TOBAM Maximum Diversification® USA Equity Index

Q3 2018 – Performance Review

Key Highlights:

- The Maximum Diversification® USA Index (MaxDiv®) returned 12.04% year to date vs. the MSCI USA benchmark return of 10.63%. During Q3 2018, MaxDiv® returned 5.31% vs. the MSCI USA return of 7.51%.

- The first half of 2018 saw a reemergence of volatility in equity markets. However, global equity risk was nominal over Q3. As markets returned closer to their historical average levels of volatility, the MaxDiv® USA was able to reduce volatility by 8.31% with respect to the MSCI USA benchmark year to date.

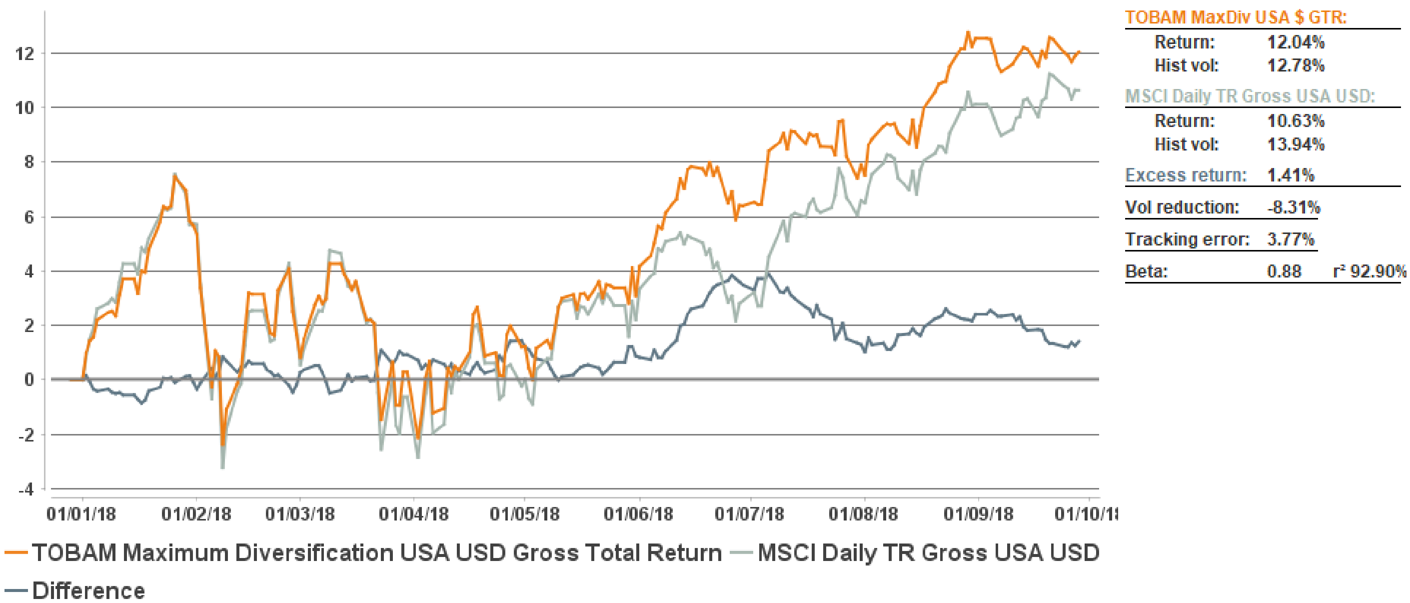
- The MSCI USA index remained biased toward Financials and IT.

- Focusing on Q3 2018 shows that the benchmark's bias towards higher market cap stocks and towards stocks that are highly correlated to the IT sector were rewarded over quarter.

1. YTD 2018 Performance

The MaxDiv® USA Index returned 12.04% year to date vs. the MSCI USA benchmark return of 10.63%. The MaxDiv® Index reduced the volatility of returns by 8.31% vs. the MSCI benchmark.

Figure 1: MaxDiv® USA vs. MSCI USA Performance YTD 2018 (12/29/2017 – 09/28/2018)



Source TOBAM. Returns are gross of fees and stated in USD. Past Performance is not indicative of future results.

The first half of 2018 was characterized by a return of stock market volatility as both realized and implied volatility picked up in February and remained in-line with historical levels. However, global equity risk was nominal over Q3. The S&P 500 returned 10.6% year to date with 7.7% coming from Q3 alone, while the DJ Stoxx 600 was up 1.4%, with Italy and Greece underperforming respectively by -3.5% and -8.5% in Q3. Financial turbulence in Turkey and Argentina was contained and did not spread to other markets. The MSCI EM was down 7.5% over the year, while over the quarter the Turkish Lira lost 25% (37% year-to-date) and the Argentinian Peso 30% (losing more than half its value year-to-date).

In 2018, under new leadership the Fed entered the last part of its rate hike cycle while the ECB announced it would phase out its Debt Purchase program by year end. This being said after a 50bps re-pricing in January and February, the 10yr US Treasury has remained in the 2.8%-3.15% range for most of the year. In Europe, the 10yr German Bund rate which spiked to above 0.7% earlier in the year dropped to 0.3% due to political risk in Italy and was range bound between 0.3% and 0.5%. The continuation of low long-term rates has led the US Treasury yield curve to a slope of approximately 0.25%, its lowest point since the Great Financial crisis. This is perceived by many as an indication of an upcoming economic recession. The strong performance of equities, and subdued implicit volatility levels coupled with a surprisingly benign backdrop in fixed income did not prove to be as supportive for credit as one might have expected. In the US, IG posted -2.16% and US High Yield 1.54% outperforming European High Yield by 1.26% in local currency terms. Overall, high quality credit underperformed lower quality credit as a result of the higher government rates, and heavier primary market activity. EM currency woes weighed on EM based issuers' performance. Corporate fundamentals remained solid with default rates at low levels.

2. Understanding the MaxDiv® Relative Performance

We now analyze the TOBAM MaxDiv® Indices relative performance vs. the MSCI benchmark, by looking at the main benchmark sector bets (Economic sectors / High vs. Low Market Capitalization stocks etc.) and how they performed over the period, since:

- TOBAM MaxDiv® Indices are long-only, fully invested, without leverage.
- By being well diversified, TOBAM MaxDiv® Indices are portfolios whose goal is to have their risk being homogeneously contributed by all the risk factors available in the investment universe. As such, it can be defined as a portfolio with as few bets as possible within its constraints.
- On the contrary, the benchmark is most times not evenly exposed to all the risk factors available in the investment universe. As such, it can be defined as a portfolio with implicit bets.
- The benchmark is "Buy & Hold": when its bets are winning bets, the benchmark concentrates even further.

➔ Thus, relative returns could be explained by looking at the performance of the benchmark largest bets

TOBAM's Diversification Ratio® (DR) measures to what extent a portfolio is diversified. The DR^2 (square of the Diversification Ratio®) measures the number of effective degrees of freedom to which a portfolio is exposed. The TOBAM Maximum Diversification approach, aims at maximizing the overall portfolio diversification, and as such will be likely to have more exposure to sectors with a higher DR^2.

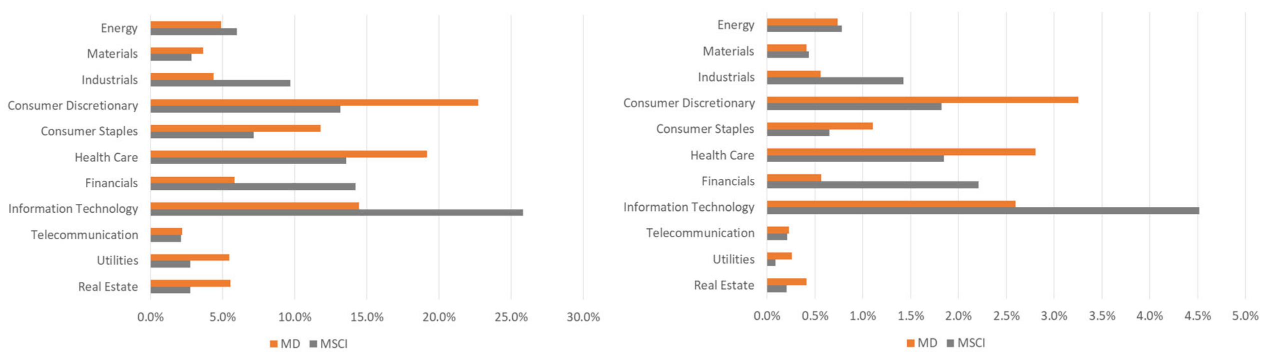
As of the end of quarter, the DR^2 of the benchmark was 3.87 vs. the MaxDiv® Index DR^2 of 7.93 In other words, the MaxDiv® Index is 2.05x more diversified than the benchmark.

3. Analyzing the Benchmark Concentrations using sector weights

Figures 2 shows that year to date the MSCI USA benchmark remained significantly biased toward IT and Financials.

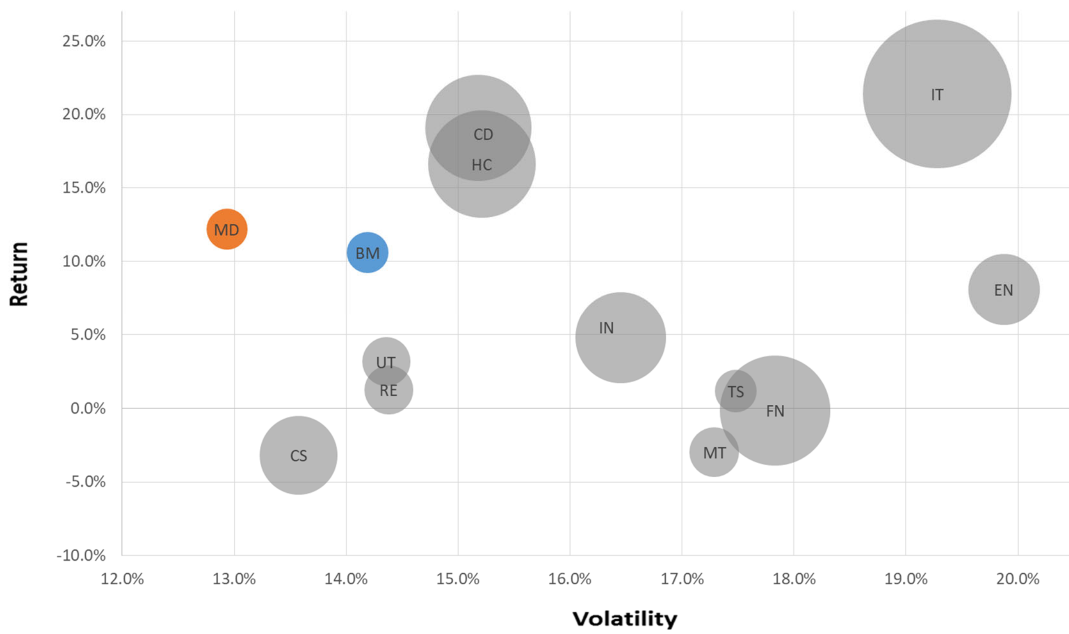
Figure 2: MaxDiv® USA vs. MSCI USA – YTD 2018

(i) Sector Allocation (Average over Period) **(ii) Sources of Volatility (Ex-Post over Period)**



Source: TOBAM, Bloomberg.

Figure 3: Risk/Return Analysis - MSCI USA Universe by sector, YTD 2018



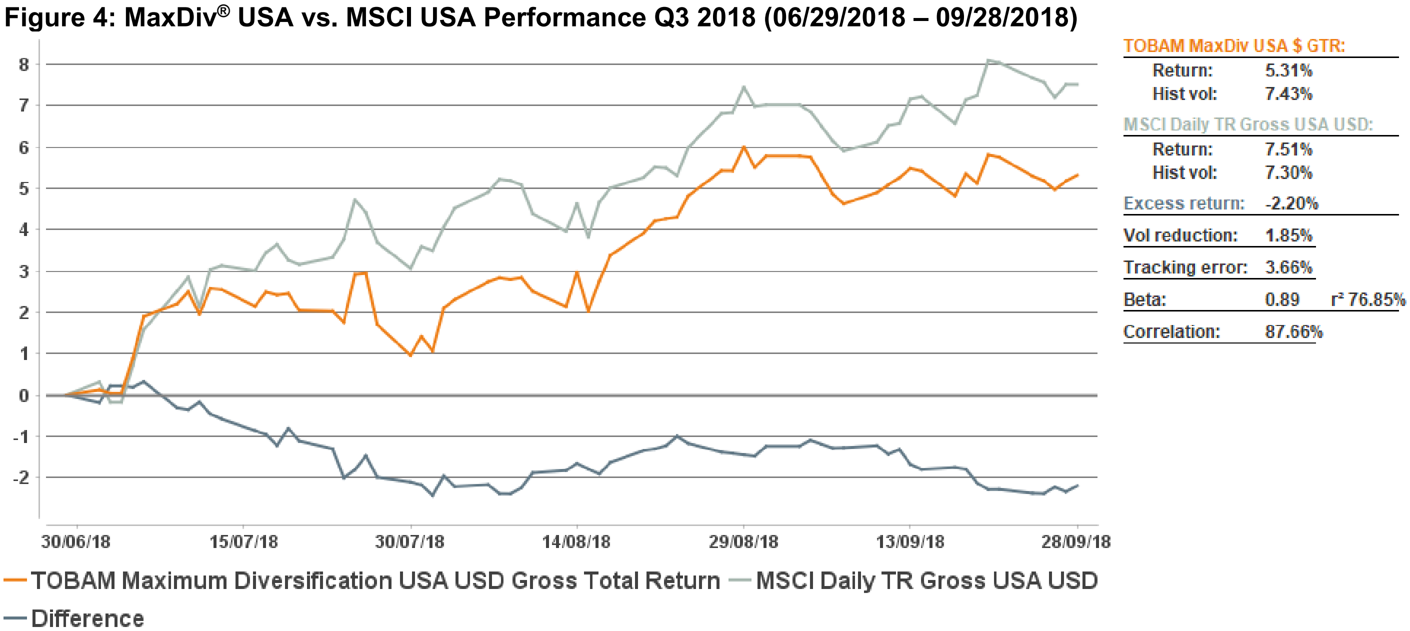
Note: The size of the bubbles is proportional to the weight of each sector in the market cap-weighted index. Source TOBAM, Bloomberg. Returns are stated in USD and are Gross of fees. Past performance is not indicative of future results.

As seen in the Risk/Return analysis above, the IT sector outperformed the benchmark while the Financial sectors largely underperformed the benchmark YTD. On a year to date basis, the benchmark had two drivers of relative performance. The first half of the year was driven by the underperformance of the benchmark's bias towards Financials. However, the performance over the third quarter was driven by the other benchmark biases, IT and Large Cap.

4. Understanding the MaxDiv® USA Relative Performance – Q3 2018

The MaxDiv® USA Index returned 5.31% during Q3 2018 vs. the MSCI USA benchmark return of 7.51%. The MaxDiv® Index reduced the volatility of returns by 1.85% vs. the MSCI benchmark.

Figure 4: MaxDiv® USA vs. MSCI USA Performance Q3 2018 (06/29/2018 – 09/28/2018)



Source TOBAM. Returns are gross of fees and stated in USD. Past Performance is not indicative of future results.

From December 29, 2017 until June 29, 2018 the MaxDiv® USA outperformed the MSCI USA by +3.49%. During the third quarter, however, the MaxDiv® USA underperformed the MSCI USA index by - 2.20%. The two below Figures 5, 6 and 7 focus on this quarter:

Figure 5: Return Attribution by sector, MaxDiv® USA vs. MSCI USA, 06/29/2018 – 09/28/2018

Sector - 29/06/2018 to 28/09/2018	Total Effect	Allocation Effect	Combined Effect	Portfolio Weight	Benchmark Weight	Benchmark Return
Energy	0.09%	0.10%	-0.01%	4.30%	5.99%	0.76%
Materials	-0.33%	-0.06%	-0.27%	3.64%	2.62%	0.13%
Industrials	-0.22%	-0.09%	-0.13%	4.71%	9.48%	9.44%
Consumer Discretionary	-0.14%	-0.02%	-0.11%	23.65%	13.17%	7.21%
Consumer Staples	-0.53%	-0.05%	-0.48%	11.15%	6.92%	6.29%
Health Care	0.15%	0.30%	-0.15%	18.98%	13.85%	14.11%
Financials	0.13%	0.24%	-0.11%	5.64%	13.63%	3.86%
Information Technology	-0.84%	-0.25%	-0.59%	13.59%	26.56%	9.39%
Telecommunication	-0.05%	0.00%	-0.05%	2.15%	2.18%	8.46%
Utilities	-0.11%	-0.17%	0.06%	6.17%	2.82%	2.29%
Real Estate	-0.33%	-0.22%	-0.12%	6.03%	2.79%	0.65%
Total	**-2.18%**	**-0.21%**	**-1.97%**	**100.00%**	**100.00%**	**7.50%**

Source TOBAM. Returns are gross of fees and stated in USD. Unattributed return: -2bps. Combined effect is the sum of the selection and interaction effects. Past performance is not indicative of future results.

Figure 5 above shows that a simple return attribution by sector does not fully explain the relative performance of Q3 2018.

Looking at the correlation of the MSCI USA to the IT sector and performing a return attribution by Correlation to IT provides better inside into the drivers of the benchmark return.

Figure 6: Return Attribution by Correlation to IT sector, MaxDiv® USA vs. MSCI USA Universe by sector, Q3 2018

Correlation to IT Terciles- 29/06/2018 to 28/09/2018	Total Effect	Allocation Effect	Combined Effect	Portfolio Weight	Benchmark Weight	Benchmark Return
Bucket1 - Lower Correlation to IT	-1.69%	-0.77%	-0.92%	53.82%	18.66%	5.25%
Bucket2	-0.42%	-0.01%	-0.40%	24.44%	23.79%	5.46%
Bucket3 - Higher Correlation to IT	-0.08%	-0.57%	0.49%	21.18%	57.52%	9.12%
Total	-2.18%	-1.35%	-0.83%	99.44%	99.96%	7.50%

Source TOBAM. Returns are gross of fees and stated in USD. Unattributed return: -2bps. Combined effect is the sum of the selection and interaction effects. Past performance is not indicative of future results.

The benchmark's weight in the higher tercile is 57.52%. This highlights the benchmark's bias to stocks that have the higher correlation to the IT sector. This bet was rewarded during the quarter as the higher correlation to IT segment outperformed the lower segments over the third quarter 2018.

Figure 7: Return Attribution by Market Cap segments, MaxDiv® USA vs. MSCI USA Universe by sector, Q3 2018

MktCaps Terciles- 29/06/2018 to 28/09/2018	Total Effect	Allocation Effect	Combined Effect	Portfolio Weight	Benchmark Weight	Benchmark Return
Bucket1 - Lower MktCaps	-0.61%	-0.49%	-0.12%	15.44%	5.40%	2.27%
Bucket2	-0.97%	-0.41%	-0.55%	31.83%	14.75%	4.89%
Bucket3 - Higher MktCaps	-0.60%	-0.23%	-0.38%	50.97%	79.85%	8.36%
Total	-2.18%	-1.13%	-1.05%	98.25%	100.00%	7.50%

Source TOBAM. Returns are gross of fees and stated in USD. Unattributed return: -2bps. Combined effect is the sum of the selection and interaction effects. Past performance is not indicative of future results.

The benchmark's weight in the higher market capitalization tercile is 79.85%. This highlights the benchmark's bias to higher cap market stocks. This bet was rewarded during Q3 2018, explaining the underperformance of the MaxDiv® USA index as the higher market cap segment outperformed the lower market cap segment by 6.09% over the third quarter 2018.

Note: The universe is split into terciles. Where terciles are defined as a set of data where the historical data is arranged in order from lowest to highest and then the data is partitioned into three groups. The lowest third of thedata values are defined as the lowest tercile, the middle third of the values are the middle tercile and the upper third of the values are the upper tercile.

5. Analyzing the Benchmark Concentrations using Correlations

Figure 6 below analyses the MSCI USA concentrations by using correlations. The benchmark has significantly higher correlations to sectors such as FN, IN and IT but also to factors such as Large Size, High Momentum and Growth. The higher correlations can be interpreted as a benchmark bias in terms of correlations.

Figure 6: Sector & Factor correlations, MSCI USA vs. MaxDiv® USA, YTD 2018

At any given time the benchmark will have multiple biases. If any of these biases are rewarded, the benchmark will continue increasing its exposure to it.

For more information

TOBAM is an asset management company offering innovative investment capabilities whose aim is to maximize diversification. TOBAM's Maximum Diversification® approach, supported by original, patented research and a mathematical definition of diversification, provides clients with diversified core exposure, in both the equity and fixed income markets. The company manages $10.4 billion (September 2018) via its Anti-Benchmark® strategies in Equities and Fixed Income. Its team includes 54 investment professionals.

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