

THE SCIENCE AND PSYCHOLOGY OF REBALANCING

Complex trade-offs and human nature work against an investor's making sound rebalancing decisions. A disciplined process ensures the job gets done.



THE INVESTMENT COMMUNITY SPILLS A LOT of ink on the importance of a well-designed investment plan, one that defines which assets to include in an investor's portfolio and in what proportions. Indeed, much intensive analysis has gone into weighing the return potential of the different assets against their risk profiles (how high and how low their returns could be), because getting that dynamic right is critical to achieving an investor's long-term financial goals.

But relatively little is spilled on how to *maintain* that dynamic. As the performance of the various assets in the portfolio differ over time—one outperforming another, as they inevitably do—the mix that was so carefully created will be thrown off. Investors, basking in the sunshine of the asset that has performed well, may inadvertently undermine their long-range goals by adding risk.

Here, investors can borrow a page from the playbooks of large institutions, endowments, and foundations—entities with a fiduciary responsibility to make full use of the best practices in portfolio management—and rebalance their portfolios. (In the case of endowments, for example, 95% indicate they rebalance.*) Rebalancing—bringing the portfolio's proportions back toward their original allocations—ensures that the investor maintains his risk/reward profile. Simply stated, it means taking money from an asset class that has performed well and reinvesting it in one that has lagged. It's putting into practice the sage advice, "Buy low, sell high."

But that leaves a lot of unanswered questions: How often should rebalancing take place? How far should a portfolio's proportions drift before they're rebalanced? And how far should they be pulled back when they are? Our research has uncovered intriguing

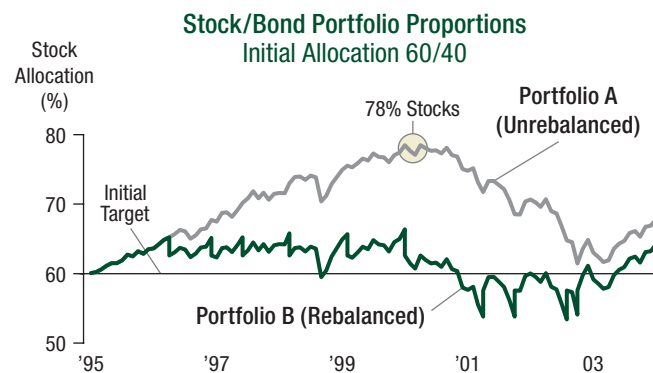
answers to these questions—addressing the mechanics of rebalancing, and thus the emotional biases that can make it essential to good investing.

THE BENEFIT OF REBALANCING

Consider the performance of two portfolios from 1995 through 2003, an especially volatile time in the capital markets (*Display 1*). Both portfolios began 1995 with \$1 million invested in the same common allocation—60% stocks and 40% bonds—but A was left to run its course while B

Display 1

Rebalancing can be more than just protective



Growth of \$1 Million			
	Peak	Subsequent Low	Ending Value
Portfolio A	\$2.81 Mil.	\$1.97 Mil.	\$2.50 Mil.
Portfolio B	2.67	2.09	2.61

Stocks are represented by the S&P 500, bonds by the Lehman Aggregate Bond Index.

Source: Compustat, Lehman Bros., and Bernstein

*2002 NACUBO Endowment Study

was rebalanced.* Of course, we know what happened in the late Nineties: Stocks boomed, while bonds lagged. By virtue of its increased weighting in stocks, Portfolio A initially did especially well, growing to \$2.81 million at its peak. Portfolio B, meanwhile, regularly sold off some of its stocks as they appreciated and bought bonds to remain close to the original target—so it didn't gain as much, reaching \$2.67 million.

By 2000, A was 78% invested in stocks—well above its initial target of 60%—just as the worst bear market for stocks since the Depression took hold and bond returns soared. Portfolio A lost nearly one-third of its value over the next three years, hitting a low of \$1.97 million. Meanwhile, Portfolio B was better prepared for the market shift because of rebalancing: It never dipped below \$2 million, and, despite not reaching the peaks that A had achieved, ended up with over \$100,000 more for the entire period of good markets and bad.

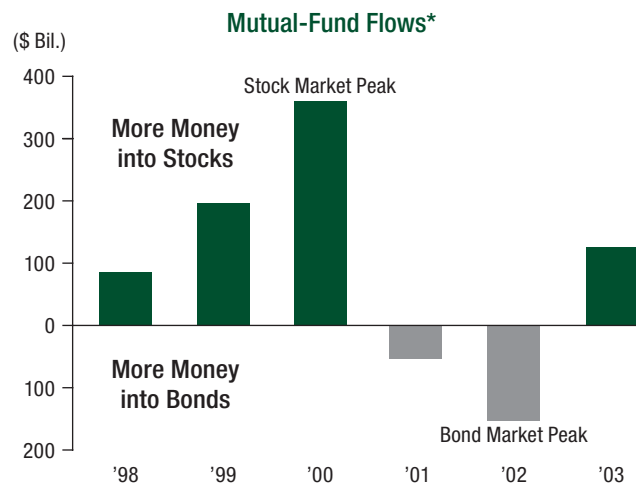
THE INNER ENEMY

Certainly, rebalancing has a logical appeal. But emotions often prove more powerful than logic, as researchers in the field of behavioral science have long known. People possess built-in biases in the way they make decisions in stressful or uncertain situations, and those biases can cause them to act counter to their own interests. For example, people have a tendency to believe that whatever is happening today will continue into the future, a bias that the research community refers to as “anchoring.” In investing, this translates into chasing what's hot today.†

We can see this in a comparison of the money that investors put into stock or bond mutual funds from 1998 through 2003 (*Display 2*). An up bar indicates that investors favored stocks and a down bar indicates that bonds were the favorite. The longer the stock bull market went on, the more money that poured into stocks. In 2000, stock valuations had reached unprecedented highs, and bonds were offering unusually attractive yields. But investors kept putting more of their assets in stocks, anchored in the assumption that the bull run would continue. After the stock market collapsed and bond prices took off, many investors

Display 2

Investors' tendency to chase what's hot runs counter to the principles of rebalancing



* Excludes hybrid funds

Source: Investment Company Institute

made the opposite mistake, moving out of stocks and into bonds—just in time for the markets to reverse once again.

Such biases are powerful and instinctive, working against the investor faced with a rebalancing decision. People aren't inclined to sell what's been winning and buy what's been lagging. For the health and safety of their own portfolios, they need some sort of formalized process that can take the emotion out of the rebalancing decision.

CREATING THE OPTIMAL APPROACH

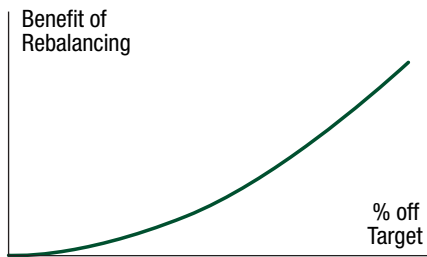
One common method is to rebalance periodically—at the end of each calendar year, for instance. This might be the easiest way to rebalance, but our research suggests it isn't the most effective. After all, the markets can move sharply in between the milestones on the calendar. For example, in nearly 30% of all months since 1960, the S&P 500 has risen or fallen by at least 5%. Such a move could trigger the need for rebalancing, so a rebalancing plan needs to address it. At the same time, setting a calendar-based approach that's too short can lead to costs—for transactions and taxes—that outweigh the benefits.

The pivotal step in creating the most effective approach to rebalancing is the assessment of trade-

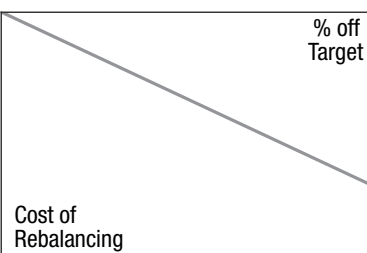
* In this example, the rebalancing method applied is as follows: When the stock/bond allocation shifts by at least five percentage points from its 60/40 proportions, the overweighted asset is sold and the underweighted asset is bought until the proportions are halfway back to the original target.

† For a full discussion, see “Exploiting the Effects of Emotions on the Capital Markets,” in *The Bernstein Journal*, Vol. I, No. 2., available from your Bernstein Financial Advisor.

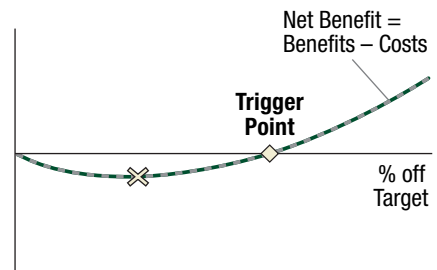
The further that portfolio proportions stray from their target, the greater the benefit of rebalancing...



Add that calculation to the fees and taxes incurred...



And you get a trigger point at the place where the benefits exceed the cost



Source: Bernstein

offs between the benefits of being on-target versus the costs of getting there. Using this framework, our research indicates that the best approach is not rebalancing at regular intervals of time, but rather when a portfolio’s allocation is off its target by a certain percentage.*

A QUANTITATIVE FRAMEWORK

To identify the optimal moment for rebalancing to occur, we must understand at what point the investor’s assets begin to veer far enough from their target that they produce unintended risks—either so much in stocks, for instance, that the chance of a large loss looms, or so much in bonds that the return potential is lower than expected. The first chart in Display 3 shows how the potential benefits from rebalancing will vary.† Moving to the right on the horizontal axis, we see that at first the potential benefits from rebalancing grow slowly: Correcting small variations from the target won’t add much value. But the more the mix varies from its target, the more risk the investor takes on, causing the benefits of rebalancing to grow quite rapidly—which is why the line curves upward. When the actual portfolio mix is very different from the target, the need to rebalance intensifies.

The middle chart shows the costs of rebalancing (transaction fees and taxes).‡ Unlike the ben-

efits—which accelerate as the portfolio mix gets further from its target—the costs exhibit a proportional relationship. After all, selling twice as much of an asset will basically cost twice as much. Thus, rebalancing costs are a straight line. By combining the benefits and the costs, as shown in the last chart, we can determine the optimal trigger point for rebalancing: the point at which the benefits become greater than the costs.⁴ When the portfolio mix is not far off from the intended target, the costs outweigh the benefits (as shown by the “net benefit” line running below zero). At higher deviations from the target, the benefits take the upper hand.

This research has implications not only for determining when to rebalance, but also by how much. Consider a hypothetical case in which the target mix is 60% stocks and 40% bonds. Let’s assume that our research on the benefits and costs of rebalancing suggests we should rebalance when the actual mix differs by four or more points from this target; therefore, we’ll commence rebalancing when the stock mix hits either 64% or 56%. One might assume, therefore, that a 64% stock mix should be brought down to the 60% target. However, our work suggests otherwise. We’ve found that we should rebalance only to the extent that the increased benefit exceeds the increased costs, which ceases to be true once we get halfway back to our target (marked by “X” on the third chart

* Our research findings were originally published in *The Journal of Portfolio Management*, Vol. 29, No. 3.

† The actual formula used to measure the benefit of rebalancing is: $[(\text{Tracking Error})^2 / 2K] \Delta^2$, where K represents the investor’s risk tolerance and Δ is the deviation from the target allocation. Since tracking error is quadratic, the benefit of rebalancing accelerates for each unit of variance from the target allocation.

‡ The actual formula used to measure the costs of rebalancing is: $C \Delta$, where C is the total two-way cost of rebalancing (selling what is overweight and buying what is underweight) and Δ is the deviation from the target allocation.

⁴ The actual formula used to measure the net benefits of rebalancing is: $[(\text{Tracking Error})^2 / 2K] \Delta^2 - C \Delta$.

in Display 3). In this example, therefore, bringing the portfolio from 64% stocks to 62% stocks is the best approach in our view; going any further creates more cost than benefit.

FINE-TUNING

Of course, well-crafted portfolios combine assets other than just U.S. stocks and bonds: growth and value, U.S. and international, real-estate investment trusts, and more. And the more different kinds of assets in a portfolio, the more complex the decision making. In quantifying when to rebalance, we must consider such factors as the correlation between the assets, their volatility, the costs of trading, and the tax impact to the investor (*Display 4*).

Display 4

Rebalancing decisions should be fine-tuned for several variables

Factor	Guideline
Correlation	The lower the correlation between an asset and the rest of the portfolio, the lower the trigger point. (Lower correlation indicates that an asset will tend to perform differently from the rest of the portfolio, so being off-target has a greater impact.)
Volatility	Since deviations from target in more volatile assets add more risk, these assets should have lower trigger points.
Costs	The more expensive it is to trade an asset class, such as emerging markets, the higher the trigger point.
Taxes	The higher the tax cost, the less frequently you should rebalance—especially if short-term capital gains taxes would be incurred.

Display 5

The risk/reward profile can be optimized with rebalancing

Fully Diversified Portfolio* 1995–2003

	Return	Risk
Unrebalanced	9.2%	10.6%
Periodic Rebalancing	9.5	9.2
“Optimal” Rebalancing	9.9	9.4

* 21% Russell 1000 Growth, 21% Russell 1000 Value, 18% MSCI EAFE (with countries weighted by market capitalization), 40% Lehman Aggregate Bond Index.

Periodic rebalancing: On the first day of each quarter, rebalance all the way back to target allocations. Optimal rebalancing: When allocations stray 5% from their targets, rebalance halfway back. Transaction costs are assumed to be 50 basis points for each asset except international stocks, which are assumed to be 85 basis points.

Source: Frank Russell Co., Lehman Bros., MSCI, and Bernstein

PUTTING IT INTO PRACTICE

For the individual investor, any rebalancing method is better than none. In fact, either of the rebalancing methods we show in Display 5 provides a rare investing benefit when compared to an unrebalanced portfolio: greater return and less risk.

But to be optimal, the approach to rebalancing should consider all the variables affecting trigger points that we’ve described, and the rebalancing should occur when the benefits outweigh the costs rather than at defined calendar milestones. The “optimally” rebalanced portfolio above outperformed the others—while delivering less risk than the unrebalanced portfolio, and risk that was comparable to the periodically rebalanced portfolio. And while the market conditions of this period were extreme, it is precisely during periods of extremes that rebalancing becomes most important to do and, without formal rules, most difficult to put into practice. ■

NOTE ABOUT THE WEALTH FORECASTING ANALYSIS:

A number of the articles in *The Bernstein Journal* make use of our Wealth Forecasting Analysis, a proprietary modeling tool designed to assist investors in a range of key decisions including setting their long-term allocations of financial assets. The Wealth Forecasting Analysis consists of a four-step process: (1) Client-Profile Input: the client's asset allocation, income, expenses, cash withdrawals, tax rate, risk-tolerance level, goals, and other factors; (2) Client Scenarios: in effect, questions the client would like guidance on, which may touch on issues such as when to retire, what his cash-flow stream is likely to be, whether his portfolio can beat inflation long term, and how different asset allocations might impact his long-term security; (3) The Capital-Markets Engine: a model that uses our proprietary research and historical data to create a vast range of market returns, which takes into account the linkages within and among the capital markets (not Bernstein portfolios), as well as their unpredictability; and finally (4) A Probability Distribution of Outcomes: Based on the assets invested pursuant to the stated asset allocation, 90% of the estimated ranges of returns and asset values the client could expect to experience are represented in a graphic output. We focus on the 10th, 50th, and 90th percentiles to understand the range of outcomes representing upside, median, and downside cases. However, outcomes outside this range are expected to occur 10% of the time; thus, the range does not establish the boundaries for all outcomes. Except where otherwise indicated, asset class assumptions are based on the following: Stocks are represented by the S&P 500, with an assumed compounding rate of 8%; growth stocks by the S&P/Barra Growth Index, 7.9%; value stocks by the S&P 500/Barra Value Index, 7.9%; developed foreign stocks by the MSCI EAFE Index (countries weighted by market capitalization), 8.2%; emerging markets stocks by the MSCI Emerging Markets Index, 7.2%; bonds by AA-rated diversified municipals with seven-year maturity, 3.3%. A "fully diversified" portfolio comprises 60/40 stocks/bonds, with the stock component 70/25/5 U.S./developed foreign/emerging markets, and the U.S. component 50/50 growth/value. Expected market returns on bonds are derived by taking into account yield and other criteria. An important assumption is that stocks will, over time, outperform long bonds by a reasonable amount, although this is by no means a certainty. Moreover, actual future results may not meet Bernstein's estimates of the range of market returns, as these results are subject to a variety of economic, market, and other variables. Accordingly, the analysis should not be construed as a promise of actual future results, the actual range of future results, or the actual probability that these results will be realized.