

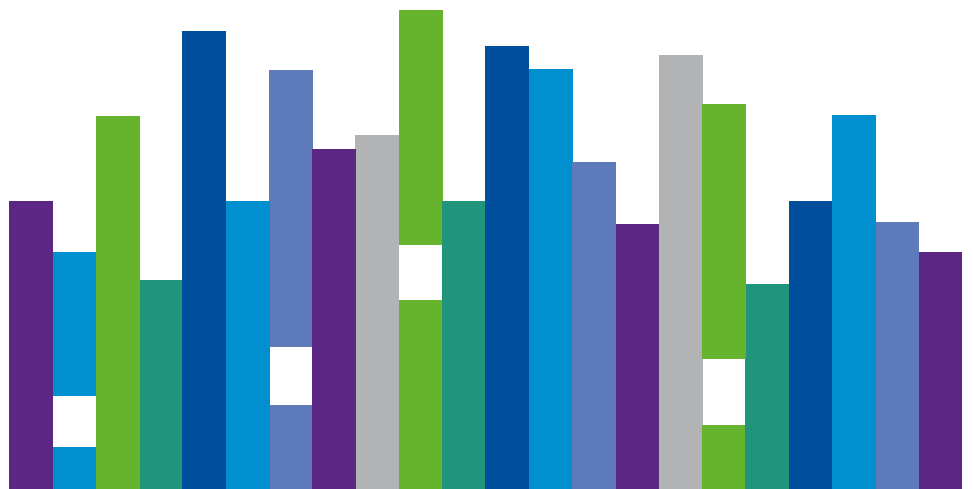


CFA Society
United Kingdom

BENCHMARKS AND INDICES


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Supported by CFA
UK's Market Integrity
and Professionalism
Committee



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DEFINITION

"Performance evaluation cannot be conducted in a vacuum. By its nature, performance evaluation is a relative concept. Even so called "absolute return" managers should provide some sense of how alternative uses of their clients' money would have performed if exposed to similar risks."

(CFA Institute Refresher Reading)

Indices – these are sets of securities and/or assets that have been aggregated based on pre-set criteria and whose aggregate value and composition is determined by pre-determined rules. An index can be composed of equities, bonds, commodities or any combination of asset classes. The following list provides some examples -

- » **Equities** – FTSE-100, S&P 500, MSCI World etc.
- » **Bonds** - FTSE Actuaries UK Conventional Gilts All Stocks Index; Markit iBoxx EUR Liquid High Yield Index etc
- » **Commodities** - Dow Jones Commodity Index.
- » **Foreign Exchange** – WM/Reuters 4pm fix

Benchmarks – Benchmarks have various key functions. They serve as portfolios for investors seeking passive exposure to a particular market segment, are used as performance standards against which to measure the value generated by active managers, act as proxies for asset classes, and provide a reference point for determining the price or value of various financial instruments or transactions.

As performance standards, benchmarks allow investors to assess two main types of performance:

- 1) How the portfolio is progressing towards a stated goal or objective;
- 2) The portfolio performance against the opportunity cost of the investment given its risk. For example, if a client has requirements that require a portfolio consisting of 50% Gilts and 50% FTSE All Share; then this 50/50 composite benchmark should be seen as the most appropriate benchmark to use.

THE PURPOSE OF THIS PAPER

Indices and benchmarks play important roles in describing the performance of markets and in describing the performance of investment products. Recent scandals in the fixed income, currency and commodity markets showed how indices can be abused and the impact that has on market integrity. In light of these events, it is important to return to first principles to appreciate why benchmarks and indices are useful tools and to ensure that they are used appropriately. It is critically important that the development of indices and benchmarks is properly governed and that, so too, is their subsequent operation and application.

This is particularly important at a time when there is rapid growth in the development of passive products based on indices and when there is a proliferation in the range of indices available against which to construct investment products.

The diversity of available indices makes it even more important for the profession to ensure that it can assess the merits of indices accurately and that it can assign the appropriate benchmark to meet a client's requirements. Clients, too, need to be conscious of the characteristics of good indices and benchmarks so that they can also contribute to market discipline in index and benchmark development, selection and use. Robust due diligence in relation to index construction and governance and benchmark selection and use is valuable throughout the investment value chain.

CFA UK'S POSITION AND ITS RELEVANCE TO MEMBERS AND OTHER STAKEHOLDERS

Indices vary in their composition and structure, but each depends on integrity in its construction and operation. It should be possible for potential users to assess that integrity by reviewing the rigour and transparency with which the index has been constructed and run. The index operator ought not to be subject to evident conflicts of interest and there should be clear, published processes for the governance and operation of the index. It would be good practice for the index operator to follow the principles for benchmarks set out by IOSCO in 2013¹.

As investment professionals, we should be aware of the strengths and limitations of the indices we use as benchmarks. We have to ensure that they are relevant and meaningful to our clients. They should provide a reliable representation of the economic realities that the index seeks to measure and should eliminate factors that might result in distortions. Asset owners and other stakeholders should be aware of what makes an acceptable and relevant benchmark and how benchmarks can best be used.

In response to both actual and suspected cases of market benchmark manipulation and misconduct, regulators have issued guidance and proposed regulation in this space. For instance, the European Commission adopted a proposal for a regulation on benchmarks in September 2013 with the aim of improving the functioning and governance of benchmarks produced and used in the EU and ensuring they were not subject to manipulation. The proposed EU regulation implements and is in line with the principles agreed at international level by the International Organization of Securities Commissions (IOSCO) in 2012 and 2013. Other international markets support the IOSCO principles, but not all national governments intend to regulate benchmarks directly.

In the words of the European Commission, 'Benchmarks are susceptible to manipulation where conflicts of interest and discretion exists in the benchmark process and these are not subject to adequate governance and controls.'² The Commission also notes that earlier changes to market abuse and criminal sanctions were

not sufficient alone to improve the way benchmarks are produced and used. Regulation was thought necessary to improve the functioning and governance of benchmarks and to ensure that benchmarks produced and used in the EU are robust, reliable representative and fit for purpose

Therefore, the regulatory response has so far focussed on:

- » Ensuring benchmark administrators are free of conflicts of interest and that they employ relevant governance and controls
- » Ensuring that the data used to calculate benchmarks are sufficient and that the calculation methodologies are robust; and
- » Ensuring that any contributors to benchmarks have adequate controls and avoid conflicts of interests.

CFA Institute responded to the consultation that IOSCO³ undertook at the time of its work on the principles. The response stated: 'CFA Institute believes that greater transparency over the calculation and production of benchmarks and indices in general, particularly where indices are based on subjective or judgmental inputs, is a key element to uphold integrity. Greater transparency underscores market discipline and helps mitigate conflicts of interest. Actual transaction data should be used in the compilation of benchmarks (where relevant) to the fullest extent possible. Other important measures to ensure the integrity of benchmarks include robust internal controls, policies, and procedures surrounding the assimilation and contribution of data for the calculation of benchmarks; adequate management reporting and supervision over the provision of inputs; policies to manage and mitigate conflicts of interest; and appropriate regulatory oversight.'

¹ Principles for Financial Benchmarks, IOSCO, July 2013 <https://www.iosco.org/library/pubdocs/pdf/IOSCOPD415.pdf>

² The European Commission's Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on indices used as benchmarks in financial instruments and financial contracts September 2013.

³ CFA Institute comment letter to IOSCO on Financial Benchmarks http://www.cfainstitute.org/learning/products/publications/commentletters/Pages/02112013_79115.aspx?PageName=searchresults&ResultsPage=1

TABLE 1 –EXAMPLES OF INVESTMENT OBJECTIVES

Investment objective	Comment	Assessment
Achieve an investment return in excess of the policy asset mix's return over a five-year time period	Actionable and attainable by use of active management. Consistent with the trustees' willingness to bear risk and the fund's mission. Unambiguous. Specified in advance.	Good
Generate active management performance in excess of an appropriate benchmark over a five-year time period.	Actionable and attainable by use of active management. Consistent with the trustees' willingness to bear risk and the fund's mission. Unambiguous. Specified in advance.	Good
Maintain a funded ratio (assets/liabilities) in excess of 0.9 measured annually.	Appropriate for funds in which liabilities or expected fund outflows have been specified (e.g., defined-benefit plans, insurance companies). Actionable and attainable as long as the fund has access to source of contributions. Unambiguous. Specified in advance.	Good
Realise investment performance that allows annual spending or fund withdrawals to equal or grow relative to the prior year's spending.	Pertains primarily to endowments and foundations. Based on the idea that fund beneficiaries have an aversion to declines in benefits.	Good
Maintain projected investment risk consistent with investment policy specifications.	Acknowledges the existence of different types of investment risk and a policy to incur certain ones, in approved amounts. Actionable and attainable.	Good
Outperform the returns of the median fund in a peer group universe.	Ambiguous and not actionable (median fund is unknown); possibly inconsistent with the trustees' willingness to bear risk or the fund's mission.	Poor
Attain return (equal to or greater than) the actuarial rate of return.	Possibly achievable over a long time period but certainly not annually.	Poor
Attain return (equal to or greater than) S&P 500 Index + 3 percent.	Unlikely to be attainable; possibly inconsistent with the trustees' willingness to bear risk.	Poor
No negative investment performance years.	Achievable only with low-risk, low-return investments that are likely to be inconsistent with the fund's mission and investment policy.	Bad
Attain U.S. Consumer Price Index + 3 percent.	Not actionable. No such investable alternative exists. Purely aspirational.	Bad
"Beat Harvard."	Not actionable (Harvard's investment policy and process is not known) and not necessarily consistent with the trustees' willingness to bear risk or the fund's mission. Purely aspirational.	Bad

QUALITIES OF A GOOD BENCHMARK

Whichever type of performance objective is being measured it is vital that the objective itself is meaningful. Table 1 provides a (non-exhaustive) list of examples of good and poor investment objectives⁴

For benchmarks to be valid they need to exhibit the following characteristics⁵ –

- » **Unambiguous.** The identities and weights of securities or factor exposures constituting the benchmark are clearly defined.
- » **Investable.** It is possible to forgo active management and simply hold the benchmark. That is, investors can effectively purchase all securities in the benchmark.
- » **Measurable.** The benchmark's return is readily calculable on a reasonably frequent basis. A good benchmark will have a transparent set of public rules and, therefore, predictability for investment managers.
- » **Appropriate.** The benchmark is consistent with the manager's investment style or area of expertise.
- » **Reflective of current investment opinions.** The manager has current investment knowledge (be it positive, negative, or neutral) of the securities or factor exposures within the benchmark.
- » **Specified in advance.** The benchmark is specified prior to the start of an evaluation period and its calculation methodology is known to all interested parties.
- » **Owned.** The investment manager should be aware of the strengths and weaknesses of any benchmark they are asked to replicate or be judged against. It must also accept accountability for a client's portfolio performance against that benchmark, and be ready to explain to the client any variance from the benchmark. Consideration of the benchmark should be embedded in and integral to the investment process and portfolio construction conducted by the investment manager.

In essence, a high quality benchmark or index should be –

1. free of conflicts of interest,
2. provide independent review/pricing; and
3. have transparent methodology.

There are a variety of benchmarks available to meet investors' needs. These benchmarks can be in one of two categories –

- 1) Standard benchmarks – those devised by index providers and similar organisations.
- 2) Customised benchmarks designed to align with the risk/return profile of the client –
 - a. Composite benchmark that uses a combination of standard benchmarks such as one that represented 50% the FTSE All Share Index and 50% the FTSE Actuaries UK Conventional Gilts All Stocks Index. It is also possible to customise a 'standard benchmark' with an ESG tilt or a client list of restricted securities which the investment manager may not invest in. Such customisation can be done by index providers, or can also be undertaken by the investment manager itself.
 - b. Goal based – for example, for a charity seeking to maintain the real value of its spending over a life of the charity⁶.

The most common types of benchmarks used are as follows⁷:

1. **Absolute Return** – performance is compared to an absolute return benchmark such as three-month money market interest rates. The money market benchmark is inappropriate because it does not capture the risk characteristics of the absolute return strategies.
2. **Manager universes** – sometimes the benchmark refers to a selection of managers or the median manager for a particular approach or investment style. Here again this type of benchmark falls short of the criteria required for a valid benchmark.
3. **Goals based** - these are benchmarks related to a particular objective of the asset owner or ultimate beneficiary. One example is maintaining a spending goal in real terms for a charity.

⁴A Primer for Investment Trustees', Research Foundation, 2011. <http://www.cfapubs.org/toc/rf/2011/2011/1>

⁵CFA Institute Refresher Readings 'Performance Measurement and Evaluation' http://www.cfainstitute.org/learning/products/publications/readings/Documents/performance/RR_2014_L3_R34_5.pdf

⁶Client Goal-Based Performance Analysis, Stephen Campisi, CFA, CFA Institute Conference Proceedings Quarterly March 2011, Vol. 2, No. 1

<http://www.cfainstitute.org/learning/products/publications/cp/Pages/cp.v28.n1.1.aspx?PageName=searchresults&ResultsPage=1>

⁷Introduction to Benchmarks by C. Mitchell Conover, PhD, CFA, CIPM, Daniel Broby, FSIP, and David R. Cariño, PhD, Ch 6, CFA Program reading.

4. **Broad market indices** – these are the most common and are closest to meeting the criteria for a valid benchmark. There are many providers that construct indices for a variety of asset classes. Usually these are constructed based on market capitalisation, the higher the market value the greater the weight of that security in the index.

5. **Alternative market indexes** – these use different weighting structures than the traditional broad market cap weighted indices to capture risk premia. These benchmarks are appropriate for factor-based investing. The matrix⁸ below provides an overview of the some factor-based approaches.

MATRIX - WELL-KNOWN SYSTEMATIC FACTORS FROM ACADEMIC RESEARCH

Systematic Factors	What it is	Commonly captured by
Value	Captures excess returns to stocks that have low prices relative to their fundamental value	Book to price, earnings to price, book value, sales, earnings, cash earnings, net profit, dividends, cash flow
Low Size (Small Cap)	Captures excess returns of smaller firms (by market capitalization) relative to their larger counterparts	Market capitalization (full or free float)
Momentum	Reflects excess returns to stocks with stronger past performance	Relative returns (3 month, 6 month, 12 month, sometimes with last 1 month excluded), historical alpha
Low Volatility	Captures excess returns to stocks with lower than average volatility, beta, and/or idiosyncratic risk	Standard deviation (1 year, 2 years, 3 years), Downside standard deviation, standard deviation of idiosyncratic returns, Beta
Dividend Yield	Captures excess returns to stocks that have higher-than-average dividend yields	Dividend yield
Quality	Captures excess returns to stocks that are characterized by low debt, stable earnings growth and other "quality" metrics	ROE, earnings stability, dividend growth stability, strength of balance sheet, financial leverage, accounting policies, strength of management, accruals, cash flows.

⁸MSCI Foundations of Factor Investing, Research Insight, December 2013

BENCHMARK GOVERNANCE AND CONTROLS

In response to actual and suspected cases of benchmark manipulation and misconduct, regulators have issued both guidance and proposed regulation in this space. Investors could gain insight into potential areas of benchmark weakness by looking at the regulators' focus.

In the words of the European Commission "Benchmarks are susceptible to manipulation where conflicts of interest and discretion exist in the benchmark process and these [benchmarks] are not subject to adequate governance and controls."⁹

The regulatory response has so far focussed on ensuring:

- » **Benchmark administrators are free of conflicts of interest, and that they have relevant governance and controls**
- » **The data used to calculate benchmarks are sufficient, and the methodologies are robust; and**
- » **That contributors to benchmarks have adequate controls and avoid conflicts of interests.**

The regulatory oversight of more benchmarks and reference rates is welcome, but the initial regulatory response suggests that a more consistent emphasis on first principles such as integrity and governance is required over time.

The UK regulator initially took enforcement action against banks involved with the Libor scandal using existing provisions¹⁰ and then brought reference rates into regulatory scope. Similarly, in Europe, regulators took action using existing laws against 'participating in illegal cartels in markets for financial derivatives covering the European Economic Area'¹¹.

FIRST PRINCIPLES

Essentially, a good benchmark that possesses the qualities cited above will be best placed to enable the asset owner/beneficiary to:

- » **Assess how their portfolio is progressing towards their objectives.**
- » **Provide insight into how performance aligns with risk appetite and tolerance for losses.**
- » **Evaluate the value for money delivered by their asset managers/investment team.**

While benchmarks are not always perfect, the closer they are to reflecting the risk appetite, loss tolerance and beliefs of the asset owner, the more meaningful the benchmark will be.

⁹The European Commission's Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on indices used as benchmarks in financial instruments and financial contracts September 2013.

¹⁰Final Notice FSA ref no. 121882 <https://www.fca.org.uk/static/fca/documents/final-notices/rbs.pdf>

¹¹Antitrust: Commission fines banks € 1.71 billion for participating in cartels in the interest rate derivatives industry http://europa.eu/rapid/press-release_IP-13-1208_en.htm

BEST AND POOR PRACTICE IN BENCHMARK SELECTION

BEST PRACTICE - MAKE IT MEANINGFUL

"Presenting performance in a manner that addresses clients' true goals can strengthen the manager-client relationship and benefit both parties."

(Stephen Campisi, CFA)

Best practice in benchmark use would demonstrate how portfolio performance relates to the client's objectives. The benchmark chosen would also align with the risk appetite and loss tolerance assigned to these objectives.

To illustrate, we use a goal-based approach using the performance for an endowment between 1992-2009. The example is taken from a CFA Institute Conference Proceedings article authored by Stephen Campisi, CFA¹². The endowment's goal (target) is to ensure it can maintain its spending goals adjusted for inflation over a long time horizon; which in this case is CPI +5.5% from 1992-2002 and 5% thereafter.

At first glance, Table 2 provides an acceptable summary of the risk-adjusted performance of the portfolio versus its benchmark. The returns are measured using annualised quarterly time-weighted returns. The benchmark is composed of 70% equities and 30% bonds (the article does not specify what these are). The portfolio has a higher Sharpe ratio and generated seven basis points of out-performance between 1992 and 2009. This does not look like much, but more to the point is it meaningful?

TABLE 2- WHAT DOES THE SEVEN BASIS POINTS OF OUT-PERFORMANCE MEAN TO THE CLIENT?

Measures	Portfolio	Benchmark
Traditional (time-weighted return)	8.05	7.98
Risk	10.82	11.26
Correlation with benchmark	0.97	
Beta to benchmark	0.93	
Alpha	0.38	
Sharpe ratio	0.40	0.38

To understand the meaning for the client, we need to look at the returns of the portfolio versus its target each year to provide context. Table 3 provides this

data, the return goals and how they changed during the period under review. As can be observed, there are several periods of under-performance during the 'lean' years. Should this make the endowment and its asset managers nervous? The answer is 'no'.

TABLE 3 - PERFORMANCE OF THE PORTFOLIO VERSUS THE TARGET

Year	Portfolio	Target
"Fat" years		
1992	12.00%	8.64%
1993	9.84%	8.48%
1994	0.78%	8.40%
1995	27.47%	8.26%
1996	14.03%	9.08%
1997	18.67%	7.39%
1998	10.94%	7.29%
1999	11.59%	8.41%
"Lean" years		
2000	4.09%	9.14%
2001	-1.15%	7.23%
2002	-9.77%	8.09%
2003	22.60%	7.31%
2004	12.42%	8.47%
2005	6.51%	8.64%
2006	12.88%	8.14%
2007	9.97%	8.83%
2008	-29.2%	5.16%
2009	27.24%	7.79%

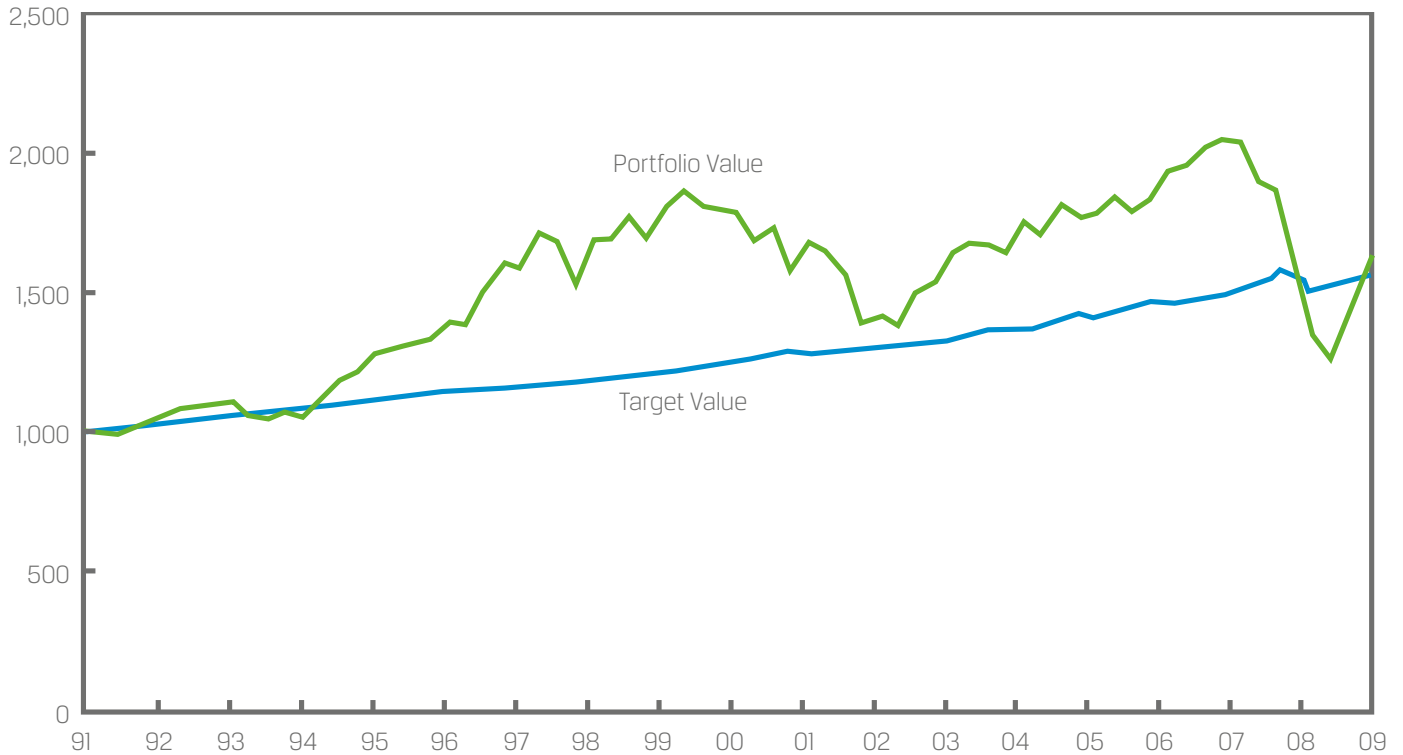
Note: Target return is CPI plus 5.5 percent from 1992-2002 and 5 percent thereafter.

To understand why the answer is 'no' it is important to look at the portfolio value and compare this to the target value. Bear in mind the period in question included the dotcom bust and the credit crisis as well as other major events that resulted in market turmoil. Figure 1 shows how the portfolio value changed compared to the target value and so provides the first sign of meaningful insight and comfort to the client. Over the period the portfolio was ahead of target and following the credit crisis soon got back on target for the endowment. The initial \$1Mn portfolio grows in value to \$1.5Mn.

¹²Client Goal-Based Performance Analysis, Stephen Campisi, CFA, CFA Institute Conference Proceedings Quarterly March 2011, Vol. 2, No. 1 <http://www.cfainstitute.org/learning/products/publications/cp/Pages/cp.v28.n1.1.aspx?PageName=searchresults&ResultsPage=1>

FIGURE 1 – PORTFOLIO VALUE VERSUS TARGET VALUE 1992-2009

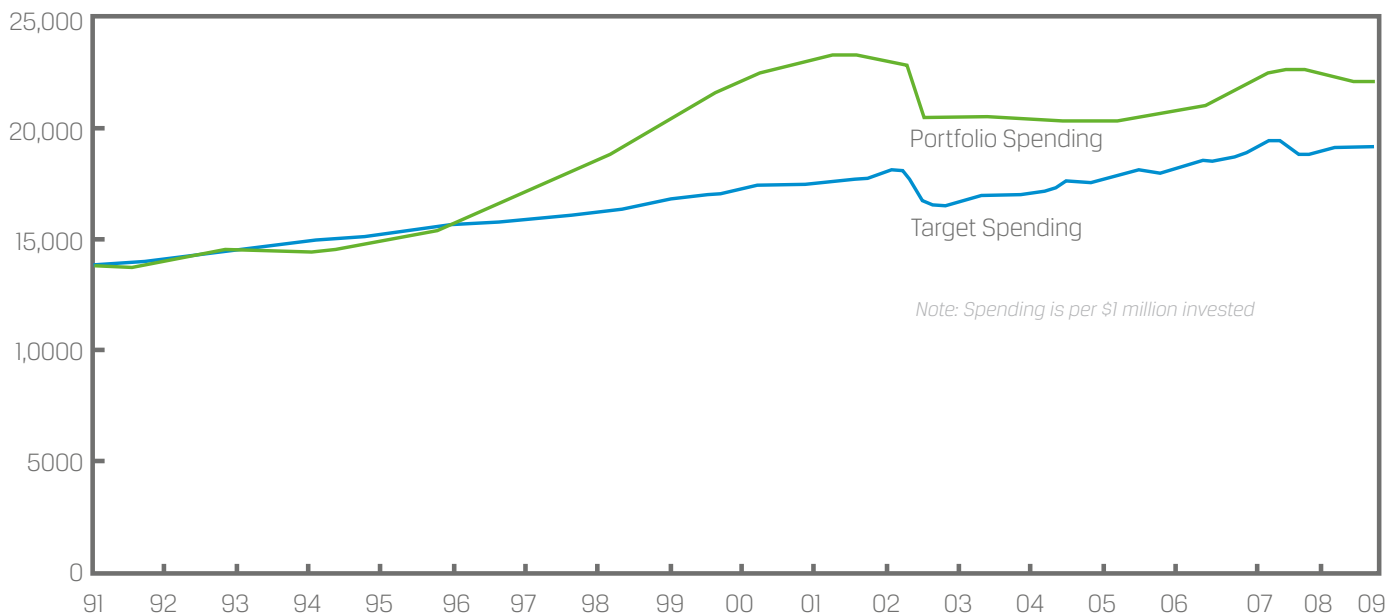
U.S. Dollars (thousands)



The added value arises in how the portfolio aligned with the primary objective of the endowment – to maintain the target level of spending in real terms. Figure 2 shows how the portfolio performed against the target spending benchmark. In each period, the portfolio will generate a return and this will be used to fund the endowment's spending; the remaining value will earn the next period's return. Any contributions or excess spending by the client is ignored so success can be evaluated based only on the ability of the initial capital to meet the stated goals.

FIGURE 2 - ACTUAL SPENDING VS. TARGET SPENDING FOR SAMPLE PORTFOLIO, MARCH 1992–DECEMBER 2009

U.S. Dollars



While the benchmark set out in Table 2 provides relevant performance information it has to be linked to the more meaningful spending benchmark of the endowment. By showing how the portfolio was able to generate surpluses, and how these surpluses were used to increase spending even during tougher economic times, the asset manager has demonstrated the value of their approach. A reported seven basis points of excess return is meaningless on its own, but being able to maintain the real value of endowment spending ahead of target, even during the tough times will be more valued by the client. Table 4 sets out how performance linked to spending.

TABLE 4 – ENDOWMENT EXCEEDED SPENDING TARGETS BY \$165,536

Portfolio	Principal	Cumulative Spending	Total
Target	\$1,562,327	\$1,205,825	\$2,768,153
Benchmark	\$1,623,123	\$1,343,335	\$2,966,458
Portfolio	\$1,646,722	\$1,371,362	\$3,018,084
Excess total	\$84,395	\$165,536	\$249,931
From strategy	\$60,796	\$137,510	\$198,306
From active	\$23,599	\$28,026	\$51,626
	IRR		
Portfolio	8.86%		
Benchmark	8.70%		
Target	8.08%		

Note: Nominal values are per \$1 million.

POOR PRACTICE IN USING BENCHMARKS – THE ALPHA ILLUSION

There is a temptation for investment managers to misuse benchmarks to demonstrate that they have skill when in fact this can be just an illusion. Poor practices range from selecting and using inappropriate benchmarks to using more appropriate benchmarks, but overlooking important aspects such as leverage.

Example of leverage

PANEL A - HEADLINE COMPARISON NOT TAKING INTO ACCOUNT THE LEVERAGE

	FTSE 100 tracker	Active Fund A
Gross total return	10%	12%
Gross alpha	0%	2%
TER	0.25%	1.67%
Return net of TER*	9.75%	10.33%
Net alpha^	-0.25%	0.58%
Volatility	20%	20%
Sharpe ratio^^	0.49	0.52

*Based on Which? average TER for active funds, excludes transaction costs.
^Net alpha is the excess return remaining after the costs for both funds have been deducted from the headline performance - Fund A (12%-1.67%) - Tracker A (10%-0.25%) = 0.58%
^^ For the purposes of this example the risk free rate is presumed to be zero

Fund A invests in FTSE 100 stocks and uses the FTSE 100 as its benchmark. Fund A uses 30% leverage to generate its returns.

Panel A shows the headline data for Fund A and the benchmark. First impressions suggest that Fund A has indeed provided alpha both after costs and taking risk into account. Hence, based on the net risk-adjusted return (Sharpe ratio) the active manager is delivering value. For illustrative purposes, we use the Sharpe ratio to calculate risk-adjusted returns. We accept and recognise that this does not capture all the potential risks for an investment. However, the analysis in panel A excludes the impact of leverage used by Fund A to generate 12% gross returns. To provide a meaningful comparison we need to calculate the performance of the benchmark applying the same level of gearing. If we do so, would the outcome been any different?

Once we take into account the leverage as set out in Panel B, the outcome is materially different and reverses the results seen in Panel A. Hence, from the client's perspective, Fund A's use of leverage has not met the opportunity cost of using a passive alternative with the same leverage. If the client was only shown results using Panel A, the active manager would have appeared more skilled than turned out to be the case in Panel B – which exposes the use of financial engineering and a mis-specified comparison.

PANEL B – TAKING LEVERAGE INTO ACCOUNT

	FTSE 100 tracker	Active Fund A
Gross total return	10%	12%
Gross return with 30% leverage	13%	12%
Gross alpha	0%	2%
TER	0.25%	1.67%
Return net of TER*	12.75%	10.33%
Net alpha [^]	-0.25%	-2.42%
Volatility	20%	20%
Sharpe ratio ^{^^}	0.64	0.52

*Based on Which? average TER for active funds, excludes transaction costs.
[^]Net alpha is the excess return remaining after the costs for both funds have been deducted from the headline performance - Fund A (12%-1.67%)- Tracker (13%-0.25%) = -2.42%
^{^^} For the purposes of this example the risk free rate is presumed to be zero

SMART BETA – IS IT REALLY 'SMART' OR JUST A BETTER BETA?

Finance theory is based on the premise that under a set of assumptions the market portfolio should be composed of all assets weighted by their market value ('cap-weighted'). In essence, the market portfolio is also presumed to be mean-variance efficient which means it minimises the risk/return trade-off. Based on this premise, we have come to rely on benchmarks based on broad market indices constructed using market value weightings.

Over time, empirical evidence has demonstrated that the cap-weighted index deviates from the theoretical ideal. This happens for a variety of reasons ranging from the presence of economic and non-economic barriers to effective market pricing and the tendency for the cap-weighted index to overweight certain sectors or constituents during bull markets and vice versa during market downturns.

With this in mind, index providers have started to offer minimum variance alternatives. The ones used in this paper are from FTSE. FTSE uses historical data to obtain the minimum variance weightings and as part of the rules based approach there are constraints to limit the allocation to each security. In chart 1 the circles refer to cap-weighted indices. The triangles refer to a weighting of the portfolio using minimum variance and is taken from data in Tables 5 and 6. One can see that the alternative weightings provide a higher return for less risk than compared to their cap-weighted equivalents.

Minimum variance weighting

CHART 1 – EFFICIENT FRONTIER

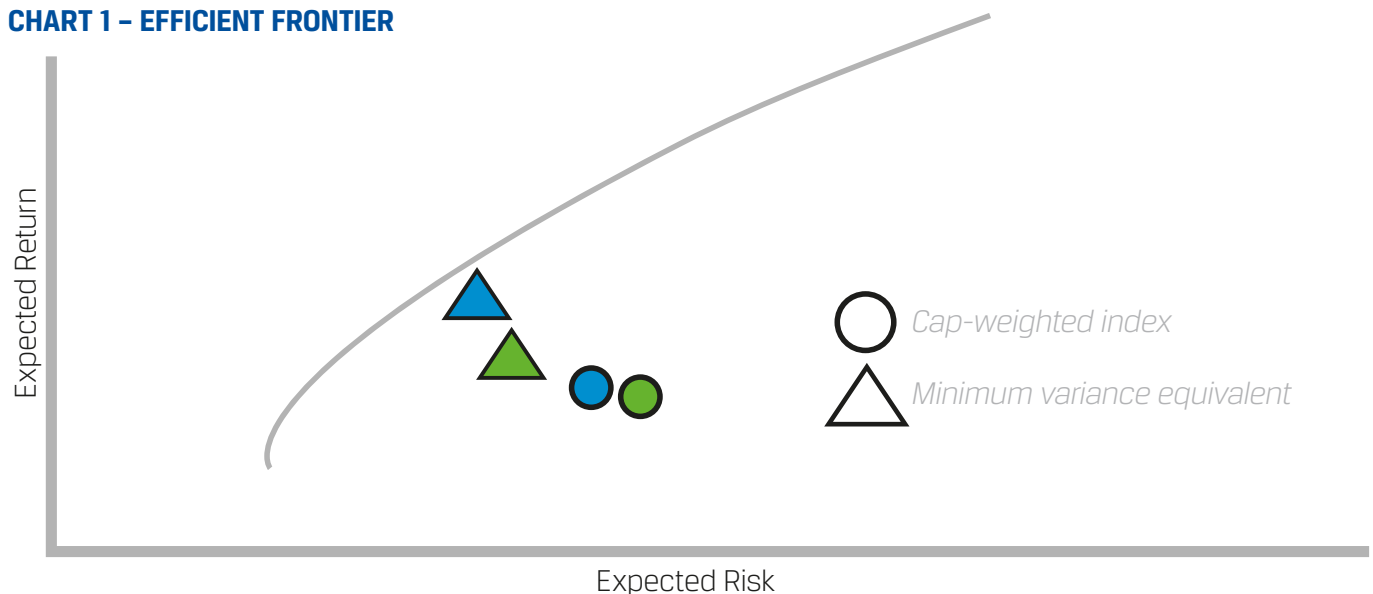


Table 5 sets out the total returns and volatility of each type of index. Table 6 sets out the risk-adjusted return of these indices and it is apparent that the minimum variance indices outperform the cap-weighted ones.

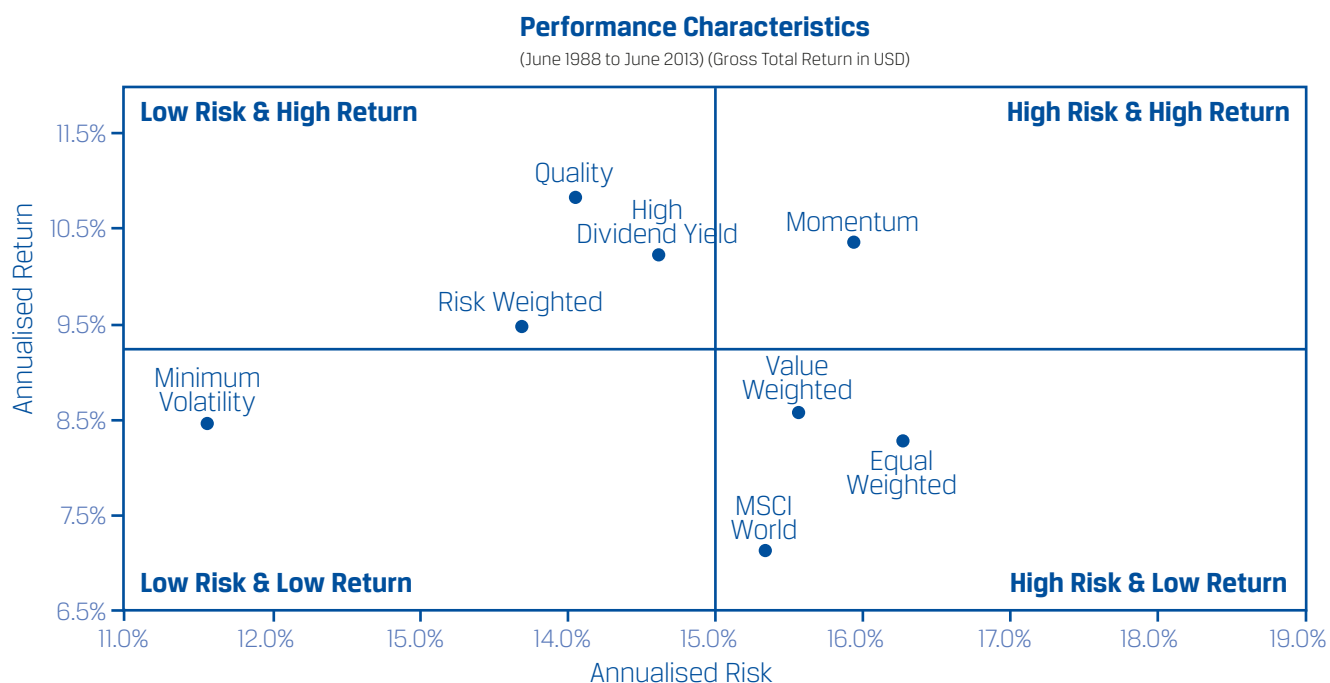
TABLES 5 AND 6 – CAP-WEIGHTED VERSUS MINIMUM VARIANCE

Performance and Volatility - Total Return											
Index (USD)	Return %						Return pa %		Volatility %**		
	3M	6M	YTD	12M	3YR	5YR	3YR	5YR	1YR	3YR	5YR
FTSE All-World Minimum Variance	1.6	0.6	8.6	8.6	49.4	72.4	14.3	11.5	6.3	9.6	11.4
FTSE Developed Minimum Variance	2.4	0.7	9.1	9.1	53.0	78.1	15.2	12.2	6.2	9.1	10.9
FTSE All-World	0.5	-1.7	4.8	4.8	51.4	58.9	14.8	9.7	8.6	12.0	14.6
FTSE Developed	0.9	-1.3	5.1	5.1	55.9	65.4	16.0	10.6	8.8	11.9	14.4

Sharp Ratio and Drawdown - Total Return									
Index (USD)	Sharpe Ratio				Drawdown (%)				
	1YR	3YR	5YR	10YR	1YR	3YR	5YR	10YR	
FTSE All-World Minimum Variance	1.3	1.5	1.0	0.7	-7.6	-9.2	-12.8	-44.5	
FTSE Developed Minimum Variance	1.4	1.6	1.1	0.7	-7.3	-8.0	-11.5	-42.3	
FTSE All-World	0.5	1.2	0.7	0.4	-9.2	-12.8	-20.4	-54.5	
FTSE Developed	0.6	1.3	0.7	0.4	-9.3	-12.4	-19.8	-53.6	

There are many who support factor investing as a way to deliver higher risk adjusted returns than those available from the market over time. Minimum variance is one example of a factor-based approach. Its performance and the performance of other factors can be seen in graph 1.

GRAPH 1

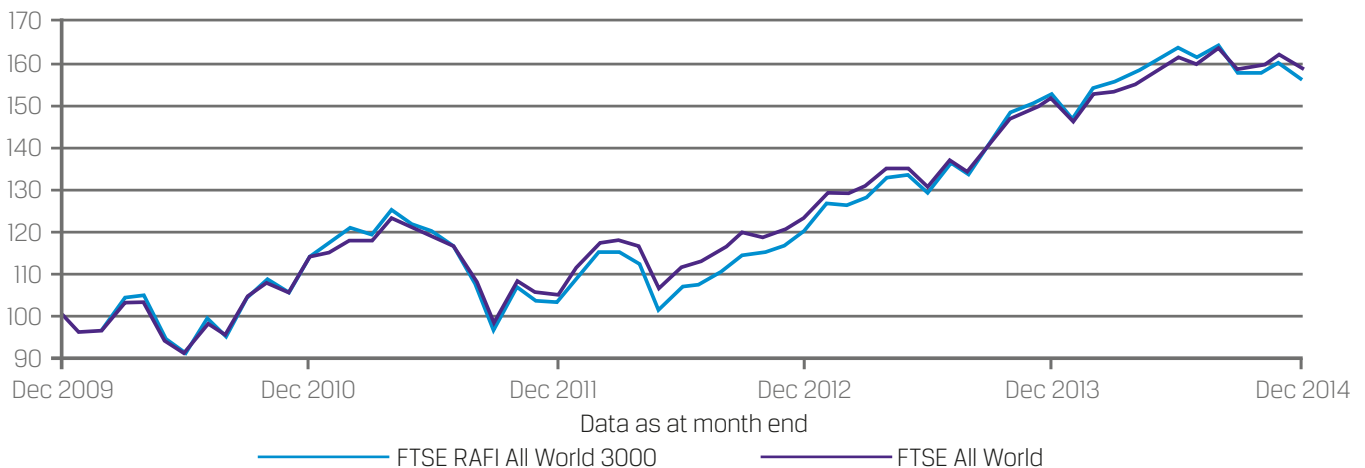


Source: MSCI¹³

FUNDAMENTAL INDEXATION

Chart 2

5 - Year Performance - Total Return (USD)



Source: FTSE

This approach weights the index using a variety of business metrics such as sales, free cashflow, dividends and book value etc. The approach appeals as it relates directly to business factors and is less susceptible to the influence of asset inflation. The FTSE RAFI™ All-World 3000 Index is an example of a fundamental index. Chart 2 shows the cumulative performance over a five-year period for FTSE RAFI™ All-World 3000 Index compared to its cap-weighted equivalent. Over the period there appears little to choose between them.

However, as discussed earlier, when assessing performance it is important to take into account the risk being taken. Table 7 demonstrates that the fundamental index over a five-year period shows lower returns and higher risk than its cap-weighted equivalent. Table 8 shows that the cap-weighted index has a higher Sharpe ratio over a five-year period while over a 10-year period, the Sharpe ratios are identical.

TABLE 7 – FUNDAMENTAL INDEXATION PERFORMANCE, VOLATILITY.

Performance and Volatility - Total Return											
Index (USD)	Return %						Return %*		Volatility %**		
	3M	6M	YTD	12M	3YR	5YR	3YR	5YR	1YR	3YR	5YR
FTSE RAFI All-World 3000	-0.9	-4.6	2.5	2.5	51.1	56.3	14.8	9.3	8.9	12.9	15.8
FTSE All World	0.5	-1.7	4.8	4.8	51.4	58.9	14.8	9.7	8.6	12.0	14.6

* Compound annual returns measured over 3 and 5 years respectively
 ** Volatility - 1YR based on 12 months daily data. 3YR based on weekly data (Wednesday to Wednesday). 5YR based on monthly data.

TABLE 8 – RISK-ADJUSTED RETURN (SHARPE RATIO).

Sharp Ratio and Drawdown - Total Return								
Index (USD)	Sharpe Ratio				Drawdown (%)			
	1YR	3YR	5YR	10YR	1YR	3YR	5YR	10YR
FTSE RAFI All-World 3000	0.3	1.1	0.6	0.4	-10.6	-15.6	-22.5	-56.3
FTSE All World	0.5	1.2	0.7	0.4	-9.2	-12.8	-20.4	-54.5

Figures are annualised
 1YR based on 12 months daily data. 3YR based on weekly data (Wednesday to Wednesday). 5YR and 10YR based on monthly data.

Source: FTSE for tables 7 and 8

¹⁴Deploying Multi-Factor Index Allocations in Institutional Portfolios, MSCI, Jennifer Bender, Remy Briand, Dimitris Melas, Raman Aylur Subramanian, and Madhu Subramanian, December 2013

Further empirical evidence is provided in a paper¹⁴ by Chow et al; they show how different approaches to weighting portfolios can bring about different outcomes. Alternative weights are used to construct the portfolio for example equal weights, risk weights and accounting metrics using business related factors e.g sales. The authors demonstrate that these alternative approaches to beta (or market return) can result in better risk-adjusted returns than their traditional passive counterpart.

Tables 9 sets out these different approaches for U.S. securities and compares these with the standard passive index. On a risk-adjusted basis, most of the alternative approaches outperform the traditional passive index and produce higher risk-adjusted returns (Sharpe ratios). However, are these new passive approaches more costly?

TABLE 9 – RETURN CHARACTERISTICS OF ANNUALLY REBALANCED U.S. STRATEGIES FOR 1,000 STOCKS, 1964–2009

Strategy	Total Return	Volatility	Sharpe Ratio	Excess Return over Benchmark	Tracking Error	Information Ratio	One-Way Turnover
S&P 500a	9.46%	15.13%	0.26	–	–	–	6.69%
Heuristic -based weighting							
Equal weighting	11.78%	17.47%	0.36	2.31%	6.37%	0.36	22.64%
RCEW (k clusters)	10.91	14.84	0.36	1.45	4.98	0.29	25.43
Diversity weighting ($p=0.76$)	10.27	15.77	0.30	0.81	2.63	0.31	8.91
Fundamental weighting	11.60	15.38	0.39	2.14	4.50	0.47	13.60
Optimization-based weighting							
Minimum-variance	11.40%	11.87%	0.49	1.94%	8.08%	0.24	48.45%
Maximum diversification	11.99	14.11	0.45	2.52	7.06	0.36	56.02
Risk-efficient ($\lambda=2$)	12.46	16.54	0.42	3.00	6.29	0.48	34.19

^aFor the S&P 500, we report of a simulated U.S. cap-weighted index of the top 500 stocks rebalanced annually on 31 December. Actual S&P 500 turnover is generally lower owing to committee-based stock selection rules.

All too often, innovation in the world of indices overlooks the necessary cost/benefit analysis. For instance, while new indices may look more attractive than traditional cap-weighted indices, it is rare for providers to indicate the additional costs involved with using these alternative indices. Chow et al have carried out a transaction cost analysis of the different approaches to weighting indices and the results are presented in Table 10. As can be observed, the turnover varies between each type of approach and is reflected in the additional costs compared to the standard cap-weighted index. Whichever approach is used, the profession still needs to evaluate the trade-off between performance, cost and risk and then apply judgement in selecting the most relevant benchmark for the client.

¹⁴ A Survey of Alternative Equity Index Strategies; Tzee-man Chow, Jason Hsu, Vitali Kalesnik, and Bryce Little *Financial Analysts Journal*, September/October 2011, Vol. 67, No. 5:37-57. <http://www.cfapubs.org/doi/pdf/10.2469/faj.v67.n5.5>

TABLE 10 – TRANSACTION COST ANALYSIS

Global (1987–2009)						
Strategy	Excess Return over Benchmark	One-Way Turnover	Market Cap (US\$ billions)	Avg. Bid-Ask Spread	Adj. Daily Volume (US\$ millions)	Trading Costs ^{abc}
Cap-weighted benchmark	–	8.4% ^d	66.34	0.11%	464.91	0.10% ^d
Heuristic -based weighting						
Equal weighting	1.05%	21.8%	23.90	0.16%	174.96	0.31%
RCEW (k clusters)	3.20	32.3	37.47	0.17	189.12	0.69
Diversity weighting ($p=0.76$)	0.16	10.4	52.37	0.12	368.16	0.13
Fundamental weighting	3.54	14.9	59.14	0.14	397.81	0.28
Optimization-based weighting						
Minimum-variance	1.01%	52.0%	23.97	0.35%	128.43	0.49%
Maximum diversification	0.18	59.7	20.08	0.45	122.50	0.57
Risk-efficient ($\lambda=2$)	1.35	36.4	26.90	0.15	193.53	0.33
US (1964–2009)						
Cap-weighted benchmark	–	6.69% ^e	80.80	0.03%	735.40	0.03% ^e
Heuristic -based weighting						
Equal weighting	2.31%	22.6%	11.48	0.06%	132.49	0.22%
RCEW (k clusters)	1.45	25.4	37.14	0.04	312.04	0.12
Diversity weighting ($p=0.76$)	0.81	8.9	50.53	0.04	477.87	0.06
Fundamental weighting	2.14	13.6	66.26	0.05	617.47	0.13
Optimization-based weighting						
Minimum-variance	1.94%	48.4%	19.63	0.05%	136.37	0.43%
Maximum diversification	2.52	56.0	14.77	0.06	124.08	0.53
Risk-efficient ($\lambda=2$)	3.00	34.2	12.06	0.06	140.07	0.25

Note: Market Capitalization, bid-ask spread, and adjusted daily volume are estimated for rebalancing at the end of 2009.

^aTrading costs are estimated with the model proposed by Keim and Madhavan (1997), which accounts for (1) different exchanges, (2) size of trade, (3) market capitalization, (4) price per share, and (5) style of investment. Portfolio size is fixed as US\$100 million; style of investment is set as indexed.

^bWe modified the Keim–Madhavan model to reflect additional costs for trading on the London Stock Exchange (50 bps for selling) and the Hong Kong Stock Exchange (10bps for buying and selling).

^cTrading costs include portfolio rebalancing only, not the costs of entering and exiting strategies.

^dTurnover and trading costs are based on a simulated cap-weighted index of the top 1,000 stocks in the global developed market.

^eTurnover and trading costs are based on a simulated cap-weighted index of the top 500 stocks in the U.S. market.

The growth and development of indices, especially in the alternative beta arena, has implications for both the asset owner and the active asset manager. Using less efficient cap-weighted indices as benchmarks to assess active managers may provide a lower risk-adjusted comparator than the 'smart' beta alternative. Similarly, the wider choice of accessing beta makes it more challenging for the asset owner to identify how best to assess a potential active manager. To demonstrate these points and provide a way forward the following example in Table 11 may be helpful.

TABLE 11 – ACTIVE MANAGER COMPARISON WITH STANDARD AND ALTERNATIVE BETA

5 Year performance data	Active manager	FTSE World Index	FTSE World Minimum Variance
Gross total return	12%	9.7%	11.5%
Gross alpha vs standard index/ alternative index	2.3%/ 0.5%	0%/-1.8%	1.8%/0%
TER*	1.67%	0.5%	1.00%
Return net of TER	10.33%	9.2%	10.5%
Net alpha^ vs standard index/alternative index	1.13%/ -0.17%	0%/-1.3%	1.3%/0%
Volatility	20%	14.6%	11.4%
Sharpe ratio^^	0.52	0.63	0.91

*Based on Which? average TER for active funds, excludes transaction costs. Others are illustrations.
^Net alpha is the excess return remaining after the costs for both funds have been deducted from the headline performance – e.g Active Fund (12%-1.67%)- FTSE World (9.7%-0.5%) = 1.13%
^^ For the purposes of this example the risk free rate is presumed to be zero

As can be seen from Table 11 the active manager has outperformed on a gross headline basis compared to both the standard and alternative indices. However, once we take into account costs and risks, the active manager has underperformed both options on a risk-adjusted basis (Sharpe ratio). The underperformance is greatest versus the alternative 'beta'. From the client's perspective, using the alternative beta in this case may have been more beneficial than using the standard passive fund or the active manager. This provides an opportunity for managers that are confident of their skill to use the most efficient version of beta as the benchmark. For passive investors, the aim would be to identify the most cost effective beta exposure taking into account the choices of 'beta' available.

CONCLUSION

Benchmarks and indices matter. Indices matter because they are used to create benchmarks and the integrity of the benchmark will depend on the integrity of the index; particularly where an index is central to the investment strategy utilised by an investment manager. Benchmarks matter because they provide meaningful comparisons to asset owners to assess how their portfolios are aligned with their –

- » goals and objectives;
- » risk appetite and capacity for losses;
- » progress towards their goals and objectives; and
- » willingness and capacity to accept periods of underperformance especially when the goal is being achieved.

While benchmarks play an important role for asset owners and investors, it should be accepted that none is likely to be a perfect match for a client.

Innovation in indices – particularly in the shape of 'smart beta' – is welcome because it has broadened the choice of appropriate benchmarks. Nevertheless, while smart beta providers suggest that these indices provide more efficient market exposure than cap-weighted indices, these alternative indices vary in term of their costs and net benefits.

When it comes to constructing the most appropriate benchmarks, the challenge for the profession remains the same and the wider choice of indices makes it even more important that we conduct ourselves in line with the highest professional standards. Regulatory interest in benchmarks and indices makes it imperative that the quality of governance related to their development and management is robust.

If investment professionals adhere to the Code and Standards and take account of best practice in index and benchmark selection – and if clients demand this of their managers – then we should move closer to the desired outcome. The outcome being where the right indices (built, governed and operated correctly) are selected to form the most relevant benchmarks (through effective selection processes) and are used appropriately by investment managers and their clients.



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