" portfolios that were not rebalanced.

For another example, fund giant Invesco reported that it had failed to rebalance an equally-weighted S&P 500 mutual fund in April 2020, a mistake that cost investors $105 million. (Invesco agreed to reimburse investors.) The error came to light when a manager noticed that the mutual fund's performance began markedly trailing the otherwise identical ETF version of the fund, which **had** undergone the scheduled rebalancing. (One stock analyst estimated the error could cause a charge of 20 cents a share.)

STRATEGIC ASSET ALLOCATION (SAA) ASSUMPTIONS

SAA relies on coherent forecasts (i.e., capital market assumptions) of long-term investment expectations and variability. Such forecasts are usually presented in the standard mean-variance framework of expected returns, volatilities and correlations:

Expected return—average annual return over the long-range horizon;

Volatility—the standard deviation of annual returns; and

Correlation—how closely associated returns of various investments are with each other.

Practitioners often rely on J.P. Morgan's long-term capital market assumptions in strategic asset allocation work, assumptions designed to extend over the 10- to 15-year time frame that is appropriate for insurance company ALM or pension plan work. J.P. Morgan employs a team of over 50 economists and strategists to recalibrate its forecasts annually to incorporate new information presented by markets, policymakers and the main-street economy itself. Prompted by springtime market events, J.P. Morgan for the first time published off-cycle adjustments to its assumptions on April 30, 2020.

COMPUTING THE REBALANCING PREMIUM

Consider a portfolio of two assets whose returns are normally distributed with identical mean return μ, variance σ^2, and with zero correlation. The expected growth rate of each asset is $\mu - \sigma^2/2$, after adjusting for volatility drag (i.e., a stock that drops 20 percent needs to rise 25 percent to recover). For simplicity, assume rebalancing to a 50/50 portfolio. Invoking the self-financing constraint that the purchase of new units of one asset is financed by the sale of the other, it can be shown that the expected growth rate of the two-asset portfolio is $\mu - \sigma^2/4$ and thus the rebalancing premium in this simple case is $\sigma^2/4$. In the case of non-zero correlation ρ, the rebalancing premium is $\sigma^2(1 - \rho)/4$.

From 2010 through 2019, S&P 500 realized volatility averaged about 15 percent. If the bond market had exhibited similar volatility and assuming no correlation between the two markets (both tenuous assumptions), the rebalancing premium for a 50/50 investor was 0.56 percent using the above formula.

EXPLOITING THE REBALANCING PREMIUM

The mean-variance mathematics underlying these calculations is highly tractable, requiring only the solution to a quadratic optimization problem. Therefore, it is possible to create portfolios of individual stocks and bonds designed to maximize the rebalancing benefit. This practice is called **volatility pumping** or **volatility harvesting** and was first formalized by Oxford professor David Luenberger in his textbook Investment Science (Oxford University Press, 1997). As Luenberger puts it (page 429), "Volatility is **not** the same as risk. Volatility is opportunity."

Luenberger observes that "when assets are combined in proportions, the resulting μ is a proportional combination of the individual μ's. However, the resulting σ^2 is reduced more than proportionally because it combines individual σ^2's with

squares of the proportionality factors." Therefore, the aggregate growth rate is greater than the proportional combination of the individual growth rates. It is "pumped up" by the reduction in the volatility term.

In general, the greater each constituent asset's volatility, the greater the overall rebalancing premium. In contrast, the greater the correlation among assets, the lesser the rebalancing return. These findings are intuitive. (But note that an increase in asset volatility increases the growth potential from rebalancing but also increases portfolio variance, decreasing growth **via** volatility drag).

The enterprising practitioner, armed with a suitable investment data feed and an optimizer, can easily build portfolios of S&P 500 subsets designed to harvest volatility. Certain **risk parity** strategies followed by major investment houses are designed to realize incremental returns through rebalancing. The amount of return generated through rebalancing is a function of asset class volatilities and diversification. In a risk parity portfolio, assets are selected based on their diversification potential and levered up or down to attain a target volatility. This construction process creates an ideal environment for systematically harvesting gains in the portfolio through rebalancing.

LITERATURE REVIEW

Maeso and Martellini ("Measuring Portfolio Rebalancing Benefits in Equity Markets," The Journal of Portfolio Management, March 2020) found that the outperformance of a rebalanced strategy compared to its buy-and-hold counterpart is in excess of 1 percent per annum for stocks in the S&P 500 index. Anderson, Bianchi, and Goldberg ("Will My Risk Parity Strategy Outperform?" University of California at Berkeley, 2012) found that a rebalanced constant mix of 60 percent stocks and 40 percent bonds, after transaction costs, outperformed a buy-and-hold mix by 74 basis points per year from 1926 to 2010 with significantly lower volatility.

William Bernstein *(www.EfficientFrontier.com)* observes that the average annual return on common stocks and long-term corporate bonds between 1926 and 1994 was 10.19 percent and 5.51 percent, respectively, returning 7.85 percent for a 50/50 buy-and-hold mix. Rebalancing this portfolio annually to maintain a 50/50 constant mix would have yielded a return of 8.34 percent, implying a rebalancing premium of 0.49 percent. But Bernstein notes that if one had put equal amounts of money into stocks and bonds on the day of Jan. 1, 1926, and had not rebalanced, the return would have been 9.17 percent. During that 69-year period the significantly higher stock return overwhelmed the bond return, causing the stock component to be greater than 90 percent for the last 40 years of the period. The higher return from the buy-and-hold portfolio comes at the cost of a much less diversified and therefore dramatically more risky portfolio than the rebalanced one.

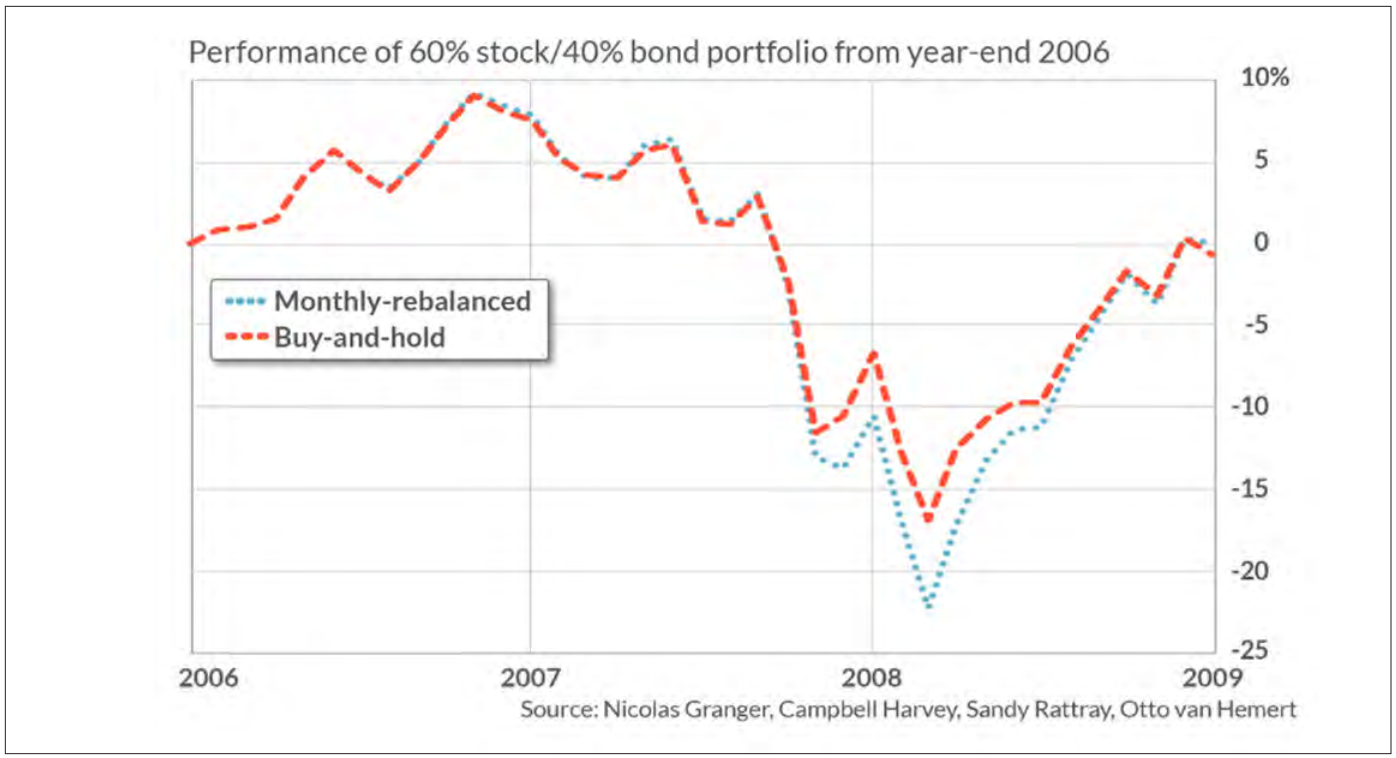
OTHER VIEWPOINTS

However, other investigators have dissented. For example, Cuthbertson, Hayley, Motson and Nitzsche ("What Does Rebalancing Really Achieve?" *International Journal of Finance & Economics*, 2016) point out that comparison between rebalanced and buy-and-hold portfolios is confounded by the fact that, even when the portfolios are identical at the start, the composition of the buy-and-hold portfolio tends to wander over time. They demonstrate analytically that "the greater expected growth of rebalanced strategies is **entirely** (emphasis added) explained by their lower portfolio volatilities rather than—as is claimed—being due to the rebalancing trades themselves being profitable."

British actuary Andrew Wise ("The Investment Return from a Portfolio with a Dynamic Rebalancing Policy," *British Actuarial Journal*, 1996) concluded that a rebalancing strategy will beat a buy-and-hold strategy about two-thirds of the time when the constituent assets in the portfolio have identical mean-variance return expectations. But when buy-and-hold beats rebalancing, it beats it by a much larger margin, so that the returns to rebalanced and buy-and-hold, in the equal expected returns case, are identical. Wise joins with Cuthbertson et al. to conclude that apparent rebalancing superiority is actually a risk-return tradeoff in disguise.

Popular financial writer Mark Hulbert examined the historical performance of rebalancing ("Almost All Retirees Make This Mistake," *MarketWatch*, July 2019), counseling skepticism of any advice that is almost universally touted. In reviewing the performance of numerous asset allocations involving regular rebalancing, he found that many portfolios performed "far worse" than expected and that rebalancing was the likely culprit. He cites the experience of the 2007–2009 Global Financial Crisis when the stock market fell for six calendar quarters in a row, with losses growing progressively larger as the crisis unfolded. A strategy of regular rebalancing would have magnified losses rather than reduced them. (See Figure 1)

Figure 1
When Rebalancing Went Astray



Hulbert does recognize the value of rebalancing in maintaining one's strategic asset allocation and in adding value in sideways markets. But he prefers to marry rebalancing with a momentum strategy in order to guard against severe market drawdowns.

CONCLUSION

Regular asset rebalancing to a rigorously determined strategic asset allocation is an accepted practice for investors to optimize their long-range investing performance. The academic literature concludes that under certain conditions that may or may not exist in reality (i.e., independently and identically distributed assets following a random walk), a rebalanced portfolio has a higher expected growth rate than its buy-and-hold counterpart.

The topic continues to generate lively controversy among interested parties. A growing number of academic papers wrestle with differing interpretations of the same empirical evidence and with competing methodological approaches for measuring the rebalancing premium. Future installments will report on the continuing research and discuss how practitioners can incorporate findings into investment and risk containment strategies. ■

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