

A Risk Framework for Core-Satellite Portfolio Construction

February 5th 2014

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Abstract

Market volatility, new technology, and diverse manager styles have combined to make the portfolio construction process more complex. Gone are the days of only using risk tolerance based, style-box portfolios, but unfortunately they are being replaced with a less mathematically based core-satellite structure. This paper examines the issues related to risk control in this structure and provides illustrations on how to identify and manage the risks associated with core-satellite portfolio construction.

The cycle continues. Market pullbacks make investors flock to tactical managers that call the drawdown. Then, tactical underperformance in the uptrend gives ammunition to 'buy and hold' proponents, as they make investors question the validity of 'timing' the markets. The argument seems new but can be traced back for decades as the market peaks and troughs. The 2008 sell-off caused a whole new generation of advisors and investors to transition to tactical managers, as diversification did not provide relief when correlations between classes increased and only 'getting out' seemed to work. The industry had adopted the 'core satellite' model to describe a way of incorporating both styles into a single portfolio, but that is just a graphic representation of a portfolio where no cohesive mathematical process exists to create it. Worse yet, it takes the proven benefits of diversification and ignores the correlation, return, and risk components and turns it into a blunt, "use a little of everything and maybe something will work" portfolio creation process.

Technology has made it very easy to create these multiple manager/style portfolios as advisors have increased access to the turnkey asset management programs (TAMPs) that make moving money from manager to manager as easy as buying and selling a mutual fund. If the managers were using distinct individual classes and the advisor was creating a diversified portfolio utilizing those managers, there would be no issues with risk control. Risk control would remain at the firm level, where investment committees create capital market assumptions and their corresponding risk tolerance based models. The separate accounts would simply be substitutions for the previously used mutual funds or ETFs.

A problem is created, however, as advisors begin to utilize tactical or absolute return managers that have no mandate to remain in any individual class. They can position their portfolio anyway they deem fit, occasionally providing general guidelines as to equity exposure, leverage, ability to short, or other various self-imposed limitations.

The following illustration details the issues that face advisors as they combine strategic core and tactical satellites for investor portfolios.

The core may be a diversified portfolio of funds, ETFs, or separate account managers, but what they will have in common is a long term strategic methodology. The manager or advisor may use annual rebalancing, but the general allocation will remain constant over time and match the investor's risk tolerance.

In this example, let's say the overall risk tolerance of the client is "growth" and the advisor and customer agree on an allocation of 75% equities and 25% fixed income. (These allocations are actually much more complex, but for now let us only look at the two asset class portfolio)

In the past, the buy and hold portfolio would be rebalanced, but the fixed income to equity ratio would not change unless the client's overall risk tolerance changed.

Now, let us consider tactical managers. These managers stay within an allocation framework that they self-prescribe. Equity exposure could range from being short the market to being over 100% exposed through use of leverage. This "range of allocation" is the framework that an advisor needs to assess in determining the potential risk being taken as part of a tactical strategy.

Tactical managers would like you to use their previous standard deviation or maximum drawdown as a measure of risk, but this greatly understates the true risk of a strategy. This brings us to the key point of this risk framework:

It is not the risk statistics of the previous track record that should be used in the analysis, but the risk statistics of the riskiest potential portfolio you might get by investing with the manager.

When analyzing the history of tactical managers, even those with 10-year track records, the sample size of "decisions" is really quite small. Managers who trade monthly have reduced the decade to only 120 data points. The sample is even smaller when you isolate the 'calls' that add most of the return benefit over the time frame. This is especially troubling now, as the most recent decade was very favorable to certain technical styles due to the extreme nature of the market down moves and the industry is enamored with the corresponding survivorship bias. Most of the alpha comes from a few good decisions surrounded by long periods of high fees. It would be better, although more complex, to analyze how a particular trading 'style' does over various price action cycles, but that is a subject for another paper.

Looking only at a tactical track record also skews a more common question that advisors have been asking for years. "How much risk did you take to get those returns?" In the past, the consolidation of a portfolio into a few asset classes would have been immediately identified as riskier than the diversified allocation. However, the tactical managers that employ these strategies are currently being viewed as "less risky" because they did not have losses like the general markets in the last drawdown.

This blurs the definition of risk in a portfolio. Using traditional risk measures on a relatively small sample size of decisions is perilous at best. Using only one data point as a definition of risk, such as not losing in 2008, puts all the emphasis on the manager always being right on future calls.

Most tactical managers understand this, which is why they never would suggest you move all of a client's money to them. Of course, they are also unclear about the amount a customer *should* allocate to them and often use arbitrary numbers like 10 or 25%. They want to manage money and beat their own benchmarks, and are not concerned with the effect on the end retail client. They leave that decision up to the advisors. However, many advisors do not have the proper skills to do this type of evaluation. We tend to view these styles as nothing more than just side trading accounts. It is fine to have them in small amounts as alternative choices in a portfolio, but they should be recognized for what they are. Without a deep analysis of style combination, they should probably be used less than in the proportions seen today.

Based on the investment style, we question why they are not treated more like the managed futures vehicles that are currently available. Managed futures companies tout the diversification benefit of including many different traders and firms as they commingle large groups of institutions utilizing multiple commodities. With "Tactical" managers we think most advisors are looking at the investment vehicle being used and not the risk in the style itself. They feel that if a trader is using ETFs such as SPY instead of a corresponding S&P 500 futures contract, it must be investing rather than trading. After accounting for leverage the risk of those two investments is the same. When leverage is added internally in the ETF, instead of externally through the use of margin, this is a potentially catastrophic mistake.

The proposed solution is to use the risk statistics of the riskiest potential portfolio a manager may utilize in a given strategy. After all, if a tactical manager is using leveraged equity and is at their most aggressive posture, they are taking the same risk *on that day* as a leveraged equity manager that employs a longer term approach. Tactical strategies on any given day are exposed to the risk of the portfolio they are holding, and therefore the most aggressive possible portfolio should be used as a 'value at risk' calculation benchmark.

The first step an advisor needs to take from a risk standpoint is to determine the potential range of allocations a tactical asset manager will employ and then relate that information into a total potential range for the investor. This requires a deeper understanding of the decision making process of the tactical manager and the trust that they will continue to abide by it.

We will continue with our previous example of a 75% equity 25% fixed income "growth" investor and expand it into a core satellite structure using a tactical manager.

Example 1

To start, let's define the following variables

%C The amount allocated to the Core Portfolio

EIC The long term allocation of equities in the Core Portfolio

LTeq = %C x EIC and represents the long term exposure to equities that is not adjusted by the inclusion of tactical management. Coincidentally, this number is equal to the lowest potential equity percentage in the total portfolio created in a core/satellite model if tactical managers don't go short the equity markets.

(Potential Low Eq)

The addition of tactical management necessitates the following variables:

%T The amount allocated to the tactical manager

LoT% The low equity level based on tactical manager style

HiT%. Highest tactical equity including leverage, also based on manager stated style

The equation representing the low potential allocation to equity from the tactical manager (**PMlo%**) would thus equal:

$$\%T \times \text{LoT}\% = \text{PMlo}\%$$

And the high allocation to equity from the tactical manager (**PMhi%**) would be:

$$\%T \times \text{HiT}\% = \text{PMhi}\%$$

When an advisor decides to use a tactical manager that can go from 100% fixed income to 2X leveraged equity exposure, those calculations result in the following.

$$\text{LoT}\% = 0$$

$$\text{HiT}\% = 200\%$$

The advisor then decides to give 25% of the portfolio to that manager, while leaving 75% in the core. The core holds a long term 75% equity position.

%C = 75%
%T = 25%
EIC = 75%

By adding the long term equity exposure in the core to the potential low exposure of the tactical manager we can derive the lowest equity exposure of the total portfolio:

Potential Low Eq = LTEq + PMlo%

We can also derive the maximum equity exposure of the portfolio with the following:

Potential High Eq = LTEq + PMhi%

This 'potential' range of the total investor portfolio is what needs to be determined when constructing a core satellite model. At some point in time, the client will be in a portfolio at some level between these two values, and the advisor needs to understand the possible impact to the total portfolio if a sudden sell off occurs when the tactical manager is at its most aggressive position.

With the assumptions we have so far, we have created a potential range of total equity exposure from **56.25%** to **106.25%**. **See table below:**

Growth investor. 75% equity / 25% fixed income long term allocation,									
75% to core model. 25% to tactical manager. 0 to 2X equity exposure									
%C	EIC	LTEq	%T	LoT%	HiT%	PMlo%	PMhi%	Potential Low Eq	Potential High Eq
75%	75%	56.25%	25%	0%	200%	0%	50%	56.25%	106.25%

If the initial risk tolerance of the customer was "growth", advisors need to realize that there will be a time that an investor will have 106.25% exposure to equity markets. This over-allocation to equities is the reason we stated earlier that there is an over-reliance on the manager continuing to be correct in the future if only the track record is used for evaluation. On that day, the 'growth' investor is exposed to an amount of equities that greatly exceeds their risk tolerance, and that only 'works' if the tactical manager is always right.

So let's provide another example. We can solve some of the problem by only using tactical managers that do not use leverage. The table looks like this:

Growth investor. 75% equity / 25% fixed income long term allocation,									
75% to core model. 25% to tactical manager. 0 to 100% equity exposure									
%C	EIC	LTeq	%T	LoT%	HiT%	PMlo%	PMhi%	Potential Low Eq	Potential High Eq
75%	75%	56.25%	25%	0%	100%	0%	25%	56.25%	81.25%

In this case, we have created an equity range of 56.25% to 81.25%.

This might look like a better range for an investor with a "growth" tolerance. 81.25% is not that far above the initial 75% target and a compliance officer may not flag the over- allocation, but what happens in a multi asset class portfolio?

While an over-allocation to large cap domestic equity may not seem too extreme, the problem is amplified in the multi asset class portfolio. When the tactical manager concentrates risk in classes that have smaller strategic allocations, things start to look very different. What if the tactical manger in the above examples decides to go into all emerging markets or use all banking sector ETFs? The **PMhi%** would be the amount allocated to that class. The fact that the investor would already be exposed to the class in the core makes it even worse.

Tactical managers are interested in making these concentration bets to add value.- They have no knowledge, nor do they care to know, of the allocation and exposure of the core holdings. From the investor's viewpoint, a **50% PMhi% plus the amount in the core allocation** to emerging markets is over-concentrated and would probably not fall on anyone's efficient frontier.

These two problems, **overall risk exposure** and **over-concentration risk**, go to the root of the problem with core satellite portfolio construction. The lack of risk control gets even worse when you consider using multiple tactical managers with varying mandates, leverage, shorting, etc.

To properly apply this framework, you could use a database that could look at the potential manager decisions, apply percentages to those managers and combine those parameters with the core holdings to create quantifiable parameters of high and low risk exposure. Even then, the over-concentration would still be out of your hands because each tactical manager would act alone in their own best interests.

The development of and expanding use of technology has helped create new efficient portfolio construction tools. These new platforms allow access to a multitude of separate management styles (core asset classes, active tactical styles, and other alternative managers) and vehicles (mutual funds, ETF's, and separate account managers) within a single portfolio. However, this flexibility also exposes the advisor and, ultimately, the client to potential **unintended risk**. As demonstrated above, combining non-traditional managers together with a strategic portfolio creates significant issues. Using the Core/Satellite construct, the advisor must now have the methodology and systems to analyze the real risk of the resulting portfolio including potential over-exposure and concentration risk. Advisors must now understand and quantify the maximum risk of each manager and style and then calculate the cumulative effect of those decisions on the risk of the overall portfolio. Only through this analysis can an advisor and client truly match the risk of a portfolio to a given risk tolerance of the client.

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Premise Capital Frontier Based Tactical™

It is widely accepted that controlling the exposure to the asset classes is the most important part of portfolio construction, yet that is exactly what one loses in the core/satellite structure. In 2009, as part of Scott's advisor team at LFA, Jason built a database to analyze the range of possible asset allocations in the Core/Satellite portfolios created by utilizing the various available managers and styles. While this allowed the team to control the ultimate equity/fixed income exposures they realized it still left portfolio construction deficiencies. Multiple manager styles in a core/satellite framework would all work to negate each other, or worse, all make calls in the same direction, creating over-concentration risk. Feeling the real solution to the problem was to overlay the tactical shifts on top of the strategic allocation, Jason and Scott formed Premise Capital, LLC to further develop their thesis.

The emphasis, they believed, should be on the exposure to the class, not on the random addition of multiple styles. Overlaying the tactical movements would allow the shifts to be grounded in their relationship to the longer term strategic allocation. A manager could over and underweight the actual exposure an investor has instead of having multiple managers all acting in their own interests of absolute return. Over and underweighting would be done intentionally within a defined framework of the investor's total equity range, with the goal of always maintaining a diversified portfolio. This solves the issues of overall risk exposure and concentration risk and gives a basic concept to employ in portfolio construction.

This tactical overlay on top of the strategic allocation is how Premise Capital manages its portfolios. We control the exposure to each class relative to each other in a diversified portfolio that remains on the Efficient Frontier. Then, acknowledging that there are also times that risk is not being rewarded, we also tactically shift along the curve to a more conservative diversified position when the situation warrants.

Premise Capital's Frontier Based Tactical™ process uses this dual tactical shift to create allocations for our Frontier Advantage Portfolios™. These portfolios are rooted in mathematically based, widely accepted, and risk controlled portfolio construction methodologies. This technique gives the Advisor and their client total control of how much risk a specific portfolio will be exposed to both in "good times" and in "bad".

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