

# Enhanced Active Equity Portfolios Are Trim Equitized Long-Short Portfolios

*More compact and less leverage.*

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**E**nanced active equity strategies, such as 120-20 or 130-30, are recent additions to the array of long-short strategies. An enhanced active portfolio has short positions but maintains full exposure to the underlying equity market, similar to an equitized market-neutral long-short portfolio. The question naturally arises as to how an enhanced active portfolio compares with the more familiar equitized market-neutral long-short portfolio.

This article compares these strategies, arriving at the somewhat surprising conclusion that an enhanced active equity portfolio can be seen as equivalent to an equitized long-short portfolio in terms of market exposure and security active weights, but it is more compact and uses less leverage.

## MARKET-NEUTRAL, EQUITIZED, AND ENHANCED ACTIVE PORTFOLIOS

Exhibit 1 shows a 1% portion of each of three hypothetical portfolios. This 1% is allocated to seven securities drawn from a broad universe. The first column gives each security's benchmark index weight, and the next gives the expected active return for each security. Active return is the return of the security in excess of the benchmark return.

The securities' weights in the benchmark are assumed to be symmetrical about the neutral (0.0% expected active return) security. The securities' returns are also assumed to be symmetrical.

For example, Security 1, the most attractive, is expected to have an active return of 3%, while Security 7, the least attractive, is expected to have an active return of -3%. The expected returns increase in magnitude as security

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# EXHIBIT 1

## A Trim Equitized Market-Neutral Long-Short Portfolio is an Enhanced Active Equity Portfolio

Security Number	Weight in Benchmark (%)	Expected Active Return (%)	Market-Neutral Long-Short			Equitized Market-Neutral Long-Short					Trim Equitized=Enhanced Active Equity			
			Weight in Market-Neutral Portfolio (%)	Active Weight (%)	Expected Contribution to Active Return (bp)	Weight in Market-Neutral Portfolio (%)	Weight in Benchmark Overlay (%)	Overlap (%)	Active Weight (%)	Expected Contribution to Active Return (bp)	Weight in Enhanced Active Portfolio (%)	Weight in Benchmark (%)	Active Weight (%)	Expected Contribution to Active Return (bp)
1	0.05	3.0	0.60	0.60	1.80	0.60	0.05		0.60	1.80	0.65	0.05	0.60	1.80
2	0.10	2.0	0.30	0.30	0.60	0.30	0.10		0.30	0.60	0.40	0.10	0.30	0.60
3	0.20	1.0	0.10	0.10	0.10	0.10	0.20		0.10	0.10	0.30	0.20	0.10	0.10
4	0.30	0.0	0.00	0.00	0.00	0.00	0.30		0.00	0.00	0.30	0.30	0.00	0.00
5	0.20	-1.0	-0.10	-0.10	0.10	-0.10	0.20	0.10	-0.10	0.10	0.10	0.20	-0.10	0.10
6	0.10	-2.0	-0.30	-0.30	0.60	-0.30	0.10	0.10	-0.30	0.60	-0.20	0.10	-0.30	0.60
7	0.05	-3.0	-0.60	-0.60	1.80	-0.60	0.05	0.05	-0.60	1.80	-0.55	0.05	-0.60	1.80

Active Weight as a % of Capital		1.00							1.00				1.00	
% of Capital Long	1.00				1.00	1.00					1.75			
% of Capital Short	1.00				1.00	0.00					0.75			
% of Capital Long + Short	2.00				2.00	1.00								
					3.00						2.50			

benchmark weights decline; the highest and the lowest expected returns come from the securities with the lowest benchmark weights.

The market-neutral long-short columns of Exhibit 1 give each security's weight in a market-neutral long-short portfolio, its active weight in the portfolio, and its expected contribution to the portfolio's return.<sup>1</sup> A market-neutral long-short portfolio invests 100% of capital long and sells 100% short. Assuming the longs and shorts are structured properly, the offsetting positions effectively cancel out market risk and return. There is thus no need for the portfolio to converge to benchmark weights to control portfolio risk. Every weight in a market-neutral portfolio is active in the sense of providing active return and/or reducing risk.

The exhibit shows the weight of each security in the market-neutral portfolio as being fully active. Furthermore, the absolute weights and the expected contributions to portfolio return of the long positions equal the corresponding absolute weights and return contributions of the short positions. The market-neutral portfolio allows symmetry between attractive and unattractive stocks, taking short positions that are equal in percentage terms to the long positions and that capture the equivalent amount of expected return.<sup>2</sup>

The market-neutral portfolio has no net exposure to any benchmark, so it will not capture market return or

risk. The investor can establish an equity market exposure, while retaining the active return of a market-neutral long-short portfolio, by combining stock index futures, exchange-traded funds (ETFs), or swaps with a market-neutral long-short portfolio. The result is a portfolio that has 200% of capital in long positions, representing 100% in individual securities held long plus 100% in the benchmark index overlay, and 100% of capital in short positions in individual securities. Unlike a market-neutral portfolio, the total weights in an equitized portfolio are no longer symmetrical between long and short exposures.

The middle columns in Exhibit 1 give for each security in the equitized portfolio its weight (as a percentage of capital) in the market-neutral portfolio, its weight in the benchmark index overlay, any overlap between a short position's weight in the market-neutral portfolio and its weight in the benchmark overlay, its active weight, and its expected contribution to portfolio active return. The market-neutral portion of the equitized portfolio is identical in composition to the market-neutral portfolio, but the equitized portfolio also holds the equity overlay, where the seven securities are represented at their benchmark weights.

The equitized portfolio thus has individual long and short positions in the seven securities as well as exposures to the same securities via the equity overlay. For example, it

holds a 0.60% weight of Security 1 in the market-neutral long-short portfolio plus the overlay with a 0.05% weight of the same security. Security 1's weight in the overall equitized portfolio is the sum of these weights, or 0.65%.

The short positions in the equitized portfolio's market-neutral portion overlap the weights in the benchmark overlay. Overlap represents an allocation of capital to offsetting long and short positions that neither add to active return nor reduce active risk. For Securities 5 and 6, overlap between the short position and the security's weight in the overlay represents 0.10 percentage point of capital, while for Security 7 the overlap is 0.05 percentage point.

The active weights and returns of the equitized portfolio are the same as the active weights and returns of the market-neutral portfolio. This stands to reason, because the overlay portion of the equitized portfolio is entirely passive; it offers no active return, only the return on the underlying benchmark. Furthermore, as with the market-neutral portfolio, the equitized portfolio's active weights and returns are symmetrical between long and short positions, even though its overall long and short exposures, including the weights in the benchmark overlay, are not symmetrical.

The last four columns of Exhibit 1 give for each security in an enhanced active portfolio its portfolio weight, benchmark weight, active weight, and expected contribution to active portfolio return. An enhanced active portfolio sells short individual securities in an amount equal to some percentage of capital and uses both the capital and the proceeds from the short sales to buy securities long. The market exposure of the short positions offsets the market exposure of the long positions purchased with the short sale proceeds, so the enhanced active portfolio has a net market exposure of 100% of capital. It thus offers the underlying benchmark index return and risk, in addition to the return and risk associated with its active positions.

Exhibit 1 shows that each security's weight in the enhanced active portfolio equals its weight in the equitized portfolio, when the latter's market-neutral portion is combined with the benchmark overlay portion, and any overlap is eliminated. Unlike the equitized long-short portfolio, however, the enhanced active portfolio has no overlap between short positions and benchmark exposures. Rather than shorting 0.10% of Security 5 while holding a 0.20% weight of Security 5 through the benchmark overlay, the enhanced active portfolio simply weights the security at 0.10%.

The active weights of the enhanced active portfolio equal the portfolio weights less the benchmark weights. These active weights, and the expected contributions to return, are identical to the active weights and returns of the market-neutral portfolio and the equitized portfolio. And they are also symmetrical between long and short positions. The symmetry of the active weights and returns holds, even though the enhanced active portfolio itself is not symmetrical long and short.

The enhanced active portfolio has sold short securities equal to 75% of the 1% of capital and purchased long positions equal to 175% of the 1% of capital. If the entire portfolio had similar characteristics to this 1% portion, it would be an enhanced active 175-75 portfolio. With 250% of capital in equity positions, this enhanced active 175-75 portfolio is more compact and uses less leverage than the equitized portfolio, which has the equivalent of 300% of capital in equity positions.

## TRIMMING AN EQUITIZED PORTFOLIO

The enhanced active portfolio is essentially a compact form of the equitized portfolio. Furthermore, one can transform an equitized portfolio into an enhanced active portfolio. The key is the overlap, shown in Exhibit 1, between the equitized portfolio's short positions and the benchmark weights represented in the equity overlay.

As we have noted, the equitized portfolio in Exhibit 1 has short positions in Securities 5, 6, and 7, which overlap with the securities' weights in the benchmark overlay portion of the portfolio. If the overlay were to consist of individual positions, rather than an index instrument, these overlaps could be eliminated.<sup>3</sup>

In the cases of Securities 5 and 6, reducing each short position by 0.10 percentage point and reducing each overlay exposure by 0.10 percentage point would eliminate the short position in Security 5 and the long exposure to Security 6. With Security 7, reducing the short position by 0.05 percentage point and reducing the long exposure by 0.05 percentage point would eliminate the long exposure. These operations eliminate the overlaps but leave the active weights unchanged, thus preserving expected portfolio performance.

These operations result in a "trim" portfolio.<sup>4</sup> Untrim portfolios are ones that hold long and short positions in the same security. Such portfolios can be made trim if the overlap can be eliminated without affecting the portfolio's overall performance.

The overlap in Security 5, the overlap in Security 6, and the overlap in Security 7 sum to 25% of the 1% allocation. Trimming this overlap results in a portfolio with 75% of 1% of capital short ( $100\% - 25\%$ ) and 175% of 1% of capital long ( $200\% - 25\%$ ). If the entire portfolio has characteristics similar to this 1% portion, the trim equitized long-short portfolio would be equivalent to an enhanced active 175-75 portfolio. In fact, trimming *any* equitized market-neutral long-short portfolio produces an equivalent enhanced active equity portfolio.

More generally, consider a market-neutral long-short portfolio that has  $100M\%$  of capital long and  $100M\%$  short, where  $M$  is a multiple of the investor's capital.<sup>5</sup> An equitized portfolio consisting of this market-neutral long-short portfolio and a benchmark index overlay is equivalent to an enhanced active equity portfolio with  $100(1 + E)$  held long and  $100E$  sold short.

$E$  is a quantity that we call the enhancement, equal to:

$$E = M - T$$

where

$$T = \sum_{i \in S} \min(|x_i|, b_i)$$

is the fraction of capital trimmed to eliminate simultaneous long and short exposures to the same security,  $x_i$  is the weight of the  $i$ -th security in the market-neutral long-short portfolio,  $b_i$  is its weight in the benchmark, and  $S$  is the set of securities sold short in the market-neutral long-short portfolio. The trimmed amount,  $T$ , has a minimum value of zero (corresponding to the case where there is no overlap) and a maximum value of one (corresponding to the case where there is complete overlap).

A special case is an equitized long-short portfolio that has long positions in the market-neutral portfolio equal to 100% of capital and short positions in the market-neutral portfolio equal to 100% of capital, and whose short positions completely overlap the securities' weights in the equity overlay. In this case, both  $M$  and  $T$  equal 1.00. This 200-100 portfolio thus has an enhancement of zero (i.e.,  $E = M - T = 0$ ). It reduces to a long-only portfolio, because the short positions completely offset the equity overlay. Such a complete offset eliminates the benefits of enhancement.

There is complete interchangeability between the various representations of trim equitized long-short portfolios

and their enhanced active equity equivalents. Exhibit 2 shows an example of this equivalence for an enhanced active 120-20 portfolio.

The three columns under enhanced active equity give portfolio weights, active weights, and expected returns for a 1% portion of this portfolio.<sup>6</sup> The long active weights equal 85% of the 1% of capital, and the short active weights equal 85% of the 1% of capital. As the next three columns show, these weights imply a market-neutral portfolio with 85% of 1% of its capital in all active long positions and 85% in all active short positions. If the entire portfolio had characteristics similar to the 1% portion,  $M$  would equal 0.85.

As the five columns under equitized implicit market-neutral long-short show, adding an equity market overlay to the active allocations produces an equitized long-short portfolio that has 1% of its capital allocated 185% long and 85% short.

With the equitized portfolio, however, the long security weights in the market overlay overlap the short positions in the market-neutral portion by 65% of the 1% allocation, so  $T$  equals 0.65. Trimming the overlap results in a portfolio with a 1% allocation that is 120% long and 20% short, as the last four columns of Exhibit 2 show.

If the entire portfolio has characteristics similar to this 1% portion, the trimmed equitized portfolio is equivalent to the starting enhanced active 120-20 portfolio. The enhancement is:

$$E = M - T = 0.85 - 0.65 = 0.20$$

Exhibit 3 provides a number of examples of equivalencies between equitized and enhanced portfolios. The first row shows the  $M$ ,  $T$ , and  $E$  for a 200-100 equitized market-neutral long-short portfolio, similar to the example in Exhibit 1. With an  $M$  of 1.00 and a  $T$  of 0.25, this portfolio is equivalent to an enhanced active portfolio that provides an enhancement of 0.75, or a 175-75 portfolio.

The second row gives the  $M$ ,  $T$ , and  $E$  for the special case of complete overlap between the short positions in the market-neutral portfolio and the equity overlay. Here  $T$  equals 1.00, and the equitized market-neutral portfolio is equivalent to an enhanced active 100-0 portfolio, which is a long-only portfolio. The third row describes the case where  $T$  equals 0.00; that is, there is no overlap between the short positions and the long exposures. The 200-100 equitized market-neutral long-short portfolio is therefore equivalent to an enhanced active 200-100 portfolio.

The fourth row provides an example similar to Exhibit 2. With  $M$  equal to 0.85 and  $T$  equal to 0.65, a 185-

## EXHIBIT 2

### An Enhanced Active Equity Portfolio is a Trim Equitized Market-Neutral Long-Short Portfolio

Security Number	Weight in Benchmark (%)	Expected Active Return (%)	Enhanced Active Equity			Implicit Market-Neutral Long-Short			Equitized Implicit Market-Neutral Long-Short					Enhanced Active Equity = Trim Equitized			
			Weight in Enhanced Active Portfolio (%)	Active Weight (%)	Expected Contribution to Active Return (bp)	Weight in Market-Neutral Portfolio (%)	Active Weight (%)	Expected Contribution to Active Return (bp)	Weight in Market-Neutral Portfolio (%)	Weight in Benchmark Overlay (%)	Overlap (%)	Active Weight (%)	Expected Contribution to Active Return (bp)	Weight in Enhanced Active Portfolio (%)	Weight in Benchmark (%)	Active Weight (%)	Expected Contribution to Active Return (bp)
1	0.05	3.0	0.55	0.50	1.50	0.50	0.50	1.50	0.50	0.05		0.50	1.50	0.55	0.05	0.50	1.50
2	0.10	2.0	0.30	0.20	0.40	0.20	0.20	0.40	0.20	0.10		0.20	0.40	0.30	0.10	0.20	0.40
3	0.20	1.0	0.35	0.15	0.15	0.15	0.15	0.15	0.15	0.20		0.15	0.15	0.35	0.20	0.15	0.15
4	0.30	0.0	0.00	-0.30	0.00	-0.30	-0.30	0.00	-0.30	0.30	0.30	-0.30	0.00	0.00	0.30	-0.30	0.00
5	0.20	-1.0	0.00	-0.20	0.20	-0.20	-0.20	0.20	-0.20	0.20	0.20	-0.20	0.20	0.00	0.20	-0.20	0.20
6	0.10	-2.0	-0.05	-0.15	0.30	-0.15	-0.15	0.30	-0.15	0.10	0.10	-0.15	0.30	-0.05	0.10	-0.15	0.30
7	0.05	-3.0	-0.15	-0.20	0.60	-0.20	-0.20	0.60	-0.20	0.05	0.05	-0.20	0.60	-0.15	0.05	-0.20	0.60

Active Weight as a % of Capital		0.85			0.85							0.85					0.85
% of Capital Long		1.20			0.85			0.85	1.00					1.20			
% of Capital Short		0.20			0.85			0.85	0.00					0.20			
% of Capital Long + Short		1.40			1.70			1.70	1.00					1.40			
			2.70														

## EXHIBIT 3

### Equitized Market-Neutral Long-Short and Enhanced Active Portfolio Equivalencies

	Equitized Market-Neutral Long-Short Portfolio	M Multiple	T Trimmed Amount	E Enhancement	Enhanced Active Portfolio $100(1+E)-100E$
Exhibit 1 Example	200-100	1.00	0.25	0.75	175-75
200-100 when T=1	200-100	1.00	1.00	0.00	100-0
200-100 when T=0	200-100	1.00	0.00	1.00	200-100
Exhibit 2 Example	185-85	0.85	0.65	0.20	120-20
When M > 1	350-250	2.50	0.50	2.00	300-200

85 equitized market-neutral long-short portfolio is equivalent to an enhanced active 120-20 portfolio with an enhancement of 0.20.

The last row in Exhibit 3 provides an example of an equitized or enhanced active portfolio that has an  $M$  greater than 1.00. In this case,  $M$  equals 2.50, so the equitized portfolio has a market-neutral long-short component with 250% of capital in long positions and 250% in short

positions. Assuming that the overlap between the short positions and the equity overlay is 0.50 ( $T = 0.50$ ), the enhancement is 2.00, which makes the 350-250 equitized market-neutral long-short portfolio equivalent to an enhanced active 300-200 portfolio.

### ENHANCED ACTIVE VERSUS EQUITIZED PORTFOLIOS

In practice, an enhanced active equity portfolio is generally not constructed by trimming a market-neutral long-short equity portfolio combined with an equity overlay. Rather, portfolio construction proceeds from an optimization process that is constrained to produce a portfolio with full exposure to the desired equity benchmark, at desired levels of portfolio risk and leverage.<sup>7</sup> The enhanced active portfolio is naturally trim, with no overlapping long and short exposures.

The enhanced active 175-75 portfolio in Exhibit 1 has the same underlying benchmark exposure and the same active weights as the equitized long-short portfolio. The portfolios have identical expected returns and identical risk exposures. Let's compare their cost structures.

Equitizing a market-neutral long-short equity portfolio with futures involves using short sale proceeds to meet margin requirements on futures contracts. About 5% of the nominal futures value in cash margin is needed, and the investor pays a stock loan fee of about 50 basis points annually on this amount. The futures should provide a return approximating the return on the underlying benchmark, less an amount reflecting the difference between the LIBOR implicit in the futures price and the short rebate the investor earns on the short sale proceeds. This differential has recently averaged about 40 basis points annually. Additionally, the investor incurs transaction costs to establish and roll the futures, for an overall cost of about 50 basis points annually.<sup>8</sup>

Establishing equity market exposure with ETFs involves a stock loan fee of about 50 basis points applied to the capital invested. The investor expects to receive the relevant stock index return less the transaction costs and management fees associated with the ETF. The cost of equitizing with a swap, negotiated between the investor and the swap counterparty, should approximate the cost of alternative methods of equitization. Thus, whether futures, ETFs, or swaps are used to equitize the market-neutral portfolio, the cost should be roughly 50 basis points annually.

The cost of implementing an enhanced active 175-75 portfolio includes a stock loan fee of about 50 basis points annually, applied to the value of the shorted securities. The proceeds from the short sales are used to purchase the additional longs. The aggregate short positions and the additional long positions in the enhanced active portfolio both equal 75% of capital. The short positions and overlay in the equitized market-neutral long-short portfolio both equal 100% of capital. So, in this example, the cost of financing an enhanced active portfolio is about 25% less than the cost of equitizing a market-neutral long-short portfolio.

Implementation costs also include the one-time costs of establishing the initial positions for each strategy, as well as the costs of trading securities over the strategy's horizon. Establishing initial positions in the equitized strategy involves investing 100% of capital in long positions, selling securities short in an amount equal to 100% of capital, and purchasing an overlay offering benchmark exposure equal to 100% of capital. Establishing initial positions in the enhanced active strategy involves investing 175% of capital in long positions and selling securities short in an amount equal to 75% of capital. The equitized portfolio thus has 200% of capital in securities and 100% in an overlay, versus the enhanced active portfolio's 250% in securities.

The cost differential will depend on the cost of purchasing an overlay that provides market exposure of 100% of capital versus the cost of establishing long and short positions in individual securities worth 50% of capital (the difference between the 250% of capital in individual security positions in the enhanced active portfolio and the 200% in the equitized portfolio). Overlays offer cost economies in terms of the management of all index constituents.<sup>9</sup>

The enhanced active portfolio holds a higher percentage of capital in individual securities than the equitized portfolio. Its individual security positions equal 250% of capital, while the equitized portfolio's individual positions amount to 200% of capital. The enhanced active portfolio's ongoing trading needs might thus be expected to exceed those of an equitized portfolio. This is not the case, however. As we have demonstrated, the two portfolios are equivalent because they have the same active weights; maintaining this equivalency requires that they trade the same stocks in the same amounts at the same time.

## BENCHMARK INDEX CHOICES

An equitized market-neutral portfolio is confined to stock index benchmarks with liquid overlays. As the enhanced active portfolio uses individual securities rather than overlays, it can achieve exposure to any benchmark, even one customized to particular investor preferences.

An enhanced active portfolio will not be useful, however, if the investor wants to transport a long-short equity portfolio's active returns to a benchmark that is different from the universe from which the securities are chosen.<sup>10</sup> For example, the investor may wish to exploit inefficiencies in stocks but establish a market exposure to bonds. The solution in this case is to combine a market-neutral long-short equity portfolio with the relevant bond benchmark overlay.<sup>11</sup>

## CONCLUSION

Enhanced active portfolios are equivalent to equitized market-neutral long-short portfolios in terms of market exposure and security active weights. The equivalence can be observed by trimming the equitized portfolio, which eliminates any overlap between short and long exposures to the same securities. The enhanced active portfolio is more compact and uses less leverage than the equivalent equitized market-neutral long-short portfolio. Furthermore, the enhanced active portfolio obtains its benchmark

exposure with individual security positions. This allows the investor to achieve benchmark exposures even if liquid overlays are not available.

## ENDNOTES

<sup>1</sup>This market-neutral long-short example is adapted from Exhibit 3 in Jacobs and Levy [2006].

<sup>2</sup>Symmetry here reflects the symmetry of the expected security returns in this example. In practice, whether active weights are symmetrical long and short will depend upon security returns, variances, and covariances. The flexibility of portfolio construction, with 100% of capital long and 100% short, gives the portfolio the same leeway to establish underweights as to establish overweights.

<sup>3</sup>In a world without transaction costs, the individual positions could be held at no greater cost than the composite benchmark security. Trimming would then allow one to form an enhanced active equity portfolio with equivalent active security weights.

<sup>4</sup>Trim and untrim portfolios are defined in Jacobs, Levy, and Markowitz [2005 and 2006].

<sup>5</sup>When  $M = 1$ , the portfolio is a fully invested market-neutral long-short portfolio, with 100% of capital long and 100% of capital short.

<sup>6</sup>The enhanced active 120-20 example is adapted from Exhibit 3 in Jacobs and Levy [2006].

<sup>7</sup>See Jacobs, Levy, and Markowitz [2006].

<sup>8</sup>Throughout the discussion of costs, we assume that the market-neutral long-short portfolio is constructed using the same enhanced prime brokerage structure as used for enhanced active

equity portfolios. This entails establishing a stock loan account with the prime broker, which allows short sale proceeds to be used for the purchase of long positions and eliminates the need to maintain a substantial cash buffer. See Jacobs and Levy [2006].

<sup>9</sup>In practice, given transaction costs, the enhanced active portfolio will hold a limited number of securities and will thus differ from the large number of holdings implicit in the index overlay instrument used to equitize the market-neutral portfolio.

<sup>10</sup>See Jacobs and Levy [1999].

<sup>11</sup>In this case, there is no overlap between the long-short portfolio and the overlay. The transported market-neutral long-short portfolio is trim to begin with.

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