Diversification Update at 31/03/2011

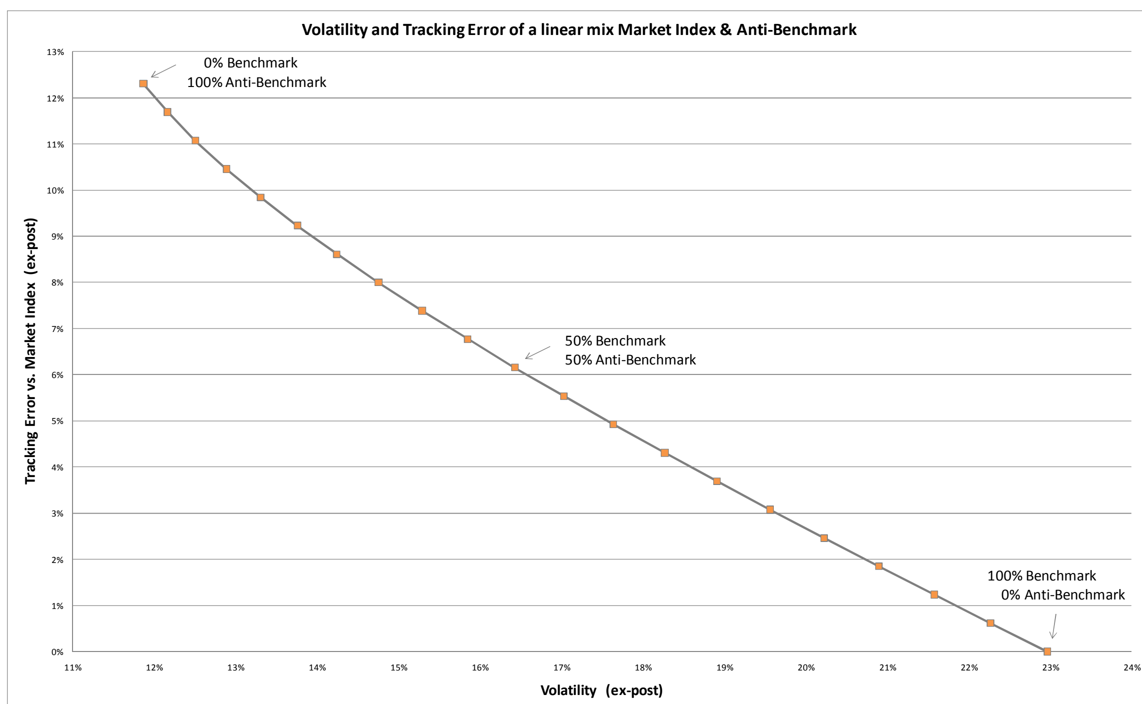
TOBAM's Diversification Ratio (DR)[1] measures how much a portfolio is diversified. The DR^2 (square of the diversification ratio) corresponds to the number of independent degrees of freedom in a particular portfolio – or the number of independent variables at work. As the chart shows, the "broad market" indices leave diversification on the table. In addition to a snapshot of each market's DR^2, the chart shows the DR^2 of a well-diversified portfolio, and the fraction of available diversification used by the index

	DR^2 - Index diversification	*DR^2 - Maximum diversification*	*% diversification used by index*
MSCI EMU	1.82	4.33	42%
MSCI US	2.04	5.57	37%
MSCI UK	2.25	3.35	67%
MSCI Japan	1.90	3.96	48%
MSCI World	2.79	7.29	38%
MSCI Australia	2.13	4.54	47%

Is tracking error a measure of risk?

Because of the confusion between the fact that the market cap-weighted benchmark is representative and its alleged efficiency characteristics, tracking error has often been either explicitly or implicitly interpreted by investors as a proxy for risk.

The graph below shows the tracking error and risk (as measured by volatility) characteristics of a portfolio composed of a linear mix of a cap-weighted market index and the Anti-Benchmark portfolio.



Source: TOBAM, EuroStoxx 250, December 1999 – January 2011.

Here we see that the portfolio's tracking error is inversely proportional to its risk: the higher the tracking error, the lower the portfolio's volatility. This means that investors who limit their tracking error as a means of risk control are actually significantly increasing portfolio risk.

Tracking error measures the distance between two portfolios

Formally speaking, tracking error measures the standard deviation of relative returns. Practically speaking, this means that tracking error measures the distance between two portfolios. As such, tracking error is silent on the notion of absolute risk. In fact, unless we know the risk of the portfolio we are tracking, the tracking error tells us nothing about the amount of risk we are incurring.

Tracking error could be an appropriate measure for index fund manager to measure how well a fund mimics the index, but is not relevant to measure the risk of an investment.

The further away from a well-diversified portfolio, the larger the bets

Since the Anti-Benchmark portfolio is a *neutral risk allocator*, the tracking error between the market portfolio and the Anti-Benchmark can be considered a proxy for the size of the bets embedded in the benchmark. The higher the tracking error between the benchmark and the Anti-Benchmark, the larger the bets the benchmark is making.

In other words, periods of extreme sector concentration in the market portfolio (TMT in the late 90's, financials in 2008 and … today!) coincide with times when the tracking error to the Anti-Benchmark is the greatest.

One can make the case that periods of high tracking error between the benchmark and the Anti-Benchmark have historically been times when being far away from the benchmark's concentrations was not a bad place to be!

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For more information:

TOBAM's Diversification Ratio® measures a portfolio's or index's diversification. It is supported by original research and is based on a mathematical definition of diversification. TOBAM's "Anti-Benchmark" Most Diversified Portfolio® maximizes this Diversification Ratio®. Maximizing diversification within a universe of securities provides a result closer to the true market risk premium from that universe. "Maximum Diversification®" and "MaxDiv®" are registered trademarks of TOBAM.

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TOBAM is a full-service asset management firm established in Paris, France, registered and authorised by the Autorité des Marchés Financiers (AMF), the French Financial Markets Authority. TOBAM's flagship Anti-Benchmark® strategies, supported by original research and a mathematical definition of diversification, provide clients with diversified core equity exposure, both globally and in domestic markets. The Anti-Benchmark ® methodology has been applied successfully to other asset classes. TOBAM also publishes the Maximum Diversification® Index series (or MaxDiv® Index) based on the Anti-Benchmark equity portfolio construction methodology. The company manages assets in excess of 1.6 billion dollars through its Anti-Benchmark range, mainly for institutional clients.

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