



Alternative Thinking | 3Q20

# Was That Intentional? Ways to Improve Your Active Risk

## Executive Summary

Investors try to outperform their strategic asset allocation benchmarks by taking active risks. Some of these are intentional, such as active management or tactical asset allocations; but others are low-conviction or even unintentional, such as implementation lags or rebalancing decisions.

Unintentional risks can be a large part of a portfolio's total active risk. Even if these risks don't detract from performance, they still make an investor's odds of outperformance lower than they otherwise could be. When it comes to beating a strategic asset allocation benchmark, reducing these unintentional active risks may be among an investor's clearest sources of "low hanging fruit."

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## **About the Portfolio Solutions Group**

The Portfolio Solutions Group (PSG) provides thought leadership to the broader investment community and custom analyses to help AQR clients achieve better portfolio outcomes.

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# Introduction: A Focus on Active Risk

Strategic asset allocation (SAA) is of primary importance to portfolios and investors. But it’s not the only thing an investment staff has to get right. When it comes to whether an investment staff is able to earn its keep, what’s typically evaluated is performance *compared* to an SAA benchmark.

Intended risk taking should increase the odds of outperforming, but those odds can be degraded by unintended risks. **Exhibit 1a** illustrates a simple case: an investor who expects to beat their policy benchmark by 0.2% per year while taking 1% tracking error (TE). Using some simplifying assumptions, this investor has a 67% chance of outperforming their SAA over a 5-year period (top square).<sup>1</sup>

But what if unintended or uncompensated risks add another 1% to the portfolio’s overall active risk? Our investor still expects 0.2% outperformance per year, but now while taking 2% TE. The investor’s odds of beating their SAA benchmark over 5 years have now fallen from 67% to 59% (lower square).

Investors have two basic levers to improve these odds: 1) find more “alpha” (i.e., move to the right),<sup>2</sup> and/or 2) reduce unintended or poorly compensated risks (i.e., move up). We believe the latter is “low hanging fruit” for most investors.

In this article, we categorize active risks simply, as either *Intentional* or *Unintentional* (**Exhibit 1b**).<sup>3</sup> An example of the former is tactical decisions—they reflect an investor’s current views and are thus expected to generate “alpha” relative to an SAA. An example of the latter is rebalancing—many investors do not rebalance monthly, but their SAA benchmark does. The resulting difference in weights between rebalance dates probably doesn’t reflect an “alpha” view; it’s more likely some combination of process, constraints, and trading cost considerations.

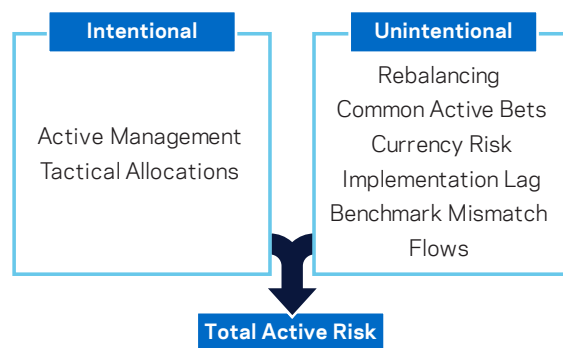
We review eight forms of active risk (two “intentional,” six “unintentional”), and outline ways that investors might improve their own active risk taking. While we use generalized examples (often using 60/40 as a base case), we note that all the risks in this article can be estimated for an investor’s actual portfolio.

## Exhibit 1: It’s Worth Knowing Where Your Active Risks Come From

**1a:** Probability of Exceeding SAA Over 5 years

		Expected Outperformance					
		0.0%	0.1%	0.2%	0.3%	0.4%	0.5%
Expected Tracking Error	1.0%	50%	59%	67%	75%	81%	87%
	1.5%	50%	56%	62%	67%	72%	77%
	2.0%	50%	54%	59%	63%	67%	71%
	2.5%	50%	54%	57%	61%	64%	67%

**1b:** Framework for Sources of Active Risk



Left Exhibit Source: AQR. For illustrative purposes only. Example assumes normal, identical and independently distributed arithmetic returns. Hypothetical data has inherent limitations, some of which are disclosed in the Appendix.

Right Exhibit Source: AQR. This diagram is not exhaustive; many investors have active risks not included above.

# Part 1: Intentional Active Risks

## Active Management

Typically, active management is delegated to external managers, though some investors also run internal programs. Active management can be a highly diversifiable source of active risk, even within the same asset class, region, and within quantitative or fundamental approaches.<sup>4</sup> Perhaps surprisingly, even active strategies that share an investment style have the ability to produce diversifying returns to each other.<sup>5</sup>

In **Exhibit 2a**, we show the range of active risk one might expect for several asset classes. Of course, a manager's standalone TE isn't what matters at the portfolio level—diversification across multiple managers may allow investors to reduce their total active risk. There's a trade-off though: an investor must have the ability to identify and monitor multiple skilled managers to reduce their expected TE without commensurately reducing their expected excess return.<sup>6</sup>

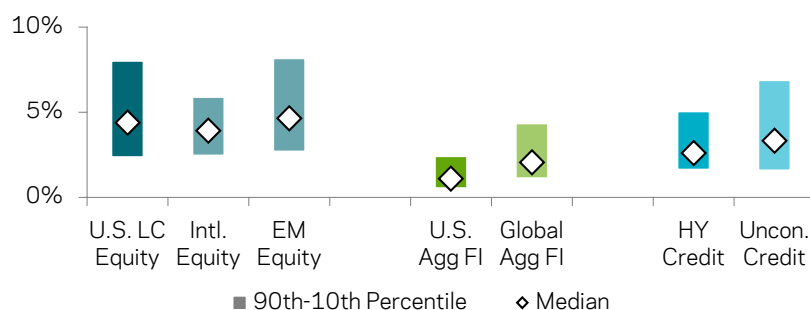
The good news is that the number of managers

required to reduce TE may be lower than expected—if the active returns are sufficiently diversifying. In the simple hypothetical case shown in **Exhibit 2b**, two managers with uncorrelated active returns can reduce a portfolio's active risk by even more than four managers with 0.4 correlated active returns (blue dots). Allocations across multiple active managers should be consistent with your beliefs. For example, equal allocations are a useful starting point, but for it to be optimal, it suggests an investor has complete uncertainty about expected TEs, returns, and correlations of underlying managers.

In contrast, investors who believe their active managers have similar risk-adjusted excess returns (i.e., information ratios) and predictable TEs might instead choose to allocate by TE. Investors who additionally believe correlations across managers are stable might choose to overweight the most diversifying managers. Each of these choices may improve the aggregate portfolio's information ratio, without requiring great foresight in terms of expected returns.

## Exhibit 2: Active Management's "Opportunity Set"

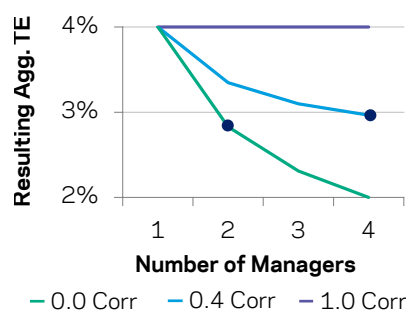
**2a:** Realized Range of TE, 1999 - 2019



Left Exhibit Source: AQR, eVestment. Managers represent categorized managers from the eVestment universe from 1999 - 2019. For illustrative purposes only and not representative of any strategy that AQR manages. Past performance is not a guarantee of future performance. Diversification does not eliminate the risk of experiencing investment losses.

Right Exhibit Source: Assumes each manager has a 4% tracking error (based on roughly the median equity TE on the left chart) and equal allocations across managers (note: the tracking error assumption is for illustrative purposes and does not matter to the shape of the curves). Differences across managers in tracking errors and in allocations will generally lead to different results; we encourage investors to build these curves for their own manager line-ups. Hypothetical data has inherent limitations, some of which are disclosed in the Appendix.

**2b:** Reduction in TE from Diversification



### Tactical Asset Allocation

The amount of active risk generated by tactical asset allocation (TAA) is directly related to 1) the size of the over- or underweight, 2) the volatilities of the affected asset classes, and 3) the correlations between them. Generally, the greater the level of volatility of the tactical assets traded the greater the expected active risk. With respect to correlations, lower correlations generally mean *higher* active risk (which may seem counter-intuitive to strategic asset allocations, where lower correlations are associated with reducing risk). The combination of these components is what matters, though: for example, tactically timing highly correlated assets can still generate meaningful active risk, if their volatilities are sufficiently different (e.g., duration timing in fixed income).

Most investors have pre-determined asset weight bands to limit the active risk achievable by TAA,<sup>7</sup> but rarely do they have an explicit TE budget, nor measure TAA risk in a way that’s easily comparable to other active risks in the portfolio. To get a sense of the active risk that may actually come from tactical tilts, Exhibit 3 shows TEs for three groups of

investors with different active risk tolerances: “conservative,” where the tactical deviation is +/-2.5%, up through “aggressive,” where the tactical deviation is +/-7.5%.<sup>8</sup> Over the long term, the correlation of stocks and bonds has averaged zero, but there have been extended periods of positive correlation (1970s and early 80s) and negative correlation (last two decades), so within each investor class we show results for -0.5, 0.0, and +0.5 stock/bond correlations.

While this example may seem simplistic (e.g., no tactical tilts *within* an asset class), we note that the magnitudes are in-line with what we find in real-world portfolios. For instance, the active risk implied by U.S. public plans' asset class deviations has averaged a little less than 1%,<sup>9</sup> right around the “moderate” active risk tolerance below.

Why does this matter? Knowing your expected TE from current and planned tactical tilts provides a fungible perspective on active risk (and arguably a clearer one). Investors should compare the total active risk from TAA to their other major intentional source of active risk: active management. Are the relative magnitudes consistent with organizational beliefs?<sup>10</sup>

**Exhibit 3: Hypothetical Active Risk by Tactically Deviating from a 60/40 Stock/Bond Portfolio**

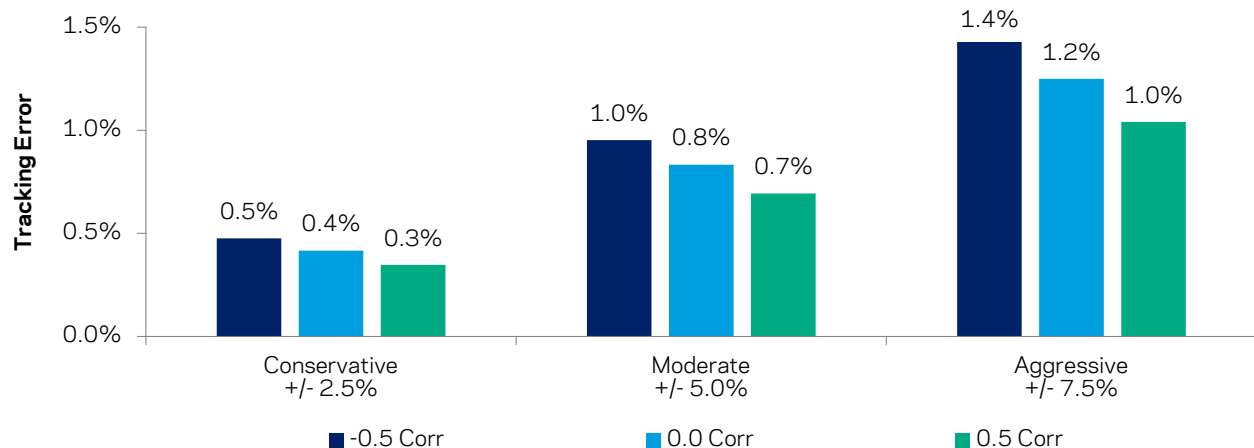


Exhibit Source: AQR, Bloomberg. Stock and bond volatility are based on a 60/40 portfolio which is 60% Global Equities Unhedged (MSCI ACWI Index) and 40% Global Aggregate Bonds Hedged (Barclays Global Aggregate Bond Index Hedged USD). Hypothetical data has inherent limitations, some of which are disclosed in the Appendix.

## Part 2: Unintentional Active Risks

### Rebalancing

Many SAA benchmarks are rebalanced monthly, but few investors rebalance their actual portfolios at that same frequency. This timing or frequency mismatch can lead to over/underweights that are unlikely to reflect tactical views, and the magnitude of the resulting active risk may even rival that of tactical tilts.<sup>11</sup> But rebalancing incurs costs, and continuously matching benchmark weights isn't practical, so how should rebalancing be evaluated from an active risk perspective?

**Exhibit 4a** shows realized TE of five hypothetical rebalancing policies versus a monthly-rebalanced 60/40 portfolio.<sup>12</sup> Clearly, faster rebalance schedules minimize unintentional TE, but there are trade-offs, such as turnover, associated transaction costs, and expected returns.<sup>13</sup> Two of these trade-offs are quantified in **Exhibit 4b**; not surprisingly,

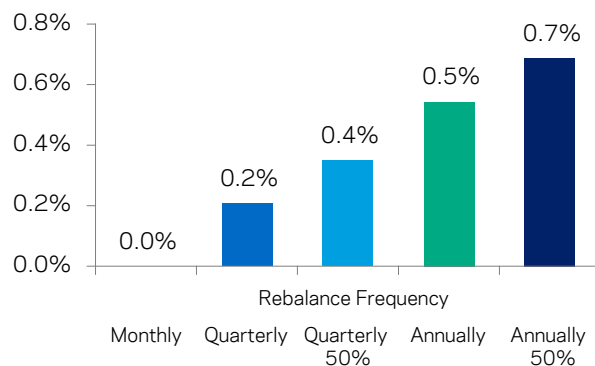
more patient approaches to rebalancing incur lower turnover and transaction costs.<sup>14</sup>

The final consideration is expected returns. In other papers we have shown that patient rebalancing approaches may maintain long-term diversification and also benefit from momentum effects.<sup>15</sup> There is some evidence that more patient approaches to rebalancing have delivered similar risk benefits but slightly higher returns, by letting multi-month trends play out (as well as by incurring lower costs).

Investors who want to harvest multi-month price momentum effects must weigh this benefit against their tolerance for TE.<sup>16</sup> In our simple example, the annual full rebalancing schedule (green bar) earned the highest net of cost return (closely followed by quarterly rebalancing 50% towards strategic weights).<sup>17</sup> Regular but patient rebalancing may be cost-effective and return-optimal while incurring a small and tolerable amount of TE.

### Exhibit 4: Trade-offs for Rebalancing Frequencies

#### 4a: Tracking Error to 60/40 Portfolio



#### 4b: Annual Turnover (LHS) and Transaction Costs (RHS)

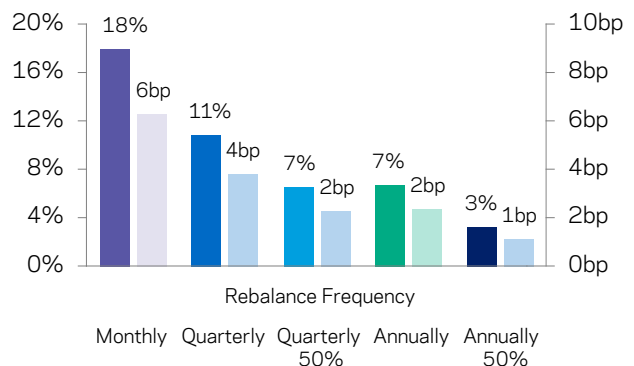


Exhibit Source: AQR, Bloomberg. 60/40 portfolio is 60% Global Equities Unhedged (MSCI ACWI Index) and 40% Global Aggregate Bonds Hedged (Barclays Global Aggregate Bond Index Hedged USD). Rebalanced Portfolio: Buying or selling securities in a portfolio to return to a desired level of asset allocation (e.g., a monthly full rebalance will shift the portfolio back to its starting target allocations on a monthly basis). Quarterly and Annual 50% will rebalance just halfway toward target weights on a quarterly/annual basis. Annual Turnover: Two Sided = (Buys+Sells)/NAV. Annual Trade Cost: we assume 35 bps t-costs for all asset classes. Annual transaction cost figure is calculated by multiplying the annual turnover by the annual trade cost (35 bps). Hypothetical data has inherent limitations, some of which are disclosed in the Appendix.

## Common Bets from Active Managers

Investors typically allocate to *multiple* active managers. If each active manager’s “edge” is fairly unique from each other, their active risks should be diversifying, and take up less of the investor’s risk budget. However, for some asset classes, active management is not particularly diversifying, suggesting an investor’s likelihood of beating a benchmark is lower than they might expect, and lower than they realistically may be able to achieve.<sup>18</sup>

This concern can extend to any asset class, but two that we’ve cautioned investors about for years are fixed income<sup>19</sup> and hedge funds (or liquid alternatives).<sup>20</sup> Compared to equities, where active returns across managers are generally lowly correlated, the active returns across managers in many segments of the fixed income market and across hedge fund strategies tend to be much more correlated (Exhibit 5, dark blue bars).

Making matters worse, the active risk in those asset classes can be highly correlated to equity

risk, something most investors already have in their asset allocations—and potentially in their tactical decisions, too. This isn’t *necessarily* a problem, but we believe it would take a unique set of circumstances for this to be optimal from an investor’s standpoint. For example, if one of the reasons to allocate to fixed income is diversification from risky assets, having equity-like active risk in fixed income contradicts the point of the allocation.<sup>21</sup> More practically, this implies a “when it rains, it pours” outcome for investors. Equities already drive overall portfolio risk; not only will your portfolio be expected to suffer when markets do, but you may underperform your SAA at the same time.

Investors have a range of ways to address this challenge. Correlation and regression analyses can help to evaluate active managers and inform changes at the portfolio level.<sup>22</sup> Additionally, from the active risk perspective, investors should consider benchmarks that match “passive” exposures as well as possible to reduce the impact such exposures could contribute to the active risk budget.<sup>23</sup>

## Exhibit 5: In Some Asset Classes, Active Management May Not Be as Unique as You’d Hope...

January 1, 2010 - December 31, 2019

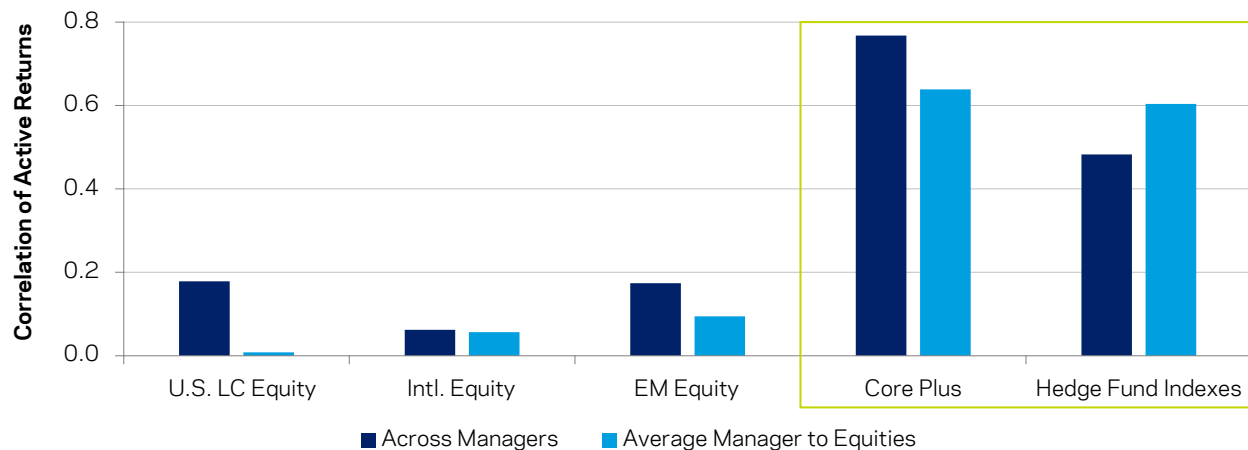


Exhibit Source: AQR, eVestment, Credit Suisse (“CS”). Equity and fixed income managers used in this exhibit are the 10 largest funds by assets with at least 10 years of data. Active Returns are all calculated against the managers’ stated benchmarks. For hedge funds, we use the following indexes: CS Distressed, CS Event Driven, CS Emerging Markets, CS Fixed Income Arbitrage, CS Managed Futures, CS Global Macro, CS Long/Short Equity, CS Equity Market Neutral; and we treat the entire hedge fund index’s return as an active return.

### Currency Risk

Investors may be able to reduce *total* portfolio risk by hedging currency exposure, but this will create active risk relative to an unhedged benchmark.<sup>24</sup> This impact can be large for non-USD domiciled investors, given that most of a global market-weighted portfolio is denominated in USD, but even for U.S. investors the impact on TE can be meaningful, and potentially uncompensated. This also applies to unintended differences in currency exposure between the portfolio and benchmark.<sup>25</sup>

**Exhibit 6** shows the realized annual impact of currency risk for two investors with global 60/40 benchmarks, where equities are unhedged and bonds are hedged.<sup>26</sup> The exhibit shows the impact of hedging major currencies individually on both TE and total portfolio risk, as well as the impact of adopting a fully hedged portfolio.<sup>27</sup>

For a USD investor we find a nearly 1% reduction in *total* portfolio volatility from

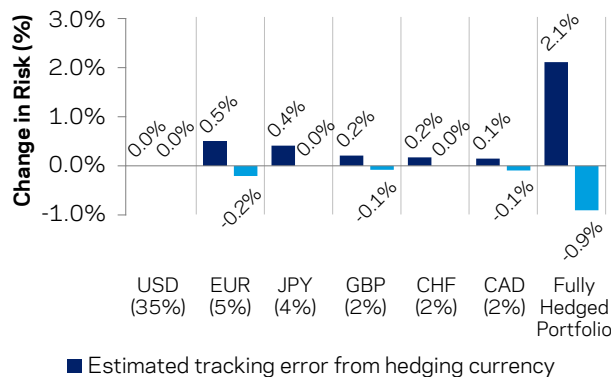
fully hedging, partly because the U.S. dollar has behaved as a “safe haven” since 2008, strengthening at times of equity market losses. If this safe haven behavior is expected to continue then it might make sense to hedge currency exposure from an SAA perspective, but at the cost of active risk: 2.1% TE in our example.<sup>28</sup>

For euro-denominated portfolios, the trade-off is noticeably different. The risk benefit from fully hedging was much smaller, while the resulting TE was much larger. The euro initially inherited the deutschmark’s safe-haven behavior, but during and after the Financial Crisis, and subsequent Euro Debt Crisis, its behavior was procyclical—and foreign currency risk therefore provided useful diversification.

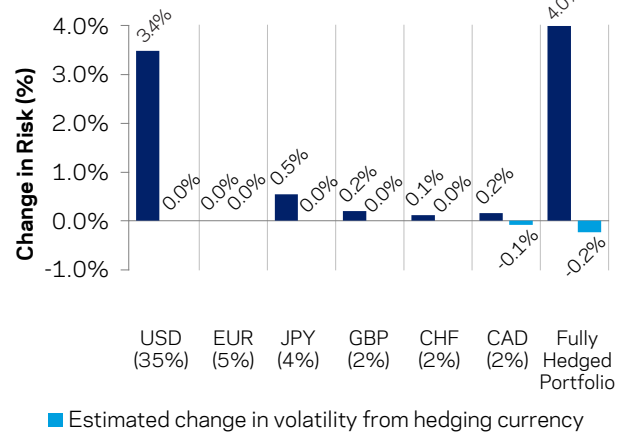
Deviating from the hedging policy of your benchmark can eat up a large amount of your active risk budget, so tactical currency views should be considered carefully. If an investor has strong views on future currency correlations, interest rate differentials and spot returns then this active risk may be justified.<sup>29</sup>

**Exhibit 6: Tracking Error and Change in Volatility from Hedging Currency Exposure**  
January 1, 1999 - June 30, 2020

#### USD Investor



#### EUR Investor



Numbers in parenthesis under each currency are the notional currency exposures for each currency in our 60/40 portfolio and are calculated based on MSCI ACWI market-caps as of June 30, 2020.

Exhibit Source: AQR, Bloomberg. Tracking error is calculated relative to 60/40 portfolio which is 60% Global Equities Unhedged (MSCI ACWI Index) and 40% Global Aggregate Bonds Hedged (Barclays Global Aggregate Bond Index Hedged USD) and is based on monthly data from January 1, 1999 - June 30, 2020.



## Implementation Lag

Illiquid assets have become increasingly prevalent in institutional portfolios,<sup>30</sup> and the rise of illiquids has also tended to increase investors’ active risk. The source of active risk we focus on in this section stems from the difference between a portfolio’s long-term target exposure to private equity (PE) and the time it can actually take to achieve that exposure.<sup>31</sup> The wider the gap between actual and target exposures, the more unintentional active risk will be realized.

For some context, over the last 2 years there were over 40 U.S. public plans (representing over \$500B in AUM) targeting exposures between 3-11% greater than the PE allocation they actually held.<sup>32</sup> U.S. plans aren’t unique in this respect; various institutions have a mismatch between current and strategic allocations to PE, in many cases because committed capital has not yet been called.<sup>33</sup>

Consider an investment staff who wants to increase PE in their overall allocation from 55%/40%/5% (stocks/bonds/PE) to 50%/40%/10%. They estimate it will take 5

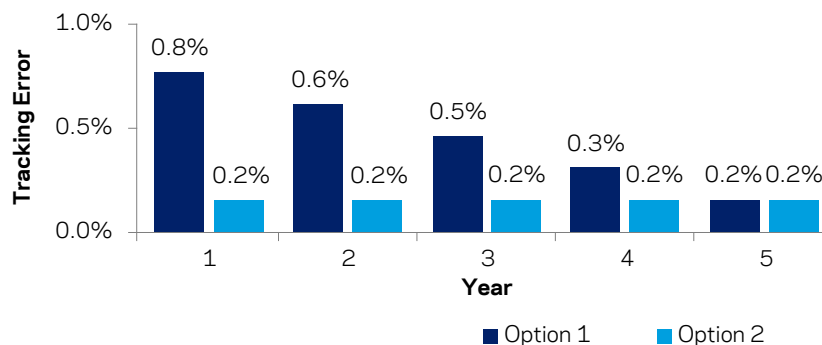
years to work up to that committed amount, and are considering two options to reflect the change in the portfolio’s policy benchmark: 1) change the benchmark’s weight of PE from 5% to 10% immediately, or 2) raise the benchmark’s weight by 1% a year for 5 years.<sup>34</sup>

**Exhibit 7a** illustrates the portfolio-level active risk these two options are expected to create each year. Due to the large initial difference in exposure (5%) between the actual and benchmark portfolios, the first option generates nearly 1% TE in the first year (cf. estimated total TAA risk of many plans is also around 1%). The second option, which more closely matches SAA and actual weights, does a much better job mitigating this risk.

**Exhibit 7b** translates uncompensated TEs to probabilities. In option 1, the implementation lag creates about a 30% chance of underperforming the SAA by 50 bps in the first year and falls through time, averaging out to 13% over the 5-year period (dark blue bar). Option 2, in which the staff takes more of an active risk perspective, significantly reduces their odds of underperforming.

## Exhibit 7: Waiting for an Important (Capital) Call

**7a:** Active Risk Due to PE Implementation Lag



**7b:** Odds of Underperforming SAA by 50 bps

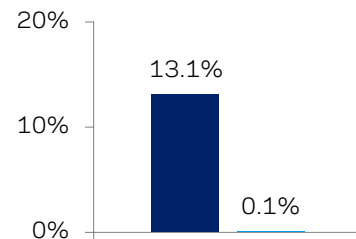


Exhibit Source: AQR, Bloomberg. The volatility for public equity is approximated by the MSCI ACWI Index, private equity is 1.2x the volatility of public small cap equity (note: even though price-smoothing in PE reduces measured total risk, it will generally boost TE), and bonds are approximated by the Barclays Global Aggregate Index. The correlations between asset classes are determined using quarterly returns from the MSCI ACWI, Barclays Global Aggregate and the Cambridge U.S. Buyouts Private Equity Index. The average odds of underperforming by 50 bps assume there is no expected alpha to SAA benchmarks and that returns are normally distributed. Hypothetical data has inherent limitations, some of which are disclosed in the Appendix.

## Benchmark Mismatch

Any unintended mismatch between an investment strategy and its benchmark will create unintentional active risk. Even for traditional asset classes where the benchmarks are well-known, publicly traded, and disclose their construction methodologies, the amount of unintended TE can be meaningful.

For example, **Exhibit 8a** shows the average TEs of the largest index-tracking ETFs within three universes over the past 10 years.<sup>35</sup> For U.S. Large Cap it's negligible, but as the benchmark becomes more complicated and more difficult to replicate, the active risk grows substantially—and may even exceed TE from active managers with the same benchmark (cf. Exhibit 2a).<sup>36</sup>

This challenge is often magnified with alternative strategies and asset classes (**Exhibit 8b**), where in many cases investors are forced to choose between public proxies and peer universes to use as benchmarks.

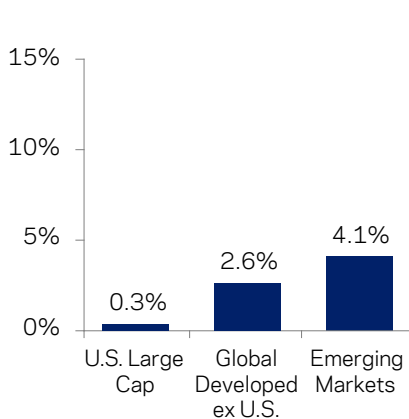
For each of the three strategies shown, there's a clear trade-off: accept higher TE for public proxies (light bars) or lower transparency for peer universes (dark).

This problem can become particularly acute for illiquid assets.<sup>37</sup> Taking private equity as an example, even if the long-term underlying economic exposure between public and private markets is similar, the differences in reported monthly, quarterly and annual returns can be vast,<sup>38</sup> creating enormous TE (over 10% in the example below). In many cases, this PE mismatch can be among the single largest sources of TE at the portfolio level.

There are a range of ways to deal with this challenge depending on plan governance. A few include: customizing existing public benchmarks (e.g., including lags to “smooth” benchmark returns), using peer benchmarks, or removing these difficult-to-benchmark asset classes from portfolio-level active risk budgeting altogether.

### Exhibit 8: Are Your Benchmarks “Close Enough”?<sup>39</sup>

**8a:** Realized TE of Index-Tracking Funds



**8b:** Realized TE of Alternatives and Privates to Common Benchmarks

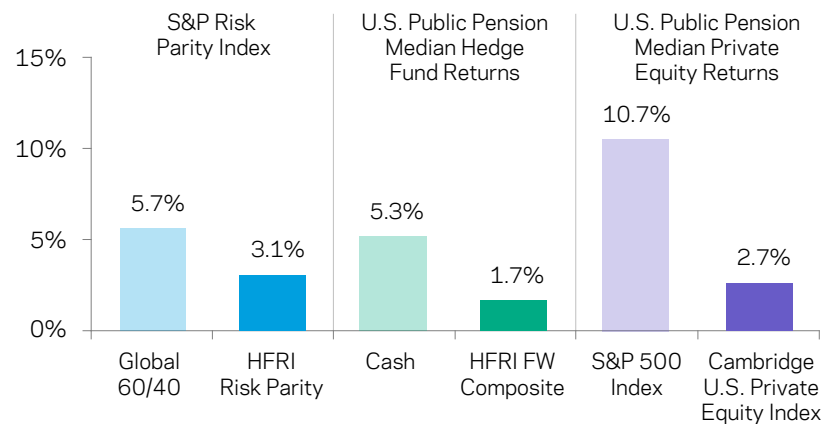


Exhibit Source: AQR, Bloomberg, Morningstar, Cambridge Associates, Public Plan Database. Active risk is calculated for the 10-year period from July 1, 2009 - June 30, 2019. Realized TE of Index-Tracking Funds shows the average TE of the 3 largest funds by assets per universe with at least 10 years of data to their respective stated benchmarks. Active risk the annualized tracking error using monthly data for the index tracking ETFs (average) and S&P Risk Parity Index and their respective common benchmarks. The U.S. Public Pension Hedge Fund and Private Equity active risk is the annual tracking error of median plan hedge fund and private equity return for plans with June fiscal year ends to its common benchmarks.

## Flows and Cash Buffers

Many investors maintain a cash buffer to meet obligations,<sup>40</sup> and even investors who don't have a specific allocation to cash can accumulate it from inflows, dividends, contributions, sales of assets, or other sources of income. Some investors may even decide to move to cash for discretionary reasons, such as to tactically de-risk their portfolio.<sup>41</sup> Any amount of uninvested cash in the portfolio will lead to tracking error versus a fully-invested benchmark, but investors may underappreciate the amount of uncompensated active risk this “risk-free” exposure can actually generate.

The volatility of the asset that is sold to raise cash is related to how much active risk is created. **Exhibit 9** shows the realized tracking error to a 60/40 portfolio for incremental allocations to a cash buffer. Clearly, allocations to cash can be a major source of uncompensated active risk—particularly if funded from high-risk assets. Funding from low-risk assets, such as bonds, reduces the impact on active risk in our simple example

(though it may be at odds with the reason for having extra cash in the first place).

Our analysis illustrates that a seemingly “risk-free” strategic allocation, or a tactical de-risking allocation to cash can in fact be a high-risk active bet relative to an SAA benchmark. Any allocation to cash involves giving up the risk premia of the asset class it is funded from, and though this may reduce downside over a given period<sup>42</sup> the portfolio would be expected to earn lower returns over the long term.

If maintaining a cash buffer is an essential part of managing your portfolio, it is possible to maintain one while achieving the same economic exposure as being fully invested by equitizing your uninvested cash. This can be achieved using equity index futures,<sup>43</sup> or other derivatives. This same methodology can be applied to unintended cash balances that build up from inflows that are not yet reinvested; equitizing these balances in the short term will minimize opportunity cost until your portfolio is fully invested.

### Exhibit 9: Impact on Tracking Error of Maintaining a Cash Buffer

January 1, 1972 - June 30, 2020

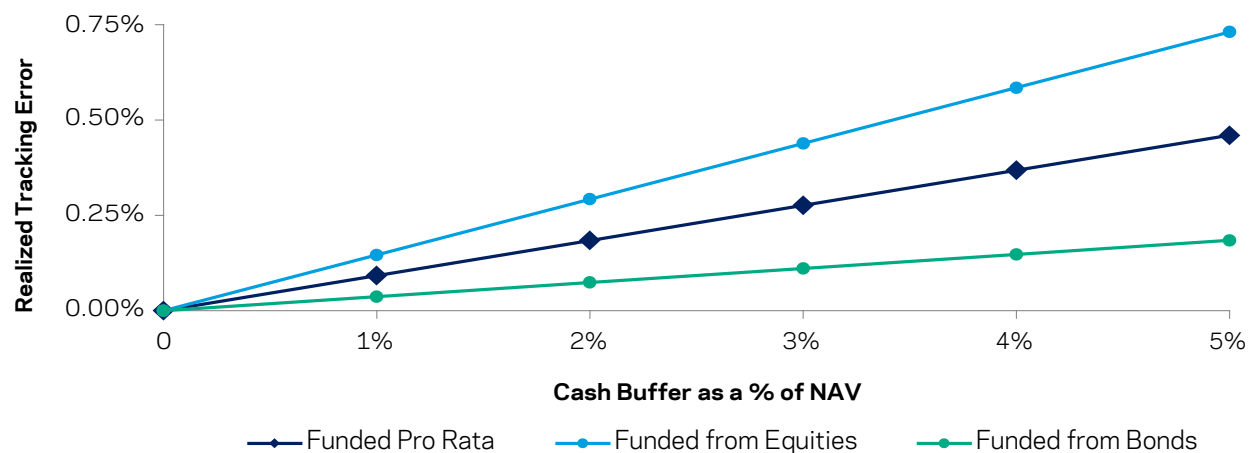


Exhibit Source: AQR, Bloomberg. 60/40 portfolio is 60% Global Equities Unhedged (MSCI ACWI Index) and 40% Global Aggregate Bonds Hedged (Barclays Global Aggregate Bond Index Hedged USD). Cash is carry on U.S. 3-month T-Bills. Tracking error is calculated relative to the fully invested 60/40 portfolio and uses monthly data from January 1, 1972 - June 30, 2020. The cash buffer is used once per year, so the proxy portfolio will be fully invested for one month of the year when the cash buffer is utilized to meet obligations. Hypothetical data has inherent limitations, some of which are disclosed in the Appendix.

# Putting It All Together

Diversification—the bedrock of strategic asset allocation—is critical for active risk budgets, too. We’ve focused on sources of active risk individually, and while we believe unintentional active risks should be minimized as efficiently as possible, what matters at the portfolio-level is how they all add up.

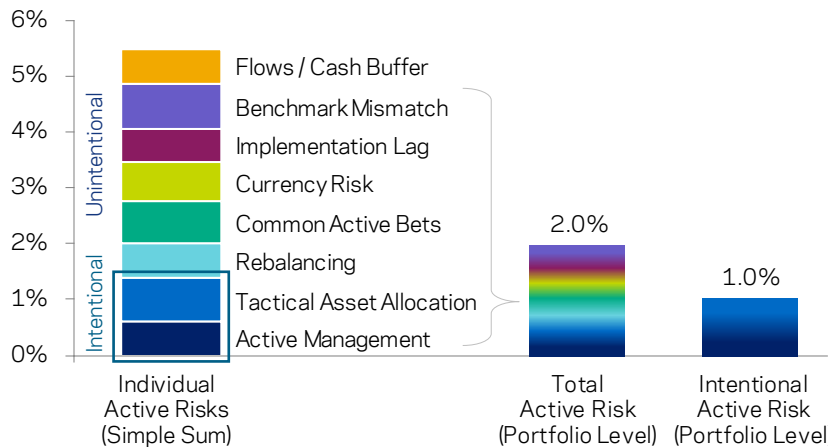
The best case for investors is for unintentional active risks to diversify each other, mitigating their impact. But less-favorable outcomes are also possible: 1) unintentional active risks can be additive, leading to more aggregate active risk than an investor may be able to bear,<sup>44</sup> and 2) unintentional active risks may offset intentional ones. In both cases, the likelihood of outperforming SAA benchmarks falls.

**Exhibit 10a** gives a sense of how the active risks we’ve covered in this article might contribute at the portfolio level, with the last two bars showing the amount of *total* active risk (here, 2.0% TE), and *intentional* active risk (1.0%). **Exhibit 10b** demonstrates how much a seemingly small difference can matter, by showing the hypothetical expected odds of outperformance over various investment horizons, assuming intentional risks generate 0.2% excess returns per year.

Bottom-line, outperforming an SAA benchmark is hard enough - making sure your portfolio’s active risk is as intentional as possible can make the journey a bit easier.

## Exhibit 10: A Portfolio Perspective on Active Risk

**10a:** Sources of Active Risk and Hypothetical Contributions to Total Active Risk



**10b:** Probability of Outperforming SAA Benchmark\*

Horizon	Active Risk (TE)	
	2.0%	1.0%
Annual	54%	58%
3-Year	57%	64%
5-Year	59%	67%
10-Year	63%	74%

\* Assuming 0.2% expected excess return

Exhibit Source: AQR. Assumes all active risks are uncorrelated to each other, intentional risks (combined) generate 0.2% excess returns, and unintentional risks generate 0.0% excess return. Analysis here assumes arithmetic, normally distributed, i.i.d. returns. For illustrative purposes only. Hypothetical data has inherent limitations, some of which are disclosed in the Appendix.

# Appendix:

## How Much Active Risk *Should* You Take?

This article takes a *descriptive* approach to active risk, but many investors may be interested in a *prescriptive* view—how much active risk should I take? The answer is necessarily unique for different investors, but we can provide a basic framework.

The appropriate amount of active risk that investors should budget can largely be described as a function of two factors:

1. The frequency in which the portfolio is expected to underperform its benchmark by a threshold that is considered intolerable.
2. The expected ability for the portfolio to outperform its benchmark over the most relevant evaluation horizon.

**Exhibit A1** is a hypothetical example of this framework. For factor 1, we assume a -1.0% intolerable loss over the course of a year. The expected frequency of realizing the intolerable loss (1 out of N years) are the rows; and factor 2, the expected ability for the portfolio to outperform in any year (batting average, or information ratio), are the columns.

In this example, if the investor can't tolerate a -1.0% loss against the benchmark any more frequently than once every 5 years and believed strongly that their active management could outperform in 60% of years (or had a 0.25 information ratio), then the active risk the portfolio should target is approximately 1.7%.

### Exhibit A1: Active Risk Implied by Risk Tolerance and Skill

		Information Ratio				
		0.05	0.1	0.15	0.2	0.25
Frequency of Exceeding a -1% Loss in a Year	1 out of 3 years	2.6%	3.0%	3.6%	4.3%	5.5%
	1 out of 4 years	1.6%	1.7%	1.9%	2.1%	2.4%
	1 out of 5 years	1.3%	1.3%	1.4%	1.6%	1.7%
	1 out of 7 years	1.0%	1.0%	1.1%	1.2%	1.2%
	1 out of 10 years	0.8%	0.9%	0.9%	0.9%	1.0%

Exhibit Source: AQR. For illustrative purposes only. The amount of active risk investors should take is based on expectations that excess return over the benchmark is persistent and normally distributed. It also assumes that the loss tolerance frequency is static and representative for all the portfolio's stakeholders. The calculation solves for the amount of active risk required to satisfy the intolerable loss frequency (20% chance of losing to the benchmark by 1% in any given year) given the portfolio's perceived skill (information ratio). Hypothetical data has inherent limitations, some of which are disclosed in the Appendix.

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# Endnotes

- 1 This exercise can be done for any expected excess return, tracking error, and horizon. We encourage investors to estimate these likelihoods for their own portfolios. Hypothetical data has inherent limitations, some of which are disclosed in the Appendix.
- 2 This doesn't have to be "alpha" in the sense of unique, idiosyncratic excess returns. For example, asset classes not currently in a portfolio and/or a range of other well-known risk premia (e.g., alternative risk premia) may still be "alpha to you."
- 3 Note: the "Intentional/Unintentional" terminology is of course debatable. Some investors may prefer to categorize them as "compensated/uncompensated," though those terms may be too strict (e.g., some sources of active risk, such as rebalance frequency, may be compensated in expectation, though not to the expected level of, say, tactical tilts). Similarly, many investors may categorize these active risks as "high conviction" and "low conviction." Regardless of terminology, the main idea in this article is that some active risks are expected to be well-compensated, and others not.
- 4 And even more so across those two approaches to active management. See [AQR Alternative Thinking 3Q17](#) for more.
- 5 For example, the average pairwise correlation is 0.35 among multi-asset alternative risk premia managers captured by the SG MARP Index. Source: SGCIB - "Understanding Multi Alternative Risk Premia Strategies" (January 2019, [AlternativeEdge Note](#)).
- 6 There are other considerations, too: for example, while diversification may reduce TE, it doesn't commensurately bring down fees (and it may be hard to justify a given level of fees for a low level of aggregate TE, even if expected returns are unaffected); and investors should be careful that *intended* exposures aren't offset by multiple managers.
- 7 These bands may be the result of the empirical fact that asset class timing is notoriously difficult—and even for "[Superstar Investors](#)" has tended to be only a small component of "alpha."
- 8 The details of what constitutes the TAA model are irrelevant for the purposes of this hypothetical example. However, common stock timing models can include: Shiller P/E, last 12-month returns, changes in GDP forecasts, etc. In this leverage-constrained single tactical asset class model an overweight to stocks is also an underweight to bonds. Further constraints on portfolio leverage or on being under-invested (holding excess cash) can cause a single asset to dominate the risk budget, stifling the ability of a TAA program to achieve the maximum potential active risk.
- 9 Source: Public Plan Database, using FY 2018 data. Implied active risk ranges are calculated using the maximum of stated policy range multiplied by the expected long-term volatility of the asset class. These deviations may not be exclusively driven by TAA models.
- 10 For example, let's say your organization is currently taking more active risk from TAA than from delegated manager active risk. For that to be optimal, it must be that your conviction in your own asset class timing is greater than your conviction in your investment managers to deliver "alpha." (Granted, there could be other constraints—e.g., for "mega plans," size may prevent them from generating much active risk from active management.)
- 11 A recent example for many investors was whether and when to rebalance their portfolios after the COVID-induced risk asset drawdowns in March 2020.
- 12 The results presented here are for a 60/40 portfolio, but note that an allocation's rebalance frequency should consider its volatility. E.g., a high-risk allocation has higher potential for deviation from policy and a higher impact of drift relative to a low-risk allocation.
- 13 Taxable investors have yet another consideration, which is after tax returns (and whether rebalancing triggers short- or long-term gains and losses). See [Sosner, Pyne and Chandra \(2017\), Understanding the Tax Efficiency of Market Neutral Equity Strategies](#).
- 14 One could also consider the additional operational and administrative cost of rebalancing more frequently. The importance of turnover and transaction costs will depend on the asset classes in an investor's portfolio. Expected transaction costs for liquid investments are modest and therefore this consideration may be secondary to risk and return considerations. Illiquid investments on the other hand can be difficult and expensive to rebalance; investors in illiquids may wish to estimate their current allocation by making adjustments based on liquid proxies.
- 15 See [Ilmanen and Maloney, 2015, Portfolio Rebalancing: Strategic Asset Allocation](#).
- 16 Which may also be exacerbated or offset by current TAA. As with all the active risks in this article, it's the interaction that ultimately dictates the efficiency of active risk in the portfolio.
- 17 Note that the optimal rebalancing strategy will depend on the composition of your portfolio and no rebalancing schedule is a surefire winner over any specific period.
- 18 For example, consider an investor with a U.S. Large Cap Equity allocation made up of four active managers, each with a persistent tilt to small cap stocks. Each manager's excess return thus has: 1) an idiosyncratic component, and 2) a common risk component (the small cap premium). The former should diversify away much more quickly than the latter, potentially leaving the investor with tracking error that is largely attributable to a single, out-of-benchmark bet: the small cap premium (with single bets typically having lower expected IRs than diversified ones). Another consequence of this example is that the investor ends up paying active fees for mostly "beta performance."
- 19 See for example: [Alternative Thinking 4Q2017, 4Q2018](#), and most recently [Brooks, Gould and Richardson \(2020\)](#) and [Palhares and Richardson \(2020\)](#).
- 20 For an early critique see [Asness, Krail and Liew \(2001\)](#).
- 21 Not to mention the issue of cost: why pay "active fees" for more equity risk when an ETF can deliver that so cheaply?

- 22 In many cases, investors should additionally incorporate “lags” in such analyses. [Asness, Krail and Liew \(2001\)](#) find that many hedge funds exhibit lagged beta and correlation to markets reflecting illiquidity, stale pricing, etc. We frequently run such analyses for our clients; please reach out to your AQR contact for further details on utilizing the Portfolio Solutions Group.
- 23 Or otherwise, go in with open eyes that your active risk may be dominated by out-of-benchmark “beta” bets that may already be present in other parts of the portfolio (e.g., equity or credit risk in Core Plus mandates), or achieved more directly (e.g., via TAA). Questions to ask in other asset classes include: does your hedge fund benchmark closely match the equity exposure of your hedge fund portfolio? How much tracking error does your private equity benchmark have to your private equity program?
- 24 Because of this, investors may be well-served to evaluate whether their benchmark’s hedging policy is optimal to begin with. See for example [Boudoukh et al. \(2015\)](#).
- 25 A prime example of unintended currency mismatch would be a portfolio that is made up of regional managers and is benchmarked vs. a global benchmark where the regional country weights of the portfolio do not match those of the benchmark.
- 26 Investors often choose to hedge the currency risk in foreign bond portfolios since currencies tend to be more volatile than bonds and so currency risk would dominate the returns if left unhedged. Conversely, many investors leave foreign equity investments unhedged. This may be because equities tend to be more volatile than currencies, so the currency risk is accepted as secondary, and perhaps diversifying, or it may be because the embedded currency exposure is seen as a deliberate part of the investment (this is often the case for investments in emerging markets). Another argument sometimes made *against* hedging equities is that international firms have offsetting currency exposure embedded in their prices (due to foreign earnings), and so could be considered partially hedged already. Yet another is that maintaining some foreign currency exposure may help to mitigate the impact of a tail event for the home currency.
- 27 Over 75% of notional FX exposure for a Global 60/40 portfolio is USD, EUR and JPY. Adding GBP, CHF and CAD achieves nearly 90% coverage.
- 28 Notice that hedging some currencies caused tracking error without reducing portfolio risk. Since the Financial Crisis, JPY has been a consistent diversifier to a stock/bond portfolio for both U.S. and European investors. If this relationship is expected to continue, it may be preferable to retain some JPY exposure from a total risk perspective and save on your active risk budget.
- 29 We maintain a tool that can help guide the ex-ante hedging decision for investors’ regional equity portfolios. Please reach out to your client service contact for further details on utilizing the Portfolio Solutions Group.
- 30 Source: BlackRock 2020 Institutional Rebalancing Survey. Illiquid assets have the only positive net percentage of respondents (global institutional investors) intending to increase allocations across asset classes.
- 31 A separate, but still potentially large source of active risk comes from benchmark choices for private allocations (e.g., public or peer, contemporaneous or lagged, how closely to match geographies, how to account for price smoothing, etc.).
- 32 Source: Public Plan Database. 2018-2019 asset allocation data.
- 33 There could be many reasons for the transition period: legal delays, slow capital commitments, lack of resources, etc.
- 34 There are a host of non-active risk related considerations the staff might debate. Real world considerations might include: investment committee’s tolerance for frequent benchmark changes, reporting difficulty, ability for the benchmark to achieve the expected return, setting the benchmark weight to the mid-point (7.5%), or changing the benchmark weight to the exact weight in the portfolio, among many more. Some institutions, recognizing the challenges of getting accurate active risk measures for illiquids, may choose to carve illiquids out completely from portfolio-level active risk calculations.
- 35 The TE is not static either; realized TE over shorter horizons has varied meaningfully around these averages.
- 36 Compared to the S&P 500 Index, which is composed of 500 constituent stocks from a single country, the MSCI EAFE Index comprises over 900 constituents from 21 countries—and the MSCI Emerging Market Index comprises nearly 1400 constituents across 26 countries. Difficulty in replicating benchmarks may include higher costs associated with trading less-liquid securities, lack of resources required to operate and execute a benchmark’s rebalancing methodology, or even strategies that are allowed to hold securities that are outside of the stated benchmark.
- 37 Public proxies are popular across illiquid investments including private equity, private debt, real estate and natural resources.
- 38 Aside from the fact that there are no private companies in public benchmarks, an investor’s private equity portfolio can vary greatly across sectors, geographies, size, style, vintage year and leverage.
- 39 All of these series should be seen as stylized examples, as individual managers and portfolio design choices can materially impact the expected active risk to a given benchmark.
- 40 For many investors, maintaining some level of uninvested cash is part of the normal course of business, and part of prudently managing a portfolio. Ideally, this would be accurately reflected in the SAA.
- 41 This has certainly become more prevalent in the current economic environment.
- 42 Profitable tactical allocations to cash are very difficult because they give up exposure to long-term asset premia (not to mention the well-known challenges of market timing). See [Asness, Imanen and Maloney \(2017\)](#) for more.
- 43 This can also be applied to other asset classes where liquid index futures are available. Since fixed income is a less volatile asset class than equities, cash drag is not as much of an issue for bond allocations.
- 44 This “adding up” can be both from the active risk perspective, but also from the total portfolio risk perspective (e.g., common credit tilts across fixed income managers can lead to a portfolio overweight to credit).



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The **MSCI All Country World Index** is designed to measure the large and mid cap global equity market performance of 23 developed and 23 emerging countries.

The **S&P 500 Index** is a market-capitalization weighted composite of the 500 largest stocks in the U.S. stock market.

The **MSCI Emerging Markets Index** is a free float-adjusted market capitalization index that is designed to measure the large and mid cap equity market performance of 23 emerging countries.

The **MSCI World Index** is a free float-adjusted market capitalization index that is designed to measure the large and mid cap equity market performance of 23 developed countries.

The **Russell 1000 Index** is a market capitalization index that is designed to measure equity market performance of the 1,000 largest companies in the Russell 3000 Index.

The **Russell 2000 Index** is a market capitalization index that is designed to measure equity market performance of the 2,000 smallest companies in the Russell 3000 Index.

The **Barclays US Corporate High Yield Index** represents the universe of fixed rate, non-investment grade debt. Eurobonds and debt issues from countries designated as emerging markets (e.g., Argentina, Brazil, Venezuela, etc.) are excluded but, Canadian and global bonds (SEC registered) of issuers in non-EMG countries are included. Original issue zeroes, step-up coupon structures, 144-As and pay-in-kind bonds (PIKs, as of October 1, 2009) are also included. The index includes corporate sectors. The corporate sectors are Industrial, Utility, and Finance, encompassing both US and non-US Corporations.

The **HFRI Fund Weighted Composite Index** is a global, equal-weighted index of over 1,500 single-manager funds that report to HFR Database. Constituent funds report monthly net of all fees performance in US Dollar and have a minimum of \$50 Million under management or a twelve (12) month track record of active performance. The HFRI Fund Weighted Composite Index does not include Funds of Hedge Funds.

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