

## **Diversification Dashboard as of September 2014:**

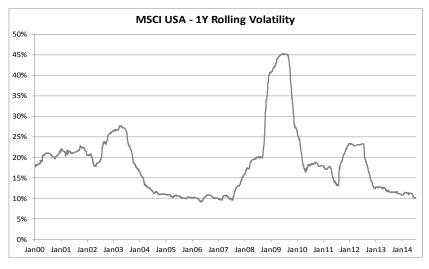
TOBAM's Diversification Ratio (DR)<sup>1</sup> measures to what extent a portfolio is diversified. The DR2 (square of the diversification ratio) measures the number of effective degrees of freedom to which a portfolio is exposed. As the table shows, the indices market" "broad leave diversification on the table. In addition to a snapshot of each market's DR2, the table shows the DR<sup>2</sup> of a well-diversified portfolio. the fraction of available diversification used by the index.

1			
	DR <sup>2</sup> - Index diversification	DR <sup>2</sup> - Maximum diversification	% diversification used by index
MSCI All Countries	6.49	29.98	21.7%
MSCI World	5.57	23.87	23.3%
MSCI Emerging	6.59	12.59	52.4%
MSCI Canada	6.24	12.16	51.3%
MSCI US	3.63	11.30	32.1%
MSCI EMU	2.78	7.95	34.9%
MSCI Pacific ex-Japan	3.22	9.20	35.0%
MSCI UK	4.16	7.19	57.8%
MSCI Japan	2.15	4.97	43.3%
MSCI Australia	2.63	5.07	52.0%

As of August 29, 2014

# Comparative Analysis of Portfolios' Sensitivities to a Rise in the Stock Market Volatility

A combination of slow but steady improvements in developed markets economies and a renewed commitment of most central banks to accommodative monetary policies provided a friendly environment for investors to bid for risk. In this backdrop, equity markets volatility reached historically low records.



Source: TOBAM

However, at the same time, a multi-year long rally has made many investors increasingly nervous.

This divergence between investors sentiment and market volatility leads us to raise questions about the respective behavior of an Anti-Benchmark portfolio and a market-capitalization weighted index in case of a sudden rise in volatility.

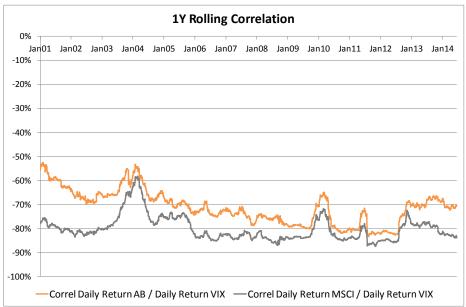
<sup>&</sup>lt;sup>1</sup> TOBAM's Diversification Ratio measures a portfolio's or index's diversification. It is supported by original research and is based on a mathematical definition of diversification. TOBAM's "Anti-Benchmark" Most Diversified Portfolio® maximizes this Diversification Ratio. Maximizing 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.



In our study, we will focus on the US equity markets and consider the potential relationship between the Anti-Benchmark and the CBOE Volatility Index® of the S&P 500 index (VIX) over a long term period (30/12/1999 - 30/06/2014).

We explore this relationship on two levels:

- 1. First, we compute historical rolling annual (1Y) correlations between the Anti-Benchmark US daily returns and the daily price differences of the VIX, and compare the result to the correlations obtained for another portfolio, the MSCI USA. The output of this analysis allows us to compare the respective behaviours of AB US and its reference index MSCI USA, with respect to volatility changes.
- 2. Second, we explore the historical relationship of relative performance of the AB US strategy vs. the MSCI USA, and interpret the excess return of the AB US strategy according to changes in volatility environments.
- I- Historical correlations of the portfolio returns to the VIX



Source: TOBAM, CBOE

- The correlations between both the AB US and MSCI USA to the VIX are always negative. Therefore this persistence indicates that when volatility rises (i.e. the VIX increases); portfolios' performance tends to be negative.
- The orange curve representing the correlation between AB and VIX is always above the grey curve which represents the correlation between MSCI and VIX. Consequently, the AB US portfolio tends to be less sensitive to changes in volatility than the MSCI USA.



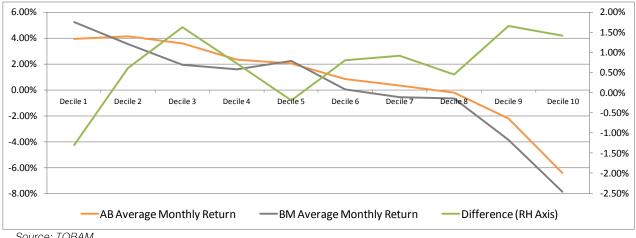
#### II-Relationship between relative performance and changes in the VIX

We consider monthly returns for AB US and MSCI USA constructed over the period previously defined for this analysis: (30/12/1999 - 30/06/2014). We group monthly returns into 10 deciles according to the changes of the end of month VIX level. We then compute average monthly returns for both AB and MSCI portfolios for each decile. The results are presented in the following table:

	Average VIX Difference Level	AB Average Monthly Return	BM Average Monthly Return	Excess Return
Decile 1	-7.71	3.93%	5.24%	-1.31%
Decile 2	-3.55	4.15%	3.53%	0.62%
Decile 3	-2.45	3.58%	1.96%	1.63%
Decile 4	-1.39	2.33%	1.60%	0.73%
Decile 5	-0.55	2.06%	2.26%	-0.19%
Decile 6	0.10	0.83%	0.02%	0.81%
Decile 7	0.95	0.35%	-0.57%	0.93%
Decile 8	2.31	-0.22%	-0.68%	0.46%
Decile 9	4.29	-2.21%	-3.87%	1.66%
Decile 10	9.46	-6.44%	-7.85%	1.41%

Source: TOBAM

While there is no a clear pattern of relative performance during decreasing volatility environments (negative excess return for Decile 1, positive excess return and high frequency of outperformance for Decile 3), the Anti-Benchmark US exhibited in the past a clear ability to generate outperformance during high increase in volatility (e.g. Decile 9 and 10).



#### Source: TOBAM

### Conclusion

Over the period under review, the Anti-Benchmark US has:

- Exhibited a lower sensitivity to the VIX compared to the market cap-weighted benchmark, and
- On average outperformed its benchmark during periods of high VIX increase.



## For more information

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