

DIVERSIFICATION DASHBOARD

May 2015

Diversification Ratios®

<p>TOBAM's Diversification Ratio® (DR) 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.</p> <p>As the table shows, the "broad market" indices leave diversification on the table. In addition to a snapshot of each market's DR², the table shows the DR² of a well-diversified portfolio, and the fraction of available diversification used by the index.</p>	Universe	DR ² Index diversification	DR ² Maximum diversification®	% diversification used by index
	MSCI All Countries World	6.15	22.99	26.8%
	MSCI World	5.27	19.90	26.5%
	MSCI Emerging Markets	7.32	15.04	48.7%
	MSCI Canada	4.67	9.94	47.0%
	MSCI Pacific Ex-Japan	3.12	9.30	33.5%
	MSCI US Equity	3.27	8.59	38.1%
	MSCI Japan	2.39	6.42	37.2%
	MSCI UK Equity	3.14	5.33	58.9%
	MSCI EMU	2.12	5.31	39.9%
MSCI Australia	2.45	4.38	55.9%	

Source: TOBAM, figures as of April 30, 2015

Drawdowns and other behavioural characteristics of the Most Diversified Portfolio: The US market case study

This study is an extract from a paper published in October 2014.

The rise of U.S. Equities during the last six years raises questions and gives investors some reasons to be nervous.

The fear of a market bubble has led investors to search for strategies capable of rewarding the risk taken while offering protection against downside risk related to the high level of risk concentration.

The Anti-Benchmark® approach aims at capturing the full equity risk premium by maximizing diversification and intends to typically enhance performance while also reducing volatility over a full market cycle.

Introduction

This note presents a comparative performance analysis of the Anti-Benchmark® and other alternative beta approaches and also provides a risk analysis which includes 2 dimensions that we believe are of primary importance to long term asset owners seeking not only performance, but also capital preservation:

- The analysis explicitly takes the investment horizon into account.
- The analysis quantifies the full downside risk (over the overall investment horizon) as opposed to a symmetric, instantaneous risk measure such as daily volatility for example.

We compare three strategies vs. the market cap-weighted benchmark MSCI USA:

- The Anti-Benchmark US strategy (AB)
- The MSCI US Equal Weighted index (EW)
- The MSCI US Minimum Variance index (MV)

We then analyze the performance of these three strategies using seven different angles:

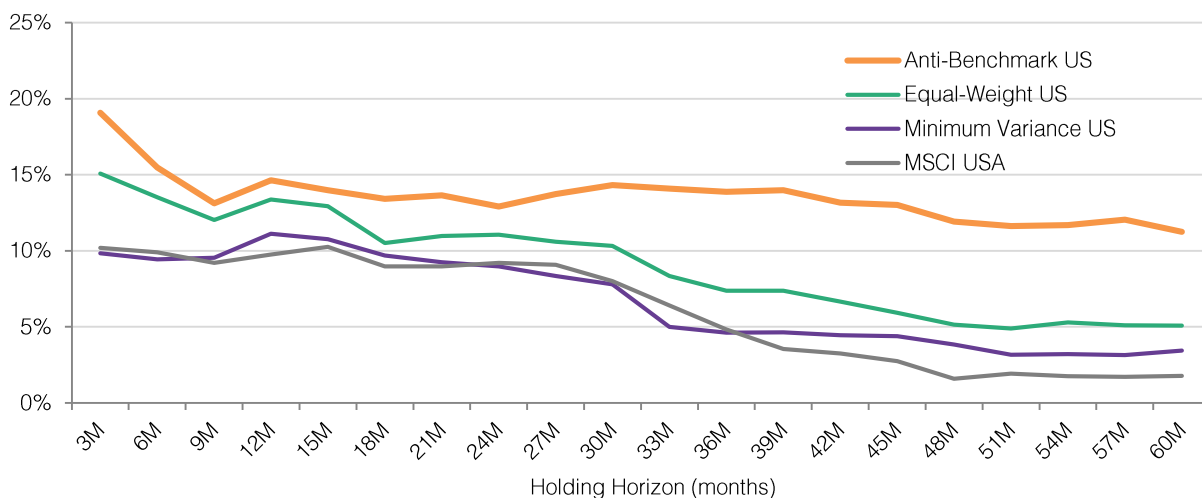
1. **Average returns of each strategy across investment horizons** ranging from 3 months to 5 years.
2. **Worst case absolute returns** of each strategy across investment horizons defined as the average absolute return realized in the worst 10% of cases.
3. **Worst case relative returns (vs. the MSCI USA)** of each strategy across investment horizons defined as the average relative return realized in the worst 10% of cases.
4. **Frequency of absolute loss** of each strategy across investment horizons ranging from 3 months to 5 years. It is defined as the frequency of negative absolute returns.
5. **Frequency of relative loss** of each strategy across investment horizons ranging from 3 months to 5 years.
6. **Maximum drawdowns** for each strategy, at any point in time.
7. **Time to recovery** after each drawdowns for each strategy, at any point in time.

We used back-tested data from December 31, 1999 to January 31, 2011, plus live data for the TOBAM AB US Fund from January 31, 2011 to September 25, 2014. All returns used in the analysis are gross of fees.

1. Absolute Performance Analysis

We analyze the strategies' absolute performance by comparing their average historical annualized returns across investment horizons.

Chart 1: Average annualized absolute returns



Source: TOBAM, MSCI. Past performance and simulations are not indicative of future results.

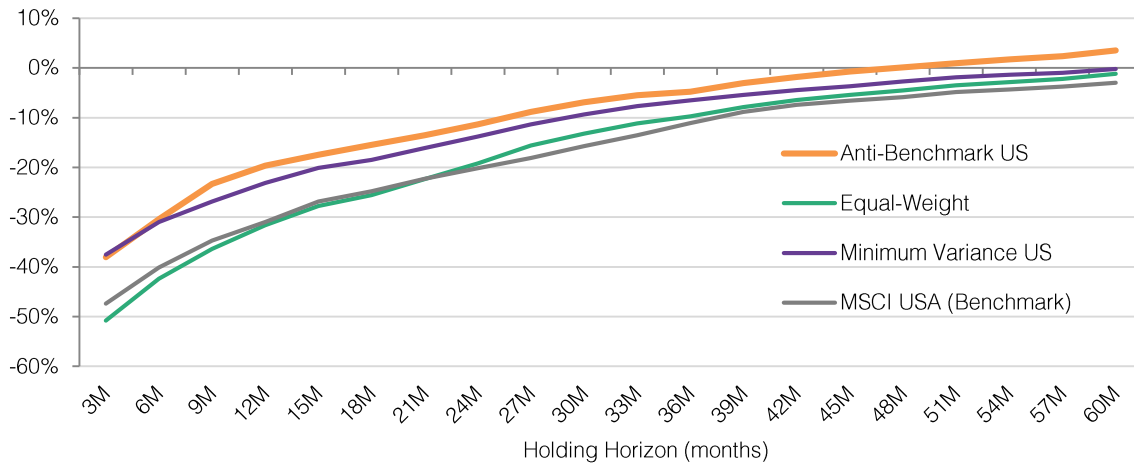
We observe that the AB portfolio, over the period studied, returned the best performance, whatever the holding horizon considered, whereas the market cap-weighted benchmark has been consistently amongst the worst performers.

2. Worst Average Absolute Loss (10% of cases)

The worst case annualized returns of each strategy across investment horizons is defined as the average absolute returns realized in the worst 10% of cases.

To calculate them for a given horizon, we retain the worst 10% of returns, and then average them.

Chart 2: Absolute CVAR 10% - US Market



Source: TOBAM, MSCI. Past performance and simulations are not indicative of future results.

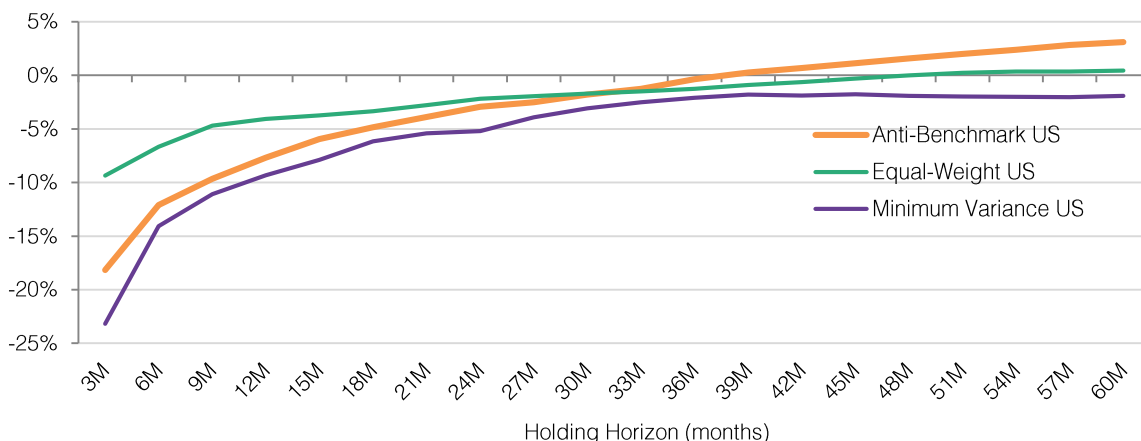
We use a Conditional Value at Risk (CVAR) methodology for the calculation of the worst 10% of returns as a simple VAR would ignore the data for the worst 10% returns which would give an incomplete results.

The analysis conducted shows that from December 31, 1999 to September 25, 2014, the Anti-Benchmark US has been the best performer during the worst 10% of cases, whatever the holding horizon considered whereas both the Equal Weight and Market Cap Weighted Benchmark have been consistently amongst the worst performers.

3. Worst Average Relative Loss (10% of cases)

The worst case annualized relative returns (computed versus the market cap weighted benchmark) of each strategy across investment horizons is defined as the average relative returns realized in the worst 10% of cases. To calculate them for a given horizon, we retain the worst 10% of returns, and then average them.

Chart 3: Relative CVAR 10% - US Market



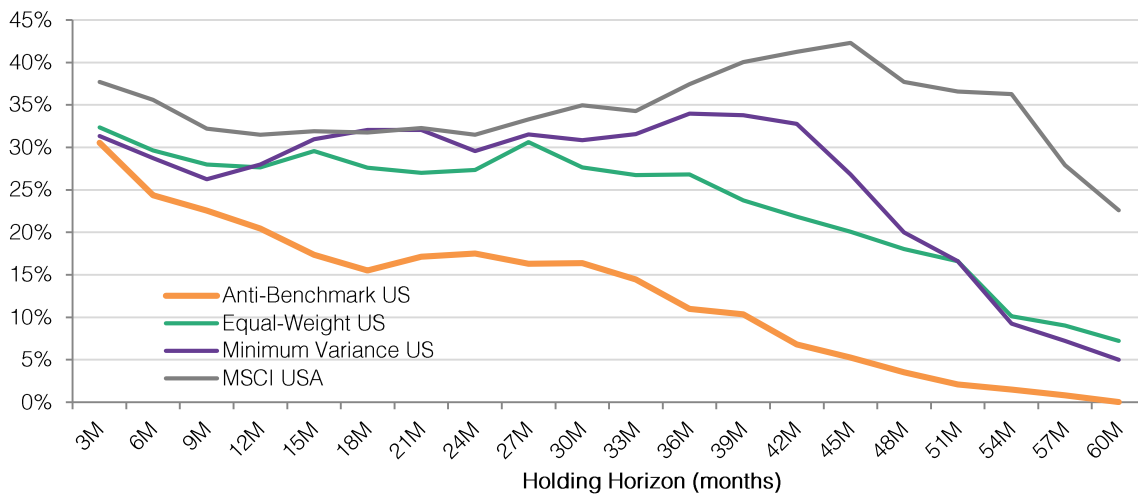
Source: TOBAM, MSCI. Past performance and simulations are not indicative of future results.

Our study shows that even though the three strategies can exhibit significant short term under-performance, their long term worst performance has been limited. For horizons greater than about 3 years, the Anti-Benchmark portfolio “underperformed less” in the worst 10% cases (compared to the Equal Weighted and minimum variance portfolios).

4. Frequency of Absolute Loss

For each given horizon we report the frequency of negative returns:

Chart 4: Frequency of absolute loss - US Market



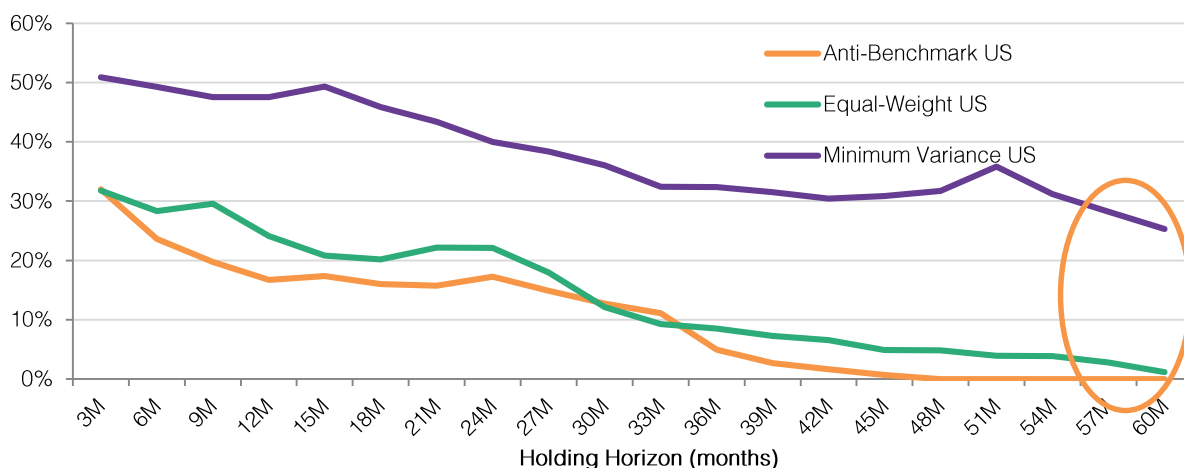
Source: TOBAM, MSCI. Past performance and simulations are not indicative of future results.

Over the period, the Anti-Benchmark portfolio showed by far the lowest probabilities of absolute loss amongst the strategies studied in this note.

5. Frequency of Relative Loss

Relative loss (computed versus the market cap weighted benchmark) of each strategy across various investment horizons: for each given horizon we report the frequency of negative returns.

Chart 5: Frequency of relative loss - US Market



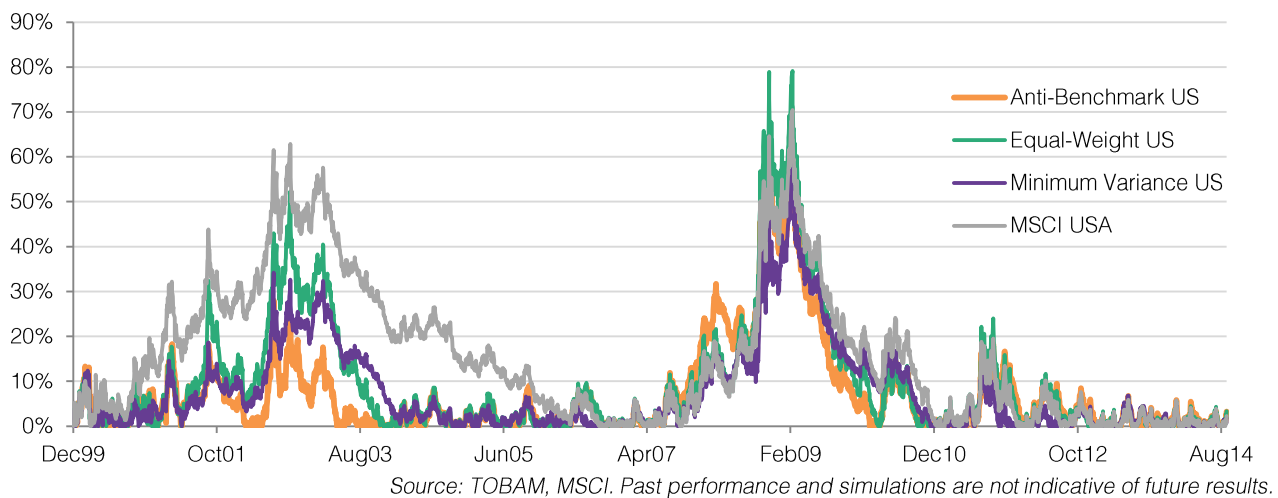
Source: TOBAM, MSCI. Past performance and simulations are not indicative of future results.

The analysis shows strong results for the Anti-Benchmark USA, especially above the 3-year holding period, where frequency of underperformance were very low for AB US compared to the other strategies studied. Overall the Anti-Benchmark USA compares very well to the other strategies whatever the holding horizon.

6. Drawdown Analysis

The drawdown represents, for any point in time over the period covered by the analysis, the measure of the decline from the historical previous peak. Chart 6 exhibits the drawdowns for each strategy and the MSCI USA.

Chart 6: Drawdown Analysis - US Market

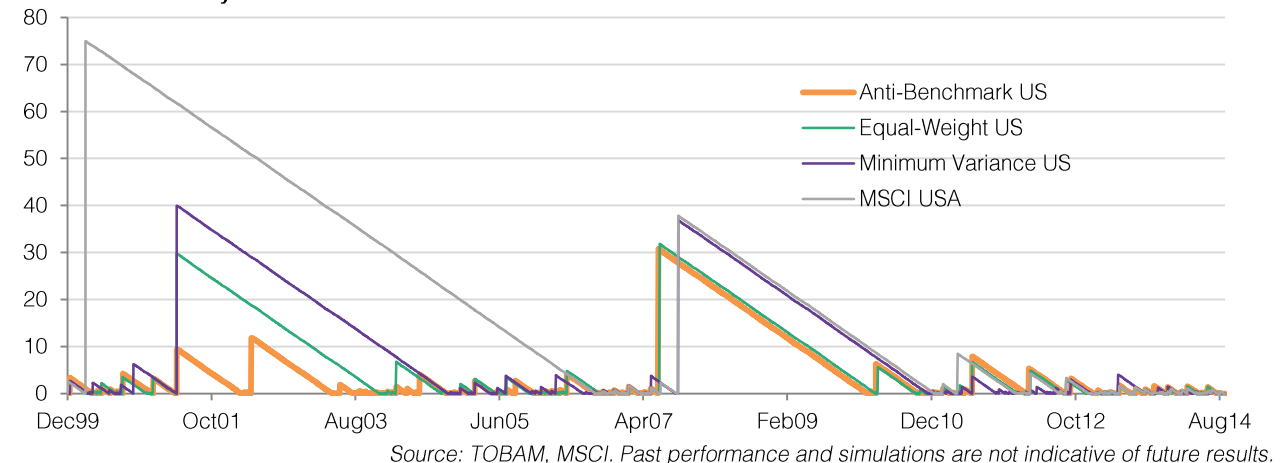


From December 1999 to September 2014, the Anti-Benchmark strategy exhibited drawdowns that are significantly lower compared to the other portfolios. It illustrates further the strategy’s capability to provide a portfolio which intends to enhance performance via greater diversification while also reducing volatility.

7. Time to Recovery Analysis

For each strategy, we present the times to recovery (measured by number of months) for each of the strategies’ drawdowns.

Chart 7: Recovery Periods in months



As seen on Chart 7, the Anti-Benchmark portfolio presented drawdowns that are significantly lower compared to the other portfolios over the period, and thus experienced a lower time to recovery.

Conclusion

The current bullish context in the US equity market leads investors to search for the best investment strategies that will allow to benefit from additional equity market appreciation while reducing the risk of the portfolio in case of a market correction.

This note illustrates the benefits of the Anti-Benchmark® approach and the ability of AB US to outperform and to provide better risk characteristics than the benchmark in arguably one of the most efficient equity markets in the world.

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