Tactical Tilts and Forgone Diversification

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Tactical timing of markets or strategies is notoriously difficult. We demonstrate that even an investor with some positive tactical timing skill may do more harm than good, depending on how investment performance is measured.

Introduction

Tactical timing may be defined as dynamically changing allocations to two or more assets or strategies (or between a single asset and cash) in an attempt to increase returns.[1] While rebalancing to constant weights already requires some turnover, tactical timing typically involves additional turnover and so any benefit must exceed the additional transaction costs incurred.

Investors tend to forget that tactical timing may incur a further penalty, which relates to forgone diversification. This penalty is larger for assets or strategies with low correlations to each other. So, for example, the penalty is more significant for tilts between stocks and bonds than for tilts between highly-correlated equity sectors or countries.

But does diversification really generate returns? There has been some debate on this topic. All else being equal, a more diversified portfolio will have a lower volatility, and hence a *higher Sharpe ratio*. The higher Sharpe ratio may be enough to convince many investors – for example those prepared to use leverage, or those who simply prefer to consider risk-adjusted performance. Investors who focus solely on expected return should choose how to measure it; greater diversification can improve – and hence tactical timing potentially degrades – some but not all measures of expected return.

We use a simple hypothetical strategy of tactical tilts between two risky assets to measure the cost of forgone diversification, and hence quantify the level of tactical skill needed to improve performance. In an extension, we consider the case of tactically timing a single risky asset.

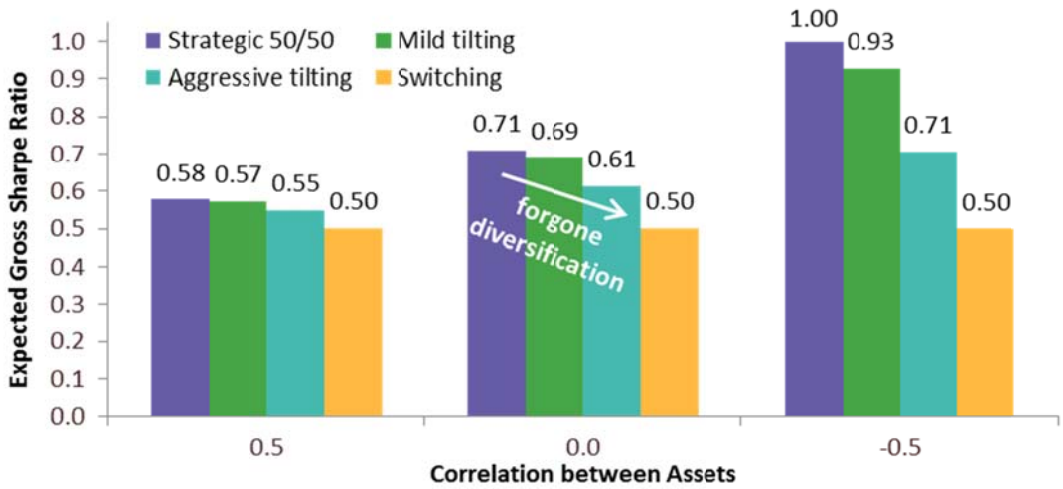
At AQR, we are continuously researching potential indicators of time-varying returns of assets and investment strategies. But we also believe in diversification, and we therefore employ such tactical signals only where, and in such a way that we believe they can overcome the diversification hurdle described in this note.

[1] Volatility- or risk-targeting is a related but distinct dynamic process that relies only on risk forecasts and is not applied with the intention of boosting returns.

A Simple Model of Tactical Asset Allocation

Consider a portfolio of two assets with expected volatilities of 10% and expected arithmetic Sharpe ratios of 0.5. Our illustration can easily be expanded to include more than two assets, and represents the common practice of tactical asset allocation. The expected Sharpe ratio of an equally-weighted ("strategic") portfolio of the two assets depends on the correlation between them, and hence the amount of diversification involved. **Exhibit 1** illustrates this dependency (purple bars), and then shows the corresponding expected Sharpe ratios for dynamic strategies, *assuming the tilts are applied randomly and have no predictive power*. The "mild tilting" strategy applies tilts with an average of +/-10% (maximum of +/-20%), while the "aggressive tilting" strategy applies tilts with an average of +/-25% (maximum of +/-50%, i.e., asset weights can vary from 0-100%). The "switching" strategy illustrates the extreme case of tactically switching capital entirely from one asset to the other. In this last case there is no diversification and the portfolio has the same expected Sharpe ratio as the single assets (here 0.5), regardless of correlation.

Exhibit 1 | ***Expected Sharpe Ratios for a Two-Asset Portfolio under Three Different Allocation Regimes***



Source: AQR. Provided for illustrative purposes only. Theoretical arithmetic Sharpe ratios gross of transaction costs and fees, assuming asset volatilities of 10% and arithmetic Sharpe ratios of 0.5. Transaction costs will likely further penalize the more dynamic tactical strategies. Please read important disclosure at the end of this document.

The left-hand group of bars, representing positively correlated assets, can be likened to a sector or country allocation strategy within an equity portfolio. In this case, the amount of forgone diversification is small and an investor with reliable return forecasts is likely to be able to improve the portfolio Sharpe ratio by making tactical bets. Similarly, so-called "smart beta" or other actively-managed portfolios of equities with higher expected returns, selected from a larger universe, are unlikely to be forgoing much diversification because equities tend to be highly correlated (indeed, many smart beta portfolios seek to be *more* diversified than cap-weighted indices, by applying a more equal or beta-adjusted weighting to their constituents).

The middle group of bars, representing uncorrelated assets, can be likened to a stock-bond allocation strategy.[2] Here the amount of forgone diversification is larger, representing a significant hurdle for tactical tilts to improve on the strategic Sharpe ratio.

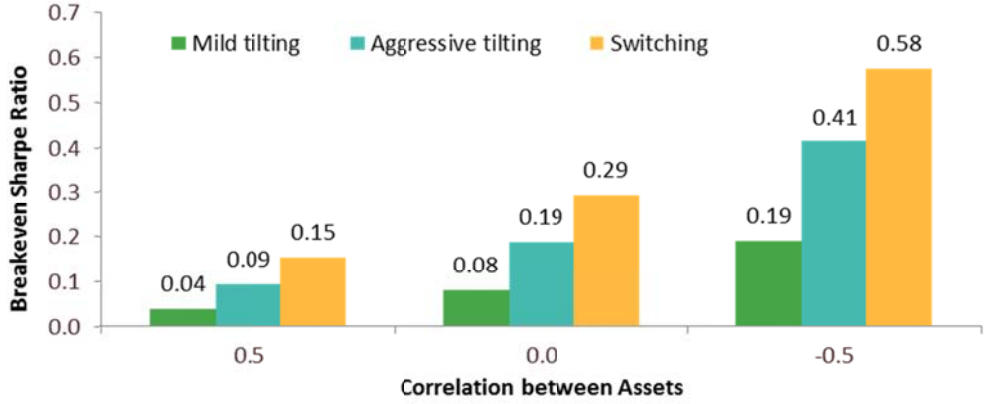
The right-hand group of bars, representing strongly diversifying assets, can be likened to a portfolio of market-neutral value and momentum strategies, which have historically exhibited significantly negative correlations. Here the diversification benefit is the largest, and hence the case for strategic allocations the strongest.

Exhibit 1 raises three questions that we answer below:

1. Are we just saying a tactical strategy has unequal, undiversified allocations on average?
Partly, yes. When the mild tilting strategy is applying its *average tilt* of 10%, its allocations to the two assets are 60% and 40%. It is therefore not surprising that the expected Sharpe ratio of this strategy is close to the expected Sharpe ratio of a static 60%/40% allocation. But in fact it is slightly lower. This is because time-varying volatility does not average in the same way as time-varying allocations: the full-sample volatility is slightly higher than is implied by the average allocations. This additional effect may be considered an extra penalty, due to forgone diversification *through time*. We will see this effect again in the extension on single-asset timing.

2. How good do tilts have to be to regain the strategic Sharpe ratio?
Each tactical portfolio is just the sum of the strategic portfolio and a long/short tactical overlay. From the additional tactical return needed to regain the strategic Sharpe ratio, and the volatility (tracking error) of the overlay, we can calculate a "breakeven Sharpe ratio" for each long/short tactical overlay, as shown in **Exhibit 2.** This is the Sharpe ratio that the tactical element must achieve just to get the tactical investor back on terms with his strategic counterpart. **The hurdle is higher for more aggressive tilts, and for tilts between more diversifying assets.**

Exhibit 2 | ***Breakeven Sharpe Ratios for Two-Asset Tactical Overlays***



Source: AQR. Provided for illustrative purposes only. Theoretical arithmetic Sharpe Ratios gross of transaction costs and fees, assuming asset volatilities of 10% and arithmetic Sharpe ratios of 0.5. Transaction costs will likely further penalize the more dynamic tactical strategies. Please read important disclosure at the end of this document.

[2] Stock-bond correlations have varied significantly over time but the long-term average is near zero. Stocks and bonds have very different volatilities; for such assets, the optimal strategic allocation that we show here should be considered to be a 50/50 risk, not capital allocation.

A tactical timing strategy is intrinsically a narrow, concentrated bet, and for it to achieve a long-term Sharpe ratio of 0.3-0.5 the success rate or "hit-rate" would need to be impressively high.[3] A hurdle of less than 0.1 (as seen for a portfolio of correlated assets) seems more acceptable.

3. Does lower Sharpe ratio mean lower return?

In general, diversification increases Sharpe ratios by reducing volatility and not by increasing returns. Some strategies seek to convert diversification effects into higher expected returns by applying leverage to regain a higher risk target. In the absence of leverage, should return-seeking investors care about forgone diversification?

Exhibit 3 shows some simulated measures of expected returns for the same simple portfolios as Exhibits 1 & 2, using the same assumptions, for the central case of uncorrelated assets. The geometric mean (GM) rate of return and the median terminal return are reduced in the tactical portfolios due to forgone diversification. These reductions are not as large as the reductions in Sharpe ratio, but we reiterate that transaction costs from increased turnover[4] are sure to cause further reductions in expected returns.

Exhibit 3 | ***Expected Return Measures for a Two-Asset Portfolio under Different Allocation Regimes***

	Strategic 50/50	Mild Tilting 10%	Aggressive Tilting 25%	Switching
Arithmetic Mean (AM) Rate of Return	5.0%	5.0%	5.0%	5.0%
GM Rate of Return	4.9%	4.9%	4.8%	4.7%
10Y Terminal Return (mean)	65.0%	65.0%	65.0%	65.0%
10Y Terminal Return (median)	61.0%	60.7%	59.4%	56.9%
Volatility	*7.1%*	*7.2%*	*8.1%*	*10.0%*

Source: AQR. Simulated results are provided for illustrative purposes only. Based on 10-year simulations with monthly rebalancing, assuming two uncorrelated assets with volatilities of 10%, expected arithmetic Sharpe ratios of 0.5, and expected normally-distributed serially-independent returns. Gross of transaction costs and fees. Transaction costs will likely further penalize the more dynamic tactical strategies. Please read important disclosures at the end of this document.

Conclusion

An investor with reliable time-varying return forecasts may be justified in applying tactical tilts, but we believe these are concentrated and often low-conviction bets and should be sized appropriately. Above and beyond the difficulties of generating reliable time-varying forecasts, investors should understand that tactical timing incurs a mechanical Sharpe ratio penalty which is larger for portfolios of more diversified assets or strategies. For a portfolio of diverse investments with low correlations to each other, balanced strategic allocations are particularly hard to beat.

[3] It is straightforward to express these breakeven Sharpe ratios as breakeven "hit-rates." For example, a Sharpe ratio of 0.2 (or 0.4) means that to outperform the strategic portfolio, the tactical trade must be profitable in 52%(55%) of months, or in 58%(66%) of years (assuming normally-distributed returns). A 51% hit-rate is not enough.

[4] We do not consider the impact of transaction costs here, partly because costs are dependent on the instruments used. In general, tactical timing of highly liquid instruments such as futures is more viable than the timing of less liquid investments.

Extension: Tactical Timing of a Single Risky Asset

How do the above findings translate to the timing of a single asset, such as the stock market? An unlevered investor dynamically allocating between cash and equities will clearly forgo some of the expected equity premium due to being underinvested on average. We wish to focus instead on forgone diversification, so we remove this effect by considering an investor employing leverage to dynamically allocate somewhere between 50% and 150% of his capital to the risky asset, with *100% invested on average*.

In this single-asset case, there is no diversification between assets. If our confident investor's tactical bets have no predictive power, surely he will still match the buy-and-hold portfolio over the long-term (gross of costs), since the impact of his tilts will average out to zero? Actually, no. By introducing time-varying risk into his portfolio, the investor is effectively forgoing diversification through time, as we discussed earlier. **Exhibit 4** shows the expected return, volatility and Sharpe ratio of this strategy compared to buy-and-hold (for an asset with 15% volatility), as well as the breakeven Sharpe ratio of the tactical bets.

Exhibit 4 | ***Expected Performance Statistics for Tactical and Buy-and-Hold Strategies***

	Buy and hold 100%	Tactical 50%-150%
AM Rate of Return	7.5%	7.5%
GM Rate of Return	6.7%	6.6%
10Y Terminal Return (mean)	112.0%	112.0%
10Y Terminal Return (median)	89.2%	87.3%
Volatility	15.0%	15.6%
Arithmetic Sharpe Ratio	0.50	0.48
Geometric Sharpe Ratio	0.45	0.42
Breakeven Tactical Sharpe Ratio		0.07

Source: AQR. Simulated results for illustrative purposes only. Tactical allocations uniformly distributed in the range 50-150%. Based on 10-year simulations with monthly rebalancing, assuming asset volatility of 15%, expected arithmetic Sharpe ratio of 0.5, and expected normally-distributed serially-independent returns. Gross of transaction costs and fees. Transaction costs will likely further penalize the tactical strategy. Important disclosures are at the end of this document.

The tactical strategy has to overcome a lower expected Sharpe ratio and median terminal return (without considering its higher transaction costs). The hurdle is modest and clearly a winning tactical bet – correctly forecasting a bull or bear market – could reap gains that easily overcome it. But over the long term, the tactical investor must continue to make winning bets if he is not to fall behind his more humble strategic counterpart.

It is worth adding that even a strategic asset allocation or a buy-and-hold strategy is not very diversified through time, because market volatility varies significantly. A *volatility-targeted* portfolio aims to improve time-diversification by adjusting notional positions inversely with volatility forecasts. By the reverse process of that discussed above, this may result in a small increase in Sharpe ratio. But any effect on Sharpe ratio is peripheral to the main aim of volatility-targeting, which is to improve risk management by producing more stable and predictable volatility outcomes for the portfolio.

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