

## Diversification Dashboard May 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>	5.36	23.48	22.8%
	<b>MSCI World</b>	4.86	17.90	27.2%
	<b>MSCI Canada</b>	5.23	10.40	50.3%
	<b>MSCI Emerging</b>	4.85	9.42	51.5%
	<b>MSCI US</b>	3.34	8.59	38.9%
	<b>MSCI EMU</b>	2.64	7.99	33.1%
	<b>MSCI Pacific ex-Japan</b>	2.67	6.64	40.3%
	<b>MSCI UK</b>	3.05	5.49	55.6%
	<b>MSCI Japan</b>	1.91	4.27	44.7%
<b>MSCI Australia</b>	2.60	4.77	54.5%	

As of April 30, 2014

## Should high volatility stocks be considered as a risk factor?

A well diversified portfolio should deliver investors a balanced exposure to all independent sources of risk available in a defined investment universe at a given time. In this issue we will explore whether holding high (or low) volatility stocks in a portfolio could be associated to an exposure to a single risk factor.

In order to address this topic, we simulated high volatility and low volatility long only strategies using the MSCI USA universe. More precisely:

- Strategy 1 High Volatility (HV) consists of the 10% most volatile stocks of the MSCI USA universe.
- Strategy 2 Low Volatility (LV) is made of the 10% least volatile stocks of the MSCI USA universe.

While we have chosen to measure volatility in deciles in this study, we have checked that the conclusion would be the same if quartiles, for example, were used instead. Both strategies are rebalanced on a monthly basis.

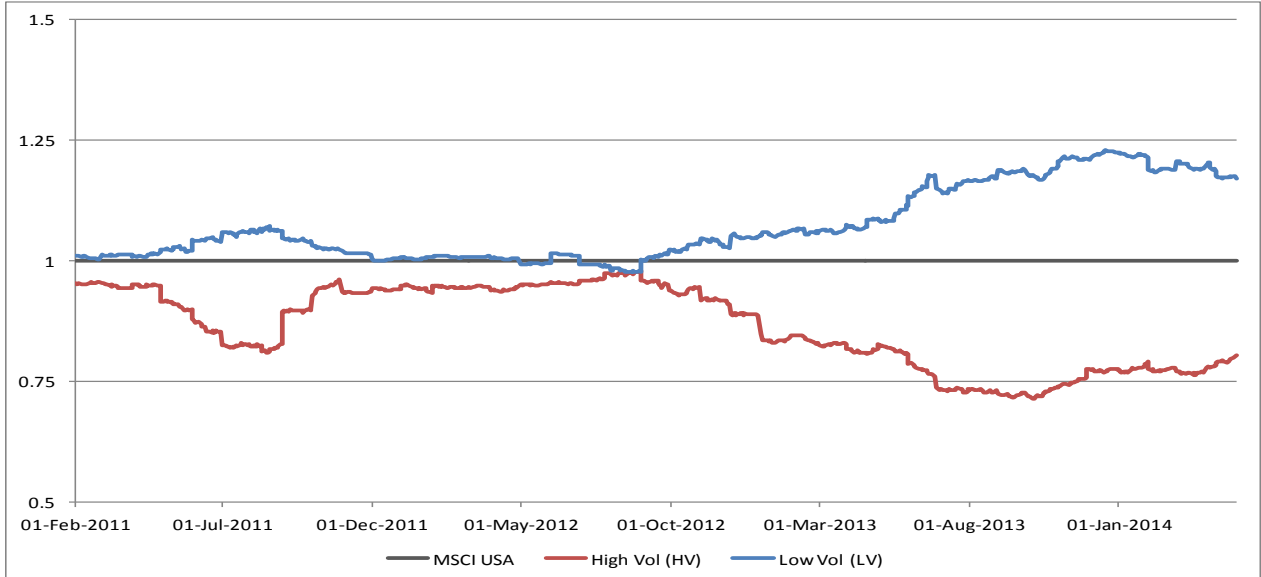
To assess whether these strategies should be qualified as exposed to a single risk factor, we use the internal correlation<sup>b</sup> as a measure of risk concentration. Intuitively, a concentrated portfolio whose stocks have a large exposure to a common risk driver should have a high internal correlation. Alternatively, a diversified portfolio whose constituents are significantly exposed to a greater number of independent risk drivers will have a lower internal correlation.

<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.

<sup>b</sup> Consider the correlation of each asset of a universe to a given portfolio P constructed on this universe; we call internal correlation of P, the average of these correlations weighted by the portfolio weights. For example a portfolio P composed of two stocks A and B with equal weights will have average self correlation of  $(\text{corr}(A, P) + \text{corr}(B, P))/2$ .

1. Internal Correlation

Exhibit 1: Ratio of Internal Correlations– Relative to the MSCI USA index\*



\* The chart above shows the internal correlation of all 3 portfolios (LV, HV, and MSCI USA) divided by the internal correlation of the MSCI USA index. The period used is the one for which TOBAM claims GIPS compliant returns for its Anti-Benchmark US strategy (since January 31 2011). Source TOBAM.

As illustrated in **Exhibit 1**, during the last few years, the Low Volatility portfolio has increasingly registered a higher level of internal correlation compared to the MSCI USA, which is the result of the significant overlap in common factor exposure.

⇒ Thus, a portfolio that has a significant exposure to low volatility stocks today is a concentrated portfolio in term of risk factors.

Over the same period, the High Volatility portfolio has achieved a considerably lower relative internal correlation, which is seemingly the outcome of a more diversified exposure to independent risk drivers.

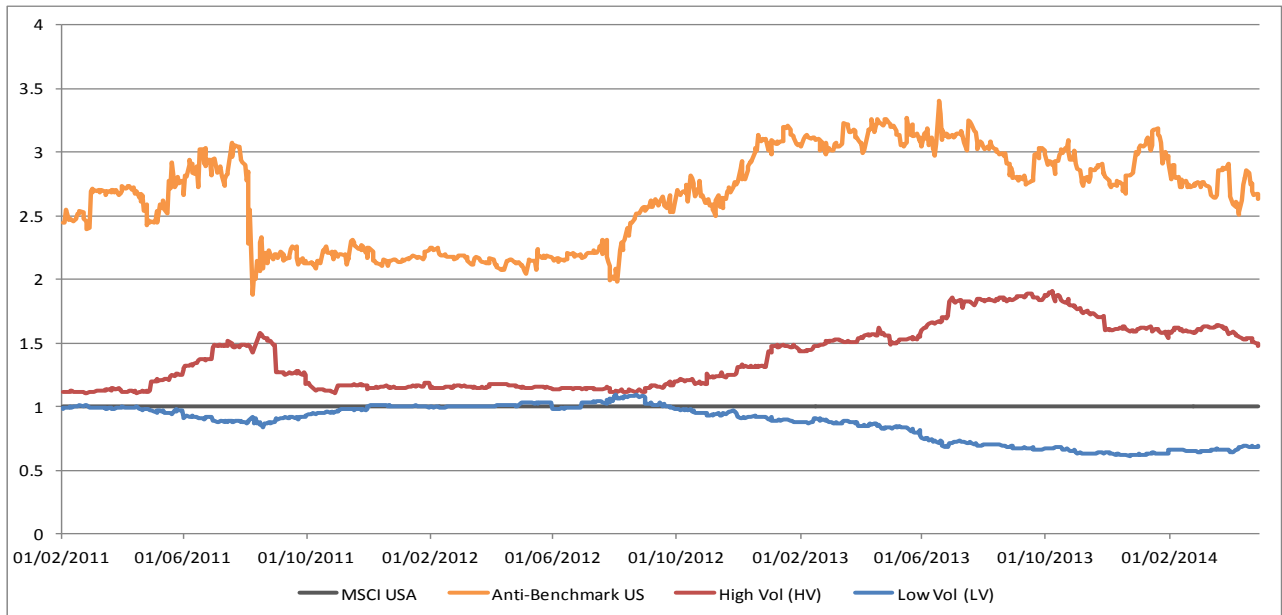
⇒ Hence, a portfolio that has a greater exposure to high volatility stocks today is not concentrated in term of risk factors.

Another interesting aspect of the above chart is that the relative internal correlation of both portfolios is evolving over time. In other words, the factor exposure of both portfolios is dynamic: the Low Volatility portfolio, which was at some point (around August 2012) as concentrated as the High Volatility portfolio, is currently at its highest concentration.

## 2. Diversification Ratio

In order to take into account not only the correlation levels but also the diversification characteristics of each portfolio, we have computed in **Exhibit 2** the Diversification Ratio Squared ( $DR^2$ ) of each portfolio relative to the MSCI USA index and also added the Anti-Benchmark USA's relative  $DR^2$ :

Exhibit 2:  $DR^2$  Ratios – Relative to the MSCI USA index\*\*



\*\* The chart above shows the  $DR^2$  of each portfolio (LV, HV, AB US and MSCI USA) divided by the  $DR^2$  of the MSCI USA index. The period used is the one for which TOBAM claims GIPS compliant returns for its Anti-Benchmark US strategy. Source TOBAM.

As expected, **Exhibit 1** and **Exhibit 2** show similar trends, whether in terms of correlation or diversification. Nevertheless, in line with its objectives, the Anti-Benchmark® US equity strategy (orange line) has consistently provided greater diversification compared to the three other portfolios (LV, HV and MSCI USA), independently from the risk factor dynamics in the market.

## Conclusion

In the current market environment high volatility stocks should not be qualified as constituting a risk factor. Indeed, as shown in this note, high volatility stocks are exposed to a diverse set of factors. As such, an investor seeking better diversification today is better off owning high volatility stocks than owning low volatility stocks whose risk exposure is concentrated in a limited set of factors.

We have also seen that risk factor exposures in equity markets are dynamic over time. A diversified portfolio should, at any given time, hold stocks that are as immune as possible to these changes and consistently offer all the diversification benefits available in a given investment universe. This is exactly what the Anti-Benchmark® aims to do: achieve maximum diversification by maximizing the number of effective independent risk drivers of a portfolio.

## 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 billion via its Anti-Benchmark strategies for institutional clients worldwide. Its team includes twenty six financial professionals.

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