Fidelity INVESTMENTS

Impact of rebalancing in a multi-asset portfolio

WHITE PAPER • JANUARY 2022

Andrew Clee, MBA, CFA | Vice President, Product

Vivian Hsu, CFA | Director, ETFs

Meghan Chen, MFE | Senior Analyst

KEY TAKEAWAYS

- Rebalancing allows for better maintenance of target portfolio risk and return characteristics.
- Rebalancing can better capture diversification benefits that may improve risk-adjusted returns.
- Automatic periodic rebalancing can mitigate the effects of behavioural biases that affect investors' asset allocation decisions over time.
- Interim capital gains taxes triggered by rebalancing activity may result in a slightly greater gross-to-net return haircut compared with a buy-and-hold approach.

INTRODUCTION

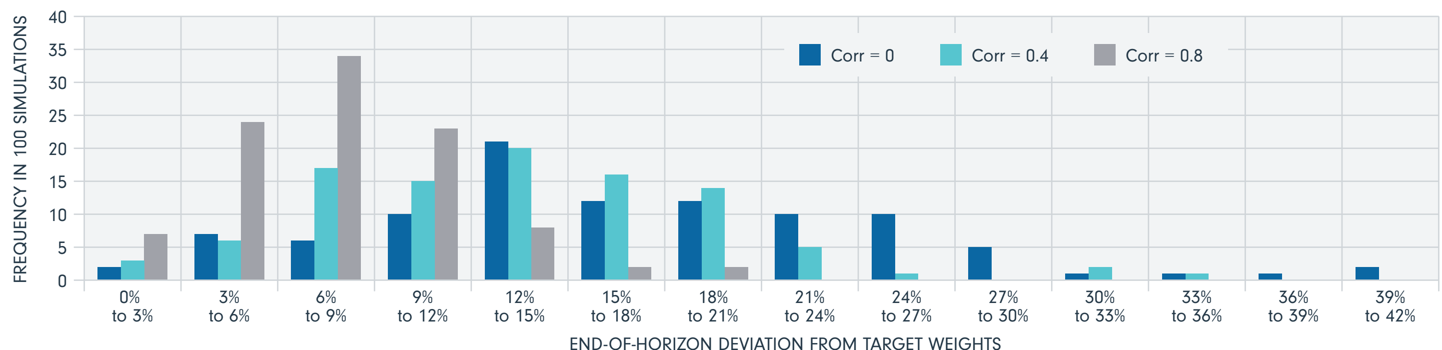
Portfolio rebalancing can have significant implications for portfolio returns and risk. In this article, we explore key benefits and considerations for investors with regard to rebalancing among asset categories in liquid asset portfolios.

BENEFITS OF REBALANCING

Maintain target portfolio characteristics

A lack of rebalancing can result in portfolio allocations that deviate significantly from the target allocation over the investment horizon. Conventional wisdom tells us that higher-return assets tend to dominate the portfolio; however, significant allocation deviations can occur even when all asset classes have the same expected return distribution. *Figure 1* illustrates the end-of-horizon deviation from target weights for 100 simulations of a portfolio with four identically distributed asset categories, assuming a ten-year investment horizon.[1]

FIGURE 1: End-of-horizon deviations from target weights at various levels of correlation



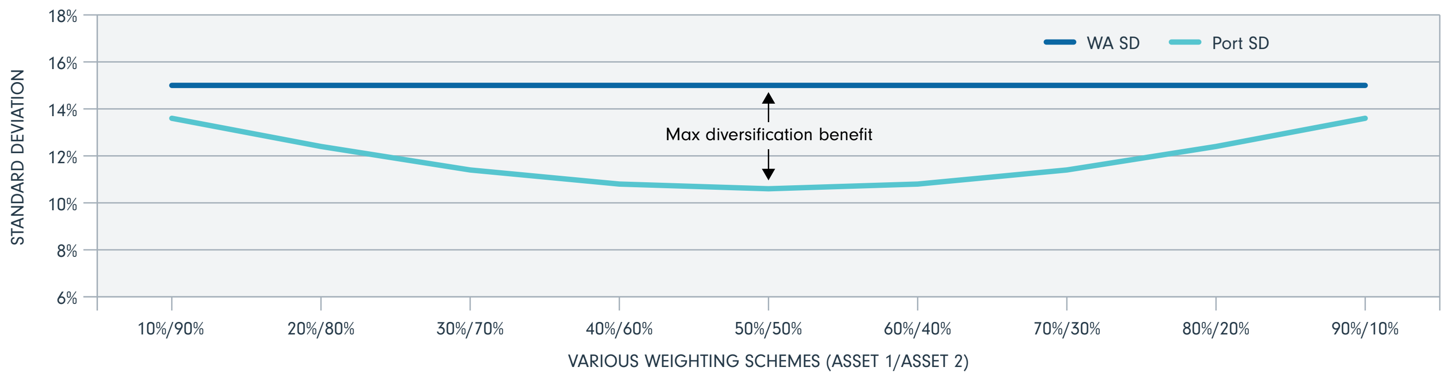
1 Generated monthly returns per a multivariate Gaussian distribution with the various specified pairwise correlations between four asset classes, each with a 5% monthly volatility and average monthly return of 0.5%. The end-of-horizon deviation is calculated as one half the sum of the asset classes' absolute value deviations from the equal-weighted target allocation at the end of a ten-year horizon with no rebalancing.

The tendency to deviate from target allocations is more pronounced the more the asset categories are mutually uncorrelated. Periodic rebalancing curbs such deviations and allows the portfolio to maintain key characteristics, such as risk and return, on target and within investors' tolerance on a look-forward basis.

Potential superior capture of diversification benefits

By preventing the portfolio from disproportionate concentration in any asset category, rebalancing generally better captures diversification benefits. *Figure 2* illustrates a simple case with two uncorrelated assets with the same expected return and volatility. As the relative weighting between the two assets changes, so too does the overall portfolio volatility, despite no change in the weighted average volatility of the underlying assets. Any deviations from the maximally diversified allocation (in the case below, a 50/50 allocation) toward a more concentrated allocation on either side would result in increasing the expected portfolio volatility.

FIGURE 2: Diversification benefits across various weights for two uncorrelated assets



In general, as long as there is imperfect correlation between the asset categories in the portfolio, movement toward a more diversified/less concentrated allocation tends to result in a greater spread between the overall portfolio volatility and the weighted average volatility of the underlying assets – in other words, there are "volatility synergies" among assets that one can capture by diversifying.[2]

Thus, because overall portfolio return always scales per the weighted average of component asset returns, one can potentially improve the risk-return trade-off by rebalancing toward allocations with greater diversification benefits.[3] Over time, as portfolio variability goes down, the compounded return over the investment horizon goes up, all else being equal.[4] Therefore, rebalancing can be beneficial not just by providing a lower volatility experience but can also result in higher terminal wealth for investors.

Mitigate behavioural biases

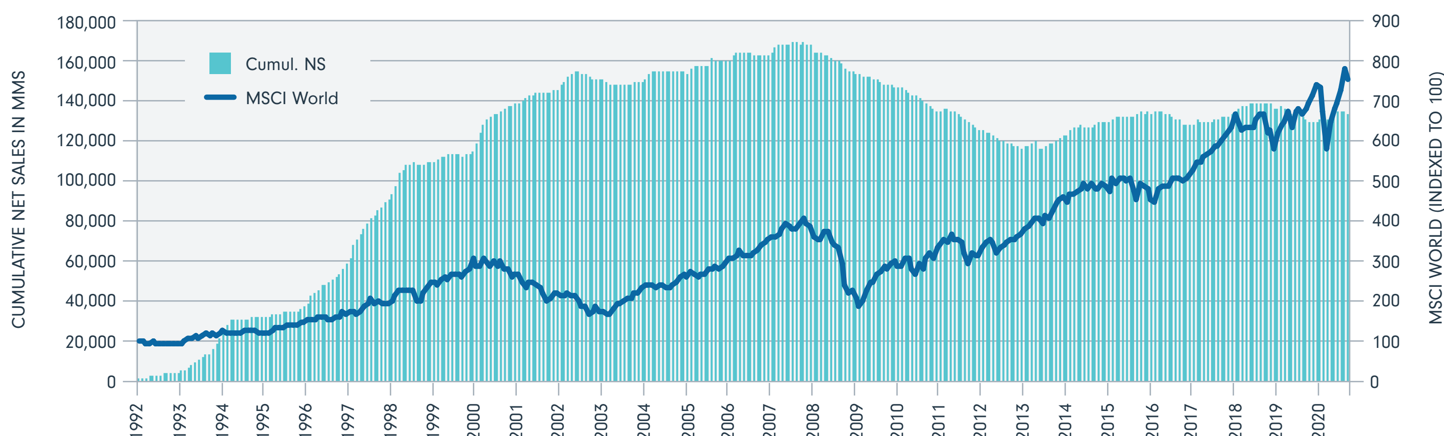
Looking at the net sales of equity mutual funds historically, there has been some evidence that investors tend to allocate away from equities following market crashes, and subsequently have a difficult time recovering their previous allocation, likely owing to well-documented behavioural biases such as the availability or recency effects. A product that offers automatic periodic rebalancing to target weights would help take the emotional aspect out of investing and encourage allocational discipline.

2 In cases where asset categories do not have equal volatility, the allocation that results in the greatest spread between the portfolio volatility and the weighted average volatility of the assets is not in general the naïve 1/N allocation, but is rather tilted towards the lower-volatility assets. Thus, depending on one's strategic allocation (per risk/return objectives), one may or may not be moving towards greater volatility synergy capture by rebalancing as the portfolio drifts from target weights. However, in the common cases of balanced or growth portfolios consisting of equities and fixed income, the asset that dominates with no rebalancing tends to be equities (higher return and risk), so that in rebalancing toward the target allocation, one would tend to be moving in the direction of greater diversification benefit.

3 Such that the portfolio volatility decreases by more than the weighted average component volatilities. In the example in Figure 2, weighted average returns are trivially constant across weighting schemes, because underlying assets are identically distributed by assumption; however, the conclusion generally holds so long as asset categories have similar return/risk ratios.

4 Per the well-known geometric average ≈ arithmetic average - $0.5\sigma^2$ approximation.

FIGURE 3: Cumulative net sales in equity mutual funds slow to recover following the Global Financial Crisis[5]

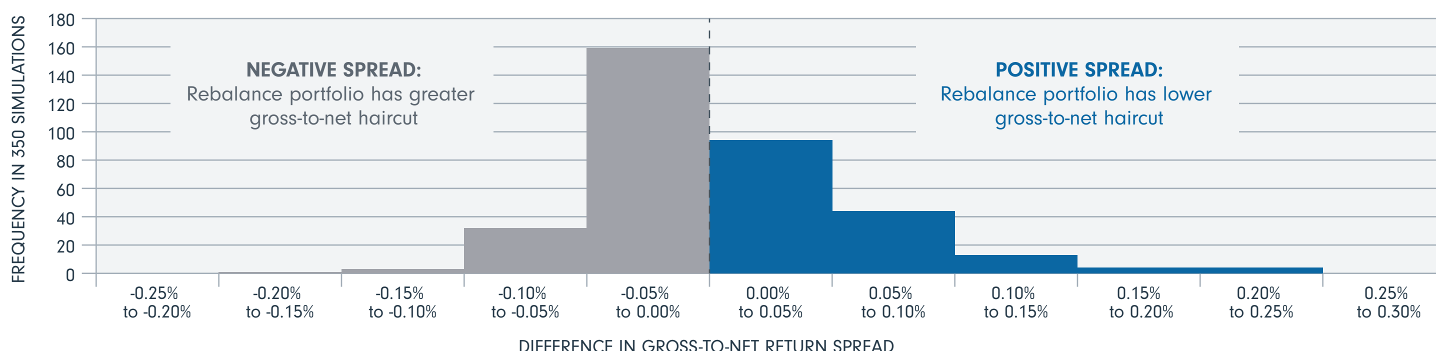


CONSIDERATIONS IN REBALANCING

Interim capital gains taxes

Rebalancing can trigger interim capital gains taxes, which may affect overall portfolio returns over time, due to factors such as compounding effects and modifications to adjusted cost bases. *Figure 4* examines the difference between the ten-year annualized gross-to-net return haircut of a portfolio with annual rebalancing and that of a buy-and-hold portfolio across 350 simulations of a 60/40 stock/bond portfolio of five products. The distribution indicates that there may be a slightly greater haircut with rebalancing in some cases.

FIGURE 4: Difference in gross-to-net spreads of a buy-and-hold portfolio and an annual rebalance portfolio[6]



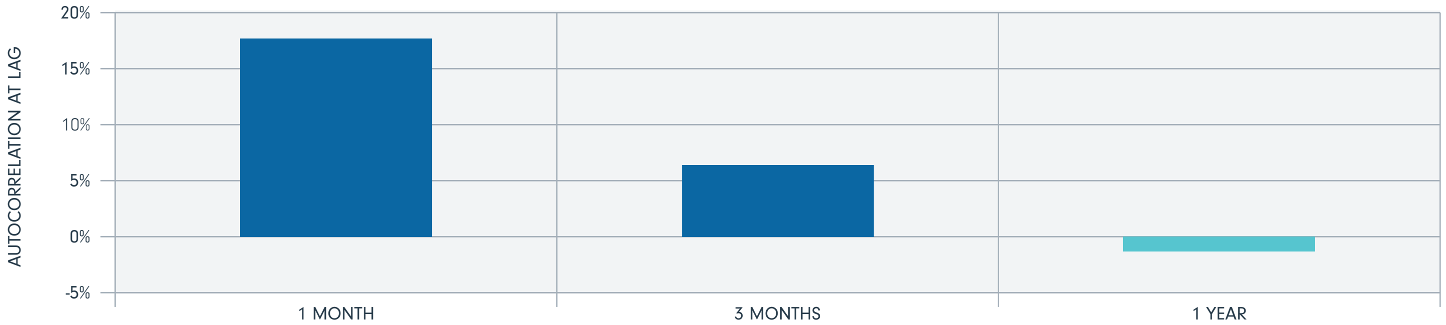
5 Source: Fidelity Canada ULC for IFIC primary net sales, including transfers. Data representing the sum of net sales for the Domestic Equity, U.S. Equity, and Global and International Equity categories. Data represents IFIC members only.

6 60/40 portfolio comprises five separate products, representing Canadian equities, U.S. equities, international developed equities, global bonds and Canadian bonds (target weights of 15%, 30%, 15%, 10% and 30%, respectively). Ten-year historical covariance matrix as at October 31, 2020, for S&P/TSX Composite, S&P 500, MSCI EAFE, Bloomberg Barclays Global Aggregate Bond – Hedged CAD, FTSE Canada Universe Bond used (price return indexes for equity categories, total return indexes for fixed income categories, in index base currencies) to estimate covariance matrix for correlated normally distributed simulation draws for price returns of the five products. A 2.5% annual price return mean is assumed for equity categories, and a 0% annual price return mean is assumed for fixed income categories. Distribution frequency assumed to be six months for all five products. Annual dividend/interest yields estimated as 3% for Canadian equities, 2% for U.S. equities, 2.5% for international developed equities and 1% for both fixed income categories. Each of the five products modelled with an assumed initial price of $10, with an initial capital amount of $10,000. Assume cash distributions and a biannual reinvestment frequency (with every other reinvestment period also a rebalancing period). Assume unit quantization (no fractional shares). Assume 1% drift cap for rebalancing. Analysis does not take into account MER. Gross return is gross of taxes, except for a 15% foreign withholding tax on non-Canadian equities' distributions. Tax impact analysis does not include any trading fees, and does not account for any tax loss carry-forwards or carry-backs related to capital losses. Tax on distributions estimated as 35% for Canadian equities and 50% for the rest (foreign dividends, ordinary income). Capital gains tax assumed as 25%.

Momentum and mean-reversion

Short-term momentum effects can play a role when deciding the frequency of rebalancing. Some markets may exhibit positive short-term momentum, which would have a negative impact on a rebalancing strategy that occurs within the timeframe of these positive trends. Conversely, mean reversion trends would have a positive impact on rebalancing strategies. *Figure 5* illustrates an example of a market that has historically exhibited some positive short-term momentum, as demonstrated by autocorrelations at various lag durations. A good way to avoid such effects is simply to rebalance at a lower frequency.

FIGURE 5: S&P/TSX Composite historical monthly return autocorrelations[7]



7 From September 30, 2000, as at October 31, 2020.

For advisor use only. No recipient is authorized to pass this communication on to any other person whatsoever or reproduce it by any means without the prior written consent of Fidelity.

Commissions, trailing commissions, management fees, brokerage fees and expenses may be associated with investments in mutual funds and ETFs. Please read the mutual fund's or ETF's prospectus, which contains detailed investment information, before investing. Fidelity's All-in-One ETFs pay indirect management fees through their investments in underlying Fidelity ETFs that pay management fees and incur trading expenses (in addition to the indirect management fee, the Fidelity ETFs will also pay indirectly the operating expenses of the underlying Fidelity ETFs). The indicated rates of return are historical annual compounded total returns for the period indicated including changes in unit value and reinvestment of distributions. The indicated rates of return do not take into account sales, redemption, distribution or option charges or income taxes payable by any unitholder that would have reduced returns. Mutual funds and ETFs are not guaranteed. Their values change frequently, and investors may experience a gain or a loss. Past performance may not be repeated.

The statements contained herein are based on information believed to be reliable and are provided for information purposes only. Where such information is based in whole or in part on information provided by third parties, we cannot guarantee that it is accurate, complete or current at all times. It does not provide investment, tax or legal advice, and is not an offer or solicitation to buy. Graphs and charts are used for illustrative purposes only and do not reflect future values or returns on investment of any fund or portfolio. Particular investment strategies should be evaluated according to an investor's investment objectives and tolerance for risk. Fidelity Investments Canada ULC and its affiliates and related entities are not liable for any errors or omissions in the information or for any loss or damage suffered.

Certain statements in this commentary may contain forward-looking statements ("FLS") that are predictive in nature and may include words such as "expects," "anticipates," "intends," "plans," "believes," "estimates" and similar forward-looking expressions or negative versions thereof. FLS are based on current expectations and projections about future general economic, political and relevant market factors, such as interest and assuming no changes to applicable tax or other laws or government regulation. Expectations and projections about future events are inherently subject to, among other things, risks and uncertainties, some of which may be unforeseeable and, accordingly, may prove to be incorrect at a future date. FLS are not guarantees of future performance, and actual events could differ materially from those expressed or implied in any FLS. A number of important factors can contribute to these digressions, including, but not limited to, general economic, political and market factors in North America and internationally, interest and foreign exchange rates, global equity and capital markets, business competition and catastrophic events. You should avoid placing any undue reliance on FLS. Further, there is no specific intention of updating any FLS, whether as a result of new information, future events or otherwise.

From time to time a manager, analyst or other Fidelity employee may express views regarding a particular company, security, and industry or market sector. The views expressed by any such person are the views of only that individual as of the time expressed and do not necessarily represent the views of Fidelity or any other person in the Fidelity organization. Any such views are subject to change at any time, based upon markets and other conditions, and Fidelity disclaims any responsibility to update such views. These views may not be relied on as investment advice and, because investment decisions for a Fidelity Fund are based on numerous factors, may not be relied on as an indication of trading intent on behalf of any Fidelity Fund.

© 2022 Fidelity Investments Canada ULC. All rights reserved. Fidelity Investments is a registered trademark of Fidelity Investments Canada ULC.

FIC-713596 01/22 453206-v202214

61.111183E