

## How does ILP rebalancing help in boosting ILP Fund performance.

After a portfolio manager has worked closely with a client to document investment objectives and constraints in an investment policy statement (IPS), agreed on the strategic asset allocation that best positions the client to achieve stated objectives, and executed the strategic asset allocation through appropriate investment strategies in an ILP for each asset class segment, the manager must constantly monitor and rebalance the portfolio. The need arises for several reasons.

First, clients' needs and circumstances change, and portfolio managers must respond to these changes to ensure that the portfolio reflects those changes. Life-cycle changes are expected for individual investors, so the portfolio manager must plan for these changes and respond to them when they occur. Institutional investors face changing circumstances just as commonly. A pension fund may receive a mandate from its trustees to assume less volatility. A university endowment may need to react to higher-than-anticipated inflation in faculty salaries.

Second, capital market conditions change. Portfolio managers must monitor such changes, adjust their capital market expectations appropriately, and reflect changed expectations in how the portfolio is invested. For example, if a client's return requirement is 8 percent but the strategic asset allocation promises to return on average 6.5 percent in the current climate, what changes should a portfolio manager recommend in light of the anticipated 150 bps shortfall?

Third, fluctuations in the market values of assets create differences between a portfolio's current asset allocation and its strategic asset allocation. These differences may be trivial on a daily basis; over longer periods of time, however, they can result in a significant divergence between the intended and actual allocations. When and how a portfolio manager rebalances the portfolio to the strategic asset allocation is one of the primary focuses of this reading.

For a portfolio manager, designing and building a portfolio is only the beginning of the dynamic and interactive process that lasts for as long as she is the client's trusted advisor. As markets evolve, maintaining the alignment between a client's portfolio and his investment objectives requires constant vigilance. Therefore, monitoring and rebalancing the portfolio is one of the most important elements of the dynamic process of portfolio management.

This process involve both monitoring and rebalancing. I will more on rebalancing but will briefly touch on monitoring as it is the basis on which rebalancing is carried out.

### **MONITORING**

To monitor something means to systematically keep watch over it to collect information that is relevant to one's purpose. In investments, the purpose is to achieve investment goals. And a reality of investing is that what you don't know *can* hurt you. An overlooked fact may mean not reaching a goal. A portfolio manager should track everything affecting the client's portfolio. We can categorize most items that need to be monitored in one of three ways:

- investor circumstances, including wealth and constraints;
- market and economic changes; and
- the portfolio itself.

Monitoring investor-related factors sometimes results in changes to a client's investment policy statement, strategic asset allocation, or individual portfolio holdings. Monitoring market and economic changes sometimes results in changes to the strategic asset allocation (when they relate to long-term capital market expectations), tactical asset allocation adjustments (when they relate to shorter-term capital market expectations), changes in style and sector exposures, or adjustments in individual holdings. Monitoring the portfolio can lead to additions or deletions to holdings or to rebalancing the strategic asset allocation.

### **Monitoring Changes in Investor Circumstances and Constraints**

Changes in circumstances and wealth often affect a client's investment plans. For private wealth clients, events such as changes in employment, marital status, and the birth of children may affect income, expenditures, risk exposures, and risk preferences. Each such change may affect the client's income, expected retirement income, and perhaps risk preferences. The responsibilities of marriage or children have repercussions for nearly all aspects of a client's financial situation. Such events often mark occasions to review the client's investment policy statement and overall financial plan. For institutional clients, operating performance, constituent pressures (such as demands for increased support from the beneficiaries of endowments), and changes in governance practices are among the factors that may affect income, expenditures, risk exposures, and risk preferences. A portfolio manager should communicate regularly with the client to become aware of such changes.

The key factors to take note of are the following:

**Return Requirement:** What is the required return that was required during financial planning and is this still viable with the current portfolio?

**Risk Profile:** Have the risk profile changed due to lifestyle and income changes?

**Time Horizon:** Individuals age and pension funds mature. Reducing investment risk is generally advisable as an individual moves through the life cycle and his time horizon shortens; bonds become increasingly suitable investments as this process occurs. Today's life-cycle mutual funds reflect that principle in their asset allocations. In contrast to individuals, some entities such as endowment funds have the hope of perpetual life; the passage of time in and of itself does not change their time horizon, risk budgets, or appropriate asset allocation.

**Tax Circumstances:** Taxes are certain; the form they will take and their amount in the future are uncertain. Taxable investors should make all decisions on an after-tax basis. Managers for taxable investors must construct portfolios that deal with each client's current tax situation and take future possible tax circumstances into account. For taxable investors, holding period length and portfolio turnover rates are important because of their effect on after-tax returns. In evaluating investment strategies to meet a taxable investor's changed objective, a portfolio manager will take into account each strategy's tax efficiency (the proportion of the expected pre-tax total return that will be retained after taxes).

**Changing Liquidity Requirements:** When a client needs money to spend, the portfolio manager should strive to provide it. A liquidity requirement is a need for cash in excess of new contributions or savings as a consequence of some event, either anticipated or unanticipated. Individual clients experience changes in liquidity requirements as a result of a

variety of events, including unemployment, illness, court judgments, retirement, divorce, the death of a spouse, or the building or purchase of a home. Changes in liquidity requirements occur for a variety of reasons for institutional clients, such as the payment of claims by insurers or of retirement benefits by defined-benefit pension plans, or the funding of a capital project by a foundation or endowment.

**Changes in Laws and Regulations:** Laws and regulations create the environment in which the investor can lawfully operate, and the portfolio manager must monitor them to ensure compliance and understand how they affect the scope of the advisor's responsibility and discretion in managing client portfolios.

**Unique Circumstances:** A unique circumstance is an internal factor (other than a liquidity requirement, time horizon, or tax concern) that may constrain portfolio choice. The client may present the portfolio manager with a variety of challenges in this respect. For example, some clients direct portfolio managers to retain concentrated stock positions because of an emotional attachment to the particular holding, because the client must maintain the stock position to demonstrate his or her commitment as an officer of the company, or because the concentrated position effectively has an extremely large unrealized capital gain. Is it feasible and appropriate to hedge or monetize the position through one of several special strategies? If not, given the volatility and concentrated risk of this single holding, how should the portfolio manager allocate the balance of the client's portfolio? As a portfolio manager, what investment actions will you recommend or implement when the emotional attachment is gone, when the client is no longer an officer of the company, or when the client's heirs receive the position?

### **Monitoring Market and Economic Changes**

In addition to changes in individual client circumstances, the economic and financial markets contexts of investments also require monitoring. Those contexts are not static. The economy moves through phases of expansion and contraction, each with some unique characteristics. Financial markets, which are linked to the economy and expectations of its future course, reflect the resulting changing relationships among asset classes and individual securities. A portfolio manager's monitoring of market and economic conditions should be broad and inclusive. Changes in asset risk attributes, market cycles, central bank policy, and the yield curve and inflation are among the factors that need to be monitored.

**Changes in Asset Risk Attributes:** The historical record reflects that underlying mean return, volatility, and correlations of asset classes sometimes meaningfully change. An asset allocation that once promised to satisfy an investor's investment objectives may no longer do so after such a shift. If that is the case, investors will need either to adjust their asset allocations or to reconsider their investment objectives. Monitoring changes in asset risk attributes is thus essential.

**Market Cycles:** Investors monitor market cycles and valuation levels to form a view on the short-term risks and rewards that financial markets offer. Based on these opinions, investors may make tactical adjustments to asset allocations or adjust individual securities holdings.

Tactically, the markets' major swings present unusual opportunities to be either very right or very wrong. When things are going well, securities eventually perform too well; during economic weakness, stock prices often decline excessively. Weakness engenders an

environment that may foreshadow extraordinary profits, while ebullient markets provide unusual opportunities to sell, reinvesting elsewhere. Reducing exposure to outperforming asset classes and increasing exposure to underperforming asset classes at the asset-class level—selling the stocks that had proven so comfortable and buying the bonds that the investment world seemed then to abhor—would have had a profound positive influence on total portfolio risk and return during those times.

**Central Bank Policy:** Central banks wield power in the capital markets through the influence of their monetary and interest rate decisions on liquidity and interest rates. Their influence is felt in both bond and stock markets. In bond markets, the most immediate impact of monetary policy is on money market yields rather than long-term bond yields. A central bank's influence on bond market *volatility*, however, is profound. Turning to the stock market, “Do not fight the Fed” has been a longstanding warning from Martin Zweig—a warning that it can be problematic to invest in the market when the Fed is tightening the money supply. Jensen, Johnson, and Mercer (2000) and Conover, Jensen, Johnson, and Mercer (2005) have documented that in the United States, stock returns are on average higher during periods of expansionary monetary policy than in periods of restrictive monetary policy, as indicated by decreases and increases in the discount rate, respectively. These lessons bear repetition. Fed policy does matter and should not be ignored: Restricted credit and higher interest rates usually hurt stock returns; eased credit and lower interest rates usually enhance stock returns.

**The Yield Curve and Inflation:** The default-risk-free yield curve reflects investors' required return at various maturities. It incorporates not only individuals' time preferences for current versus future real consumption but also expected inflation and the maturity premium demanded. Yield curve changes reflect changes in bond values, and bond value changes affect equity values through the competition that bonds supply to equities. Thus investors closely monitor the yield curve. The premium on long-term bonds over short-term bonds tends to be countercyclical (i.e., high during recessions and low at the top of expansions) because investors demand greater rewards for bearing risk during bad times. By contrast, short-term yields tend to be pro-cyclical because central banks tend to lower short rates in an attempt to stimulate economic activity during recessions. Yield curves thus tend to become steeply upward-sloping during recessions, to flatten in the course of expansions, and to be downward sloping (inverted) before an impending recession. In the United States, for example, nearly every recession after the mid-1960s was predicted by an inverted yield curve within six quarters of the recession; only one inverted yield curve was not followed by a recession during this period. Thus the evidence suggests that the yield curve contains information about future GDP growth. Theory also suggests that the yield curve reflects expectations about future inflation. Inflation has a pervasive influence on investors' ability to achieve their financial and investment objectives. On the one hand, it affects the nominal amount of money required to purchase a given basket of goods and services. On the other hand, inflation influences returns and risk in capital markets. When inflation rises beyond expectations, bond investors face a cut in *real yield*. As nominal yields rise in turn to counteract this loss, bond prices fall. Unexpected changes in the inflation rate are highly significant to stock market returns as well.

### **Monitoring the Portfolio**

Monitoring a portfolio is a continuous process that requires the manager to evaluate 1) events and trends affecting the prospects of individual holdings and asset classes and their suitability

for attaining client objectives and 2) changes in asset values that create unintended divergences from the client's strategic asset allocation. The former tend to lead to changes in investment policy or to substitutions of individual holdings; the latter lead directly to rebalancing to the existing strategic asset allocation. New information on economic and market conditions or on individual companies may lead a portfolio manager to take a variety of investment actions in an effort to add value for the client. The following examples offer some perspectives for the practitioner to consider as he or she translates monitoring into investment action.

### How Active Managers May Use New Analysis and Information

As portfolio managers gather and analyze information that leads to capital market expectation revisions, they may attempt to add value through at least three types of portfolio actions:

- **Tactical asset allocation.** The portfolio manager may, in the short term, adjust the target asset mix within the parameters of the investment policy statement by selling perceived overpriced asset classes and reinvesting the proceeds in perceived underpriced asset classes in an attempt to profit from perceived disequilibria. When an investor's long-term capital market expectations change, however, the manager must revisit the strategic asset allocation.
- **Style and sector exposures.** Portfolio managers may alter investment emphasis within asset classes because of changes in capital market expectations. For example, a portfolio manager may lengthen the duration in the fixed-income allocation based on expectations of a sustained period of declining interest rates or adjust the style of the equity portfolio based on expectations that an economy is entering a period of sustained economic growth. Portfolio managers also may adjust the exposure to certain sectors back to or closer to historical weightings to reduce sector exposure relative to the index. For example, consider the impact on portfolio risk and return of reducing the exposure to the technology sector (within the large-cap US equity allocation) in January 2000, when technology represented more than 31 percent of the S&P 500 Index relative to the historical average of about 17 percent.
- **Individual security exposures.** A portfolio manager may trade an individual issue for one that seems to offer better value or reduce the exposure of a specific security as the returns of a single security begin to contribute a greater proportion of the total return than the manager believes to be appropriate.

### REBALANCING THE PORTFOLIO

The term "rebalancing" has been used in the literature of investing to cover a range of distinct actions including 1) adjusting the actual portfolio to the current strategic asset allocation because of price changes in portfolio holdings; 2) revisions to the investor's target asset class weights because of changes in the investor's investment objectives or constraints, or because of changes in his capital market expectations; and 3) tactical asset allocation (TAA). In this article we use "rebalancing" to refer only to the first type of action: rebalancing to the strategic asset allocation in reaction to price changes. Both individual and institutional investors need to set policy with respect to this type of action.

### The Benefits and Costs of Rebalancing

Portfolio rebalancing involves a simple trade-off: the cost of rebalancing versus the cost of not rebalancing.

### **Rebalancing Benefits**

Clients and their investment managers work hard to have their normal asset policy mix reflect an educated judgment of their appetite for reward and their aversion to risk. That having been done, however, the mix often drifts with the tides of day-to-day market fluctuations. If we assume that an investor's strategic asset allocation is optimal, then any divergence in the investor's portfolio from this strategic asset allocation is undesired and represents an expected utility loss to the investor. Rebalancing benefits the investor by reducing the present value of expected losses from not tracking the optimum. In theory, the basic cost of not rebalancing is this present value of expected utility losses. Equivalently, the cost of not rebalancing is the present value of expected utility losses from straying from the optimum.

There are also several practical risk management benefits to rebalancing. First, if higher-risk assets earn higher returns on average and we let the asset mix drift, higher-risk assets will tend to represent ever-larger proportions of the portfolio over time. Thus the level of portfolio risk will tend to drift upward. Portfolio risk will tend to be greater than that established for the client in the investment policy statement. Rebalancing controls drift in the overall level of portfolio risk. Second, as asset mix drifts, the *types* of risk exposures drift. Rebalancing maintains the client's desired systematic risk exposures. Finally, not rebalancing may mean holding assets that have become overpriced, offering inferior future rewards. A commitment to rebalance to the strategic asset allocation offers an effective way to dissuade clients from abandoning policy at inauspicious moments. Once signed on to the concept, clients are more likely to stay the course.

The following example illustrate the benefits of disciplined rebalancing judged against the do-nothing alternatives of letting the asset mix drift.

### **An Illustration of the Benefits of Disciplined Rebalancing**

Although portfolios can be rebalanced using a variety of methods, it is important to recognize that, in comparison to letting an asset mix drift, any disciplined approach to rebalancing tends to add value over a long-term investment horizon by enhancing portfolio returns and/or reducing portfolio risk.

For example, assume an institutional client wishes to maintain the stated policy mix of 60 percent stocks and 40 percent bonds and requires monthly rebalancing to the equilibrium 60/40 mix. Transaction costs of 10 bps on each side of a trade are assumed to be attainable using futures.

In the four decades (1973–2010) summarized in the Exhibit 1, simple monthly rebalancing produced an average annual return of 9.29 percent versus 9.02 percent for a drifting mix—a 27 bps enhancement. Furthermore, the incremental return involved significantly less risk. That is, the rebalanced portfolio's standard deviation during that time period was 11.96 percent versus 13.66 percent—170 bps less than that of the drifting mix! What this means for the investors is that they will experience less variability in returns when rebalancing is done compared to letting the asset mix drift. This on top of the higher average return over the

period is a clear benefit – getting higher return with lower volatility as illustrated by the higher rewards to risk ratio of 0.78 over 0.66- an 18% improvement!

Analysing the results of the two strategies across time adds additional insight. Examining Exhibit 2 gives rise to some significant return differences. First, the rebalancing strategy significantly underperformed the drifting mix strategy in the late 1990s as the tech bubble began to build. During this period, the equity market experienced large gains attributable mainly to technology stocks. As equity prices kept climbing, the drifting mix portfolio held higher and higher percentages of its assets in equity. As long as the price of equities continued to rise, the drifting mix benefitted from its skewed asset allocation. As the tech bubble burst in 2000, however, the benefit of disciplined rebalancing becomes obvious. With the drastic price declines in stocks, the drifting mix portfolio suffers substantial losses in 2000, 2001, and 2002. Meanwhile, the rebalanced portfolio, which held a significant portion of assets in bonds throughout the tech bubble, is not as exposed to the bursting of the tech bubble and performs relatively well compared with the drifting mix portfolio.

A second trend evident in Exhibit 2 is the outperformance by the rebalanced portfolio during the recent economic crisis. The intuition for this outperformance is similar to the explanation of the tech boom and bust above. With strong positive stock returns in the mid- 2000s, especially in 2003 and 2006, the drifting mix portfolio again becomes heavily invested in equities. With the equity market’s precipitous drop in 2008, the drifting mix experiences a significant loss. The rebalanced portfolio, by retaining a healthy mix of stocks and bonds, avoids some of this exposure and performs relatively well.

In the most recent 16-year period (1995–2010), rebalancing appears to be even more beneficial. As seen in the Exhibit 3, the additional average annual return for a monthly rebalanced portfolio over a drifting mix portfolio is 68 bps for the period. This incremental return is over twice as large as the 27 bps difference observed over the entire period from 1973–2010 (see Exhibit 1). Exhibit 3 illustrates that the risk (standard deviation of return) during the last 16 years is significantly higher than the risk measured for the entire 38-year period. However, consistent with the full-period findings, rebalancing during this more recent period results in substantially lower risk than the drifting mix approach (the difference in risk is 184 bps). Relative to the full-period, the recent 16-year period shows lower overall average returns and higher risk, yet the benefits of rebalancing remain consistent. This most recent period provides an obvious example of the benefit of rebalancing. By rebalancing, investors are able to retain a diversified mix of assets and avoid over-exposure to extreme price fluctuations in individual asset classes. Over the last 16 years, a rebalanced portfolio would have allowed investors to avoid some of the losses associated with the bursting of the tech bubble and the most recent financial crisis.

Exhibit 1: Full- Period Rebalancing Results January 1973- December 2010			
	Rebalancing Returns	Drifting Mix	Difference
Average	9.29%	9.02%	0.27%
Maximum	35.25	35.75%	
Minimum	-15.71	-13.57%	

Standard Deviation	11.96	13.66	
Rewards/ Risk Ratio	0.78	0.66	

Year	Rebalancing	Drifting	Diff.	Year	Rebalancing	Drifting	Diff.
1973	-10.22%	-10.19%	-0.03%	1992	7.64	7.55	0.09
1974	-15.71	-13.57	-2.14	1993	12.97	12.49	0.48
1975	24.87	21.66	3.21	1994	-1.90	-1.36	-0.54
1976	20.80	20.15	0.65	1995	35.25	35.75	-0.50
1977	-5.10	-4.62	-0.48	1996	13.58	16.23	-2.65
1978	3.28	2.51	0.77	1997	26.38	29.00	-2.62
1979	8.00	7.15	0.85	1998	24.45	26.60	-2.15
1980	16.09	15.46	0.63	1999	9.12	15.72	-6.60
1981	-1.51	-1.99	0.48	2000	-0.29	-6.98	6.69
1982	29.40	28.90	0.50	2001	-5.17	-8.47	3.30
1983	13.14	13.39	-0.25	2002	-7.83	-12.88	5.05
1984	9.91	9.38	0.53	2003	17.47	18.11	-0.64
1985	32.41	32.29	0.12	2004	7.06	7.31	-0.25
1986	20.43	19.99	0.44	2005	2.54	2.57	-0.03
1987	2.73	1.30	1.43	2006	9.86	10.58	-0.72
1988	13.27	13.45	-0.18	2007	5.79	5.19	0.60
1989	26.54	26.74	-0.48	2008	-23.75	-25.37	1.62
1990	1.36	0.78	0.58	2009	17.93	16.85	1.08
1991	26.26	26.74	-0.48	2010	9.65	9.18	0.47

	Rebalancing Returns	Drifting Mix	Difference
Average	8.88%	8.20%	0.68%
Maximum	35.25	35.75%	
Minimum	-23.75	-25.37	
Standard Deviation	14.38	16.22	
Rewards/ Risk Ratio	0.62	0.51	

This example reinforces the point that disciplined rebalancing has tended to reduce risk while incrementally adding to returns. “Tended” means just that: It does not work in every year or even in every market cycle, but it should work over long-term investment horizons. Rebalancing to a fixed asset mix—because it involves both selling appreciated assets and buying depreciated assets—can be viewed as a contrarian investment discipline that can be expected to earn a positive return for supplying liquidity.

### **Rebalancing Costs**

Despite its benefits, rebalancing exacts financial costs. These costs are of two types—transaction costs and, for taxable investors, tax costs.

**Transaction Costs:** Transaction costs can never be recovered, and their cumulative erosion of value can significantly deteriorate portfolio performance. Transaction costs offset the benefits of rebalancing. Yet the true trade-off is not easy to gauge because transaction costs are difficult to measure.

**Tax Costs:** In rebalancing, a portfolio manager sells appreciated asset classes and buys depreciated asset classes to bring the asset mix in line with target proportions. In most jurisdictions the sale of appreciated assets triggers a tax liability for taxable investors and is a cost of rebalancing for such investors. However, an appreciated asset class may contain assets with not only unrealized short- and long-term capital gains but also short- and long-term capital losses. Realizing short-term losses, long-term capital losses, long-term capital gains, and lastly short-term gains, in that order, would usually be the tax-efficient priority in selling. In contrast to the difference between long- and short-term capital gains, the value of the deferral of a long-term capital gain is generally much less in magnitude.

### **Rebalancing Disciplines**

A rebalancing discipline is a strategy for rebalancing. In practice, portfolio managers have most commonly adopted either calendar rebalancing or percentage-of-portfolio rebalancing.

***Calendar Rebalancing:*** Calendar rebalancing involves rebalancing a portfolio to target weights on a periodic basis, for example, monthly, quarterly, semiannually, or annually. Quarterly rebalancing is one popular choice; the choice of rebalancing frequency is sometimes linked to the schedule of portfolio reviews.

If an investor's policy portfolio has three asset classes with target proportions of 45/15/40, and his investment policy specifies rebalancing at the beginning of each month, at each rebalancing date asset proportions would be brought back to 45/15/40. Calendar rebalancing is the simplest rebalancing discipline. It does not involve continuously monitoring portfolio values within the rebalancing period. If the rebalancing frequency is adequate given the portfolio's volatility, calendar rebalancing can suffice in ensuring that the actual portfolio does not drift far away from target for long periods of time. A drawback of calendar rebalancing: It is unrelated to market behaviour. On any given rebalancing date, the portfolio could be very close to or far away from optimal proportions. In the former case, the portfolio would be nearly optimal and the costs in rebalancing might swamp the benefits. In the latter case, an investor might incur unnecessarily high costs in terms of market impact by rebalancing.

**Percentage-of-Portfolio Rebalancing:** Percentage-of-portfolio rebalancing (also called percent-range or interval rebalancing) offers an alternative to calendar rebalancing. Percentage-of-portfolio rebalancing involves setting rebalancing thresholds or trigger points stated as a percentage of the portfolio's value. For example, if the target proportion for an asset class is 40 percent of portfolio value, trigger points could be at 35 percent and 45 percent of portfolio value. We would say that 35 percent to 45 percent (or  $40\% \pm 5\%$ ) is the corridor or tolerance band for the value of that asset class. The portfolio is rebalanced when an asset class's weight first passes through one of its rebalancing thresholds, or equivalently, outside the corridor.

For example, consider a three-asset class portfolio of domestic equities, international equities, and domestic bonds. The target asset proportions are 45/15/40 with respective corridors  $45\% \pm 4.5\%$ ,  $15\% \pm 1.5\%$ , and  $40\% \pm 4\%$ . Suppose the portfolio manager observes the actual allocation to be 50/14/36; the upper threshold (49.5%) for domestic equities has been breached. The asset mix would be rebalanced to 45/15/40.

Rebalancing trades can occur on any calendar date for percentage-of-portfolio rebalancing, in contrast to calendar rebalancing. Compared with calendar rebalancing (particularly at lower frequencies such as semiannual or annual), percentage-of-portfolio rebalancing can exercise tighter control on divergences from target proportions because it is directly related to market performance.

Percentage-of-portfolio rebalancing requires monitoring of portfolio values at an agreed-upon frequency in order to identify instances in which a trigger point is breached. To be implemented with greatest precision, monitoring should occur daily. Daily monitoring obviously requires having an efficient custodian, one who can accurately monitor and quickly process and communicate portfolio and asset class valuations.

An obvious and important question is: How are the corridors for asset classes determined?

Investors sometimes set ad hoc corridors. We have already illustrated an example of one well-known yet ad hoc approach, based on a hypothetical portfolio of domestic equities, international equities, and domestic bonds. The corridors were set according to a formula based on a percentage of the target allocation,  $\text{target} \pm (\text{target allocation} \times P\%)$ , where  $P\%$  was 10% (but could be another percentage such as 5%). Following that formula, a corridor of  $45\% \pm (45\% \times 10\%) = 45\% \pm 4.5\%$  applied to domestic stocks,  $15\% \pm 1.5\%$  applied to international equities, and  $40\% \pm 4\%$  applied to domestic bonds. However, *ad hoc* approaches such as this one are open to several criticisms. The approach illustrated does not account for differences in transaction costs in rebalancing these three asset classes, for example.

There are at least five factors should play a role in setting the corridor for an asset class:

- transaction costs;
- risk tolerance concerning tracking risk versus the strategic asset allocation;
- correlation with other asset classes;
- volatility;
- volatilities of other asset classes.

A summary is given below:

Exhibit 4: Factors Affecting Optimal Corridor Width		
Factor	Effect on Optimal Width of Corridor (All Else Equal)	Intuition
<b><i>Factors Positively Related to Optimal Corridor Width</i></b>		
Transaction costs	The higher the transaction costs, the wider the optimal corridor.	High transaction costs set a high hurdle for rebalancing benefits to overcome.
Risk tolerance	The higher the risk tolerance, the wider the optimal corridor.	Higher risk tolerance means less sensitivity to divergences from target.
Correlation with rest of portfolio	The higher the correlation, the wider the optimal corridor.	When asset classes move in synch, further divergence from targets is less likely.

<b><i>Factors Inversely Related to Optimal Corridor Width</i></b>		
Asset class volatility	The higher the volatility of a given asset class, the narrower the optimal corridor.	A given move away from target is potentially more costly for a high-volatility asset class, as a further divergence becomes more likely.
Volatility of rest of portfolio	The higher this volatility, the narrower the optimal corridor.	Makes large divergences from strategic asset allocation more likely.

**Other Rebalancing Strategies:** There are other rebalancing disciplines other than those discussed above. Calendar rebalancing can be combined with percentage-of-portfolio rebalancing. In this approach (which may be called calendar-and-percentage-of-portfolio rebalancing), the manager monitors the portfolio at regular frequencies, such as quarterly. The manager then decides to rebalance based on a percentage-of-portfolio principle (has a trigger point been exceeded?). This approach mitigates the problem of incurring rebalancing costs when near the optimum that can occur in the calendar rebalancing.

Another approach is the equal probability rebalancing discipline. In this discipline, the manager specifies a corridor for each asset class as a common multiple of the standard deviation of the asset class's returns. Rebalancing to the target proportions occurs when any asset class weight moves outside its corridor. In this discipline each asset class is equally likely to trigger rebalancing if the normal distribution describes asset class returns. However, equal probability rebalancing does not account for differences in transaction costs or asset correlations.

Lastly there is tactical rebalancing, a variation of calendar rebalancing that specifies less frequent rebalancing when markets appear to be trending and more frequent rebalancing when they are characterized by reversals. This approach seeks to add value by tying rebalancing frequency to expected market conditions that most favour rebalancing to a constant mix.

### **Setting Optimal Thresholds**

The optimal portfolio rebalancing strategy should maximize the present value of the *net* benefit of rebalancing to the investor. Equivalently, the optimal strategy minimizes the present value of the sum of two costs: expected utility losses (from divergences from the optimum) and transaction costs (from rebalancing trades). Despite the apparent simplicity of the above formulations, finding the optimal strategy in a completely general context remains a complex challenge:

- If the costs of rebalancing are hard to measure, the benefits of rebalancing are even harder to quantify.
- The return characteristics of different asset classes differ from each other, and at the same time interrelationships (correlations) exist among the asset classes that a rebalancing strategy may need to reflect.
- The optimal rebalancing decisions at different points in time are linked; one decision affects another.
- Accurately reflecting transaction costs may be difficult; for example, transaction costs can be nonlinear in the size of a rebalancing trade.
- The optimal strategy is likely to change through time as prices evolve and new information becomes available.
- Rebalancing has tax implications for taxable investors.

At some future date, investors may be able to update optimal rebalancing thresholds in real time based on a lifetime utility of wealth formulation, including a transaction costs penalty component. Implementing such a system lies in the future rather than present of industry practice. If reasonable simplifying assumptions are permitted, some models are currently available to suggest specific values for optimal corridors, although no industry standard has been established yet.

Hopefully this article have sufficiently highlighted the long-term benefits of disciplined rebalancing versus a strategy where the asset mix is left to drift. It is important that in the initial stage of fact finding that the appropriate risk profile and return requirement is established and the Strategic Asset Allocation of the investor is documented in an Investment Policy Statement (IPS). It is equally important to revisit the IPS as the lifestyle and circumstances of the investors may have change requiring for example shorter time horizon (as time goes-by) or need for liquidity (unforeseen unemployment, business downturn etc.). The monitoring of the portfolio must then be matched with a rebalancing discipline that is sound and where benefits will out-weight costs.

Monitoring and rebalancing a portfolio is similar to flying an airplane: The pilot monitors and adjusts, if necessary, the plane's altitude, speed, and direction to make sure that the plane ultimately arrives at the predetermined destination. Just as a pilot makes in-flight adjustments, so does the portfolio manager. An important question in this regard is how far off course can the plane get before the pilot must make an adjustment?

It is a constant balancing act where the pilot (Advisers/ Investment Managers) are checking on their instruments (monitoring tools) to be sure that the passengers (clients) are brought safely to their destination (financial goals).

Wong Kwek Yong, CFA, CAIA, ChFC, CLU