# PORTFOLIO REBALANCING

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## OVERVIEW

In the world of investment management, a great deal of attention is given to the investment selection and the actual process of investing. Any quick search of investments will return a large variety of research reports, suggestions, and findings. It is easy to see why many believe that investment selection is the key to successful portfolio return. However, investment selection is only part of the equation. The discipline of rebalancing is an often overlooked contributor to a portfolio's long-term success.

The rationale for rebalancing is not complex. Rebalancing prevents a portfolio from becoming overweight and therefore acquiring more risk than desired. For example, as the equity markets grow and bond prices decline, a balanced portfolio can quickly turn into an aggressive portfolio. Rebalancing requires selling stocks and buying bonds to restore parity. In short, this is a way to account for changing valuations. When prices increase, generally the growth expectation for that asset decreases, and since we ideally want to hold investments that have a higher expected return this makes sense. Rebalancing assists in capturing the price increases and keeping the risk levels of the portfolio in line with the expectations. It sheds the investments whose expected returns have decreased and increases those investments that are cheaper.

Some argue that winners should be left alone so they can continue to grow, but this short sighted expectation requires accuracy — or market timing — that is nearly impossible. Rebalancing, on the other hand, does the opposite: the assets that have grown the most are sold and replaced with the assets that have decreased the most. Rebalancing is a strategy for the long-term investor, and although the argument for rebalancing is straightforward, the *frequency* with which to optimize performance is debated. This paper concludes that rebalancing at a threshold of 30% from targeted weight will maximize a diversified portfolio's performance.

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## STUDY

There are numerous studies highlighting portfolio outperformance due to rebalancing: Stein, Bouchey, Atwill, and Nemtchinov (2011); Plyakha, Uppal, and Vilkov (2012); as well as our own study by Nesbitt (2005), to name a few. Nesbitt concluded that rebalancing assets when they exceeded a 25% tolerance from the targeted weight optimized performance. Since the inputs have changed over time (e.g. trading costs), we thought we should review our rebalancing policy to ensure that we are still achieving the maximum benefit.

In his study, Nesbitt concluded that rebalancing on a regular schedule (e.g. weekly, monthly, yearly, etc.) did not produce optimal results. His conclusions were echoed in a study conducted by Vanguard (Jaconetti, Kinniry, & Zilbering, 2010). As a result, we did not revisit periodic rebalancing, but instead focused our research on the optimal threshold.

To test various rebalancing bands we utilized a portfolio with a target allocation of 60% equity and 40% fixed income. We looked back 20 years to data starting in 1998 and used a variety of indexes representing 14 different asset classes:

| *Asset Class* | *Index Used* |
|---|---|
| Domestic Large-Cap Value | Russell 1000 Value TR USD |
| Domestic Large-Cap Growth | Russell 1000 Growth TR USD |
| Domestic Large-Cap Growth | Russell Mid Cap Value |
| Domestic Mid-Cap Growth | Russell Mid Cap Growth |
| Developed International Large-Cap Value | MSCI EAFE Value |
| Developed International Large-Cap Growth | MSCI EAFE Growth |
| Developed International Small-Cap | MSCI ACWI Small |
| Emerging Markets Equity | MSCI EM GR |
| Core Taxable Fixed Income | 80-20 Taxable FI Index |
| TIPs | Barclay US Treasury US TIPS |
| Floating Rate | Credit Suisse Leveraged Loan |
| High Yield | FTSE HY Market |
| Emerging Markets Debt | JPM EMBI Global Diversified |
| Cash Equivalents | Manager Benchmark Taxable Money Market |

Because taxes vary by individual, we chose not to include tax costs in our study. Additionally, because there are no transaction costs for trading our mutual funds, we determined transaction costs to be $0.

Testing included tolerance bands of 20%, 25%, 30%, 35%, and 40%. Since 25% was shown to be the optimal band based on our previous study, we chose to first test a slightly lower band to confirm our hypothesis that a portfolio would benefit from a larger band.

As long as the asset class in the allocation stayed between each of the bands, no rebalancing occurred. If any individual asset class was over or under each band being tested, the portfolio asset class was rebalanced back to target. To determine portfolio performance we used: return, standard deviation, Sharpe ratio, beta, and the Treynor ratio.

**Return**: the annualized rate of return of an investment over a period of time, combining both capital appreciation and income.

**Standard deviation**: a statistic used to measure the dispersion of a set of data from its mean (in this case mean return). As the difference from the mean becomes greater, the standard deviation increases, indicating greater volatility.

**Beta**: a measure of the volatility of a portfolio in comparison to the market (in this case the S&P 500). A beta of 1 indicates similar volatility. A beta below 1 is less volatile than the market, and above 1 more volatile.

**Sharpe ratio**: a ratio to measure risk-adjusted performance, calculated by subtracting the risk-free rate from the rate of return for a portfolio, then dividing the result by the standard deviation of the portfolio returns.

**Treynor ratio**: measures the performance of a sector relative to risk. The higher the ratio, the better the return relative to risk.

## ANALYSIS AND RESULTS

The table below reveals that a 30% tolerance band is the most advantageous in terms of standard risk/reward measurements. Even though the return of the portfolio rebalanced with a 40% tolerance band was higher, the risks were increased substantially and therefore not ideal. The lower tolerance bands were similar in returns and risk measurements, except for the rebalancing frequency and the number of rebalancing trades. The frequency of rebalancing can also affect the portfolio outcome. Our research indicates that a 30% tolerance band had the lowest maximum drawdown as demonstrated by the lower standard deviation, as well as an improved Sharpe ratio.

| | *Tolerance Bands* | | | | |
|---|---|---|---|---|---|
| ***Tolerance Bands*** | ***20%*** | ***25%*** | ***30%*** | ***35%*** | ***40%*** |
| **Return** | 10.11 | 10.11 | 10.06 | 10.44 | 10.73 |
| **Standard Deviation** | 6.35 | 6.32 | 6.24 | 6.71 | 6.77 |
| **Beta** | 0.65 | 0.65 | 0.64 | 0.69 | 0.69 |
| **Sharpe Ratio** | 1.42 | 1.43 | 1.43 | 1.39 | 1.42 |
| **Treynor Ratio (geo)** | 14.15 | 14.17 | 14.27 | 13.8 | 14.1 |
| | | | | | |
| **Annual Turnover** | 6.4% | 5.4% | 3.55% | 3.45% | 2.75% |

Our recommendation for longer term portfolios is to use a 30% tolerance band.

## CONCLUSION

The rebalancing strategy may seem like a minor detail, but in reality it can directly impact and improve portfolio performance. Attempting to maximize expected return with no consideration of risk may not be prudent. Looking at the expected return in relation to the level of risk is vital to long-term success. Our prior research suggested that an optimal rebalancing strategy was 25%, while our current research concludes that 30% is the more optimal strategy. It may seem like a small difference, but even a small difference can have a large impact on long-term results. Finally, although we did not take taxes into consideration, the wider tolerance band reduces trading, which should increase tax efficiency.

## REFERENCES


Nesbitt, T. (2005) The Art of Portfolio Rebalancing: An Unbiased Review of Current Rebalance Processes *Washington Trust Bank White Paper*.

Plyakha, Y. Uppal, R., & Vilkov, G., (2012) Why Does an Equal-Weighted Portfolio Outperform Value- and Price-Weighted Portfolios? *Working Paper, EDHEC Business School*.

Stein, D., Bouchey, P., Atwill, T., & Nemtchinov, V. (2011) Structured Active Portfolio Management: Why does diversifying and rebalancing create alpha? *Parametric White Paper*.

Jaconetti, C., Kinniry, F., & Zilbering, Y. (2010) Best practices for portfolio balancing *Vanguard Research Paper*.