

DIVERSIFICATION DASHBOARD

June 2018

Diversification Ratios[®]

Universes	DR ² Index diversification	DR ² Maximum Diversification [®]	% diversification used by index
MSCI All Countries World	4.38	14.82	29.5%
MSCI Canada	5.61	13.27	42.3%
MSCI World	4.00	12.69	31.5%
MSCI US Equity	3.40	9.74	34.9%
MSCI Emerging Markets	4.79	9.61	49.9%
MSCI Pacific Ex-Japan	3.66	8.54	42.9%
MSCI EMU	2.98	7.03	42.4%
MSCI Japan	2.87	6.67	43.0%
MSCI UK Equity	3.79	6.23	60.8%
BofA Merrill Lynch US Corporate & High Yield	4.32	6.76	63.9%
BofA Merrill Lynch Global High Yield	6.32	8.63	73.2%

TOBAM's Diversification Ratio[®] (DR) measures to what extent a portfolio is diversified.

The DR² (square of the diversification ratio) measures the number of independent sources of risk to which a portfolio is exposed.

As the table shows, the "broad market" indices do not fully utilise diversification capabilities. 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.

Source: TOBAM, figures as of May 31, 2018.

Celebrating 1-year of Anti-Benchmark[®] Global High Yield

Having applied the Maximum Diversification[®] methodology to equities since 2006, TOBAM successfully implemented its patented strategy to corporate bonds in May 2014 with the Anti-Benchmark[®] US Credit strategy. In March 2017, TOBAM expanded its offering in Smart Beta Fixed Income to introduce the Anti-Benchmark[®] Global High Yield strategy.

Celebrating its first anniversary, it provides us with a good opportunity to analyse the successful freshman year of the Global High Yield strategy.

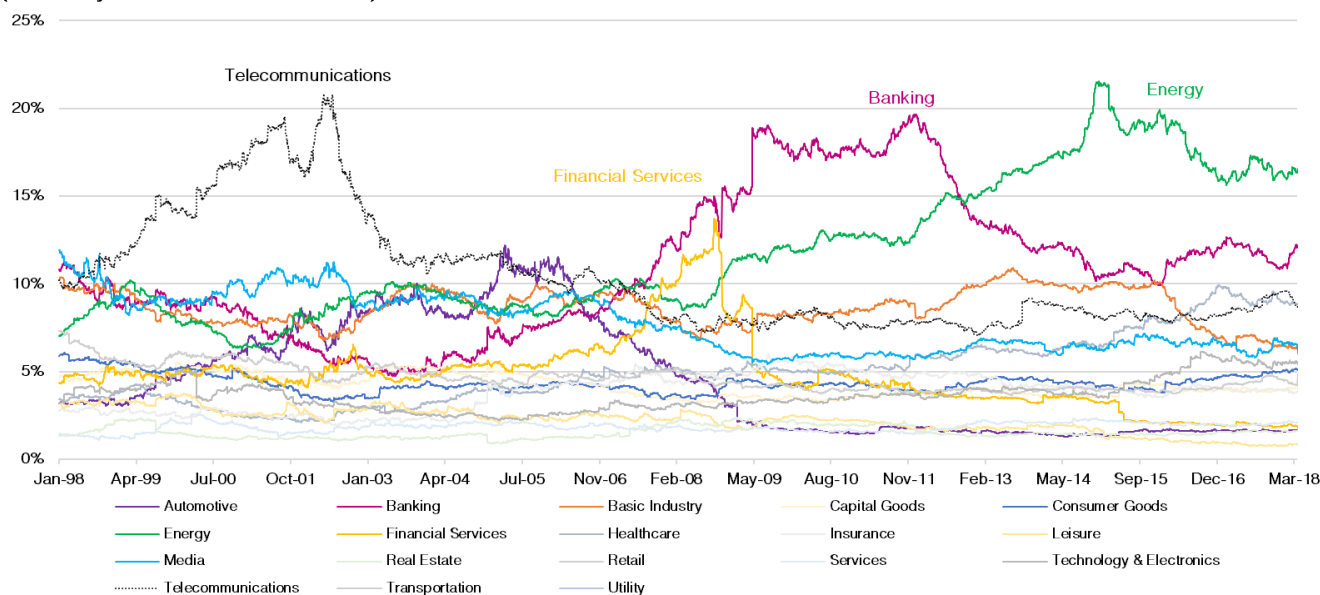
Introduction

TOBAM's mission is 'to provide rational and professional solutions to long term investors in the context of efficient (i.e. unforecastable) markets.' As a pioneer in the world of Smart Beta, TOBAM has two separate live strategies in Smart Beta Fixed Income which provide rational and professional solutions to investors wary of the concentration risks inherent to the debt-weighted benchmarks (Figure 1).

In this Dashboard, we will look back at the first year of existence of the Anti-Benchmark[®] Global High Yield strategy and study its track-record and performance drivers.

We will then explore the benefits of adding the Anti-Benchmark[®] strategy to a fixed income exposure, in terms of default management, exposure to energy risk, and the management of correlations to sectors and market factors.

Figure 1: Risk weighted concentrations in the ICE BofA ML Global High Yield Index (January 1998 to March 2018)



Source: ICE BofA ML, TOBAM calculations. Figures as of March 2018. Concentrations are DTS-weighted. Key Risks: The value of your investment and the income from it will vary and your initial investment is not guaranteed.

1. Anti-Benchmark® Global High Yield: track-record and performance drivers

1.1 Market Highlights

The end of March 2018 marked just over a year of Anti-Benchmark® Global High Yield. The strategy, in its rookie season, managed to outperform the benchmark by more than 200bps gross of fees, in two very contrasting market environments.

Figure 2: Anti-Benchmark® Global High Yield gross of fees performance (Inception to 29th March 2018)



Source: Bloomberg, ICE, TOBAM calculations. Inception date of AB Global High Yield strategy is Mar 13, 2017. Figures as of Mar 29 2018. Past performance is not indicative of future results. The performance figures do not reflect the deduction of advisory fees; the clients return will be reduced by the advisory fees and any other expenses it may incur in the management of its account. Advisory fees are described in Part II of the advisors Form ADV. The net performance over the period (including management/advisory, administrative & subscription fee) would be 8.90%.

Period 1: From March to September 2017, the strategy registered 130 basis points of gross outperformance in a calm and supportive market.

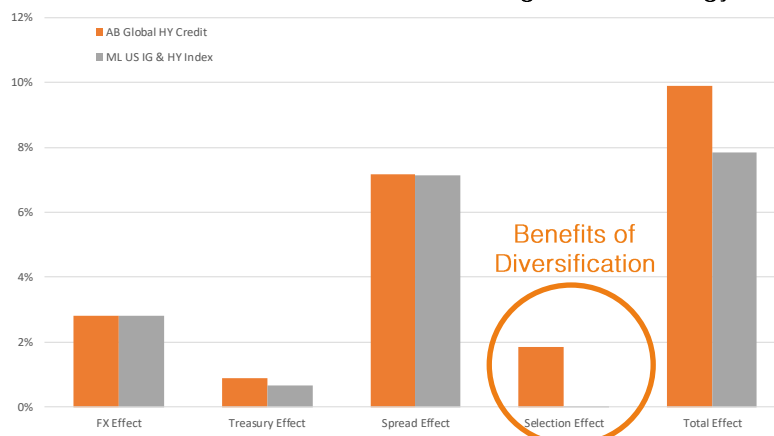
Period 2: October 2017 to March 2018: we experienced a decline in November 2017, followed by a sharper drop in February 2018, mainly triggered by the repricing of rates, weak equities and rising volatility. This challenging environment still allowed the strategy to outperform the benchmark by 79 basis points in Period 2, to bring the strategy's outperformance since inception to +2.09% overall.

1.2 Understanding relative outperformance

A. Return attribution

Figure 3 below analyses the drivers of performance of the Anti-Benchmark® Global High Yield strategy and the Benchmark respectively, by breaking it down into various factors.

Figure 3: Performance attribution of Anti-Benchmark® Global High Yield strategy since inception

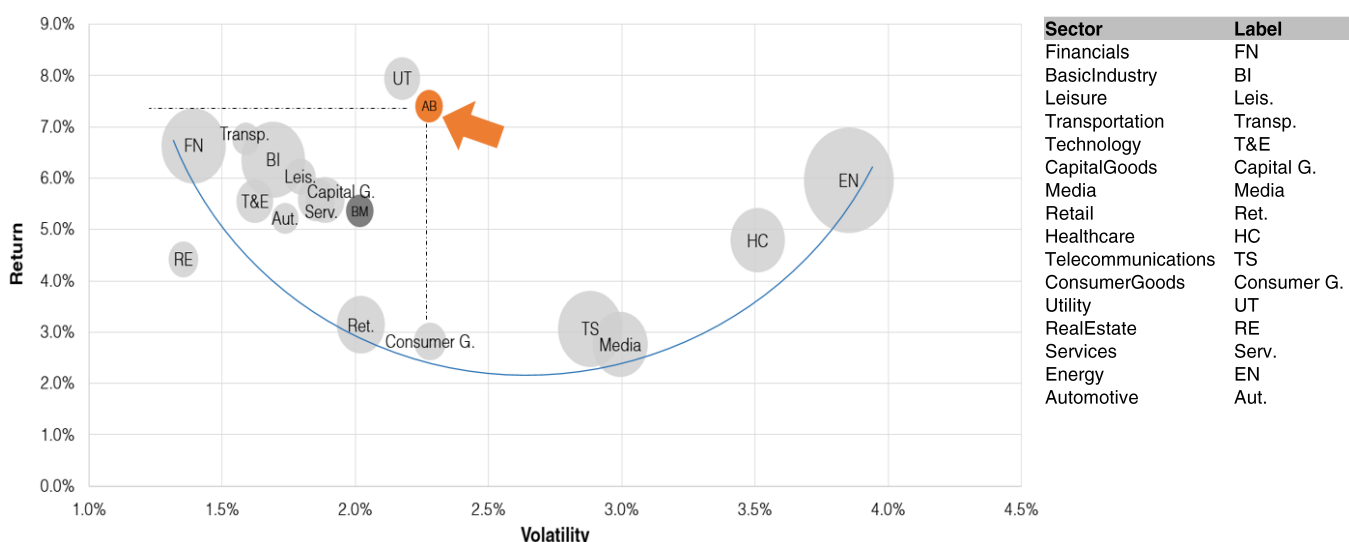


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Unsurprisingly, since benchmark's FX, duration and spreads are +/- 10% matched, the "FX", "Treasury" and "spread" effects do not explain the Anti-Benchmark®'s relative outperformance. The main driver of the outperformance is the selection effect of the strategy, demonstrating the benefits of diversification.

B. Sector Analysis

Figure 4: Risk/Return Analysis – ICE Global HY Corporate Universe by Sector (12/03/2017 – 29/03/2018)



Source: Bloomberg, ICE, TOBAM calculations. Inception date of AB Global High Yield strategy is Mar 13, 2017. Figures as of Mar 29 2018. The size of each sector bubble represents the relative weighting in the benchmark's universe. Past performance is not indicative of future results. The performance figures do not reflect the deduction of advisory fees; the clients return will be reduced by the advisory fees and any other expenses it may incur in the management of its account. Advisory fees are described in Part II of the advisors Form ADV. The net performance over the period (including management/advisory, administrative & subscription fee) would be 8.90%.

As the Anti-Benchmark is diversified, to understand the relative performance versus the benchmark we can analyse the implicit bets made by the benchmark.

- Since inception, the Anti-Benchmark® Global High Yield **outperformed all but one of the Benchmark's sectors**, while keeping volatility in line with the average.
- TOBAM's diversified approach involves maintaining a **balanced exposure to all risk factors** beyond the simple sector allocation effect, a feature observed in Figure 4.
- The Benchmark's largest concentration, Energy, performed slightly better than the market with more than twice the realized volatility, a detrimental bet for the Benchmark's risk-return profile.
- The Benchmark's bets toward Financials and Basic Industries were, on the other hand, rewarded, displaying elevated returns (>6%) with a low level of volatility.

2. The potential benefits of the Anti-Benchmark® strategy in the context of a fixed income portfolio

2.1 Diversification as a tool to manage default risk

Default risk is, naturally, a key driver of the High Yield markets globally. The historical analysis of default risk presented in Figure 5 reinforces the case for issuer diversification in the High Yield market. For each month, we plot (in black) the default rate of the last 12 months for the entire US High Yield universe. We then measure the default rate of the 3 sectors which held the highest risk-weighted concentration (in red) 12 months earlier to avoid survivorship bias. The three time periods circled demonstrate that passive investing tends to maximise the exposure to a sector at the worst possible time.

Figure 5: US High Yield vs. Top 3 Sector risk-weighted concentrations default rate (LTM)

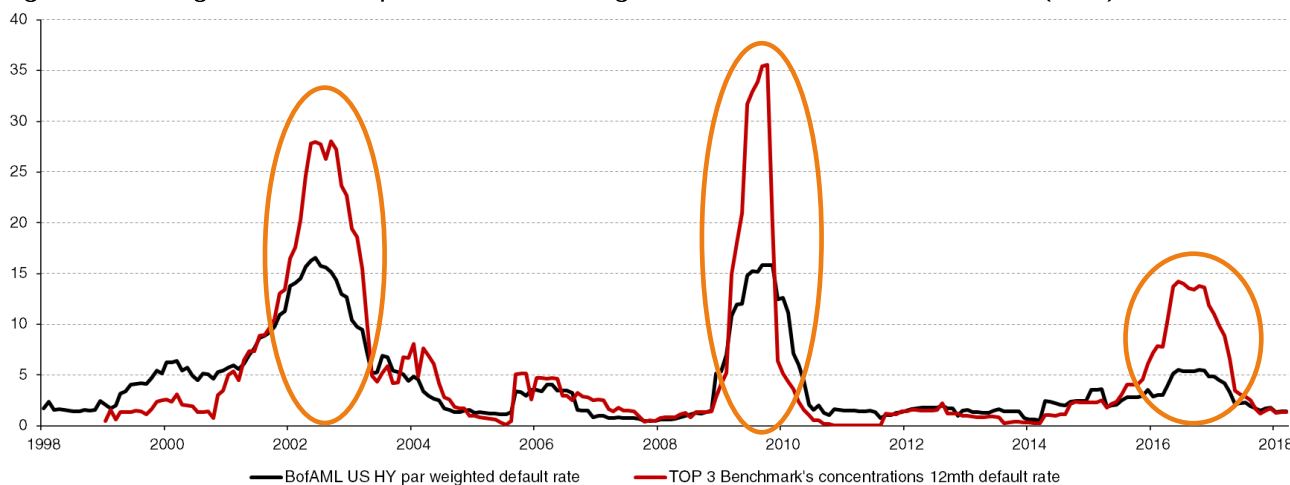


Figure 6: Highest Default Rates – Top 4 Sectors during crisis

Jun-02			Oct-09			Oct-16		
# Sector	Default rate (%)	cumulated share (%)	# Sector	Default rate (%)	cumulated share (%)	# Sector	Default rate (%)	cumulated share (%)
1 Technology	47.1	7.1	1 Automotive	60.5	20.4	1 Energy	21.0	67.1
2 Telecoms	33.2	43.8	2 Media	37.4	44.1	2 Materials	16.0	87.5
3 Automotive	32.6	49.0	3 Gaming	34.4	55.3	3 Automotive	4.0	88.8
4 Media	13.5	75.3	4 Financials	22.7	71.4	4 Hotels & Lei:	2.9	89.7
Mkt avg	16.6	100.0	Mkt avg	15.9	100.0	Mkt avg	5.5	100.0

Source: BofA. As of April 2018, TOBAM calculations

This finding is confirmed in figure 6 by detailing the 4 sectors with the highest default rate at each crisis, and their respective share of overall defaults. These sectors each time represented more than 70% of total debt in default, which confirms that default is a concentrated phenomenon during a crisis. We can see here again that some of the market's biggest concentrations, such as Telecom and Media in 2002, Financials in 2009, and Energy in 2016, contributed very significantly to the wave of defaults the market experienced. **Take-away: Diversifying away from the market's concentration can also provide investors with a way to effectively manage default risk.**

2.2 Diversification to mitigate the risk of current market concentration in energy

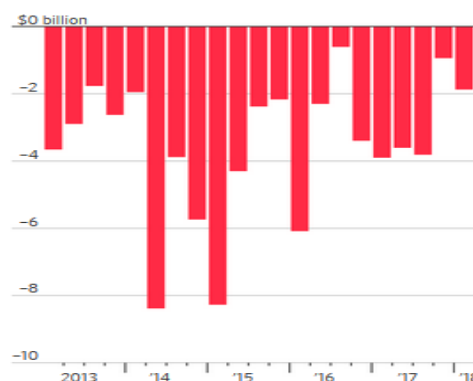
As the Energy sector is currently the Global High Yield market’s largest risk concentration, it is important to analyse its significance to investors invested in debt-weighted indices. Intuitively, oil prices are, for this reason, a dominant driver of the Global Credit market.

Oil prices (WTI) are still down significantly from their 2014 highs of over \$110 (Figure 7), and producers continue to spend cash at similar levels to when oil prices were high, putting their balance sheet at risk (Figure 8).

Figure 7: WTI Crude Oil Prices



Figure 8: Top 20 US Shale Oil Producers Cash Flow



Source: TOBAM and WSJ. As of April 2018

The dire state of energy companies in the US has been largely reflected by the price of their stocks. They are currently hovering around their multi-year lows, but this trend is not seen in credit markets. Energy bonds are back to multi-year highs (Figure 9). The rally in Energy credit has been so powerful that despite a challenging environment for Energy companies, the spread pick-up investors used to get to take on the Energy risk almost disappeared (Figure 10)

Figure 9: Performance of HY Energy Bonds vs. Energy Equity ETF

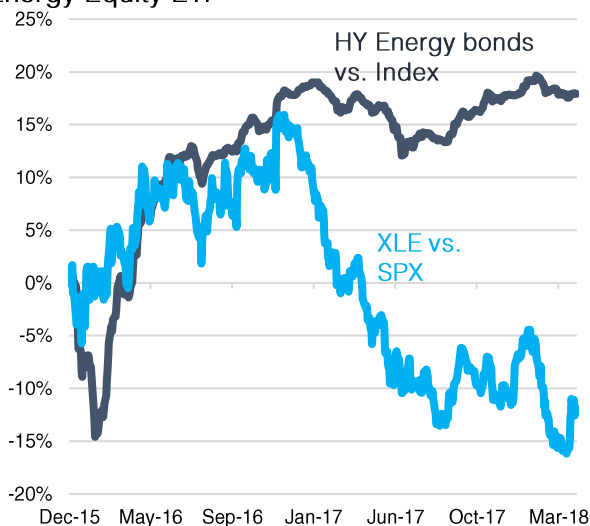


Figure 10: Spread pick-up in HY Energy credit versus the rest of the US HY market



Source: TOBAM, GS, BoA. As of April 2018.

Take-away: The Anti-Benchmark® strategy provides a way to diversify away from the Energy risk for investors wary of getting overly exposed to the fate of challenged shale oil producers in the US.

2.3 Diversification Benefits at portfolio level

In this section we are aiming to illustrate the strategy’s diversification benefits using correlations as a measuring yardstick.

Figure 11 displays the correlations of the Anti-Benchmark® HY strategy (in orange) and the ICE-BofA ML Global HY Index (in grey) to each of the Index’ sub-sectors. Since inception, the strategy has been less correlated than the benchmark to each of its sectors, showcasing the strategy’s diversifying power.

In Figure 12, we are comparing the correlation in absolute terms of the Anti-Benchmark® Global High Yield strategy (FX hedged) and a traditional passive debt-weighted exposure such as HYG ETF, to a wide range of generic market indicators. Whether one looks at equity, volatility, rates or credit, between the HYG and the Anti-Benchmark® strategy, the Anti-Benchmark® has a lower correlation in absolute terms.

Figure 11: AB & BM correlation to ICE Sectors

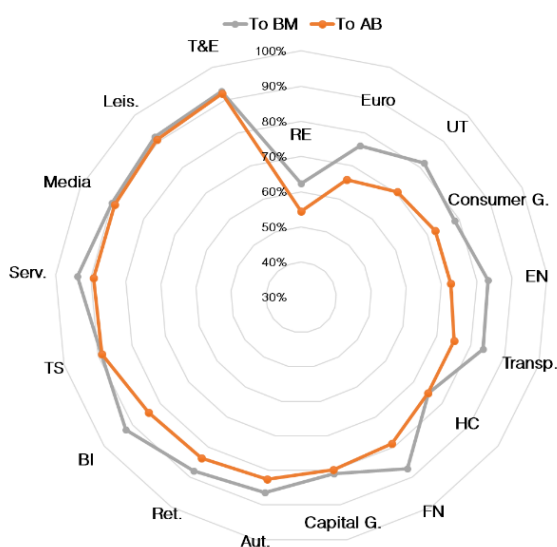
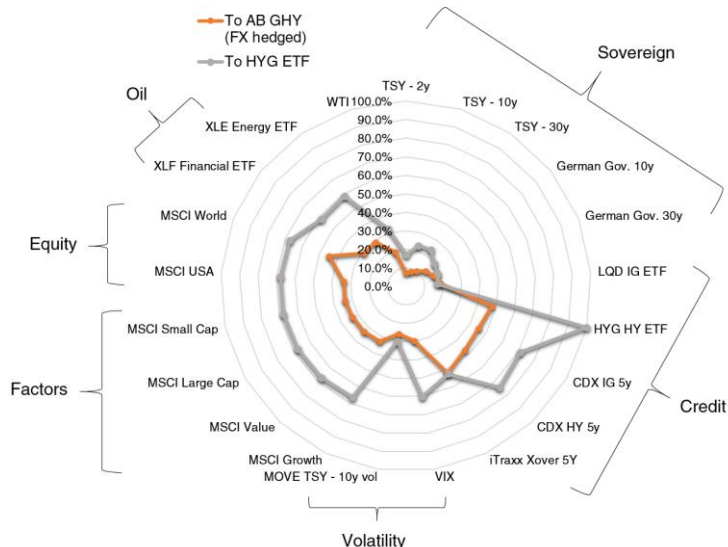


Figure 12: AB & HYG correlation in absolute terms to market indicators



Source: TOBAM, CBOE, ICE-BofA ML, MSCI, Bloomberg, HIS-Markit, Blackrock. Figure 11, live data are used only since fund’s inception 13/03/2017. Figure 12, daily returns are back tested data from 01/05/2007 to the fund’s inception on 13/03/2017, then live data until 31/03/2018. Back tested results are for information purposes only. They are intended to illustrate how the Strategy may have behaved over the mentioned period. The simulations are gross of tax and exclude costs of transaction and fee assumptions. Past performance is not indicative of future results. The performance figures do not reflect the deduction of advisory fees; the clients return will be reduced by the advisory fees and any other expenses it may incur in the management of its account. Advisory fees are described in Part II of the advisors Form ADV. The net performance over the period (including management/advisory, administrative & subscription fee) would be 8.90%.

On the back of these results, we look at the diversification benefits of adding Anti-Benchmark® exposure to a portfolio composed exclusively of a passive debt-weighted exposure such as HYG ETF.

Figure 13: Correlations of Mixed Portfolios to market indicators

Mixed Portfolio-correlations at different weights	vs. CDX HY	vs. MSCI USA	vs. Reversed VIXX ETF	vs. US Energy ETF
20% AB / 80% HYG	88%	70%	62%	53%
40% AB / 60% HYG	88%	69%	61%	52%
60% AB / 40% HYG	85%	66%	59%	50%
80% AB / 20% HYG	79%	60%	54%	45%

Sources: TOBAM, Iboxx, MSCI, live portfolio data from 13/03/2017 to 31/03/2018. Key Risks: The value of your investment and the income from it will vary and your initial investment amount is not guaranteed. Allocations are subject to change.

In Figure 13, we observe that the larger the percentage of AB Global HY within the Mixed Portfolio, the lower the correlation of the portfolio to a set of market indicators.

This result is consistent with the utility function of the Anti-Benchmark[®] Credit investment process which aims to diversify a portfolio's exposure evenly to all risk factors in a specified universe.

Take-away: The Anti-Benchmark[®] Global High Yield portfolio tends to exhibit lower sensitivity to sectors and market indicators than passive investment products such as the broader benchmark or the HYG ETF. This could prove useful for investors looking to mitigate various risks in their fixed income portfolio.

Conclusion

The Anti-Benchmark[®] Global High Yield Strategy celebrated its one-year anniversary, outperforming the benchmark since inception and during two different market regimes.

This Diversification Dashboard aims to illustrate the various ways investors can consider using the Anti-Benchmark[®] strategy within their allocation to the credit asset class:

- Thanks to greater diversification, the Anti-Benchmark[®] strategy aims at **outperforming the broader market while maintaining a similar risk profile** (as measured by average spread and duration).
- By diversifying away from the market's biggest concentrations, the Anti-Benchmark[®] strategy can be an effective **default risk management tool**.
- More specifically, with Energy bonds at their peak despite a challenging environment, the Anti-Benchmark[®] can be a good way to **mitigate the Energy risk concentration**.
- Thanks to its diversified profile, investors can use the Anti-Benchmark[®] strategy to **decrease their overall correlation to sector risk or various generic market indicators**.



For more information

TOBAM is an asset management company offering innovative investment capabilities designed to increase diversification. Its mission is to provide rational and professional solutions to long term investors in the context of efficient markets.

The Maximum Diversification® approach, TOBAM's flagship investment process founded in 2006, is supported by original, patented research and a mathematical definition of diversification and provides clients with diversified core exposure, in both the equity and fixed income markets.

In line with its mission statement and commitment to diversification, TOBAM also launched a separate activity on cryptocurrencies in 2017.

Diversification is our only bet.

TOBAM currently manages US\$10 billion (at March 29, 2018). TOBAM's team is composed of 51 professionals.

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