TOBAM
CORE INVESTMENTS

DIVERSIFICATION DASHBOARD

January 2020

Diversification Ratios®

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 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 DR^2, the table shows the DR^2 of a well-diversified portfolio, and the fraction of available diversification used by the index.

Universes	DR^2 Benchmark	DR^2 Anti-Benchmark®	% diversification captured by benchmark
MSCI All Countries World	3.93	16.60	23.7%
MSCI World	3.63	14.15	25.6%
MSCI Canada	4.89	14.04	34.8%
MSCI Emerging Markets	4.13	10.36	39.9%
MSCI US	2.95	8.69	33.9%
MSCI EMU	3.10	7.29	42.5%
MSCI Pacific Ex-Japan	3.46	7.83	44.2%
MSCI Switzerland	2.38	6.75	35.3%
MSCI Japan	3.12	6.32	49.3%
MSCI UK Equity	3.52	5.03	70.1%
ICE-BofAML Global Corporate	4.02	6.16	65.3%
ICE-BofAML Global High Yield	5.79	7.36	78.7%
Multi Asset "Comparable" Universe	8.63	20.69	41.7%

Source: TOBAM, figures as of December 31, 2019.

Signs of rising stress in the High Yield market's largest sector, Energy

On the back of the shale oil and gas boom in the US, Energy has slowly become the preeminent concentration of the High Yield space. We believe that this level of debt is increasingly becoming unsustainable for the market, as observed in 2015-2016 during the first Energy crisis, or more recently in Q4 2018. Today, after a period of calm, signs of stress are appearing around the Energy sector again.

Should these warning signs be taken seriously? And what should a credit investor do to mitigate these risks?

I. Looking back on the Energy concentration in the credit market

Technological advances in fracking techniques triggered in the 2000s a gold rush in the oil and gas industry, aimed at unlocking vast underground resources in the US soil. Oil companies, sometimes newly created for the occasion, initiated billions of dollars' worth of capex programs to take advantage of these new resources. These investments reached at times close to half of these companies' revenues, far above market standards.

Figure 1: HY energy capex and revenues, LTM (last twelve months)

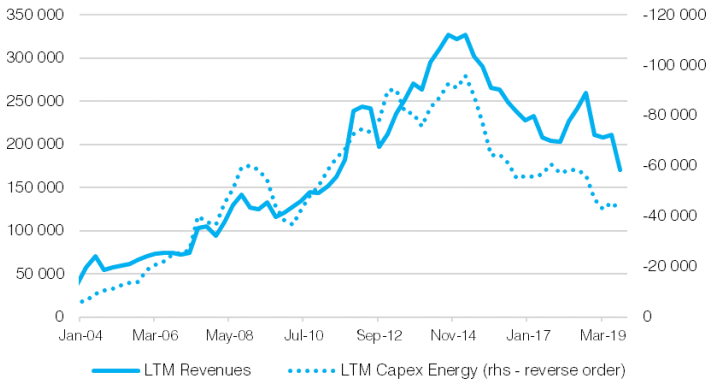
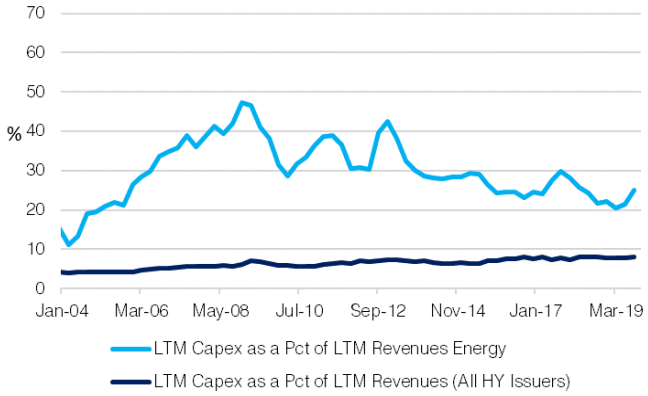


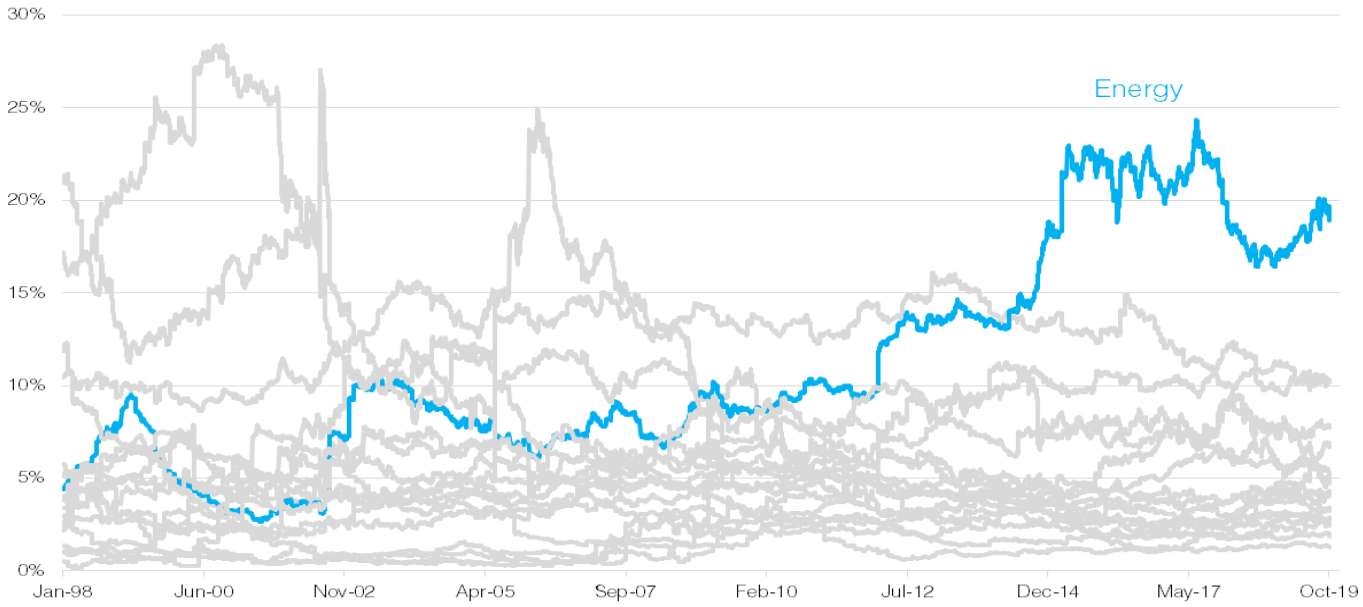
Figure 2: LTM capex as a % of LTM revenues



Source: TOBAM, ICE-BoAML. Historical Data from 1998 to 2019.

This incredible rush for investments was largely financed by new debt, triggering a rapid rise of the sector's concentration in the Benchmark.

Figure 3: ICE-BoAML Global High Yield Index: Risk-weighted sector weights



Source: TOBAM, ICE-BoAML
Weights are weighted using Duration-Times-Spread (DTS)

This concentration of debt in the Energy sector, which has reached historic levels, has proven difficult to sustain for the market. The 2015-2016 oil crisis, the market's violent repricing and the ensuing wave of defaults, remains a painful memory especially for ETF investors mimicking the Benchmark's weights allocation.

Today, after a calmer period, signs of stress are materializing again around the Energy concentration. Could we be witnessing a slow remake of the great Energy crisis? And where does that leave credit investors?

II. Signs of stress in the Energy market: is something brewing?

The collapse in oil prices from 2014 took passive investors wrong-footed, as it was then that debt-weighted Benchmarks and ETFs were maximizing their allocations to Energy risk.
Looking at various market indicators, the vast amount of stress seizing market participants in 2016 was clearly on display.
Today, as weakness and volatility are appearing to stage a comeback in the oil market, it is interesting to compare these indicators against their 2016 levels and try to measure how much stress is currently embedded in the market.

Indicator 1: Oil prices

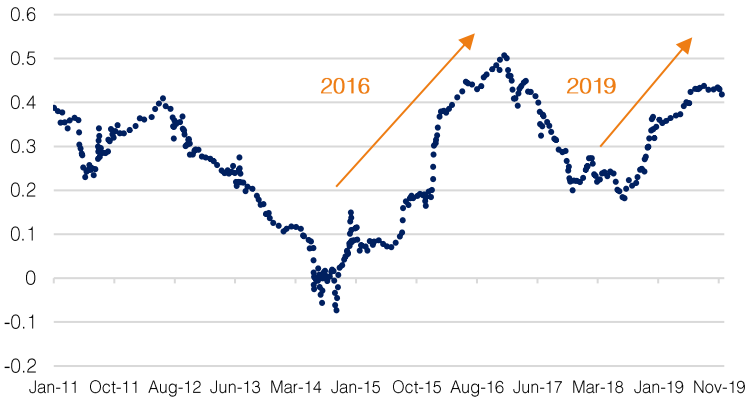
Figure 4: Oil prices (WTI)

After touching a 13-year low in February 2016, oil prices staged an impressive come-back for several months. This rally came to an abrupt end at the beginning of Q4 2018. Since then, the oil market has been weaker, directionless and volatile.

Source: TOBAM, Bloomberg. Data from January 2010 to December 2019.

Indicator 2: The High Yield market's correlation to oil prices is back to 2016 levels

Figure 5: US HY correlation to oil prices



This heightened volatility in oil prices has caught market participants' attention, as witnessed by the High Yield market's correlation to oil prices: correlation is now close to its highs, dating from February 2016 Energy lows.

Source: TOBAM, Bloomberg. Data from January 2011 to November 2019.

Indicator 3: The market is flooded with oil

Why are we witnessing such volatility in oil prices?

In a market where global oil demand is stalling due to weaker economic growth, signs on the field increasingly point to a significant slowdown of activity in the main US oil fields. Very much as in 2016, the output growth is slowing close to a halt.

Figure 6: US Oil Production versus Global Demand

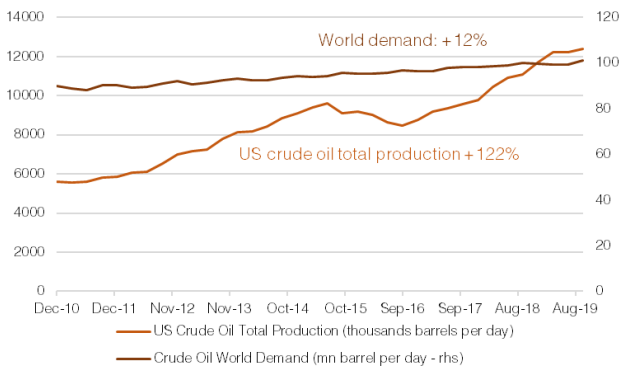
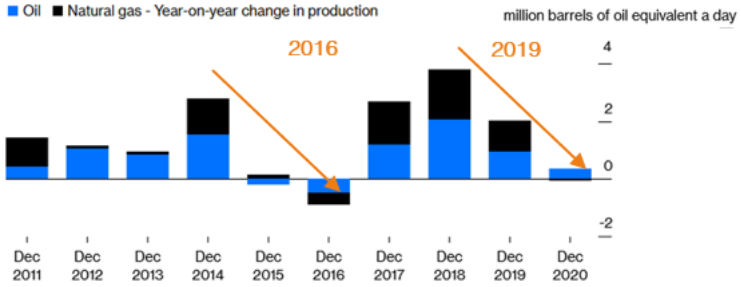


Figure 7: YoY change in production



Source: Figure 1: TOBAM, Bloomberg, DOE, EIA. Data from December 2010 to September 2019.
Figure 2: Bloomberg, EIA. Data from January 2011 to November 2019.

Indicator 4: Primary market for Energy companies

On the back of these operating headwinds, it has become increasingly difficult for Energy companies to tap the primary market, a trend which is now accelerating. After years of rapid growth in Energy debt, we are going through a change of regime: the share of US HY Energy companies in the total primary emissions stands now below 2016 levels (figure 8). As a consequence, the amount of Energy debt outstanding is growing at a slower pace (figure 9).

Figure 8: US HY energy share of US HY primary

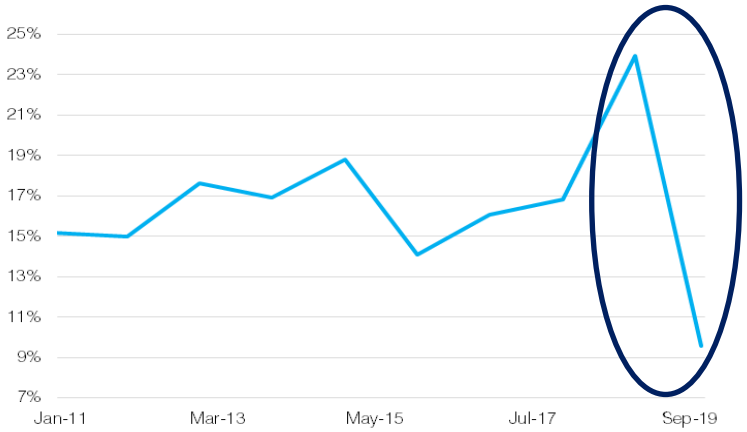
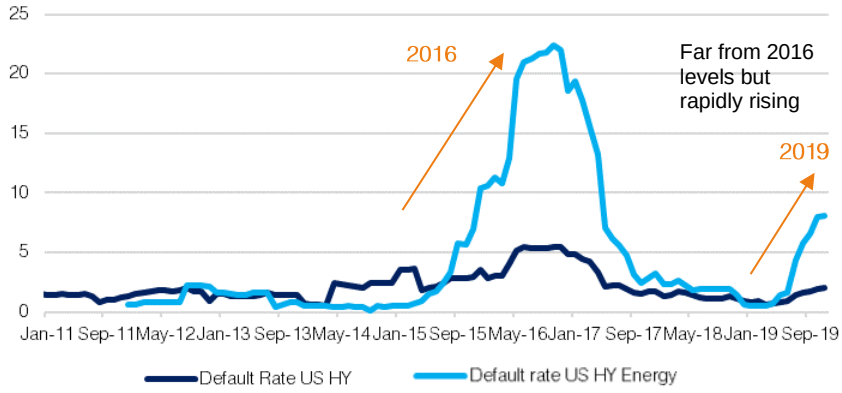


Figure 9: US HY energy debt, yoy % chg

Source: TOBAM, Bloomberg. Data from January 2011 to November 2019.

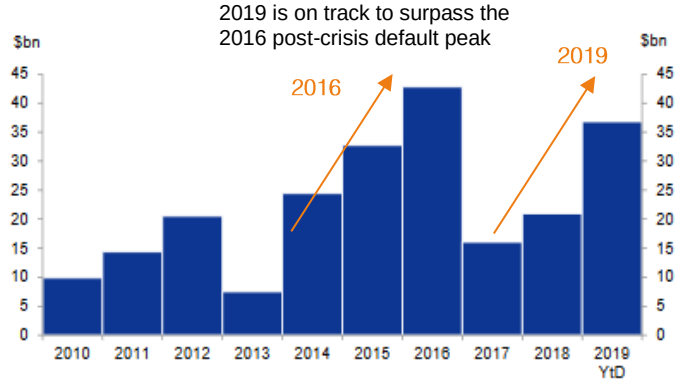
Indicator 5: Rapidly rising default rates in Energy

Figure 10: US HY Default rates



With lower oil prices, the primary market is virtually shut for some issuers and looming maturities to refinance, the market is experiencing a rapid rise in Energy defaults. The last twelve months default rate in Energy is rising rapidly, while the notional amount that entered default this year is close to 2016's level.

Figure 11: Notional amount entering default



Source: Figure 10: TOBAM, ICE-BoAML. Data from January 2011 to November 2019. Figure 11: Bloomberg, Goldman Sachs Global Investment Research.

Indicator 6: Dispersion is staging a come-back

With anxiety among market participants hitting Energy credits, the market is increasingly seeing sensitivity to oil prices as a differentiating factor. The Energy sector has now decoupled from the rest of the market, with dispersion between HY credits therefore almost back to its 2016 peak, and rising.

Figure 12: US HY sectors performance

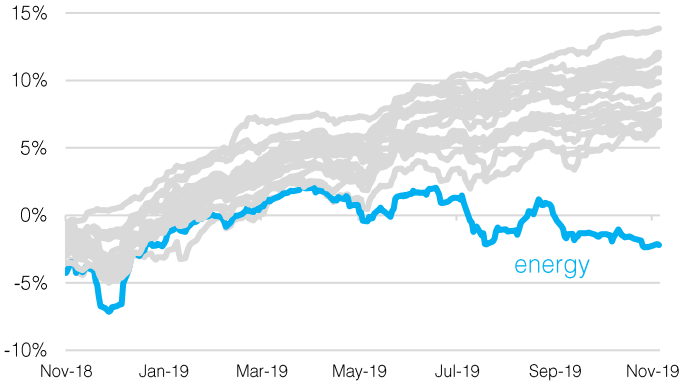


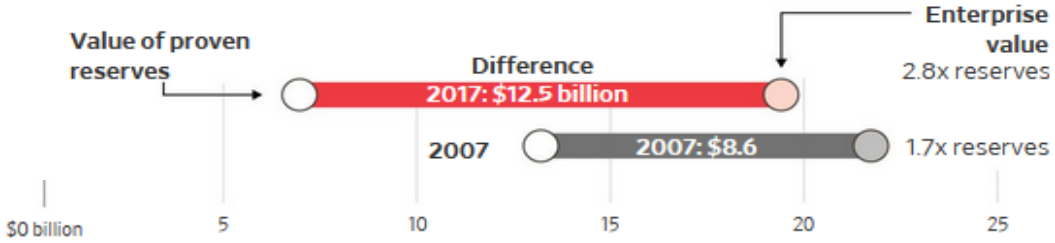
Figure 13: US HY dispersion

Source: TOBAM, ICE-BoAML, Bloomberg. Last twelve months US HY sectors performance from November 2018, to November 2019. US HY dispersion from January 2011 to August 2019, and defined as the proportion of bonds in the ICE-BofAML US HY index marked outside +/- 100bps of overall index level.

Indicator 7: Stretched valuation

This challenging backdrop is coming on the tail of lofty valuations. The picture is telling comparing enterprise value with proven oil reserve. In 2007, at the beginning of the shale boom, US companies' valuation was reflecting quite tightly the value of their proven reserves. Today, following years of rising debt loads and overly optimistic reserves forecasts, the companies' enterprise value is almost three times higher.

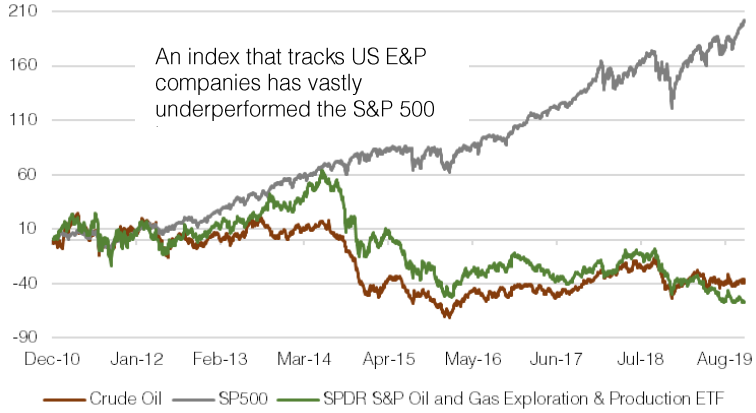
Figure 14: Average enterprise value vs. value of proven oil reserves



Source: WSJ, S&P Global Market Intelligence, company disclosures. 29 companies (2017); 17 companies (2007)

Indicator 8: Yawning disconnect between Energy stocks and credits

Figure 15: Performance of Oil, Oil & Gas Exploration & Production (E&P) ETF and US Equities

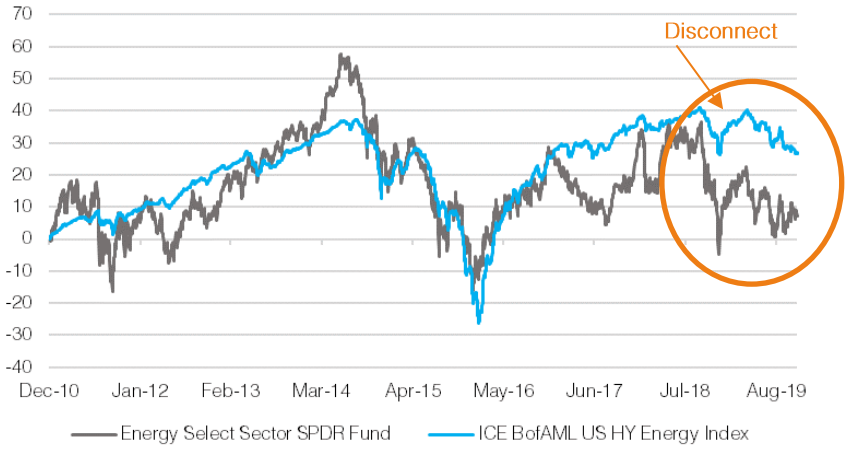


The growing concerns surrounding Energy companies, as well as their stretched valuations, have been widely noticed by Equity investors: for instance, the popular E&P ETF is now trading through its 2016 lows.

Source: TOBAM, FactSet. Data from December 2010 to November 2019.

III. Does credit market valuation reflect the rising Energy stress?

Figure 16: Performance of Energy Equities versus HY Energy Credit

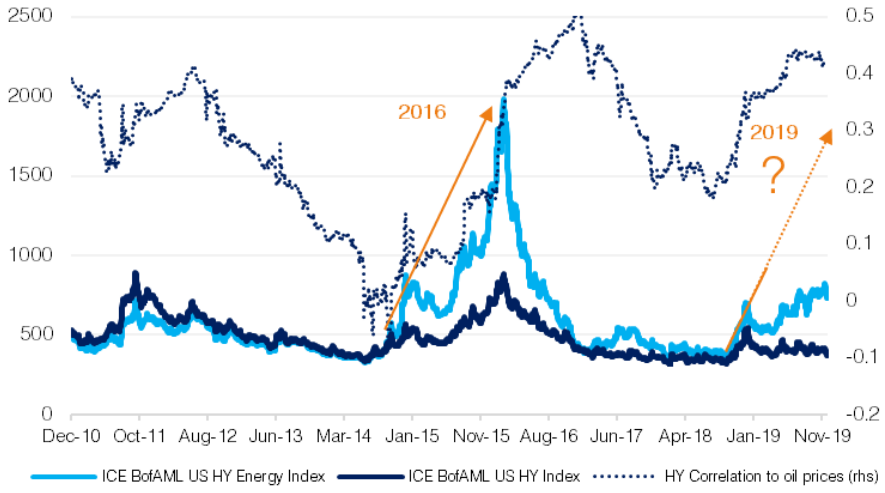


In the meantime, it is remarkable to see High Yield Energy credits barely budging, and hovering close to the highs.

Chart 16 indicates that the credit and equity asset classes are taking different approaches in pricing risks in the sector.

Source: TOBAM, Bloomberg, ICE-BoAML. Data from January 2011 to November 2019.

Figure 17: US HY spreads and correlation to oil prices



All in all, as mounting anxiety can be seen in the above indicators often reaching levels close to the early 2016 era, spreads repricing has been fairly muted.

There seems to be a disconnect between Energy stress indicators reaching very high levels and current market's pricing.

Source: TOBAM, ICE-BoAML, Bloomberg. Data from January 2011 to November 2019.

IV. Benefits of the Maximum Diversification approach in this context

These rising signs of stress in Energy, combined with the outperformance of the credit, point to potential troubles for credit investors mimicking the benchmark's allocation to Energy. If a crisis of the like of 2016 were to repeat itself, being well-diversified would be key to preserve returns, as witnessed by the performance of the Anti-Benchmark credit strategy when Energy first collapsed 4 years ago.

As an illustration, it is worth noting that as of November 2019 for example, the Anti-Benchmark Global HY strategy had close to half the Benchmark's exposure in Energy (in risk-adjusted terms).

The reasons for the resilience of a diversified approach can be illustrated by the graphs below. Whenever a factor gets more correlated to the market, the Anti-Benchmark (AB) strategy disinvests the said factor. This pattern was clearly on display during the last two periods of stress in Energy, in 2016 and 2018.

Figure 18: Relative Risk Weight Energy sector & Oil correlation to US Credit

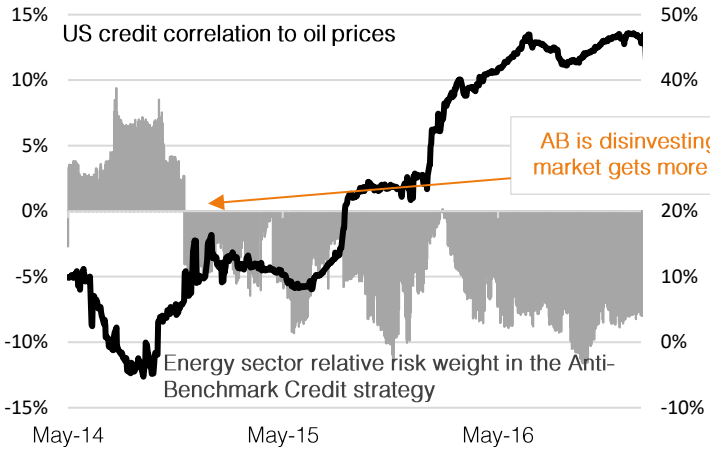
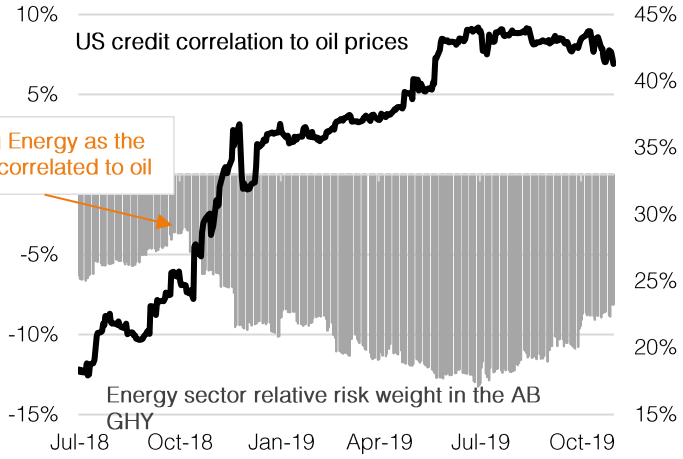


Figure 19: Relative Risk Weight Energy sector & Oil correlation to US HY Credit



Source: TOBAM, ICE-BoAML, Bloomberg. Data from May 14, 2014 to December 31, 2016 (Figure 18). Data from (Figure 19). Risk is defined by the Duration Times Spread (DTS).

Conclusion

- There seems to be a widening disconnect between stress indicators in the High Yield Energy market and current market's valuations.
- Given the concentration of the market toward Energy names, a bout of repricing would penalize heavily the Benchmark and the ETF mimicking its composition.
- In 2015 and 2016, during the first repricing of the Energy sector, the well-diversified positioning of the Anti-Benchmark US Credit outperformed significantly the Benchmark and its heavy exposure to Energy.
- Today, the uncertainty surrounding the Benchmark's largest concentration could favor a diversified exposure to the market, such as the one provided by the Anti-Benchmark Credit strategy.

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.

TOBAM manages US$8.5 billion (at December 31, 2019). TOBAM's team is composed of 51 professionals.

Contacts

Paris
49-53, Avenue des Champs-Elysées
75008 Paris
France

New York
Dublin
Hong Kong

Client Service
clientservice@tobam.fr
www.tobam.fr

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