

## Diversification Dashboard June 2014:

TOBAM's Diversification Ratio (DR) <sup>a</sup> measures to what extent a portfolio is diversified. The DR <sup>2</sup> (square of the diversification ratio) measures the number of effective degrees of freedom to which a portfolio is exposed. As the table shows, the "broad market" indices leave diversification on the table. In addition to a snapshot of each market's DR <sup>2</sup> , the table shows the DR <sup>2</sup> of a well-diversified portfolio, and the fraction of available diversification used by the index.		<b>DR<sup>2</sup> - Index diversification</b>	<b>DR<sup>2</sup> - Maximum diversification</b>	<b>% Diversification used by index</b>
	<b>MSCI All Countries</b>	5.41	23.31	23.2%
	<b>MSCI World</b>	4.79	16.72	28.7%
	<b>MSCI Emerging</b>	4.87	10.09	48.3%
	<b>MSCI Canada</b>	5.05	9.84	51.4%
	<b>MSCI US</b>	3.28	8.60	38.2%
	<b>MSCI EMU</b>	2.67	7.61	35.1%
	<b>MSCI Pacific ex-Japan</b>	2.63	6.79	38.7%
	<b>MSCI UK</b>	3.30	5.84	56.5%
	<b>MSCI Japan</b>	1.89	3.93	48.2%
<b>MSCI Australia</b>	2.48	4.78	52.0%	

As of May 30, 2014

### How Sensitive are Smart Beta Portfolios to Interest Rates?

With interest rates near record lows, and developed economies finally experiencing positive growth, investors are getting more concerned about rises in global interest rates.

While the exposure to interest rate risk is manageable for bond investors via the traditional duration-based approach, it appears there is no consensus amongst equity investors on how to measure and eventually manage their interest rate exposure.

As such, we briefly investigate in this note the potential impact of changes in interest rates on the excess returns of the Equal Weighted, Minimum Volatility and Maximum Diversification strategies versus the Market Cap Weighted Benchmark in the US equities market. In addition to the interest rate factor, we have included in our analysis macro-economic variables such as inflation and the trade weighted US Dollar Index.

<sup>a</sup> 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<sup>®</sup> 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<sup>®</sup>" and "MaxDiv<sup>®</sup>" are registered trademarks of TOBAM.

I- Overview of the Methodology

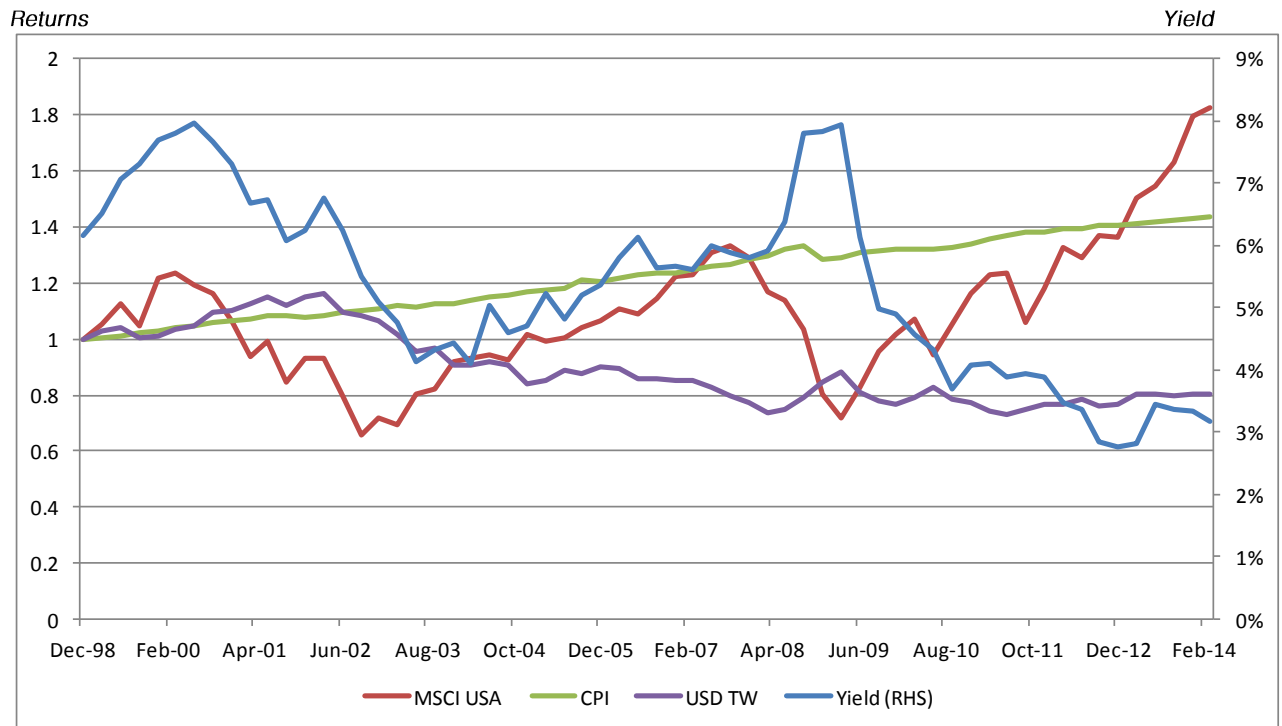
- Market Cap Weighted Benchmark: MSCI USA, from December 1998 to March 2014.
- Equity strategies:
  - Equal Weighted: MSCI USA Equal Weight Index
  - Minimum Volatility: MSCI USA Minimum Volatility Index
  - Maximum Diversification: Anti-Benchmark® US Equity
- We have regressed the above US equity strategies' quarterly returns against the changes of the following time series which are measured in percentages except for Corporate Interest Rates, for which changes are measured in differences:
  1. Market Cap Weighted Benchmark: MSCI USA
  2. Corporate Interest Rates: Bank of America Merrill Lynch US corporate investment grade index
  3. Inflation: Consumer Price Index
  4. Currency: The Fed's US Trade Weighted Major Currency Index (Measure of the dollar strength compared to a trade-weighted basket of major foreign currencies )

Note: We have used corporate rates instead of government interest rates as the aggregate funding cost of the MSCI USA companies is likely to be better reflected by a corporate investment grade index.

The results are presented in below:

II- Empirical Results

**Exhibit 1. Time Series of 4 variables**



Source TOBAM. Past Performance is not indicative of future results.

**Exhibit 2. Linear Regression**

Data from Dec 1998 to Mar 2014

		Stocks	Corporate	Inflation	Currency		
		MSCI US	Yield	CPI	USD TW	Alpha	R2
Equity	<b>Anti-Benchmark USA</b>	<b>0.74</b>	<b>-0.58</b>	<b>0.23</b>	<b>-0.14</b>	<b>0.01</b>	<b>74%</b>
	<i>tstat</i>	11.45	-0.48	0.28	-0.70	1.70	
	<b>MSCI USA Minimum Volatility</b>	<b>0.70</b>	<b>-0.93</b>	<b>0.43</b>	<b>0.12</b>	<b>0.00</b>	<b>85%</b>
	<i>tstat</i>	16.84	-1.19	0.83	1.00	0.60	
	<b>MSCI USA Equal Weighted</b>	<b>1.11</b>	<b>-2.00</b>	<b>0.44</b>	<b>0.16</b>	<b>0.01</b>	<b>92%</b>
	<i>tstat</i>	23.85	-2.28	0.76	1.16	0.99	

Source TOBAM. Past Performance is not indicative of future results.

### III- Analysis

As shown in Exhibit 2, while all equity portfolios display a negative exposure to US corporate rates, the level of their exposure differs:

- The Anti-Benchmark® US strategy exhibits the lowest exposure associated with the lowest level of significance (38% for a t-stat of 0.48) among the 4 variables.
- The Minimum Volatility portfolio achieves an exposure almost twice as high as that of the Anti-Benchmark®, with a level of significance of 76% (for a t-stat of 1.19).
- The Equal Weighted portfolio registers the highest exposure: double the level for Minimum Volatility and four times higher compared to the Anti-Benchmark®. In addition to its higher exposure, the Equal Weighted Portfolio exposure displays the highest level of significance (97% for a t-stat of 2.28)

These results seem to confirm that the past relative performance of the Equal Weight & Minimum Volatility strategies are in part due to a higher exposure to interest rate risk during a period in which yields have experienced a secular downtrend.

In addition to their higher exposure to interest rate changes, the Minimum Volatility and the Equal Weighted portfolios display a positive exposure to the Currency Index, as opposed to the Anti-Benchmark. One explanation for this could be a bias toward companies whose business activities are more US centric. In the case of the Minimum Volatility portfolio, that would likely comprise low volatility companies such as Utility and Telecom Services stocks. This is also partially mitigated by low t-stats.

### Conclusion

During the period studied, the Anti-Benchmark® portfolio is the most immune to changes in interest rates when compared to Minimum Volatility and Equal Weighted portfolios in US markets. Indeed, from December 1999 and March 2014, while all three portfolios have demonstrated a negative exposure to rises in interest rates, the other two smart beta strategies seemed to be in a more vulnerable position during periods of rising interest rates.

## For more information

TOBAM is an asset management company offering innovative investment capabilities whose aim is to maximize diversification. 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 company manages over \$6.2 billion (June 2014) via its Anti-Benchmark strategies for institutional clients worldwide. Its team includes twenty six financial professionals.

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