

# Towards true diversification

Yves Choueifaty, Tristan Froidure and Elizabeth Brearden wonder why the dynamic strategy implied by cap-weighted indices is regarded as 'passive' and posit their 'anti benchmark' portfolio as a true proxy for the equity risk premium

## Commentary Maximum Diversification

With strong parallels in human populations and ecosystems, diversification in investments is an intuitive concept that is, strangely enough, not really reflected in standard market practices. Typically synonymous with the quantity of portfolio holdings, spread across a large number of securities, diversification is assured by 'owning the market', or so the traditional thinking goes. 'The market' is most often referred to as one of the largest published cap-weighted indices. Although the size of assets under management benchmarked to cap-weighted indices has grown enormously over the past 30 years, concerns about the efficiency of using such benchmarks have been raised both in the finance industry and academia.

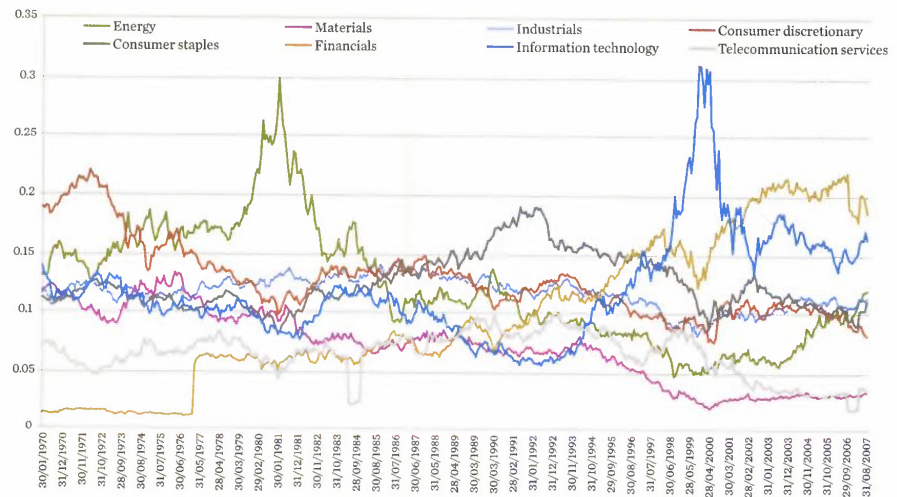
Investing in cap-weighted indices has long been justified with the help of the capital asset pricing model (CAPM). According to theory, each investor will hold a portfolio aligned with his or her risk tolerance - containing an amount of the risk-free asset and an amount of the same optimal portfolio of risky assets, namely the market portfolio. Investors have assumed that the differences between the cap-weighted portfolio and the market portfolio are small enough to be ignored, and this has encouraged the adoption of the cap-weighted equity portfolio for passive investors and as a reasonable benchmark for active investors. In addition, they submit to simple economic interpretation as the sum of all (equity) portfolios; they are easily calculated and result in a self rebalancing buy-and-hold strategy. However, a growing body of empirical evidence continues to highlight the inadequacies of this approach.

### Limitations

Firstly, as stocks appreciate, they take on a greater and greater representation in the cap-weighted index, especially in times of market euphoria. One needs only to recall the 1970s energy crisis, tech stocks in 2000 and financials today, to feel the pain of a market that is concentrated in a few big names or risk factors, which dictate how and when the market moves (figure 1).

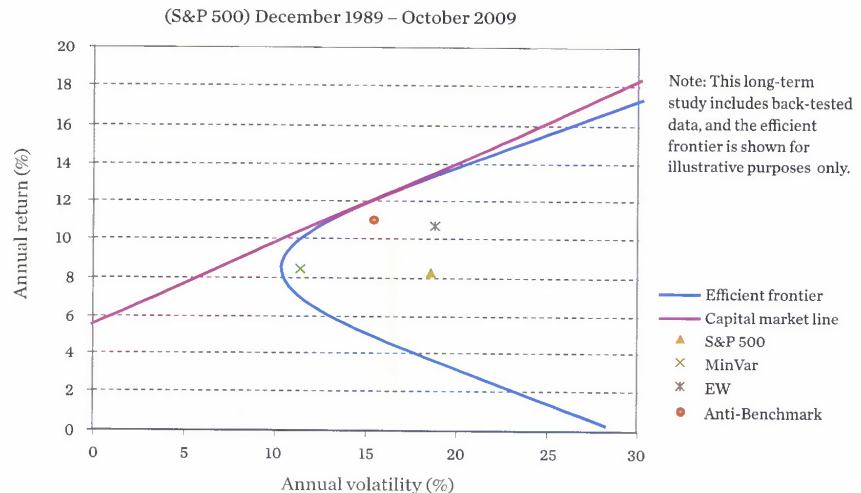
Second, economies, markets and financial instruments are more correlated than ever today, a side effect of globalisation that can become unwieldy during times of market concentration. As more and more investors jump on the bandwagon, or simply maintain portfolio holdings close to those of the index, the 'bubble' expands until it bursts - for it cannot expand indefinitely. Finally, we have seen most recently, with BP's precipitous fall from grace, that investors are not rewarded for just 'owning the market' - or, more precisely, 'owning the index'. Highly correlated markets can make stock selection irrelevant and even destroy the benefits of spreading portfolio

1. S&P 500 sector weights, January 1970



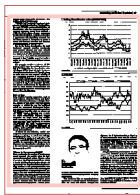
Source: Factset, Russell, Standard & Poor's

2. Performance and risk for beta prime strategies (S&P 500) December 1989 - October 2009



Note: This long-term study includes back-tested data, and the efficient frontier is shown for illustrative purposes only.

Source: TOBAM



holdings across many stocks and sectors – the traditional idea of diversification.

TOBAM's 'anti benchmark' investment strategies aim for full diversification. The diversification ratio, TOBAM's mathematical definition of diversification, takes into account stock correlations and volatilities, aiming for an unbiased – and thus truly diversified – portfolio. Maximising the diversification Ratio in portfolio construction is synonymous with diversifying across all the risk factors present in the market, to ensure a neutral risk allocation over time, and the most diversified portfolio, or anti benchmark.

Due to its higher diversification, the Anti Benchmark approach provides consistently lower portfolio volatility over time. TOBAM believes that reducing volatility per se should be a by product of a well grounded investment process, not an end in itself. The anti benchmark approach is thus 'volatility aware' but neither singles out nor eliminates securities or sectors outright.

For example, consider a universe of two stocks, A and B, where the volatility of A is twice that of B. Maximising the diversification ratio will allocate 1/3 to A and 2/3 to B. Next, consider a three-stock universe of X, Y and Z, where all stocks have the same expected volatility. X and Y are highly correlated at 90% and Z has a low correlation of 10% with the two other stocks. The most diversified portfolio will hold just over 1/4 each of X and Y, and just under 1/2 of Z. This gives us confidence that the Diversification Ratio is a useful measure of diversification, and that maximising it gives us a method to generate the most diversified portfolio.

### Beta prime

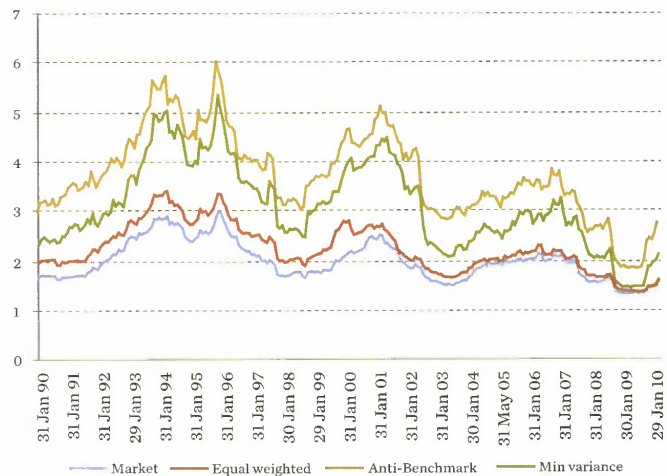
Other credible investing approaches, such as equal weighted, minimum variance and fundamental indexation, take a step in the right direction. Known as 'beta prime', they use different strategies to rethink the way the traditional indices are constructed. Fundamental indexation approaches will typically produce portfolios with different weightings from the market cap and equally weighted portfolios and, as such, can reduce concentration. Minimum variance approaches are biased toward low volatility stocks or sectors, as they target the lowest volatility achievable. Other approaches lie between equal-weighted and equal volatility-weighted portfolios, but lack theoretical foundations. In addition, these approaches' stability over time has yet to be established.

If history is any indication, market cap-weighted indices, in addition to typical beta prime strategies, are far from the efficient frontier (figure 2). Similarly, looking at diversification ratios over the period 1980-2008, the anti benchmark portfolio, by construction, will always have the highest ex ante diversification ratio (figure 3). It is also clear that the market cap-weighted portfolio is poorly diversified.

### Where is the core portfolio?

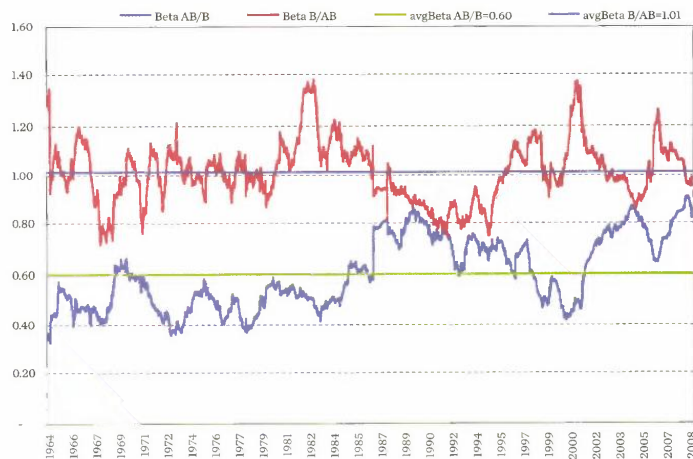
These results raise the question of how investors should approach 'the market', given the inadequacy of cap-weighted indices. Figure 1 makes it clear that cap-weighted indices do not deliver a neutral risk allocation but rather allocate risk dynamically – to the point of allocating increasingly more risk to each growing risk factor. True diversification, on the other hand, would capture each unique source of equity risk premium precisely at the time it is most decorrelated from other sources. This approach allows the investor to generate value through the complementarity of true diversification, not by making bets against a biased reference index. The most diversified Portfolio is resolutely agnostic – it is the portfolio

### 3. Rolling diversification ratios (US S&P 500)



Source: TOBAM

### 4. AB betas



Source: TOBAM



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where the investor has no information about the future and seeks only exposure to the equity risk premium.

This sheds new light on measuring its beta against that of the cap-weighted index: between 1963 and today this measure averaged 60%

(figure 4). But if the benchmark is as biased as we have established it to be, then the unbiased diversified portfolio should serve as the reference index against which the beta of the cap-weighted index is measured. Reversing the equation, the cap-weighted benchmark beta versus the most diversified portfolio averages just over 100% historically.

Going a step further, assuming that the only compensated risk is the equity non-diversifiable risk, we could argue that as the most diversified portfolio is the best candidate for having the most efficient exposure to compensated risks, and delivering the theoretical equivalent of the equity risk premium. TOBAM thus publishes the maximum diversification index series (MaxDiv index) based on the anti benchmark methodology, both globally and in domestic markets. We believe it is the starting point for portfolio construction because its only bet is to avoid bets.

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