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Portfolio Strategy

Generic Shorts in Active 130/30 Extensions

Generic investments such as ETF's and index funds provide exposure to a specific sector or to a broad market index. Since generics have zero alpha relative to their respective benchmarks, they can be viewed as consuming or generating funds without disturbing the portfolio's active position structures.

In a long/short fund, generics can "top off" one side or the other in order to balance the portfolio to a desired net level of investment. Compared with balancing through the use of low alpha or marginal security-specific positions, generics have the advantage of being less research-intensive, more liquid, and more readily sustained over time.

Active portfolios often embed factor exposures that are less than fully-productive in alpha terms. An appropriate basket of generics can limit unwanted factor effects, lower tracking errors, and improve information ratios.

In active 130/30 extensions, it can sometimes be difficult to find a full complement of active short positions. This paper presents a simplified model that illustrates how zero-alpha generics can provide funds needed for reinvestment, augment long alphas, and offset potential factor effects.

A generalization of the generic concept can be applied to any active portfolio by separating out an "Activity" component containing all positions whose primary purpose is alpha generation. The remaining positions then consist of basic market weights, fragmented overweights and underweights, as well as literal generic instruments. The percentage weight devoted to this Activity component, usually well below 50%, plays an important role in assessing the portfolio's alpha-producing capability.

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Generic Shorts in Active 130/30 Extensions

Summary & Conclusions

The potential benefit from active extension is derived from: 1) the opportunity to augment the active positions in the long portfolio, 2) the use of the short positions to offset unproductive factor risks in the long positions, and 3) the addition of fresh active short positions with positive alphas. Our previous Note [1] analyzed the relative contribution from these three effects on portfolio alphas and information ratios (IR's).

One of the cases examined was referred to as Long Reinvestment Only (LRO). The short extension was basically index-like with zero cost, zero alpha and zero residual volatility. However, this short extension did generate proceeds that could be reinvested in order to augment the original alpha-producing long positions. This situation essentially represented a form of leverage that proportionally increased the existing long active positions with no alpha or offset impact from the short positions. The net result was a constant IR as any alpha increase was matched by a corresponding increase in tracking error (TE).

This Note explores the use of more customized generic shorts that have the ability to offset factor effects in the long portfolio. These generics can be thought of as style/sector-specific instruments such as ETF's or tailored baskets that are tied to an existing factor in the long-only portfolio. Thus, the crux of this analysis is that while these generic shorts have zero alpha, they can still provide benefits in terms of providing reinvestable funds and correlation offsets.

The Short Generic Model

In our basic model, the long-only portfolio has 25 positions with 2% active weights, leading to an initial active weight of 50%. An exponential alpha ranking curve is assumed, which begins at 5% and then declines to 1.5% by the 25^{th} position. The residual volatility of each active position is 20%. Most portfolios will have multiple factors that represent exposures of the individual positions to common variables. These include factors that may be value-based (Dividend Yield, Book/Price, Earnings/Price), growth-based (EPS Growth, Long-Term Growth Rate) or factors related to various industries and sectors. Our simple model for these unproductive factor effects is a +0.05 pairwise correlation across all long positions. The resulting long-only portfolio has an alpha of 1.46%, TE of 3.0% and an IR of 0.49.

The characteristics of the generic short portfolio will be quite different. Due to management fees and tracking/trading transactions, there will be costs associated with using generic shorts even though they have a zero alpha expectation. In order to estimate the residual volatilities for the generic shorts, a sample of style-based ETF returns was taken which yielded an average residual volatility of 5%. For simplicity, the generic short portfolio is modeled as a single position on the short side having this 5% residual volatility. The correlation of this single generic short with each long portfolio was set at -0.25, a value that would enable the generics to fully offset the 0.05 correlation within a long portfolio of comparable size.

Extensions with Generic Offsets

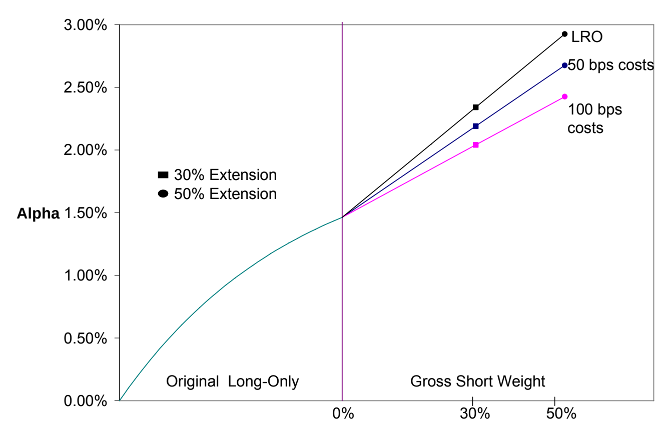
The LRO case treated the generic shorts as having no alpha or TE effects. However, there are opportunities to offset unproductive correlations (and better control TE) with more focused generic shorts. The tradeoff is the costs associated with the generics that can erode the overall portfolio alpha.

The following Exhibits include the LRO case from our earlier Note along with two generic offset cases with shorting costs of 50 bps and 100 bps.

Exhibit 1 compares the portfolio alpha for the three different cases. The LRO portfolio alpha rises proportionally with the increasing active weight, leading to a 2.93% alpha at a 50% short weight. With 50 bps and 100 bps generic shorting alpha costs, the portfolio alpha at the 50% short weight declines to 2.68% and 2.43%, respectively. This 25 bps and 50 bps alpha reduction is simply a function of the 50% short weight multiplied by the 50 bps and 100 bps costs.

Exhibit 1

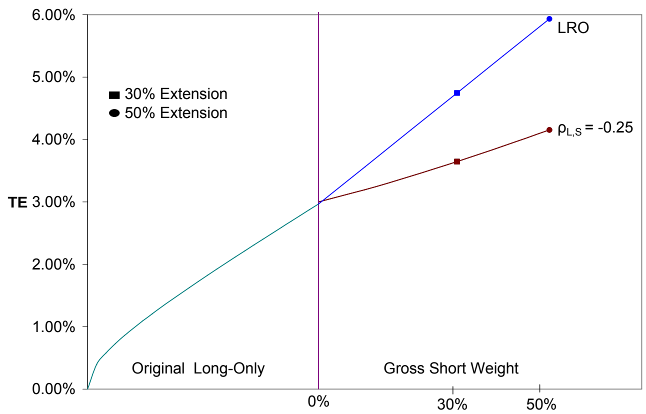
Alpha vs. Short Weight



Source: Morgan Stanley Research

Exhibit 2 now turns to the TE. The -0.25 offset situation results in a significant drop in TE versus the LRO case. At a 50% extension, the active weight in each position rises from 2% to 4% and the associated TE grows to 4%.

Exhibit 2
TE vs. Short Weight

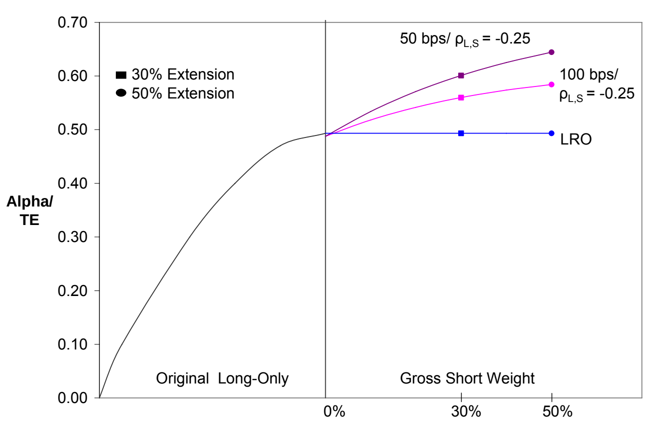


Source: Morgan Stanley Research

Information Ratios

Exhibit 3 combines the alpha and TE's to generate IR curves based on the alpha/TE ratio. With LRO, the IR stays constant at 0.49 as the higher alphas are obtained with a comparable increase in TE. In the cases with a -0.25 offset, the IR rises into the 0.60-0.65 range. Thus, a 20-30% improvement in IR can be obtained with the use of generic shorts as offsets.

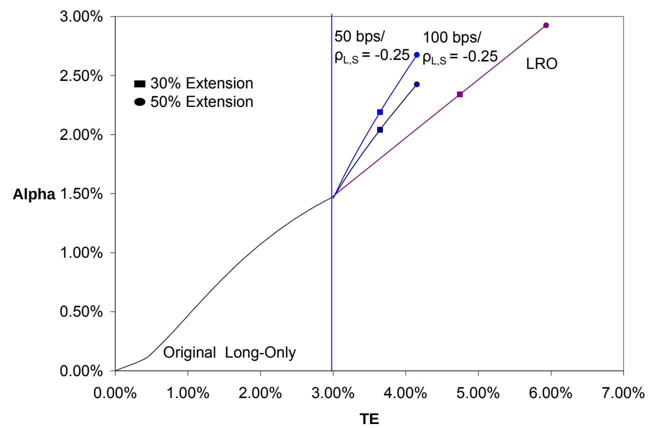
Exhibit 3
Alpha/TE vs. Short Weight



Source: Morgan Stanley Research

Exhibit 4 separates the alpha/TE ratio into its two components. The 30% and 50% points on each curve are marked by squares and dots, respectively. The alphas fall between 2.0-2.3% at a 30% short weight and between 2.4-2.9% at a 50% short weight. The TE's have a much wider range: between 3.7-4.8% at 30% and 4.2-5.9% at 50%.

Exhibit 4
Alpha vs. TE



Source: Morgan Stanley Research

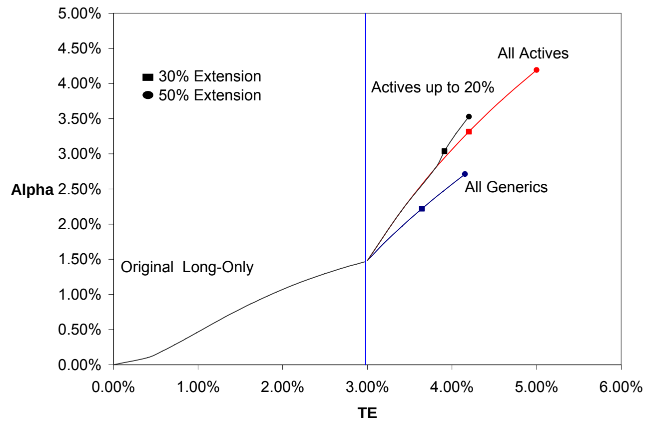
For situations where the binding constraint is a maximum TE such as 5%, the LRO would not be viable for short weights above 30%. For the -0.25 offset cases, the TE's fall below 4% for all short weights, with alphas increasing to 2.4-2.9%.

Generic Completions

In practice, individual alpha-generating shorts would generally be used to the extent possible. However, once all such specific shorts have been put in place, there may still be opportunities for deploying additional funds on the long side. In order to generate these funds, the portfolio manager may turn to generic shorts to "complete" the extension.

Exhibit 5 presents the alpha versus TE for three cases: 1) the offsetting all-generics with 50 bps costs (from Exhibits 1-4), 2) the all-active shorts, and 3) a mixed scenario when the first 20% short weight is actively invested while the remaining 30% of the extension is "completed" with generic shorts.

Exhibit 5
Alpha vs. TE: Generics and Active Shorts



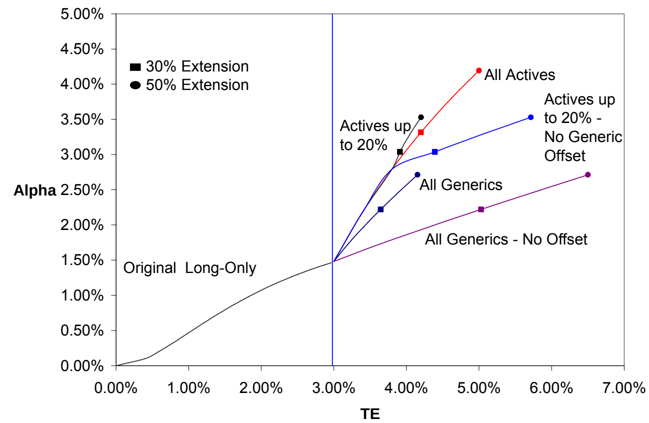
Source: Morgan Stanley Research

The fully active and 20% active/30% generic cases yield identical alphas and TE's for a 20% extension. At higher extensions, the generic shorts provide no alpha, and all the alpha benefits come from the reinvested longs. In terms of TE, the generic and the active shorts both act to offset the correlations within the long portfolio. However, the generic shorts have a lower overall volatility and hence have a lower TE contribution.

Thus, the use of offsetting generics allows for higher extension percentages — and higher alphas — to be obtained while staying within more clearly specified TE bounds. For example, with a 50% extension, the TE reaches 5% for all-actives but only 4.2% for the 20% active/30% generic case. At this 4.2% TE, the 20% active/30% generic case actually provides higher alphas than either the all-generic or even the all-active portfolio. Such generic completions would prove particularly valuable in a highly TE-sensitive situation.

The value of correlation offsets is underscored in Exhibit 6, where the results from offsetting generics are compared with generic completions that are simply independent of all long and short active positions. For a given extension level, the alphas will be close, but the portfolio TE's are seen to be much greater without the offsets.

Exhibit 6
Alpha vs. TE: Generic Shorts with No Offset



Source: Morgan Stanley Research

In practice, it is not unusual for situations to arise where the potential investment in active longs exceeds that available in active shorts (or vice versa). Some form of generic completion will then be needed to take full advantage of the alpha potential, while still maintaining beta neutrality. To the extent that offsetting generics can be found, the fund's alpha potential can be realized while restraining its TE to fall within tolerable limits.

References:

1) Leibowitz, Martin L. and Anthony Bova. "Active Return Drivers in 130/30 Extensions." Portfolio Analysis Note, August 27, 2007

Appendix

The Basic TE Model with Generics

In our previous paper, the number of long positions n_L and short positions n_S were both fixed. The weight ω assigned to each position was then determined by the total active long and short weights A_L and A_S,

$$\omega_L = \frac{A_L}{n_L}$$
$$\omega_S = \frac{A_S}{n_S}$$

Residual volatilities of σ_L and σ_S were assigned to both long and short positions, with pairwise correlations ρ_L and ρ_S <u>within</u> the longs and shorts, respectively, and ρ_{LS} <u>between</u> the long and short positions.

The portfolio tracking error (TE) was then given by

$$(TE)^2 = n_L\omega_L^2\sigma_L^2 + n_S\omega_S^2\sigma_S^2 + n_L(n_L - 1)\omega_L^2\sigma_L^2\rho_L + n_S(n_S - 1)\omega_S^2\sigma_S^2\rho_S + 2n_L\omega_L\sigma_L n_S\omega_S\sigma_S\rho_{LS}$$

When n_L and n_S are both reasonably large, the following approximation can be used,

$$\begin{aligned}(TE)^2 &\cong n_L\omega_L^2\sigma_L^2 + n_S\omega_S^2\sigma_S^2 + (n_L\omega_L)^2\sigma_L^2\rho_L + (n_S\omega_S)^2\sigma_S^2\rho_S + 2(n_L\omega_L)\sigma_L(n_S\omega_S)\sigma_S\rho_{LS} \\ &= \frac{A_L^2}{n_L}\sigma_L^2 + \frac{A_S^2}{n_S}\sigma_S^2 + A_L^2\sigma_L^2\rho_L + A_S^2\sigma_S^2\rho_S + 2A_L\sigma_L A_S\sigma_S\rho_{LS}\end{aligned}$$

However, in this paper with generic shorting, n_S =1, ρ_S becomes irrelevant and the ρ_S term effectively disappears. The above TE expression therefore becomes

$$(TE)^2 = n_L\omega_L^2\sigma_L^2 + \omega_G^2\sigma_G^2 + n_L(n_L - 1)\omega_L^2\sigma_L^2\rho_L + 2n_L\omega_L\sigma_L\omega_G\sigma_G\rho_{LG}$$

where we have now substituted the subsequent G for S to clarify our reference to the generic shorts.

Since $\omega_G = A_G$, the approximation now takes on the form,

$$(TE)^2 \cong \frac{A_L^2}{n_L}\sigma_L^2 + A_G^2\sigma_G^2 + A_L^2\sigma_L^2\rho_L + 2A_L\sigma_L A_G\sigma_G\rho_{LG}$$

TE Model with Generic "Completions"

The model becomes somewhat more complex when the short extension begins with specific short positions and is then completed with generic shorts.

Using the subscript S to refer to the specific shorts, the TE equation takes on the form,

$$(TE)^2 = n_L\omega_L^2\sigma_L^2 + n_S\omega_S^2\sigma_S^2 + n_G\omega_G^2\sigma_G^2 + n_L(n_L-1)\omega_L^2\sigma_L^2\rho_L + n_S(n_S-1)\omega_S^2\sigma_S^2\rho_S + n_G(n_G-1)\omega_G^2\sigma_G^2\rho_G$$
$$+ 2n_L\omega_L\sigma_L n_S\omega_S\sigma_S\rho_{LS} + 2n_L\omega_L\sigma_L n_G\omega_G\sigma_G\rho_{LG} + 2n_S\omega_S\sigma_S n_G\omega_G\sigma_G\rho_{SG}$$

As before, we assume that the generic is a single uniform position, so $n_G = 1$. For simplicity, we assume that $\sigma_S = \sigma_L$ and that $\rho_{SG} = 0$, i.e., that the generic short addresses different factors. The TE approximation then takes on the form,

$$\left(\frac{TE}{\sigma_L}\right)^2 = \frac{A_L^2}{n_L} + \frac{A_S^2}{n_S} + A_G^2\left(\frac{\sigma_G}{\sigma_L}\right)^2 + (A_L^2 + A_S^2)\rho_L + 2A_L A_S\rho_{LS} + 2A_L A_G\left(\frac{\sigma_G}{\sigma_L}\right)\rho_{LG}$$

Finally, if E is the total percentage extension, then the generic short acts as a completion piece,

$A_G = E - A_S$

and

$A_L = A_{LO} + E$

where A_{LO} is the active percentage of the original long-only portfolio.

Alpha Functions

The alpha function α_i depicts the i^{th} long position's expected return relative to the specified benchmark. This function is assumed to have an exponential form with an initial alpha α_o and a position-by-position decay rate μ,

$$\alpha_i = \alpha_o e^{-\mu(i-1)} \qquad i = 1, n_L$$

In this paper, the long alpha function has the values α_o =5%, μ=.05, and N_L=25

In general, for active weights ω_i, the expected alpha return for a long portfolio will be

$$\alpha_L(n_L) = \sum_1^{n_L}\omega_i\alpha_i$$
$$= \alpha_o\sum_1^{n_L}\omega_i e^{-\mu(i-1)}$$

In this paper, the active weight ω_i, in the long portfolio will be treated as uniform value ω_L across all 25 positions, so that

$$\alpha_L(n_L) = \alpha_o\omega_L\left[\frac{1-e^{-\mu n_L}}{1-e^{-\mu}}\right]$$

for the initial long portfolio with its 25 positions having 2% active weights.

In active extension, the new shorts create proceeds E that are reinvested proportionally across the 25 long positions, so that the total alpha combination from the longs is

$$\alpha_L(n_L)[1+E]$$

The active shorts are assumed to follow the same alpha pattern as the longs, less a shorting cost c_S. Thus, for n_s short active positions,

$$\begin{aligned}\alpha_S(n_S) &= (\alpha_o - c_S)\sum_{1}^{n_s}\omega_i e^{-\mu(i-1)} \\ &= (\alpha_o - c_S)\omega_S\left[\frac{1-e^{-\mu n_S}}{1-e^{-\mu}}\right]\end{aligned}$$

The short generics provide no alpha but they do incur a cost c_G. For an extension E with n_L long positions and n_S short actives, the portfolio alpha becomes

$$\begin{aligned}\alpha_P(E \mid n_L, n_S) &= \alpha_L(n_L)[1+E] + \alpha_S(n_S) - A_G c_G \\ &= \alpha_L(n_L)[1+E] + \alpha_S(n_S) - (E - n_S\omega_s)c_G\end{aligned}$$

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