TOBAM*
CORE INVESTMENTS

DIVERSIFICATION DASHBOARD

May 2016

Diversification Ratios

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.

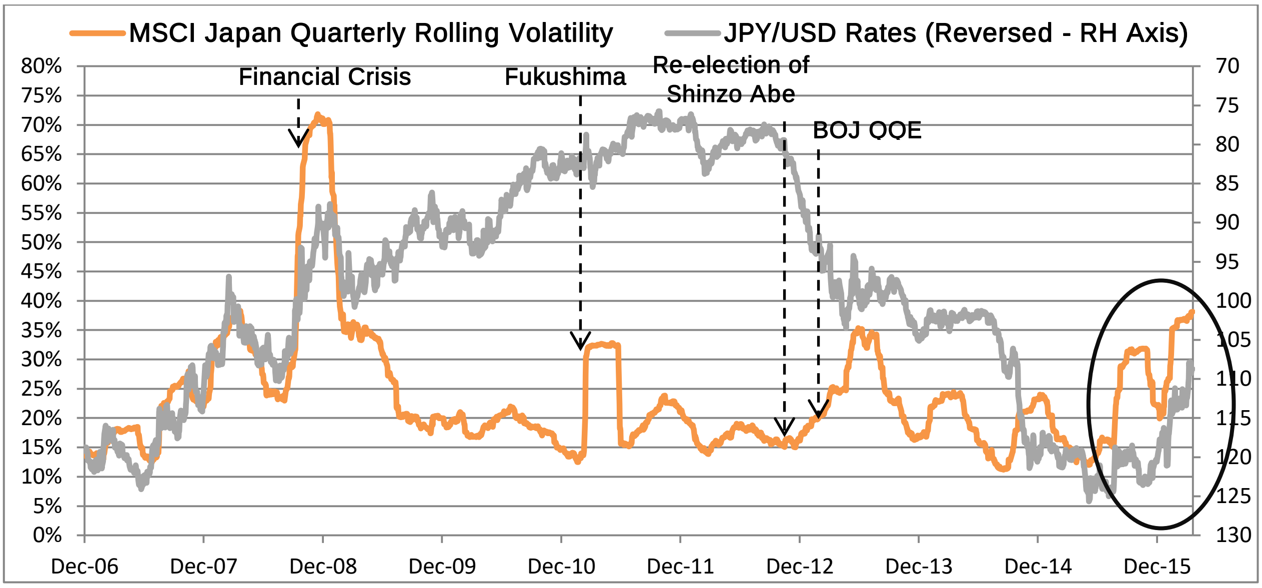
As the table shows, the "broad market" indices leave diversification on the table. In addition to a snapshot of each market's DR2, the table shows the DR2 of a well-diversified portfolio, and the fraction of available diversification used by the index.

Universes	DR^2 Index diversification	DR^2 Maximum diversification	% diversification used by index
MSCI All Countries World	3.83	10.69	35.85%
MSCI World	3.54	10.63	33.29%
MSCI Canada	3.30	7.70	42.82%
MSCI Emerging Markets	3.84	7.20	53.30%
MSCI US Equity	2.44	5.60	43.49%
MSCI Pacific Ex-Japan	2.17	4.81	45.19%
MSCI UK Equity	2.07	3.35	61.68%
MSCI EMU	1.69	3.21	52.48%
MSCI Japan	1.78	2.91	61.22%
BofA Merrill Lynch US Corporate & High Yield	2.80	3.77	74.10%

Source: TOBAM, figures as of March 31st, 2016

The Benefits of Diversification: Case of Japanese Equities in Q1 2016

Since the Yen reached its cheapest level in years vs. the USD in June 2015 (JPY/USD: 126), the Japanese currency has been steadily appreciating against the USD reaching its highest price in 18 months in April 2016 (JPY/USD: 109). While the current price remains low when compared to historical levels (5 years average is 98), this recent rally of the Yen was a twist in market trend seen for the first time since the re-election of Shinzo Abe as Japan's prime minister in December 2012. Amid a strengthening Yen, concerns on Japan's economy and the effectiveness of Abenomics, Japanese equities experienced their most volatile quarter in 7 years with the MSCI Japan's volatility reaching 38% in Q1 2016 – levels last seen during the financial crisis of 2008-Q12009:



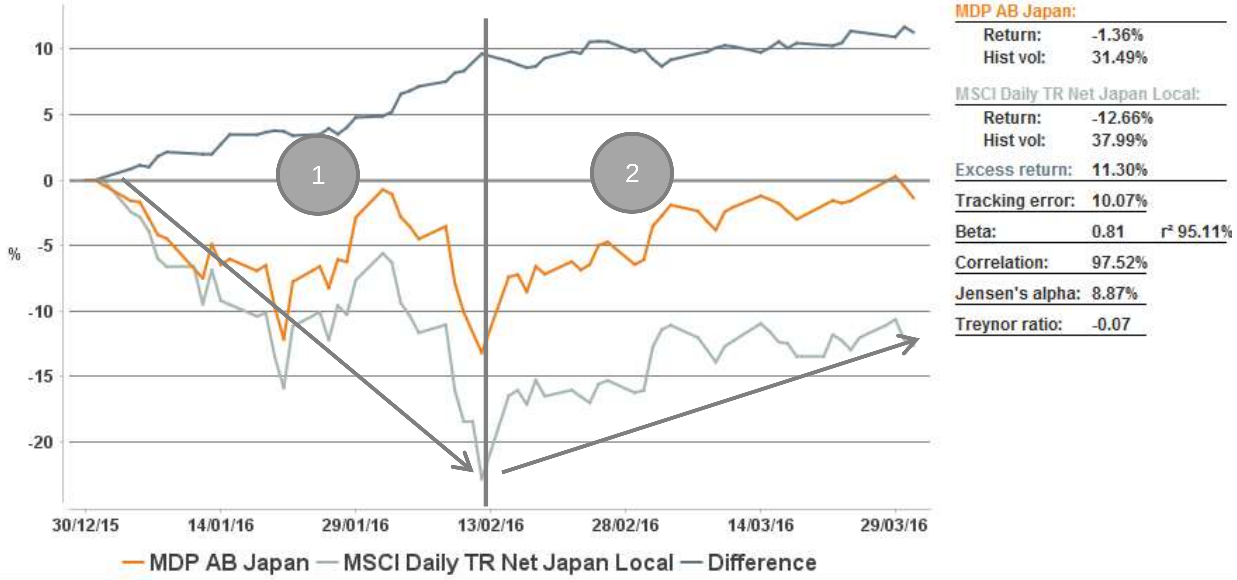
The right hand axis has been reversed in order to illustrate the recent appreciation of the JPY vs. the USD. Source TOBAM.

In this market backdrop, Japanese equities plunged in Q1 2016, with the MSCI Japan index returning -12.66%. The Anti-Benchmark Japan strategy provided significant protection on the downside and outperformed its benchmark by +11.30%. In addition to its outperformance, the Anti-Benchmark reduced volatility vs. the MSCI Japan by 17%.

In this edition of the Diversification Dashboard we will investigate the drivers which led to the outperformance of the Anti-Benchmark portfolio in Japanese equities in Q1 2016.

1. Q1 2016: Performance Overview

Exhibit1: MSCI Japan TR vs. Anti-Benchmark Japan.



Source TOBAM. Past performance is not indicative of future results. Returns are stated in JPY and are gross of management fees.

As illustrated in the chart above, in Q1 2016, the Anti-Benchmark Japan returned -1.36% vs. -12.66% for the MSCI Japan, outperforming its benchmark by +11.30% and reducing volatility vs. the benchmark by 17%. Of note, the low beta of the Anti-Benchmark (0.81) explains only 21% of the outperformance; in the following section we will look at other dimensions in order to explain the relative return over the period.

In terms of market direction the quarter could be split in two periods:

- **Period 1 -** from the opening of the year to February 12, the MSCI Japan fell by -22.85%, one of the largest down-moves in equities globally. During this period, the Anti-Benchmark outperformed by +9.65% and reduced volatility by 13%. The drop in Global Equities during this period was spurned by the collapse of Chinese equities and oil prices - global equities markets experienced a classical "risk-off" move. This was compounded by specific concerns on the Japanese economy and the effectiveness of Abenomics.
- **Period 2 -** after February 12 to the end of the quarter, the MSCI Japan rallied by +13.22%. The market rally was driven by a more accommodative stance by Central banks in response to the global market and economic instability – including the Bank of Japan adopting a negative rate policy. During this period, the Anti-Benchmark Japan performed in line with the index (+13.65%) while also reducing volatility by 21% vs. the MSCI Japan.

In this note, we will focus on Period 1, during which the bulk of the outperformance was registered.

2. Drivers of Performance: Companies exposure to JPY/USD rates.

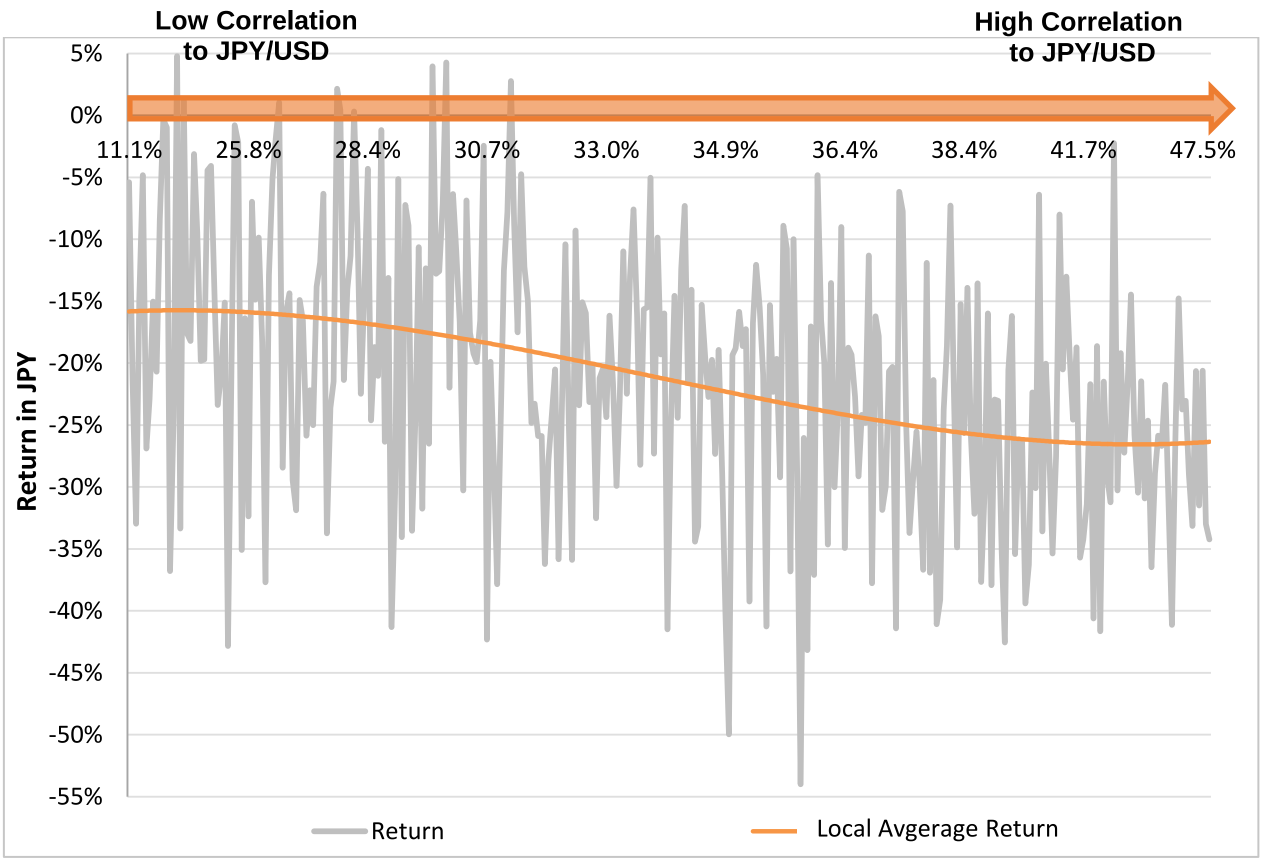
The first arrow of Mr. Abe's program about monetary stimulus mainly benefited export companies with the sharp depreciation of the Yen in recent years. We will analyse in this section the impact of the recent rapid rally of the Yen (a twist in market trend) on the performance of different company profiles in the Japanese equity market.

Exhibit 2 illustrates the return of all stocks of the MSCI Japan universe ranked by their correlation to the changes in JPY/USD rates over the past 12 months:

- Highly correlated stocks tend to benefit from a depreciating Yen (increase in JPY/USD rates): typically exporters which have a considerable portion of their revenues coming from abroad (such as Automakers, Financials, etc.).

- Lowly correlated assets are less dependent from the fluctuation of the FX rates as their revenues are coming from other sources of risk ("domestic" companies).

Exhibit 2: Period 1 – Return of Japanese Equities Ordered by their Correlation to JPY/USD.



Source TOBAM. Returns are stated in JPY – Past performance is not indicative of future results. Correlations are computed using 1 year daily data (13/02/2015 – 12/02/2016).

Over the period under review, companies that were more correlated to the fluctuation of the JPY/USD displayed on average a lower return than companies which were less dependent from the fluctuation of the FX rates.

To complement the above analysis, the following tables split the universe by tercile based on the stocks correlation to JPY/USD and compare the allocation of both the MSCI Japan and the Anti-Benchmark Japan for each bucket:

Exhibit 3:
Period1 – Japanese Equities Split in Tercile based on their Correlation to JPY/USD.

Correlation to JPY/USD	MSCI Japan Average Weight	AB Japan Average Weight	Delta Weight	Average Return	Relative Return Allocation Effect
1 - Low Correlation	24.41%	77.23%	52.82%	-16.28%	2.63%
2	28.07%	19.33%	-8.74%	-21.70%	0.04%
3 - High Correlation	47.53%	3.41%	-44.12%	-25.80%	2.00%
Grand Total	**100.00%**	**99.96%**	**0.04%**	**-21.26%**	**4.67%**

Source TOBAM. Returns are stated in JPY – Past performance is not indicative of future results. Correlations are computed using 1 year daily data (13/02/2015 – 12/02/2016).

Analysing the different dimensions of the above table:

a. **Weights:**

- The MSCI Japan index was biased toward stocks that are the most correlated to the fluctuation of the JPY/USD. 47.53% of its weight was allocated toward stocks belonging to the high correlation tercile.

⇨ Of note the bias of the MSCI Japan toward "Exporters" can be explained by several consecutive years of accommodative environment for Exporting companies which benefited from the Yen devaluation: the cap-weighted is a buy-and-hold strategy which by construction concentrates in past winners *(refer to the **Appendix – Exhibit 4**).*

- On the contrary the Anti-Benchmark portfolio had an important allocation to stocks which:
  - Are less exposed to the fluctuation of JPY/USD rates.
  - Are exposed to other **diverse*** sources of risk.

*** (refer to Appendix – Exhibit 5):** *An intuitive way to illustrate the diversified exposure to sources of risk in the low correlation buckets, consist in comparing the GICS sectors of the first and tenth decile – where respectively the Anti-Benchmark and the MSCI Japan had their highest allocation.*

b. **Returns:**

- Stocks that displayed high correlation to the JPY/USD rates significantly underperformed (on average) stocks that were less exposed to the fluctuation of JPY/USD rates: stocks belonging to the high correlation tercile underperformed by -9.51% on average the stocks belonging to the "low correlation" tercile.
- Over the period, the higher the correlation to the JPY/USD rates, the lower on average was the return of a stock.

c. **Relative Return - Explanatory Power:**

- Over period 1, the Anti-Benchmark Japan (-13.20%), outperformed the MSCI Japan (-22.85%) by +9.65%.
- The allocation effect by tercile was equal to +4.67%. In other terms, roughly 50% of the excess return is explained just by looking at this specific dimension.

3. Conclusion

Amid an accommodative monetary policy which led to significant devaluation of the Yen in recent years, the MSCI cap-weighted benchmark was trapped (as a result of its buy-and-hold strategy) with an overexposure to Export companies which collapsed on the verge of a market correction. The first quarter of 2016 is a good illustration of how a diversified portfolio can protect investors from the implicit dynamic bets implemented by a cap-weighted investment….a passive investor in the Japanese equity markets is currently highly exposed to the fluctuation of JPY's FX rates.

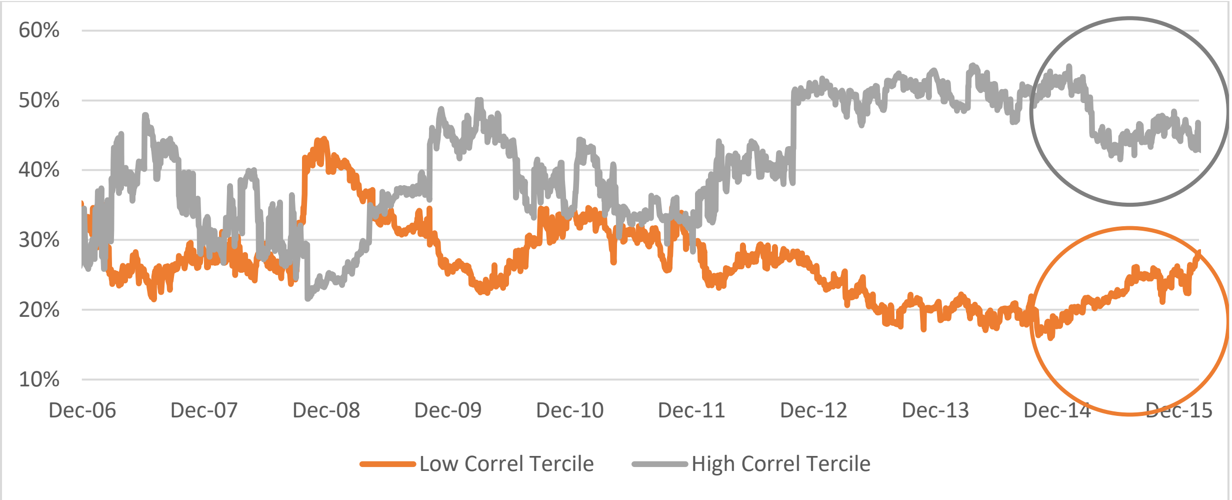
Of note, over the past 5 years, as of April 28th, 2016:

	MSCI Japan	Anti-Benchmark Japan	Difference
Total return	67.54%	97.06%	+29.52%
Annualized Return	10.87%	14.53%	+ 3.66%
Volatility	22.30%	16.73%	-25%
Sharpe Ratio	0.51	0.86	+0.35

Source TOBAM. Past performance is not indicative of future results. Returns are stated in JPY and are gross of management fees.

Appendix

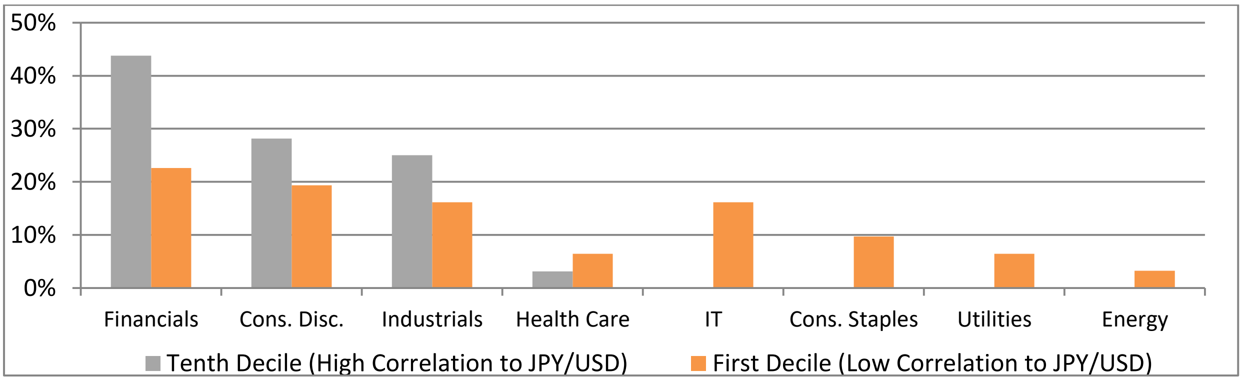
Exhibit 4:
MSCI Japan - Rolling Weights in the First and Third Tercile based on Stocks' Correlation to JPY/USD rates.



Source TOBAM. Correlations are computed using 1 year daily data.

Exhibit 5:
1st vs. 10th Decile – GICS Sectors: Allocation of an Equal Weighted Portfolio (MSCI Japan Universe)

In the following table we compare the allocation of an equal weighted portfolio (MSCI Japan universe) for each of the first and last decile by GICS sectors. Stocks are grouped into deciles based on their correlation to the JPY/USD rates.



Source TOBAM. Weights are computed using an Equal Weighted allocation by stock. Correlations are computed using 1 year daily data.

The charts above indicate that:

- Stocks included in the highest correlation decile correspond mainly to three sectors: Financials, Consumer Discretionary and Industrials (and marginally to Health Care).
- On the contrary the first decile includes a much more diversified exposure with companies belonging to various sectors.

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Contacts:

Paris
Christophe Roehri
+33 1 53 23 41 60
Christophe.Roehri@tobam.fr

New York
Stephane Detobel
+1 212 468 5171
stephane.detobel@tobamusa.com

Francis Verpoucke
+1 212 468 5170
francis.verpoucke@tobamusa.com

Hong Kong
Christopher Cheung
+852 2827 3894
christopher.cheung@tobamasia.com

Cape Town
Michael Gran
+44 7796 953 113
michael.gran@tobam.fr

Client Service
+33 1 53 23 41 66
ClientService@tobam.fr

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