

DIVERSIFICATION DASHBOARD

November 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. 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	4.15	11.84	35.0 %
	MSCI World	3.74	11.37	32.9 %
	MSCI Emerging Markets	4.95	8.52	58.1 %
	MSCI Canada	3.70	7.94	46.6 %
	MSCI US Equity	2.58	5.63	45.8 %
	MSCI Pacific Ex-Japan	2.44	5.37	45.5 %
	MSCI Japan	2.09	4.17	50.2 %
	MSCI UK Equity	2.18	3.49	62.6 %
	MSCI EMU	1.69	3.47	48.7 %
	MSCI Australia	1.97	3.25	60.7%

Source: TOBAM, figures as of October 30, 2015

Yves Choueifaty is a member of The 300 Club since its creation in October 2011. With 17 members throughout the world, the mission of the Club is to raise awareness about the potential impact of current market thinking and behaviours.

This white paper was published in April 2015 by Yves Choueifaty, as a 300 Club Member.

The Role of Core Asset Managers in the Global Economy

The asset management industry exerts unprecedented influence on the global economy. With global investable assets expected to increase to more than \$100trn by 2020¹ (six times total US GDP in 2013), and the need to find scapegoats in the wake of the 2008 financial crisis, it is important to consider the role and responsibilities of core asset managers in the global economy.

One of the most fundamental purposes of the industry is to invest savings back into the economy in a way that maximises the scale of reward investors can achieve for a given level of risk and drives future economic growth and stability. It is this purpose that 'core' asset managers, who represent the bulk of investors' portfolios in order to deliver returns in line with their long-term strategic asset allocation, need to remain resolutely focused on.

1. What really drives wealth generation?

At its heart, the job of core asset managers within the overall wealth creation process is about reinvesting savings into the economy to create wealth for investors through growth and development. Importantly, the real source of wealth is not the "skills" of portfolio managers, but the "skills" of employees working in the companies in which savings are invested. Labour, in other words. It is labour that, through innovation, productivity gains

¹ PWC: *Asset Management 2020, A Brave New World*

and corporate governance, for example, create wealth for the investor. This is especially true in the case of equity holdings.

The fundamental role of core asset managers is to act as a link between savings and labour and ensure the risks savers are taking are rewarded as well as possible. To achieve this as purely as possible, it is critical to immunise investors' core portfolios against any kind of speculation.

2. Immunity from speculation

Whenever any investor builds a core allocation to any asset class, it is done out of the belief that risk will be rewarded by a risk premium. This risk premium can be defined as the return generated by the undiversifiable portfolio.

Core asset managers are access providers to that risk premium, without which a core allocation to any asset class is not justified, regardless of the manager's potential skill. This involves building portfolios that are as protected as possible from any hypothetical phenomena (speculative bets), focusing purely on the existence of a future risk premium.

Importantly, the existence of a risk premium in the equity markets assumes solely that free enterprise and capitalism will survive, but does not involve making any bets on a specific bias, security or factor.

The word speculation comes from the Latin "speculare" (to see). A speculator assumes he or she has the capacity to see forward. In investment terms, it is someone who has a view on the future and implements a portfolio based on this view. This manager would be exploiting mispricings in the financial economy or markets by forecasting which factors are cheap and will rise, and which are expensive and will fall. This manager is therefore offering some degree of hypothetical added value through their potential ability to forecast, resulting in a biased portfolio.

Imagine there are two gold mines. A speculator will only buy one of them "speculating" on the fact that the other would soon be exhausted. A core investor, however, would evenly allocate risk to both mines, believing the likelihood of exhaustion is taken into account in the prices of both mines. This second approach provides access to the true equity risk premium, rather than trying to take advantage of mispricings.

3. Market efficiency is misunderstood

Much of the misunderstanding about the role of core asset managers comes from the ambiguity of the word "efficient".

Efficient market theory suggests all (current and historic) information, whether publicly available or not, is taken into account in asset prices. In efficient markets, it is therefore difficult to forecast differences in risk/reward ratios in the future. Looking at the financial markets, it is clear forecasting risk rewards is extremely difficult.

If it is not possible to forecast accurately, and the 2008 financial crisis proved the extent to which this is true of markets, the only alternative open to investors is to diversify. For managers to maximise the risk/reward available to investors, it is essential to build a portfolio that offers access to "pure" and neutral beta in the most diversified way possible.

4. Passive is not the same as neutral

Importantly, passive investing, which is often described as beta investing, has nothing to do with achieving neutral access to the risk premium. Buying a capitalisation-weighted benchmark means buying something that is hugely biased and does not offer pure beta or immunity from financial speculation. These benchmarks can take on heavy structural biases that evolve over time.

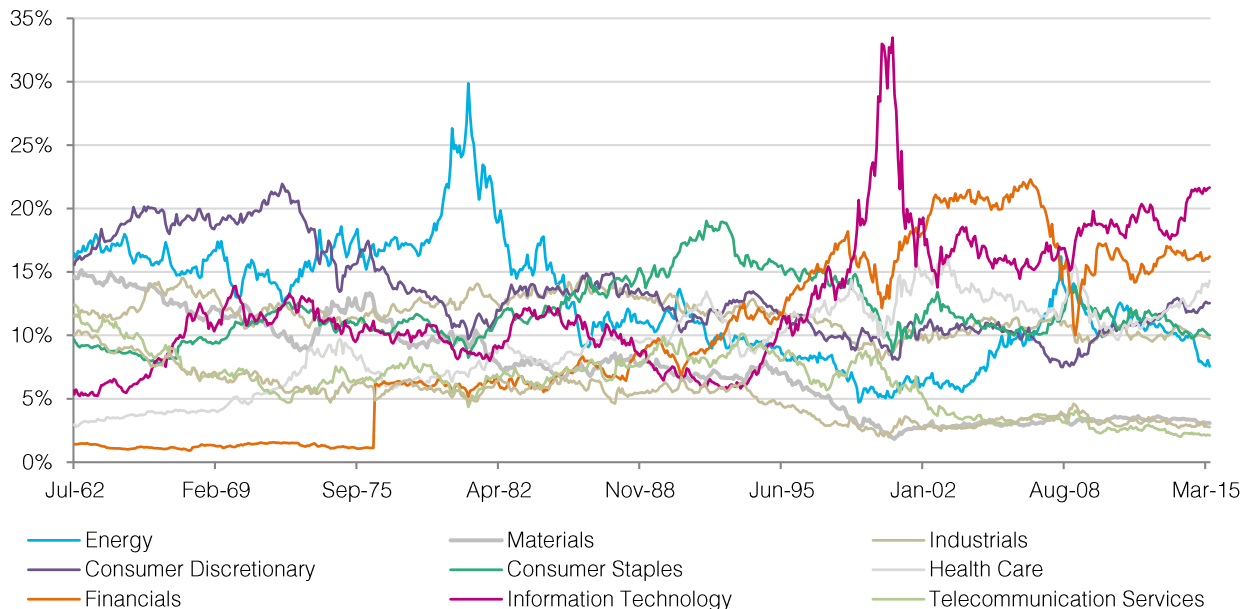
They are inherently biased as they attribute greater index representation to stocks or factors as they appreciate and less as they fall. They are a sum of speculations and these implicit bets change dynamically over time as the benchmark re-weights assets and alters those it tracks.

Because they attribute greater representation to stocks whose share prices have risen, market capitalization-weighted benchmarks reflect past successes. Furthermore, because an investor tracking these indexes would

therefore have to allocate more money to the largest stocks, these benchmarks inherently forecast that the successes of the past will be successes of the future.

Chart 1: S&P 500: Large Cap Equity Sector Weights

The S&P 500 carries heavy (and costly) implicit bets that evolve dynamically over time



Source: TOBAM; CRSP 1962-2015

These bets can be very costly as cap-weighted benchmarks effectively mean investors are making maximum allocations to stocks on the day they crash, and minimum allocations on the day they start rising.

Thus, passive investing through capitalisation-weighted benchmarks ultimately destroys value for savers and emphasises the speculative aspect of market pricing.

In doing so, they decrease the stability of markets and the wider global economy by creating significant imbalances. The greater that imbalance becomes, the greater the impact of changes in prices and the more volatility markets will experience.

5. Correlations, not portfolio weights, drive diversification

At the investment level, an efficient portfolio is one where it is not possible to achieve less risk and more reward. It is on the efficiency frontier, along which the reward available for a given level of risk is maximised.

For a portfolio to provide immunity through diversification and capture the full risk premium available for a given universe of securities, it must maximise diversification by selecting a range of stocks within the given universe that minimise the degree to which the constituent parts of the portfolio are exposed to the same source of risk. This means neutrally allocating across the effective independent sources of risk.

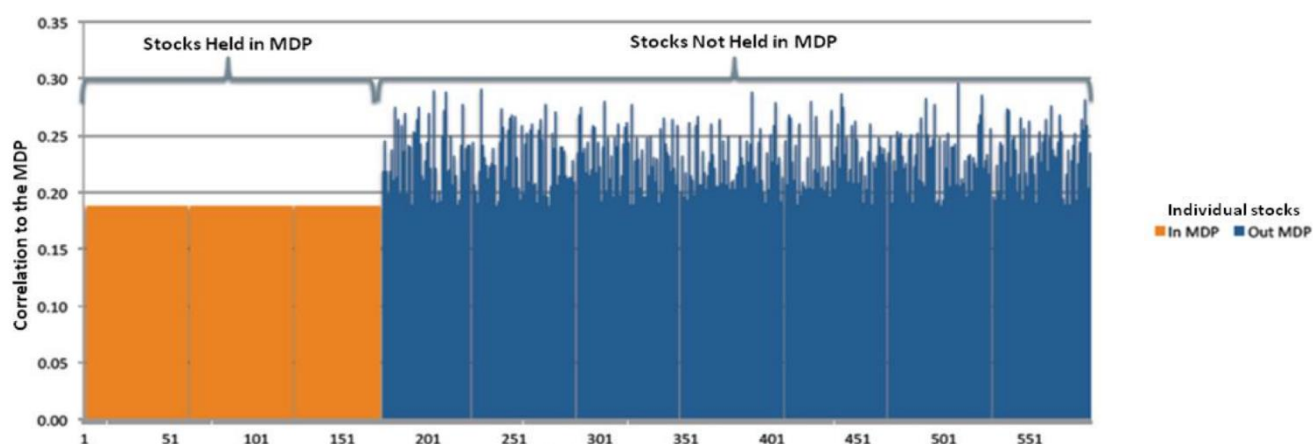
In other words, correlation, not portfolio weights, must drive diversification.

Diversification means finding the combination of least correlated assets in a given universe that always results in a portfolio whose overall risk is as low as possible when compared to the weighted average of the risk associated with each individual asset.

A portfolio has the greatest possible immunity from bias at the point of maximum diversification. To achieve the Most Diversified Portfolio (MDP) the correlation of the overall portfolio to its constituent holdings must be equal and as low as possible. As such, adding any of the excluded assets within the universe into the portfolio would increase the correlations of the portfolio.

The graph below illustrates the correlation of stocks within and outside of the Most Diversified Portfolio:

Chart 2: Correlation of Stocks within and outside of the Most Diversified Portfolio



Source: TOBAM. The above chart is for illustrative purpose only.

Because the MDP strips out any biases, it is not subject to the same degree of volatility as passive benchmarks, which contributes to a more stable economy in the long-term, drives continued economic growth and maximises the risk-reward ratio for savers by increasing the scale of available risk premium they are able to harvest.

Because the MDP both maximises the scale of risk premium available and lowers volatility, it can offer significantly better risk/return characteristics over the long term than passive investment.

Conclusion

Given the scale of money managed by the global asset management industry will increase to over \$100 trillion by 2020 with a compound growth rate of nearly 6%², core asset managers need to think very carefully about the role and responsibilities that come with having this degree of influence on the global economy.

The total alignment of interests between core investment and the economy at large is paramount. Economic growth and development generated by labour is the real source of wealth generation.

When an investor buys a biased benchmark, they are implicitly forecasting, weakening the link between savers and the risk premium. Maximising diversification based on correlation, rather than asset-weightings, strips out the impact of financial speculation on asset prices, thereby forming the strongest link between savers and the real drivers of wealth generation.

Core asset managers should therefore be doing two things: firstly, they should be moving away from asset-weighted benchmarks, which are inherently biased, in their efforts to provide access to true beta; secondly, they need to maximise diversification in order to achieve the best possible risk reward for savers.

Taking a neutral approach to core asset management maximises the risk reward ratio available to investors and helps generate prosperity and stability in the global economy, which ultimately drives wealth for savers.

By definition, a maximum diversification approach intrinsically promotes companies that stand out in terms of innovation, efficiency and strong governance. It is these characteristics that, through time, create growth, wealth and improve the overall wellbeing of society.

² PWC: *Asset Management 2020, A Brave New World*



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 \$8 billion (as of September 2015) via its Anti-Benchmark® strategies in Equities and Fixed Income. Its team includes 38 investment professionals.

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