MILL CREEK

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Rebalancing: An Active Approach



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Executive Summary

- **Rebalancing is a key but often underemphasized** component of active portfolio management.
- **Routine rebalancing can enhance returns** in normal market environments, but can also increase drawdowns during persistent market declines.
- **Incorporating simple momentum signals into rebalancing decisions** can help investors avoid rebalancing at inopportune times and improve risk-adjusted outcomes.
- Taxable investors will likely find it optimal to use bond income, equity dividends, and portfolio inflows/outflows to **incrementally rebalance on an ongoing basis**.

Investors and their advisors spend considerable effort developing target asset allocations and selecting investment managers but frequently overlook rebalancing as an important component of portfolio management. While the necessity of occasional portfolio rebalancing is obvious to keep portfolios in line with allocation targets, the specific characteristics of an optimal rebalancing strategy are not nearly as clear.

Should a portfolio be automatically rebalanced every month, every year, or only when drift has been sufficient to push the allocation outside of acceptable bands? How much of a difference will different rebalancing methods make from a performance standpoint? These are important questions as rebalancing can impact portfolio return, volatility, and even the magnitude of drawdowns during bear markets.

We believe:

- 1. Frequent rebalancing offers a small, positive bonus to portfolio return, but
- 2. can also exacerbate drawdowns or truncate bull markets.
- 3. Adding momentum overlay to rebalancing decisions can help investors capture the rebalancing bonus while avoiding "catching a falling knife" during sustained downturns.

We've focused on 60/40 stock/bond portfolios in this article, but the concepts hold true for more diversified portfolios and portfolios targeting different levels of risk.

A rebalancing bonus?

In David Swensen's¹ book, <u>Unconventional Success</u>, he wrote the following (p.198):

"As a matter of course, every trading day, Yale estimates the value of each of the components of the endowment. When marketable securities asset classes (domestic equity, foreign developed equity, emerging market equity, and fixed income) deviate from target allocations, the university's investment office takes steps to restore allocations to target levels. In fiscal year 2003, Yale executed approximately \$3.8 billion in rebalancing trades, roughly evenly split between purchases and sales. Net profit from rebalancing amounted to approximately \$26 million, representing 1.6% return on the 1.6 billion equity portfolio."

Many investors have taken this paragraph at face value as proof frequent rebalancing leads to absolute outperformance, and the finance departments at most universities would agree. Finance theory tells us that frequent rebalancing between two assets that are not perfectly correlated will lead to outperformance versus a portfolio left to drift², since frequent rebalancing is a straightforward buy low/sell high strategy that intuitively leads to outperformance. Our Capital Market Assumptions (CMAs), for example, imply a 1% annual rebalancing bonus for a 60/40 portfolio – similar to Yale's reported gain.

However, real-life markets are where finance theories go to die, and we don't have to look too far into the past to find periods where frequent rebalancing led to meaningful underperformance instead of outperformance.

For example, a monthly rebalanced portfolio would have underperformed a drift portfolio by 3% between March 2008 and February 2009. In a period of sustained underperformance for equities, frequent rebalancing (buying the dip) can exacerbate drawdowns versus just letting the portfolio drift. Similarly, a monthly rebalance underperformed by over 2% between April 2020 and March 2021 due to strong equity returns and anemic bond performance. In retrospect, investors would have been better off allowing the portfolio to drift instead of continually reducing equity exposure.

What drives these differing outcomes? If equities significantly outperform or underperform bonds over a year, an annual rebalance will outperform a monthly rebalance. If equities and

 ¹ David Swensen was chief investment officer at Yale University from 1985 until his death in May 2021.
² The rebalancing bonus can be estimated as the difference between the mean variances of the assets and their covariance. (<u>http://www.efficientfrontier.com/ef/996/rebal.htm</u>). Assets that are highly correlated, like different parts of the equity market, will have a small rebalancing bonus than assets that are negatively correlated.

bonds perform similarly over a year, a monthly rebalance will outperform an annual rebalance. Said differently, the relative performance of calendar-based rebalancing will be based on asset class dispersion (Fig. 1). This relationship holds true for any two rebalance periods being compared (daily versus weekly versus weekly versus monthly, etc.).

In Fig. 1, the red box calls out "normal" historical periods where stock/bond performance was within 20% or so in a given 12-month period. These are the periods that show up in Finance 101 models. The blue box shows periods of significant equity underperformance, and the orange box captures periods of significant equity outperformance



Fig. 1: Rebalance frequency is a bet on asset class dispersion

Stock minus bond performance (1 year)

Since 1975, a monthly rebalanced portfolio has only outperformed an annually rebalanced portfolio 51% of the time and produced a median 1-year outperformance of 0.01%. So much for a bonus.

Buy the dip?

A historical example can be helpful in understanding when frequent rebalancing underperforms. As stated above, a monthly rebalanced portfolio underperformed a drift portfolio by 3% between March 2008 and February 2009 (Fig. 2). Continuously buying the dip magnified the portfolio drawdown as equity markets collapsed, resulting in 3% underperformance over that period.

Source: Bloomberg, Mill Creek.



Fig. 2: Rebalancing in 2008 exacerbated the drawdown

Source: Bloomberg, Mill Creek.

While these two portfolios eventually saw a convergence in performance, frequent rebalancing made a bad situation worse.

Capturing the bonus

As illustrated earlier, too-frequent rebalancing can lead to "catching a falling knife (blue box)" and "trimming the flowers and watering the weeds (orange box)." If we can prevent those actions, we can improve our odds of capturing the much-heralded rebalancing bonus.

One of the ways in which real-life markets deviate from financial theory is that big gains and losses tend to cluster together and equity markets have exhibited *momentum* over time, which simply means that when the equity market is in an uptrend it tends to keep outperforming and when it is in a downtrend it tends to keep underperforming. Those are the periods in which frequent rebalancing becomes counterproductive.

A simple and transparent way to measure market momentum and inform rebalancing is a 1month and 3-month price momentum crossover model. If both 1 and 3-month returns are positive it is a bullish trend signal, whereas if both are negative it is a bearish trend signal.³ This model helps differentiate quick-recovery periods like COVID from long downtrends like the Global Financial Crisis.

³ While this is the model we use to illustrate a momentum overlay in this paper, we use an assortment of quantitative and qualitative indicators when rebalancing actual portfolios.

The momentum model functions as an overlay on normal rebalancing⁴ by suggesting when it is better to delay rebalancing during periods of strong up or downtrends. In practical usage, a rebalance would be delayed when the model suggests a positive or negative trend – helping to avoid the orange and blue box outcomes while capturing the rebalancing bonus. Since 1975, this model would have *produced 0.3% annualized outperformance with lower volatility versus a monthly rebalance.* These gains come from delaying rebalancing in strongly trending markets.





Source: Bloomberg, Mill Creek.

Costs of rebalancing

The rebalancing framework we've presented so far is admittedly naive to real-world conditions. We haven't included taxes or behavioral constraints in our analysis. We've also focused on a simple stock/bond portfolio instead of a well-diversified portfolio of public and private assets. Even so, the analysis highlights the importance of active rebalancing in portfolio management and the drawbacks of taking a passive approach.

We mentioned earlier that our CMAs imply a 0.9% rebalancing bonus for a 60/40 stock-bond portfolio. They also imply a 0.19% annual tax drag from rebalancing assuming 24% tax on realized capital gains. Much of this tax drag can be offset through portfolio management actions by using dividends, bond income, portfolio contributions, and portfolio distributions to

⁴ A version of this idea is presented in: Granger, Nicolas and Greenig, Douglas and Harvey, Campbell R. and Rattray, Sandy and Zou, David, Rebalancing Risk (October 3, 2014). Available at SSRN: https://ssrn.com/abstract=2488552 or http://dx.doi.org/10.2139/ssrn.2488552

tack the portfolio back toward targets, but occasionally, investors will have to grin and bear the costs associated with rebalancing to keep portfolios aligned with allocation targets.

Taxable investors can also create more flexibility by using equity strategies that proactively seek to realize losses on an ongoing basis. These strategies are commonly called "direct indexing" because they typically offer index-like exposure (e.g., S&P 500) with the goal of producing valuable tax losses that the investor can use to offset realized gains generated through rebalancing. The specifics of direct index strategies are beyond the scope of this paper, but direct indexing can create enough tax losses to fully offset rebalancing tax drag for most investors.

Practical Application

Our guidelines for rebalancing are as follows:

- 1. Prudent rebalancing is an active decision based on market and portfolio-specific considerations,
- 2. Realistically, most investors will execute ongoing "partial" rebalancing by using dividends, bond income, portfolio contributions, and portfolio distributions to nudge portfolios back toward target allocations,
- 3. Delaying rebalancing during periods of strong momentum in equity markets can minimize drawdowns and allow portfolios to benefit from periods of strong equity returns, and
- 4. Tax-aware investing can largely offset the ongoing tax drag associated with rebalancing.

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