

EQUITY PRODUCTS

Combo Strategy for Hedging the Russell 3000 Index

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Following an earlier article about hedging the Russell 1000 Index with a combination of S&P Index futures at CME Group, we have received some inquiries about the Russell 3000 Index: Would a similar strategy work? The answer is resoundingly positive: A combination of S&P 500, S&P MidCap 400 and S&P SmallCap 600 futures tracks the Russell 3000 Index well enough to warrant some serious considerations.

Construction of Hedging Strategy – Although the three S&P Indexes combined possess only half as many constituents as the Russell 3000 Index, the performance need not be dramatically different. In fact, the correlation table in Exhibit 1 shows that a combination of the three indexes, suitably weighted, should produce a good approximation.

	Russell 3000	S&P 500	S&P MidCap 400	S&P SmallCap 600	Russell 2000
Russell 3000	1.000	0.996	0.951	0.919	0.919
S&P 500	0.996	1.000	0.926	0.889	0.887
S&P MidCap 400	0.951	0.926	1.000	0.959	0.956
S&P SmallCap 600	0.919	0.889	0.959	1.000	0.989
Russell 2000	0.919	0.887	0.956	0.989	1.000

EXHIBIT 1 – Correlation matrix of daily price return performance among the indexes (January 2, 2003 – March 31, 2008)

If you run a multiple regression using the three S&P Indexes against the Russell 3000 Index daily returns, the regression coefficients will be the best statistical hedge ratios for the combination strategy. Using the same daily returns data as those in Exhibit 1, we derived the following hedge ratios.

S&P 500	S&P MidCap 400	S&P SmallCap 600
0.823	0.114	0.063

EXHIBIT 2 – Sample hedge ratio, based on multiple regression (January 2, 2003 – March 31, 2008)

For each dollar in the Russell 3000 Index, put \$0.823 in the S&P 500 Index, \$0.114 in S&P MidCap 400 Index and \$0.063 in S&P SmallCap 600 Index. Using this static strategy, the correlation vs. the E-mini Russell 3000 Index during the same period was 0.9996, an improvement over the corresponding number between S&P 500 and Russell 3000 Indexes.

Tracking Error – What's more important than the correlation is the tracking error between the hedging portfolio and the target. Exhibit 3 shows the average as well as the dispersion of the monthly tracking error, measured in basis points, for the possible strategies. Notice that the introduction of the S&P MidCap 400 Index (MID) by itself already leads to significant reduction of the tracking error.

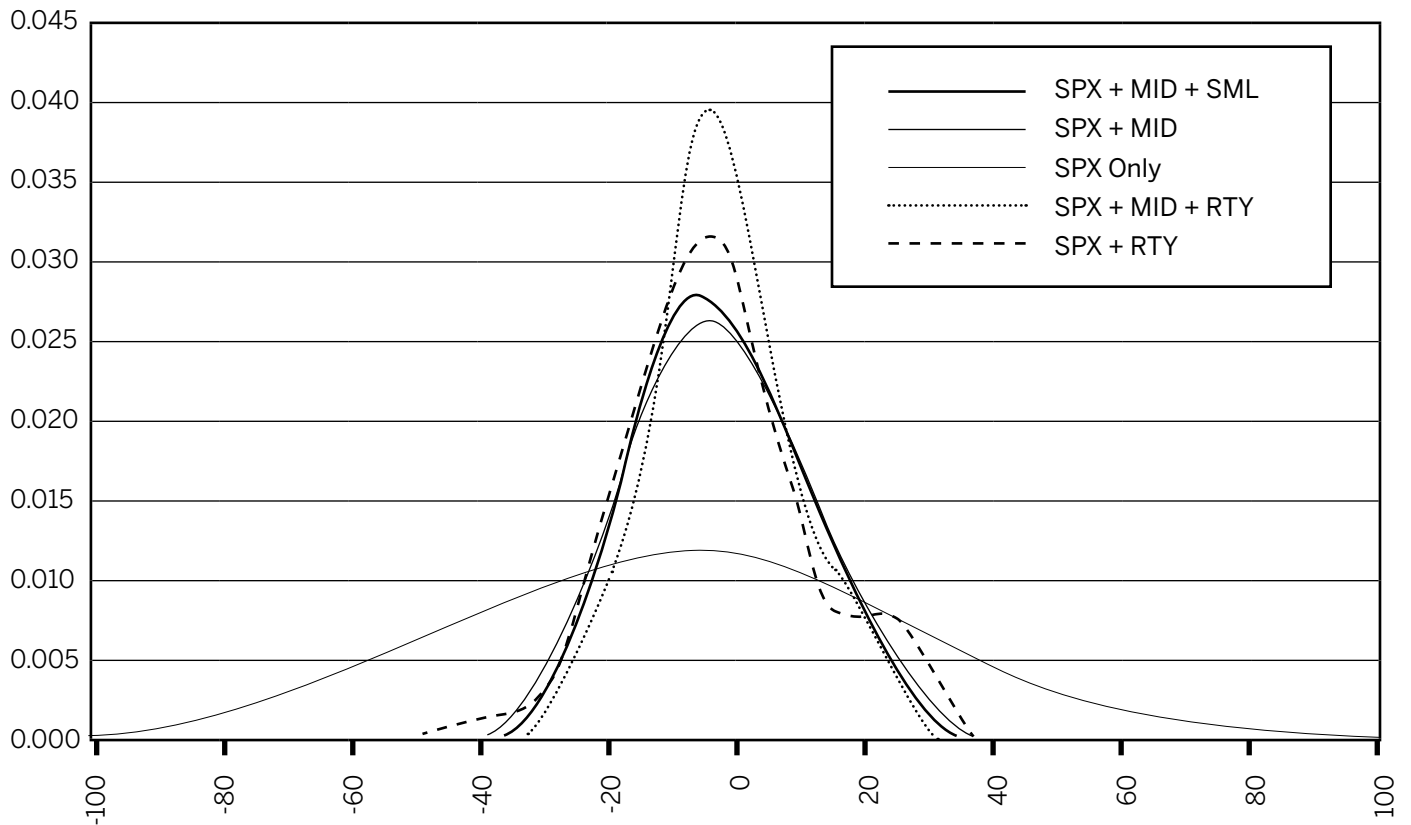
	SPX/MID/SML	SPX/MID	SPX Only	SPX/MID/RTY	SPX/RTY
Ave	-1.27	-1.40	-5.34	-1.3	-2.6
Std Dev	12.17	13.33	31.89	10.40	13.33

EXHIBIT 3 – Monthly total returns tracking error, measured in bps, between the hedging strategies and Russell 3000 Index (January 2, 2003 – March 31, 2008)

The addition of either S&P SmallCap 600 (SML) or Russell 2000 (RTY) Indexes would introduce some marginal improvement. Likewise, a combination of S&P 500 and Russell 2000 Indexes would show similar results.

We estimated¹ the probability distribution of the monthly tracking error for the five possible strategies. The results, shown in Exhibit 4, clearly suggest that the combination approach meaningfully reduced the tracking error to within a manageable range.

EXHIBIT 4 – Estimated distribution of the monthly total returns tracking error, measured in basis points, between the hedging strategies and Russell 3000 Index (January 2, 2003 – March 31, 2008)



Liquidity Considerations – Although the hedge ratio of the S&P SmallCap 600 Index is small, it still requires a sizeable position when applied to a large portfolio. As of this writing, the market for E-mini S&P SmallCap 600 Index futures is still developing and may not have enough liquidity to support a multi-million dollar position. Using the Russell 2000 Index in place of the S&P SmallCap 600 would work. However, market participants can suitably redistribute its weight into the S&P 500 and S&P MidCap 400 futures to capture the bulk of the tracking improvement, as evidenced in Exhibits 3 and 4.

Of course, the total tracking error of the futures portfolio versus the Russell 3000 Index should include the tracking error of futures to their respective indexes. Given the non-existence of liquidity in the Russell 3000 Index futures, however the trade-off of tracking error for liquidity remains very compelling.

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¹ We employed standard kernel density estimation techniques with Gaussian kernel. The unsmoothed histogram is also available upon request.