REVELATION
INVESTMENT RESEARCH, INC.

Creating a Downside Risk Alert Index Strategy

Client Question

How might Downside Risk Alert be used to create an equity index, and what characteristics would that index have?

RIR Reply

The popularity of ETFs and 'smart beta' strategies has led clients to ask whether DRA could be the basis for an equity index. Conceptually, a DRA Index might provide an array of attractive characteristics found in separate smart beta strategies and ETFs – low beta, low volatility, high quality, cheap valuation – all in a single investment strategy.

As a base case, we constructed a DRA index that would hold all stocks ranked in DRA deciles 1–4 (approximately 900 names) selected from the approximately 2300 members of the MSCI U.S. IMI Index (excluding REITs). The DRA Index members were market cap weighted and rebalanced annually from December 31, 2001 – December 31, 2017. Similarly, we created a DRAI index by using Downside Risk Alert International's top 4 deciles to select stocks from the approximately 1700 members of the MSCI ACWI ex U.S. Index from December 31, 2003 – December 31, 2017. For our DRA Index portfolios simulations, we deducted transaction costs of 0.15% for each rebalancing trade. To highlight their unique return and risk characteristics, we benchmarked DRA and DRAI Index portfolio performance against the broad market MSCI U.S. IMI and ACWI Ex-US indexes.

Table 1 shows that <u>the DRA and DRAI Index portfolios outperformed their respective benchmarks in every key aspect – providing higher returns, lower beta, and lower volatility – with also having good benchmark tracking characteristics – high R-squared and low tracking error.</u> Furthermore, DRA/DRAI Index portfolio performance was consistent through time. The Upside and Downside Hit Ratios show the percentage of periods that the Index portfolios outperformed their benchmarks in quarters where market benchmark returns were positive or negative, respectively. Impressively, <u>the DRA (DRAI) Index portfolio outperformed in 71% (56%) of up quarters and 100% (100%) of down quarters.</u> In terms of return magnitude, the Upside and Downside Capture Ratios show that the DRA (DRAI) Index portfolios outperformed slightly (6% and 1%) in up market quarters, while capturing a *significantly* smaller portion (19% and 21%) of market drops in down quarters.

These base case results are intriguing, particularly since our DRA and DRAI Index designs used simple rules for membership selection, position weighting, and rebalancing. To see how sensitive our DRA-based index portfolios were to these rules, we tested a series of other index construction strategies. For example, using sector neutral or country neutral model rankings somewhat reduced Index portfolio tracking error, but also lowered Index returns. Tightening the Index inclusion rules (e.g., holding stocks ranked in deciles 1–3 or 1–2) increased Index returns but at the cost of higher tracking error and more Index turnover. Loosening the Index sell rule (e.g. holding stocks until their decile ranks fell to 6 or worse), reduced Index turnover but also lowered Index returns. Finally, we found that any positive return benefits from more frequent Index rebalancing were offset by increased Index portfolio transaction costs from higher Index turnover. While we are not implying that the base case Indexes are optimal, they appear to be solid strategies in their simplest form.

In conclusion, this study shows that DRA and DRAI offer great promise as the basis for equity indexes (and ETFs) with attractive return and risk characteristics. Even a simple DRA Index portfolio has historically beaten the broad U.S. stock market by a wide margin (see Table 2 and Figure 1) with relatively consistent performance, low beta and volatility, and excellent downside risk protection. Furthermore, by using more sophisticated portfolio risk optimization tools, we know that a DRA (DRAI) Index or actively managed portfolio could be constructed using far fewer stocks while delivering similar risk-adjusted return characteristics.

Table 1: Performance Statistics of Base DRA & DRAI Index Funds, 11/2001-11/2018

	DRA Base Index Fund	DRAI Base Index Fund
Annualized Portfolio Return	9.73%	8.12%
Annualized Benchmark Return	8.05%	6.30%
Annualized Excess Return	1.68%	1.82%
Alpha	2.50%	2.21%
Beta	0.88	0.90
Std Deviation of Annual Portfolio Return	15.8%	19.8%
Std Deviation of Annual Benchmark Return	17.8%	21.9%
R^2	0.98	0.99
Annualized Tracking Error	3.32%	3.20%
Upside Hit Ratio (Qtrs)	71%	56%
Downside Hit Ratio (Qtrs)	100%	100%
Upside Capture Ratio (Qtrs)	1.06	1.01
Downside Capture Ratio (Qtrs)	0.81	0.76
Annualized Portfolio Turnover	23.4%	28.7%
Avg Number of Portfolio Positions	895	704

Table 2: Annual Performance of Base DRA Index Fund vs MSCI U.S. IMI, 11/2001-11/2018

	Portfolio	Benchmark	Excess Return
2002	-11.70	-18.14	6.44
2003	24.78	30.69	-5.90
2004	15.54	11.62	3.92
2005	6.06	5.63	0.43
2006	16.58	15.15	1.43
2007	7.58	5.62	1.96
2008	-32.06	-36.59	4.53
2009	24.23	27.78	-3.55
2010	16.05	16.57	-0.52
2011	7.45	0.52	6.93
2012	16.64	16.23	0.40
2013	34.46	34.26	0.20
2014	13.35	11.04	2.30
2015	-0.97	0.12	-1.08
2016	13.49	12.31	1.18
2017	24.05	21.62	2.43

Figure 1: Growth of a Dollar of DRA Index Fund vs MSCI U.S. IMI, 11/2001-11/2018