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Indices and benchmarks

March **2014**



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Contents

1.	Introduction: Benchmark or index?	4
2.	How do indices work?	6
З.	Indices are evolving	8
4.	Why use indices and what are they for?	9
	 as benchmarks, reference tools and economic indicators 	10
	• as the bases for investment products	11
5.	Indices as performance benchmarks	14
	• key issues to consider	14
	• periodic review	15
	customised benchmarks	15
6.	Smart beta/strategy/alternative weight/factor indices	16
•••••	• rise in popularity	16
	characteristics	17
•••••	• analysis by type	18
•••••	incorporation into a portfolio	19
7.	Using indices to measure performance	20
•••••	assessing performance drivers over time	20
•••••	assessing risk	20
8.	How to select an index	21
•••••	methodology matters	21
•••••	key index construction criteria	22
9.	What else do investors need to consider before using an index?	25
10.	Non-equity indices	26
11.	Summary	29



Introduction: Benchmark or index?

1

ften investors are confused about the difference between benchmarks and indices.

The Financial Times¹ defines 'benchmark' and 'index' as:

Benchmark: A point of reference that is used to compare investment performance. It forms an objective test of the effective implementation of an investment strategy. Benchmarks allow returns and variations in investment returns to be measured and attributed, thereby making it possible to determine how effectively investors have performed against them. Well chosen, benchmarks allow returns to be decomposed at every level. They allow the users of the resultant analysis to communicate effectively and to make informed decisions.

Index: An indicator of trends in a market or economy, reflecting changes in various component data (often weighted to account for their relative importance). An index is a portfolio of stocks, chosen according to simple, pre-defined rules, and designed to capture a particular investment style. It is a performance benchmark, in as much as it represents an achievable return from a largely passive investment strategy. These rules don't add any insight into the merits of the underlying constituents of the index but help in its construction.

By way of an example, the investment return from placing money in a bank account is a benchmark and the return from investing in low-risk US treasury bills another. Both could be used to provide an independent measure against which riskier stock market strategies and investments could be compared. It is important to recognise that indices can often be used as benchmarks:

An index comprising all of the stocks listed on a given stock exchange could be used as a benchmark by an investor whose investments are made on that exchange. However, an index of the stocks of one country would not be a meaningful benchmark for investments made on another exchange. Only indices relevant to a particular investment strategy should be considered as benchmarks. Eligibility for inclusion in a particular index is determined by different criteria including market sector, product, size and geographical location. As investors often use an index as their benchmark – in fact today's indices are often designed to look like or even be parts of investment portfolios – the terms are often used interchangeably. Originally this was not the case. For example, in 1884 when Charles Dow and Edward Jones published the 'Dow Jones Averages' index – the first US stock market index – in their daily 'Customer Afternoon Newsletter', it consisted of a single number and a short list of company names.

Focusing on the 'tech stocks' of the day, the index included nine railroad companies, two steam ship lines and one non-transportation company, Western Union². Its purpose was to give investors a clear, unbiased look at stock market activity during a time characterised as a 'perilous free-for-all in stock speculation'³. It did not seek to represent how investors sought returns. Dow and Jones calculated its index by selecting the most heavily traded companies, and simply averaging their closing prices.

While the index gave potential investors insight into market's performance (when the index value rose, companies were generally increasing in value and when it didn't, they weren't), realistically it could not have been used as an investment product and it had a negligible value as an investment benchmark.

¹ Source: FT Lexicon; lexicon.ft.com

² Five years later, the newsletter had become The Wall Street Journal. By the end of the century, the index had evolved to become the Dow Jones Industrial Average. See 'Follow the Numbers' at online.wsj.com/public/resources/documents/info-DJTimeline0706.html.

³ See 'Charles Henry Dow' by Bruce J. Evensen, available at www.anb.org/articles/16/16-03537.html (American National Biography Online; accessed 4/1/2014). Evensen suggests that the historical 'news index' of the prominent Providence [Rhode Island] Journal, where Dow worked under the tutelage of famed editor George W. Danielson in the late 1870s, 'is the probable model for the 'stock index' in the Wall Street Journal'.



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How do indices work?

The 'railroad index' introduced by Dow and Jones would be considered today as an example of a specialist index because it used averaged prices, and as a result, was dominated by companies that happened to have high share prices, rather than high market values.

As a share price represents only the value placed on an *individual* share, for companies issuing widely varying numbers of shares price is neither a meaningful measure of the overall worth of a company nor a logical way of representing the overall performance of a group of companies.

Conversely, multiplying each company's share price by the number of shares issued by that company gives the overall value placed on it by the market (known as *'market capitalisation'*). Summing these values, and then dividing the sum by the number of companies in an index, creates a *'market capitalisation – weighted'* index, the most commonly-used index design today.

Here, the company accorded the highest value by the market will represent the highest percentage weight within the index, and the company with the smallest value, the lowest. This is a much more logical way of showing company performance. Indeed, it is close to the approach most investors take of investing more of their money in large companies than in small. This measure shows the change over time in the overall capitalisation of the market and also the change in the values of shareholders' holdings in the companies. The latter point is crucial. While there are now myriad ways of selecting constituents and weighting them within indices, it is the simple market capitalisation–weighted index that represents the total value of the stocks (ie of the investment wealth) held by shareholders.

Financial market indices yield performance insights by demonstrating change within a part or the whole of a market, based on the price movements of a particular group of assets. Change in value is assessed against a starting (or base) price, and can be examined over different time periods, depending on whether a user wishes to evaluate short – or long-term trends. It is percentage change over a given time period that matters here, rather than value. In other words, should one index rise from 100 to 200 and another increase from 500 to 1,000, the same percentage change has taken place, and thus index performance is the same.

Change in value of an index

By way of an example, if in January 2011 the base value of 'index A' was 100, and if that had changed to 150 by January 2014 through appreciation of index members' stock prices, then it can be said that the index rose 50% over a three-year period, equivalent to a compound annual interest rate of 14.5%.



Longer-term analysis of equities markets ought to take into account the dividends paid by companies to their shareholders, though this is often not reflected in a stated index return performance. The majority of indices assume that investors receiving dividends do not reinvest their payments and are thus called 'price return' indices as they only take into account the change in stock price of index members. 'Total return' versions of those indices, however, do incorporate dividend reinvestment, which is important for funds to consider as more appropriate benchmarks as funds also usually reinvest dividends.

Because the constituency of most indices is determined on the basis of a clearly disclosed set of rules, an index will represent a 'passive' investment in a pre-defined group of stocks. The constituency of an index will however change from time to time in line with a recurring, scheduled process (known as index review, rebalance or reconstitution), also defined in the rules. The purpose of the review is to ensure that the index continues to represent its original objective or market segment it represents. For example, when companies in large-company indices fall in value, they are removed and eligible new large companies added to replace them.



Indices are evolving



Over the past 130 years increasing global demand for indices has led to constant evolution in index use and design, both of which have changed dramatically.

They have become powerful tools for investors who grasp their importance and understand how they can be used. At the present time their numbers, range of underlying index designs and objectives and range of uses to which they are put, are growing at a faster rate than at any other time in history.

'Smart beta' indices (also known as 'strategy indices') have become particularly popular in recent years. They give additional, more targeted options for benchmarking the performance of managers tasked with investing in value, growth, or defensive companies, or with controlling volatility. Smart beta indices are discussed in depth in section six.

The evolution of indices

1884	Charles Dow and Edward Jones publish 'Customer's Afternoon Newsletter' with its 'railroad index'
1896	The Dow Jones Industrial Average Index (DJIA) is first introduced
1935	The FT30, British industrial index and forerunner of the FTSE 100, is launched
1957	The S&P 500 makes its debut as the first broad market index
1962	The FTSE All-Share Index is launched
1971	Wells Fargo introduces the first institutional index fund
1974	The Wilshire 5000, a total U.S. market index, is launched
1975	The Vanguard Group launches first indexed mutual fund
1984	Russell introduces first size segmented indices, the Russell 1000 $^{m e}$ and Russell 2000 $^{m e}$
1990 - 2000	First exchange-traded funds (ETFs) are introduced in U.S., Canada, and Europe
1998	The EURO STOXX 50® Index is launched
2003	PowerShares Capital Management introduces two Intellidex Index-based ETFs
2005	Fundamental Index – one of the most successful 'smart beta' products – launched
2009	ETF assets exceed \$1 Trillion ⁴
2013	ETF assets exceed \$2 Trillion ⁴

⁴ Source: Blackrock 'ETP Landscape, Industry Highlights 2013, December 2013'.

4

Why use indices and what are they for?

Indices are used for several purposes. Many investors are familiar with indices' more common use as benchmarks for measuring market performance (ie comparisons within a market, sector or other such group of assets, or investment return against inflation), or as a measure of how a given portfolio manager's investments have performed against the index.

Current indices are however used not only for better understanding markets, but increasingly as the underlying design of investment products.

Today, four major global index providers – S & P Dow Jones, Russell, FTSE and MSCI each calculate hundreds of thousands of indices daily. Many of these indices are replicated, either closely or entirely, in investment products, for example, passivelyinvested investment trusts, mutual funds, and exchange traded funds (ETFs). (see page 11 for more information on ETFs). In addition, indices are being offered by numerous smaller regional and specialist providers and by others like banks, exchanges, and data vendors, who cover particular regions, asset classes or other specialisations.

Alone, it is often useful to think of an index as being much like an investment portfolio. A group of stocks is selected, a decision made how to apportion a given investment amount across various assets (by summing the individual market capitalisations of the constituent assets), and the investment performance of the resulting allocation is measured on an ongoing basis by summing the portfolio holdings. It is therefore a relatively easy step to actually build investment products that closely mimic indices. If a portfolio comprises the same assets at the same weights as the index, the two measures would change at the same rate. The investment product becomes useful to any investors believing that the index represents an appropriate group of assets or strategy in which to invest, and benefits from the independent selection of its components via the index provider's methodology, rather than via that of a particular fund manager.

If, for example, the index comprises a 'neutral' selection of companies – perhaps, say, the largest 100 in the UK market – it would be a useful tool for assessing the performance of a fund manager who was investing in large UK companies. Equally, if an investor wanted to buy large UK companies but did not have a view as to exactly which ones, he could buy the constituents of that index in the same proportion as the index (a 'passive' investment strategy), and have a portfolio that would perform in line with the average performance of large UK companies.

As many investors believe that minimising the overall cost of making their investments is a key determinant of the investment outcome, they may be content with average market returns (which they would expect to achieve by buying index constituents' stocks) and therefore with a passive, index-based investing approach that has the added advantage of generally being relatively cheap. Where investors or fund managers make choices about the companies they buy, based on their own opinions and analyses, these represent 'active' investment decisions which require a degree of skill in selecting only those stocks that will perform better than the market and avoiding those that won't. This skill comes at a price, which a

9

portfolio implemented passively to simply track the selected index with no discernment required would not have. Managers and investors that actively trade their portfolios trade off an increased risk that their investments will underperform the market average for an opportunity to achieve larger returns, and their services generally cost more. In the middle ground is a large group of investors and managers who will often create portfolios that are similar (but not identical) to indices (often referred to as 'closet index trackers') to reduce the chance that their investments will significantly underperform while gaining some opportunity for outperformance.

Indices are nonetheless relevant to both active and passive investors and managers, as well as to practitioners of every approach in between. They are used both to create highly efficient investment products and to measure the performance of the managers who seek to outperform them. Investors now need to gain familiarity with different indices' objectives and calculation methodologies as they choose from among the thousands of products available in the marketplace. In order to be able to extrapolate sensible predictions of how an index might perform in the future, it is crucial that they understand how an index is created, its objectives, the manner in which it is managed and how it has performed in the past.

• As benchmarks

Indices set a benchmark, or a standard, against which a security, fund, or investment manager's performance can be measured. Should a pension fund decide to invest in global equities, trustees can use global market indices created by FTSE, MSCI, Russell or others to compare that fund's performance versus the benchmark. If an investment fund has risen 10% in a year, and an appropriate benchmark has risen 5%, it is clear that the fund manager has performed well. It's important, however, that comparisons ensuring like-for-like references are used, ie that a particular index reflects the same broad market, or opportunity set, that a given portfolio seeks to invest. If however the index contained assets that the investment manager could not purchase, or did not contain assets that he could, the index would not be fairly measuring the 'opportunity set' from

which he had made his investment choices and therefore would not be a fair measure of his success or failure. Since fund managers are scrutinised on this basis, benchmarks influence how fund managers construct and manage their portfolios. They take into account the risk of each investment relative to the benchmark's performance, rather than overall performance. Even where the fund benchmark is absolute – ie not relative to a market index – active managers often construct portfolios that are similar to the most commonly used benchmarks to reduce the likelihood of significant underperformance relative to other managers. For more information on benchmark selection, see section 5.

 Indices indicate market performance
 Aside from fund managers, economists and the media alike find stock indices a helpful reference. Indices can be used to generate and support stories on share price changes. Established index names are more commonly referred to, even if due to their methodology or means of compilation they are not necessarily the most appropriate guide. A good example of this is frequent use of the FTSE 100 rather than the FTSE All-Share to report UK stock market movements, despite the index containing only 100 of the approximately 2,500 stocks listed on the London Stock Exchange.

• Indices act as economic indicators and they inform market analyses

Indices underpin long-term analysis and forecasting. Economists use index performance data to construct their models, as stock markets are deemed indicative of economic behavioural changes. Economists need broad indices to ensure that their analyses are comprehensive and not subject to bias, since the performance of larger companies alone can be misleading. Actuaries use index data to decide whether certain asset classes are appropriate for meeting the obligations of pension or insurance funds, for example by examining historic performance of the assets versus inflation over long periods. This is important for investors who depend on skilful actuarial management for the amount of money they receive in retirement.

Indices are bases for investment products (a) Index-tracking funds

Index-tracking funds, a form of 'passive' investment management, were created in the early 1970s to provide a cheap and easy way for investors to perform in line with indices. This approach has grown increasingly popular, due to increasing evidence that it is hard for managers to outperform indices over long time periods and to deliver strong returns after management fees and other charges. As managers of indextracking funds do not have to make active investment decisions that require extensive analysis, the costs investors incur by this style of management are lower. Performance is usually broadly in line with the index, but will be in most cases slightly reduced, since investors will pay some fees, commissions, and taxes via their managers, which detract from market performance.

The rationale supporting this approach is entirely different than that for active management. Whether an index manager purchases shares in a specific company depends on whether or not that company is included in, or excluded from, the index. Also the manager does not make decisions on the likely future performance of individual companies within the index, but rather focuses on understanding and predicting changes to the structure and constituency of the index, and on the efficient trading of its stocks. In turn, this has led to greater emphasis on the transparency of index construction and on the quality of index design, since these define fund characteristics and help to determine future performance.

Index managers seek to limit the transaction costs associated with the purchase and sale of shares that occur with changes in the index for example changes due to corporate events, takeovers and mergers, and at the time of index reconstitution, as managers are not compensated for this in the measurement of their performance. The changes are, of course, to ensure that indices remain accurate and fully investable and allow the manager to readily buy and sell each constituent, without undue delays or difficulty and without incurring excessive cost. Structural changes to an index will be accompanied by near-simultaneous changes in index-tracking portfolios.

In index investing, an underlying index needs to be able to meet the requirements of the end investor. Only slight investment deviations from the index can be made, and therefore opportunities for performance enhancement over that index's performance are restricted.

(b) Exchange-traded funds (ETFs)

Growth in index-tracking strategies has led to innovation in investment products. ETFs are funds that use very similar holdings to the constituents of a given equity, bond, currency or commodities index. By doing so they provide an investment product that performs as closely as possible to the index. ETFs usually have tax-efficient structures and relatively low costs, and can be considered as providing the benefits of index funds, with the advantages of ordinary stocks. They are listed on stock exchanges in the same manner as normal equities and therefore can be traded as single entities which significantly reduce the expense of trading, as opposed to building up a portfolio of individual equities⁵. As such they can be used to guickly adjust the asset allocation of a portfolio, or to quickly invest cash into equities.

Additionally, being traded on exchange provides liquidity and ease of trading, whereas index funds are generally only traded via each fund's manager, and only at a single daily fixed price.

⁵ Not only is there the cost saving of buying only one entity, but additionally the action of buying and selling an ETF does not create additional trading costs that have to be passed on to investors. If there is significantly more buying than selling, or vice versa, trading is carried out between the ETF issuer and financial institutions that increases or decreases the supply of the ETF shares, but this process is transparent to the investor.

A particularly strong market has developed in ETFs covering the world's major stock indices, where there are many ETFs against some individual, key indices such as the FTSE 100 and S&P 500. This has resulted in competitive pricing and a close focus on the costs of managing ETFs and therefore control of the costs borne in the end by the investor.

A subset of ETFs provide 'leveraged' or 'inverse' exposure to a given index. They generally look to achieve daily returns that represent twice, three times or the inverse of the 'normal' performance of that index. These ETFs should be treated with caution, as the effects of the daily readjustment required to maintain the required leverage can be to reduce the performance of the ETF. The effect of volatility is to further reduce the value of the ETF – a 10% rise in an index value from 100 to 110, followed by a fall the next day of 9% (ie back to its original value of 100), would be reflected in a 2x leverage ETF by a climb from 100 to 120, and a fall from 120 to approximately 98⁶. In other words, although the underlying index has not changed over the period, the leveraged index has lost value.

ETFs of commodities and commodity indices have become particularly popular, because of the relative difficulty of buying commodities – commodities, being physical assets, are in many cases difficult to trade and own in their physical form. Historically investors would trade commodities derivatives, primarily futures and options, to gain their exposure, but these are still themselves significantly more difficult to trade than stocks. As an ETF can be bought without any of the difficulties of buying futures contracts or trading the physical commodities, they represent a muchneeded solution in this area.

A final point to note on ETFs is the debate surrounding the two broad mechanisms for creating them; physical replication (where the ETF issuer buys the underlying assets) and synthetic replication, where derivatives are used to build the exposure to the index. These derivatives are generally traded 'over the counter' between the issuer and an individual bank, who could in theory have problems meeting their obligations, resulting in problems for the ETF. However, European ETFs that are indicated compliant with the European Undertakings for Collective Investment in Transferable Securities III (UCITS III) regulations will avoid these, as those regulations ban these types of structures.

(c) Derivatives

Derivatives are financial products whose value derives from the price of underlying assets such as stocks, commodities, bonds, or indices. Derivatives include financial futures, whose value is calculated from the difference between the index value on a specific future date (the expiry date) and the base index value on which the contract was established. Similarly, option contracts allow the holder the right but not the obligation to buy (or sell, depending on the nature of the contract) a specific index at a particular level on or before a given future date. Swaps, usually traded over the counter, rather than on an exchange, offer an investor the performance of an underlying investment (usually an index) in return for the returns on another asset. This is usually a combination of the interest earned on the notional amount of the investment, had it been placed in the bank, plus an additional percentage fee.

There are two main advantages of these products. First, as with ETFs, an entire index exposure can be gained in one trade. Secondly, only a small percentage of the overall value of the trade – the 'margin' – needs to be paid when the trade is made. The outcome of the trade is settled when the product expires. As a result, an investor can take a position on the future trend in markets without having to commit the full cost of buying and selling, or can reduce ('hedge') the risk in an existing position without having to sell some of the assets in the underlying portfolio.

⁶ The leverage index calculation for the second period is (2x-9%)*120, ie resulting in an index value of 98.

For example, an investor holding a UK shares portfolio could buy a FTSE 100 call option, a product that performs in line with that index, in order to increase the investment performance if the index rises in value, but without having to find the full amount of money to be exposed to the market rise. (The investor would of course be liable for that full amount if the market fell.) Conversely, this investor could hedge the downside risk of the portfolio by buying a FTSE 100 put option, a product that performs inversely to its underlying asset (here, an index). As a result the put option would increase in value if UK large cap companies as a group fell, and thereby offset part of the loss sustained on the share portfolio itself.

(d)Structured Products

Structured products are hybrid investment products that incorporate different strategies. Most structured products provide a return based on the performance of some underlying price or index, with popular underlyings being equity indices.

The most commonly used carry guarantees, rather than simply rising and falling in line with the underlying investments, and are hence often called 'non-linear investments'.

For example, investors could be promised a percentage of the gain of a specified index during a stated timeframe or their money returned should the index fall. These sorts of returns are achieved by investing the bulk of the original capital in a low-risk bond, with the remaining proportion invested in a call option against the index, a derivative that would deliver potential gains from a market rise. Their benefits include: they tend to provide an investment return that is known in advance (subject to various different scenarios), that this return tends to be different to that received from other assets, thereby spreading the overall risk to which the investor is exposed (a process known as 'diversification') and that they often incorporate some protection from market falls.





5

Indices as performance benchmarks

Pension fund trustees who assign objectives to their investment managers usually need a means of assessing or benchmarking manager performance relative to those objectives.

When the objective is absolute return, the benchmark is normally some sort of low-risk asset, such as the return from bank-deposited cash or a specifiedpercentage improvement over and above an agreed-upon inflation rate. Where trustees are more concerned with performance relative to market returns, they generally benchmark via either peer group comparison or a market index. Peer group comparisons are becoming less common; index usage continues to increase.

Key issues to consider when choosing index benchmarks

In their asset allocation process, a trustee will determine what percentage of a fund's portfolio they intend to invest in each asset class, eg domestic equity, foreign equity, bonds, commodities and so on. The trustee then typically turns to selecting indices as asset allocation proxies, with a mind to each index acting as a benchmark for a subset of the fund's holdings.

Two important considerations in the selection of indices are:

- (a) The chosen index should be an appropriate benchmark for the specific subset of assets.
- (b) Trustees should recognise that in setting an index benchmark, they are overtly

defining the universe of assets in which their manager will likely invest, and that such definition can be, indirectly, restrictive.

Choosing an index without mid cap or small cap companies means the manager could be unfairly criticised for holding a diversified, lower-risk portfolio of investments covering all sizes of stocks, should the smaller companies underperform over a period. A possible outcome of benchmark mismatch would be the manager tilting the invested portfolio towards larger companies, at the cost of diversification and greater portfolio volatility, to avoid the risk of both outperformance and underperformance from holding stocks not in the benchmark, and resulting in the manager not delivering to the investor the outcome he had planned for. In this scenario, the index would not represent a fair assessment of that manager's actual investment skill. Often it would merely reflect the relative performance of the subsets of the markets he/ she invested in.

There have been many cases of inappropriate or poorly matched indices being set as benchmarks, such as using the 'mega-cap' EURO STOXX 50® index of Europe's 50 largest companies to benchmark a fund investing across all European equities.

• The need to periodically review benchmark indices

Historically, it has been rare for funds to change benchmarks. There are various reasons for this. Perhaps the most significant are those surrounding transition costs. These are the costs incurred when a fund switches from using one benchmark to another: primarily (although not exclusively), assets currently held but not in the new benchmark will need to be sold, those in the new one bought, with a generally rebalancing of the weights of individual assets within the fund usually required, necessitating further trading. This often also requires currency trading, if (as is usually the case) the weight of countries within the portfolio needs to change. Nonetheless, some recent major 'benchmark switches' by large asset owners, however, have amounted to recognition among trustees that they should regularly assess whether their chosen benchmarks are 'fit for purpose,' in terms of accuracy, appropriateness and cost efficiency. Trustee objectives change over time and indices, even as they are usually governed by transparent rules, may change their investment characteristics over time too. For example, a market can become dominated

by large companies, or companies whose stocks have higher volatility or an index provider can make a country classification change with which the trustees fundamentally disagree. Additionally, differences between the various index providers' indices are often not well understood. Overall, benchmark reviews should be conducted regularly and frequently.

Customised benchmarks

Increasing investor preference for 'ethical' or 'socially responsible' investing has been perhaps the key driver behind the creation of customised indices. Trustees have sought to exclude certain groups of companies, for example, those involved in arms manufacturing, from their investment portfolios. This has created a need for new versions of benchmark indices, from which those stocks have been removed to avoid an unfair comparison between the manager of a portfolio not able to buy those stocks, and an index that contains them. Custom indexing has proliferated as trustees and managers have placed more emphasis on ensuring that mandates and manager capabilities are as closely matched, and as accurately benchmarked, as possible.





6

Smart beta / strategy / alternative weight / factor indices

All investors make active decisions in their investment processes. Whether their decisions are about allocation across the various investment asset types, or about whether to buy particular stocks or funds within each asset class, everyone takes a direct role in setting their objectives.

Traditionally, the primary decision for an investor allocating to a particular asset class has been whether to practice active management or to follow a passive, index-based approach. Two developments have given rise to an alternative.

The rise of these indices

The first development is investors' increasing recognition that building a portfolio based on a market capitalisation-weighted index may not represent the most risk-efficient way to invest in a group of stocks. And that doing so represents an active decision to adopt the market consensus. In addition, the understanding that market consensus is driven not just by the nature of the companies issuing the stocks eg their cash flow, earnings history, management style, etc. but also by 'behavioural investing' factors – famously called 'animal spirits' by John Maynard Keynes in 1936, during the Great Depression⁷ – where investor psychology drives investment decisions, rather than more rational approaches.

So in a world where market sentiment impacts stock prices, capitalisation-weighted indices are increasingly no longer being seen as a neutral investment position. Investors are still expressing their views on the market, whether that is that small-cap stocks may outperform large-cap stocks, or that emerging markets may outperform developed markets. These views are reflected in stock prices and therefore in the market exposure the index provides. This was illustrated dramatically during the early 2000s, when the bursting of the tech bubble meant that an investment in virtually any alternative to a market cap index would have outperformed.

The second is the advent of the indices captured under the titles 'smart beta', 'strategy indices', 'alternative weight indices' or 'factor indices', amongst others. These capture market segments or drivers of risk and reward⁸ that have historically been available only via active management – indeed, many investment managers have built large and successful businesses by exploiting one or more of these targeted market exposures. The 'growth' factor, for example, is in the performance of companies that tend to reinvest earnings to achieve rapid growth, and the 'value' factor is the performance of companies that tend to return it to shareholders as dividends. Russell's introduction of size, growth and value indices in the 1980s represented an early recognition that indices can be more targeted than broad market exposure. They were the first smart beta indices, even if they weren't called that at the time. These and other indices are more targeted exposures to factors like size or style, or to risk characteristics such as volatility, momentum, or quality. These approaches aim to capture exposures that have been shown to add value over time as investment strategies, or as components of investment strategies⁹. Alternatively weighted indices may also provide biases to these same factors, such as value, but in a less precise or explicit manner. Finally, thematic indices will provide exposure to an investor's desired investment themes, such

as income, yield, or emerging markets, but may not require these characteristics to offer the potential to achieve a risk or reward premium.

Characteristics of smart beta indices

Smart beta indices are simple, systematic, and transparent in their construction and therefore retain some of the benefits of passive implementation. In addition the expanded 'toolkit' of investment strategies they represent is now also available to trustees and investors as they seek to most effectively and efficiently achieve their investment objectives.

Today, the investment industry is becoming more aware of the differences between factor exposures that can be manufactured more cheaply (through smart beta), and true sources of active returns (or 'alpha'). This has led to a host of alternative or strategy indices, which tend to fall in one of three broad categories: alternative weight, factor/ style exposures or thematic exposures. These indices address structural biases inherent in market cap-weighted indices. For example, the former are dominated by large companies. Rather than weighting by market cap, alternative weighted indices weight stocks on something else, such as company fundamentals like cash flows, sales or dividends. Recent innovations in fixed income indices, such as weighting index constituents by their home country's GDP rather than by the issuance amount, are similar in concept.

While increased choice and flexibility should be considered an advantage, investors are finding it increasingly difficult to navigate the wide variety of available indices. Investors can be overwhelmed by the range of methodologies, which vary significantly in terms of complexity, transparency, and practical considerations such as turnover, cost of implementation, tracking error, and concentration of the portfolio. In evaluating the appropriateness of any of these indices, investors should take a holistic approach and explore, for example, how well the index strategy suits their objectives, risk constraints and beliefs, and how well it complements or interacts with the allocations across the rest of the portfolio.



The evolution of smart beta indices

⁷ In 'The General Theory of Employment, Interest, and Money', Keynes wrote that perhaps most investing decisions are 'the result of animal spirits – a spontaneous urge to action rather than inaction, and not as the outcome of a weighted average of quantitative benefits multiplied by quantitative probabilities' – often paraphrased as 'markets are moved by animal spirits, not reason'.

⁸ Both the reward from an investment and the amount of risk that is entailed in that investment are relevant, and tightly linked, as shown in the calculation and close management of its 'risk / reward ratio'. If an investment can be created that should deliver the same reward as another, but with a lower risk of a significant loss in adverse market conditions, obviously that is preferable to the other investment. There is a market therefore for both indices that target increased rewards, but also for indices that target particular risks, or risk levels.

⁹ See Clare, Motson & Thomas 2013: 'An Evaluation of Alternative Equity Indices, Part 1.'

A more detailed analysis follows, to illustrate the active consideration investors and trustees must undertake for three types of indices.

(a)Fundamental indices

The Fundamental index approach pioneered by Arnott, Hsu and Moore¹⁰ is one of the earliest and best-known examples of alternatively weighted indices. Both FTSE and Russell have worked with Arnott's company, Research Affiliates, to create Fundamental indices. Some differences in methodology exist between these index series but both are built on the core principle of basing stock weights in the Fundamental index on a company's economic fundamentals, rather than on price or company market capitalisation. This departure from cap weighting effectively breaks the link between a stock's market price and its index weight and makes the performance of the index less subject to market sentiment. The indices select securities from an underlying index universe (such as the Russell 3000® or FTSE All-Share) and assigns weights to them on the basis of fundamental factors such as sales, cash flow, and dividends. These weights are then rebalanced regularly, returning each constituent's weight to that based on its appropriate fundamentals.

These indices are designed to deliver consistent exposure to stocks based on measures of company size determined by fundamental factors, which are generally more stable than market price. Using economic measures of size can provide a stable anchor in trading against market prices, particularly in extreme market circumstances. The effect of market bubbles, such as the Japan boom of the 1980s and the global technology boom of the late 1990s (where stocks' weights within indices dramatically increased during the bubble periods, then fell back dramatically when the bubbles burst) is reduced as companies whose market valuations are rising are regularly scaled back to appropriate levels, based on their fundamentals. This 'scaling back' generally produces indices with a dynamic value tilt and

will also result in sector exposures that differ from the benchmark index. Thus, these indices can deliver performance that varies over time relative to the benchmark and in different market environments.

(b)Defensive indices

Defensive indexing is an approach whereby constituents are selected for their combination of lower-than-average market volatility and lower-than-average risk. This is measured by quality measures such as high return on assets, low earnings variability and lower leverage. Defensive stocks have lower historical price volatility and exhibit high-quality characteristics. This approach provides opportunities for investors to achieve higher risk-adjusted returns via indices that represent better means of benchmarking the managers tasked with investing in stable companies. It has also been used as a basis for passive investing, giving concentrated exposure to relatively stable, higher-quality and lower-risk stocks, which may suffer smaller losses than their peers during market downturns.

(c) Thematic indices

A thematic index, usually an equity index, is one following a generally accepted investment theme, rather than a particular country, sector or similar segment. An example of a thematic exposure is an index comprised of companies listed in developed markets, such as the U.S., Europe and the UK, that derive significant revenue from emerging markets. This investment strategy would seek to gain exposure to growth in those regions without directly purchasing the financial securities issued by emerging markets companies or governments. For example, Boeing has large absolute revenues from emerging markets customers, and Eldorado Gold also derives a significant percentage of its total revenue from emerging markets. Indices comprising companies such as these can give investors



exposure to emerging markets returns while they are investing only in developed markets companies. This avoids the specific risks and higher trading costs associated with some emerging market investments. This approach can also be complementary to direct investment in emerging markets.

Incorporating these indices into a portfolio

The adoption of the strategies inherent in these indices also presents new challenges, as investors need to determine how to incorporate them within their portfolios. Trustees must still assess the cost/benefit trade-off of choosing an active or passive investment strategy, even in more targeted segments of the market. For example, if trustees take a view that a particular exposure (for example, low volatility or momentum) may be beneficial, an active manager may provide the best means of accessing that exposure as, assuming they can predict the market cycle sufficiently well, they can reduce the fund's exposure during the part of market cycles when that exposure may be overpriced or is likely to underperform, and vice versa. The ability of active managers to ensure new smart beta index tools are effective - ie deliver appropriate outcomes

to the investor – will depend on how they implement these tools within the overall portfolio structure. If used inappropriately these tools may represent a higher-cost investment solution than the one required, or may have represented a higher cost but significantly better performing or lower-risk solution than one actually employed.

Alternatively, it may make sense for investors to access some exposures passively, rather than incur the generally higher cost, delay and due diligence costs associated with hiring an active manager. This is particularly true for exposures where investors hold a view that a segment of the market, such as value or small cap, is likely to outperform over the long-term, as identifying active managers that will outperform over the longer term is difficult.

A multitude of products can be based on strategy indices: mutual funds, ETFs, separately managed accounts, swaps and structured products. These options give an investor a variety of style, region and risk exposures that go beyond market cap weighting. Such indices help investors gain more control as they tune their portfolios toward achievement of specific desired exposures and investment outcomes.



Using indices to measure performance

Assessing performance drivers over time

Indices can aid in the understanding of performance drivers within a portfolio, such as those based on size, country, or region, or more complicated drivers, such as companies' degree of financial leverage or dividend profile. To give a simple example, if an investment manager has over-weighted his exposure to smaller companies, comparison with an index will identify this overweighting. By comparing the companies' percentage weight in the index to their weight in the fund, the effect of their outperformance or underperformance on the fund's performance can be shown. It should be noted, however, that such analysis is valid only when extended over a reasonably long time period.

Most managers measure performance on a quarterly or even monthly basis to gain the most accurate record of performance achieved and its characteristics. These periods are however generally too short to obtain useful results: generally, at least three years' worth of data is required for determination of the extent to which performance differences result from skill, or from luck. For some strategy indices, in which performance is strongly tied to particular points in the market cycle, there may be a prolonged period of underperformance between periods of outperformance, and thus even longer periods might be needed for a truly telling analysis.

Assessing risk

Risk is normally measured as either absolute portfolio volatility, or volatility of returns against the benchmark index. A way of quantifying risk is by comparing a fund's returns to those of the index over several timeframes. This approach does not examine present risk – only that which existed in the past. It is often argued that past data can be helpful in forecasting risk exposure, given that analysts can base their calculations on sometimes-extensive historical information; the approach does carry an implicit assumption that previous conditions will hold true in some specified future period, when, of course, the future has never been readily predictable. Yet the information gained can at the least help trustees to better understand risk characteristics and to gauge whether a manager's particular style broadly supports their own investment goals.

Measuring performance can therefore be informative for asset allocation purposes. But to be truly effective, the index itself needs a transparent methodology.

8 How to select an index

Along with the growth of financial analysis since the 1960s, there has been growth in the number and sophistication of statistics to support index design.

As a statistical tool intended to measure stock market performance over time, an index can be used as an economic indicator, as a basis of investment products, or as a benchmark against which an investor can assess portfolio performance. The qualities and features that make an index a suitable basis for derivative and structured products are not always the same as those that make an index the best choice for benchmarking investment performance. A company that issues structured or derivative products, for instance, may design features that make an index easy to replicate and its constituents easy to trade, rather than focus on capturing an accurate representation of the market. For asset owners and trustees wanting to benchmark performance against the broader market, design features that help to capture a wide portion of the market are paramount.

Generally, for investors seeking appropriate indices, the following principles apply:

Methodology matters

As they are evaluating and selecting investment managers for client portfolios, financial professionals typically invest significant effort in due diligence. This includes an examination of a manager's philosophy, process, people, and performance – commonly known as 'the four P's'. Yet because indexbased strategies are now so familiar, sometimes their efforts to understand how an index is constructed are less rigorous. It is important for investors to realise that no two indices are exactly alike. Indices concentrated on the same market segment can have material differences in design, which may result in meaningful differences in market exposure and portfolio performance.

Most global index providers have come to agree on many of the principles underlying the selection of index constituents, and a degree of convergence has therefore taken place in methodology and construction. But differences among indices persist, with important implications for investors.

Performance measurement is a process whereby indices are used to measure and analyse the performance of an investment portfolio in comparison with a benchmark. Looking at the differences between the structure of a portfolio and an underlying benchmark, investors can identify factors that have resulted in performance disparity, and thus gain a better understanding of the relative performance of their investments as compared to their chosen benchmark. Breaking down the underlying benchmark index and looking at the emphasis placed on, and effectiveness of, the relative weightings and performance of different factors, such as company size, countries, regions, and industry sectors, and then comparing these elements with the portfolio, can help account for performance. Mathematical models can also provide an assessment of fund performance by use of statistical analyses of historical relationships between shares, and of the characteristics they have in common.

A full understanding of the results of such analyses, however, also requires a full understanding of the methodologies providers follow as they build and maintain their indices. But differences among indices are not well understood, perhaps due to the common belief that many are similar in their essentials. In reality, although the performance of different providers' global indices might be closely correlated, differences in methodology can have significant differences at the country and local sub-index level. Full discussion of this is beyond the scope of this guide, but a list of examples is given below.

Differences in index methodology between providers can lead to differences in:

- Percentage representation of individual countries.
- Size classification (large, mid, small cap) and whether classification is determined by country, by region, or globally.
- Classification of entire markets as developed, emerging, or frontier that can hinder investors' ability to allocate to specific assets on the basis of these classifications.
- The use of sampling, rather than including all eligible stocks from a given country or sector.
- Companies' country classification: by revenues, domicile, or location of listing.
- The use of committees to interpret rules or select index constituents.

• Key index construction criteria

Generally, the various index providers have relatively standard core index suites, covering global stocks and the different country, regional, and sector breakdowns for those stocks. These suites include the use of a suitably representative set of stocks to measure a market, segment, or strategy; the use of public data for the calculation of indices; the inclusion of only tradable, freely-floating¹¹ stock and the public provision of documents explaining the stock-selection process and the management of the index. But there are differences. Some use rules that allow for a broad approach to index management, whereas others use an entirely transparent and objective set of rules for constituent selection and index management.

Despite their similarities, very similar indices do, in many instances, differ subtly or sometimes significantly in their outcomes. All of these matters call for careful consideration of which particular index is to be deemed appropriate for which particular use.



(a)Portfolio fit

As to broad market benchmarks: it is important to know whether the individual market capweighted indices will provide the necessary building blocks for accurate asset allocation. For example, are large cap and small cap indices clearly defined, with no gaps between them, and no overlaps? This is important because the potential outcome for an investor using an index series with overlaps in coverage is unintended 'extra' exposure to a market segment. This can undermine the investor's intended asset allocation and produce a risk/

¹¹ 'Free float', which Russell introduced to indices in 1984, is the inclusion of only that proportion of a company's stock that is truly available for investment, rather than being tied up by company founders, in strategic holdings, etc.; it was broadly adopted between 1999 and 2004.

return profile that is inconsistent with the intended exposure.

(b)Representativeness

Investors should also consider whether an index's design provides for targeted exposure to the intended market segment. As part of this assessment, it is important to recognise the objective of the index – ie whether it is to measure a broad market or to provide exposure to a specific market segment or strategy. For a market benchmark such as a global small cap index, is the market segment accurately represented and complete? For a strategy index, such as a fundamental index or a low-volatility index, do the characteristics used to select and weight securities accurately target the intended exposure?

(c)Objectivity and transparency

To efficiently track an index, investors need to have clear insight into how that index is constructed. A key question is whether an objective, rules-based approach is used, or whether index constituents are determined by the subjective decisions of a committee. A subjective approach equates to a form of active management that is antithetical to an index's goal of offering transparent market exposures.

A methodology that is both objective and transparent makes an index more predictable and easier to replicate, while an index that is subjective and non-transparent is harder to track. Difficulty in tracking an index can result in an inability to provide consistent, accurate exposure to the targeted market segment. This added uncertainty can undermine deliberate asset allocation and lead to unexpected outcomes for investors.

(d)How is the index weighted?

How constituents are weighted affects an index's specific characteristics, turnover and potential tracking error. Traditional market cap-weighted indices are considered to represent the 'market' for a given asset class, as they include the full investment opportunity set within each asset class. They also tend to have low turnover, and therefore low management costs. They do not require rebalancing other than when new constituents are added or existing constituents drop out at the time of index reconstitution, or due to corporate events, takeovers and mergers.

	WEIGHTING	REBALANCING	TURNOVER
MARKET CAP	Index constituents are weighted by size as determined by price times number of shares outstanding	Regular rebalancing not required. Annual reconstitu- tion helps an index continue to accurately represent the full opportunity set because companies can move from one index to another	Generally relatively low turnover
EQUAL WEIGHT	Constituents, sectors or some combination have an equal weight in the index	Regular rebalancing required to maintain equal weighting	Trade-off is potentially higher turnover
FUNDAMENTAL	Constituents weighted by fundamental characteristics such as revenues or dividends	Regular rebalancing required	Trade-off is potentially higher turnover
FACTOR	Constituents are weighted by exposure to a specific factor such as low volatility	Regular rebalancing required	Trade-off is potentially higher turnover

WEIGHTING METHODOLOGIES

Other index weighting methodologies have been introduced (mainly in alternative beta strategy indices) to help investors avoid some of the price-driven biases of market cap-weighted indices or to focus on specific risk factors. These approaches include equal weighting, in which constituents, sectors, or a combination of the two have an equal weight in the index; fundamental weighting, where constituents are weighted on the basis of various fundamental characteristics, such as revenues or dividends; and factor weighting, where constituents are weighted by their exposure to a specific factor, such as low volatility.

Indices wherein the approach is other than market cap weighting offer the potential to outperform market cap-weighted indices. However, there are trade-offs to consider. These indices tend to have higher turnover than market cap-weighted indices, as they require regular rebalancing to maintain their targeted exposures. They also tend to have moderate to high tracking error relative to market cap-weighted indices, which is to be expected, since they have different constituent weights and might not include all of the broader index's constituents.

Regardless of which weighting approach is chosen, an investor needs to understand the methodology to ensure that emphasis is on the intended characteristics and exposures.

(e) Maintenance: rebalancing

It is important that index constituents are reviewed regularly to ensure that they reflect the evolution of dynamic markets. Ideally, rebalancing would occur daily, but the trading costs of doing so would be unmanageable. Regularity of the reviews depends on the uses for which the indices are intended. Broad market benchmarks, for example, don't require regular rebalancing, although of course they still require maintenance. Annual reconstitution of these indices, perhaps with regular checks for possible inclusion of initial public offerings (IPOs) and for changes resulting from monthly share rebalances, provides for accurate, comprehensive representation without unnecessary turnover.

Smart beta/strategy indices, and indices designed for derivatives trading, are often rebalanced quarterly (or even monthly) to maintain their exposures to specific targeted market characteristics. Investors need to be aware of the potential turnover within each index and the associated cost, as well as the impact of any index design choices that may have been made to help to limit turnover and hence cost, mostly likely at the cost of more accurate replication.

CORPORATE ACTIONS

MERGERS AND ACQUISITIONS (M&A)	A merger is the combination of two companies to form a new company. An acquisition involves an acquiring company purchasing a target company without forming a new company.
INITIAL PUBLIC OFFERINGS (IPOS)	The initial sale of a company's stock to public shareholders.
SHARES OUTSTANDING	Changes can occur from stock buybacks, secondary offerings, merger activity etc.
SPIN-OFFS	A new entity resulting from the spinning off of assets and equity from a parent company.

The more investors and fund managers know about how corporate actions among index constituents will be handled, the better, given that corporate actions can materially impact an index's representativeness and resultant performance. In principle, indices attempt to replicate the corporate actions approach that needs to be taken by a fund comprising the index's constituents. It is therefore crucial that indices have objective processes for the handling of corporate actions such as mergers and acquisitions, share adjustments and IPOs. Indices that maintain set schedules for these actions offer more predictability and certainty for investors. This transparency greatly bolsters an index's reliability.

9

What else do investors need to consider before using an index?

Factors other than those discussed in the previous section may influence the decision as to which type of index to select and how to use it. Some of these are described in the table below.

Liquidity	Are constituents of the index readily available to investors and can they be easily bought and sold? When constituents are less liquid or unavailable for purchase, index replication is made more difficult; the potential for increased tracking error and failure to deliver consistent exposure to an intended asset class is heightened.	
Operational capability	Is the index provider well established and are its products widely used? Does the provider have proven operational capability and broad client services support?	
Data availability	Is index data published and widely accessible on major financial information platforms such as Bloomberg, FactSet, Morningstar, Axioma and Barra?	
Free float	'Free float' is a technical amendment to each company's weight. It reflects the availability of stocks for public investment in the market, by excluding stocks held by governments, other companies and other strategic investors (such as company founders). For example: if 75% of a company's shares are held privately, only 25% of its shares will be included in the index. This ensures a better balance between demand for shares and their availability in the market than would be achieved with the inclusion of all of the company's shares.	





Indices exist for asset classes other than equities, although equities are most familiar to investors. Investors' search for greater diversification and better asset and liability matching has prompted the growth of non-equity indices, some of which are outlined below.

(a) Fixed income products

There has been a shift in preference from bonds and towards equities for much of the past 30 years, due to the perception that the latter asset class delivers higher returns. Despite this, the size of the global bond market remains significantly larger, reported as \$85 trillion in June 2013¹², as opposed to that of the global equity market, which stood at \$54.57 trillion at the end of 2013^{13} . The perceived simplicity and (at least historically) greater security associated with returns on fixed income, or bonds, has, however, brought these products somewhat back into fashion, particularly as pension funds seek to ensure that they can meet their obligations to plan participants.

Unsurprisingly, bond indices exist to cover the various segments of that market, primarily sovereign bonds, corporate bonds, municipal bonds (primarily a US phenomenon) and mortgage-backed securities. In their basic design, bond indices are similar to equity indices, but some nuances are problematic for investors. Special attention has to be paid to receipt of income so that the index will stay aligned with the aim of investors and successfully avoid incoherent total return calculations. As the term outstanding for each constituent of a bond index reduces over time, various bond index characteristics also change, which brings challenges for fund managers. The rise in issuance of index-linked bonds has reduced this issue somewhat, as such bonds are much closer aligned with pension fund liabilities.

It is important for investors in bonds to recognise that the yield of the bond is an important component of the bond return over time, and that historically, over medium to long periods (of ten or twenty years, for example), bonds generally underperform equities¹⁴, as the higher volatility (risk) of investing in equities has to be compensated by higher returns. They have however been a historically more stable investment, so the aim of investing in these products is often to limit their downside as much as possible, by looking at the likelihood of an issuing agency's default (failure to repay). Calculation of yield to maturity helps investors understand how much money they are likely to receive over the investment horizon. This includes capital appreciation

¹² Figure from the Bank for International Settlements

¹³ Figure from the World Federation of Exchanges.

¹⁴ In fact, the financial crisis of 2008 provided a recent occasion when the reverse was briefly true - over both ten and twenty years to 2008 bonds outperformed. (Source: Bloomberg)



or depreciation to maturity and the coupon or interest rate payable on the bond in this process gives a more accurate insight into the amount an investor will (likely) ultimately receive. Different taxes can be levied on bonds' income or capital growth, a fact that has prompted the creation of indices that better reflect those specific differences.

In the last few years it has become widely recognised that the traditional construction method for bond indices, which selects and weights bonds according to the sum issued, exposes investors to the most indebted countries or companies – an issue often called 'the bums problem'. Although new indices have been introduced that weight bonds according to GDP (in the case of sovereign debt), credit rating, liquidity and so on (in the case of both sovereign and corporate bonds), bond indices however still do not have anything like the same level of usage as within the equity world, either for performance measurement or replication products. Some managers will however, after deciding on an appropriate benchmark, create their own index comprising a mix of various bond indices, from which they will select a subset of constituents.

Innovation and development in bond index design is likely to be rapid over the next few years.

(b)Real estate

Real estate is a popular asset class among institutional investors, although it is less liquid than fixed income and equities products. Property lacks price transparency, as each asset, or building, is unique and therefore valuations tend to be drawn from recent transactions and the views of market experts. Algorithms are sometimes used to estimate property values with reference to similar properties sold most recently.

The unique features of this asset class make it difficult to compile direct property investment indices that can remain accurate. There are two types of property indices: tradable and portfolio. For tradable indices, valuations are carried out on either monthly or quarterly schedules, on the basis of the (likely) limited numbers and types of properties.

There are three main ways for investors to gain exposure to real estate properties: by buying directly; by buying property company shares or property derivatives; or by buying into real estate investment trusts (REITs). The advantage of shares and REITs is that, like equities, they offer daily visible valuations. But since they are similar to equities, they are also subject to market volatility. To help potential investors decide whether direct or indirect property exposure is best for them, indices designed to assess the performance and risk features of each approach, and to determine best fit with investor objectives, are available. Real estate derivatives, a fairly new phenomenon, behave similarly to equity index derivatives.

(c) Commodities

As with real estate, commodity investments are tied to physical assets. But developing more reliable indices for this asset class is easier, due to greater price transparency – thanks to the frequent trading of commodities that takes place in both the spot (current) price and futures markets. Those prices create a means for index pricing. How to weight commodities within an index is a subject of some debate, since there is no known total value of the assets; this leads to differently-constructed indices with differences in performance outcomes.

Commodities exposure can also be gained indirectly, for example through the purchase of shares in mining companies or a mining companies index.

(d)Hedge funds

Hedge funds are a large, nebulous group of actively-managed investment funds that at least originally had the objective of achieving 'absolute returns', in other words to have a positive performance in every year, rather than to simply outperform the market. Investing in hedge funds is generally more complex than for other investment funds; despite the fact that hedge funds are priced frequently, valuations and their calculations are less transparent than those for some other assets, making the decision to invest more difficult. Trading also tends to be more complex, and the investment approach taken by hedge funds is prone to variation due to changes in market trends, which creates a risk that the original objectives might get lost. Since many hedge funds are 'closed' to receiving new investment monies, and therefore much less liquid than other types of funds, development of indices that represent meaningful performance benchmarks for this asset class is a complicated process.

(e)Private equity

In this investment approach, an investor takes a direct stake in a company that is not listed on a public exchange. Private equity funds therefore suffer from the same illiquidity as hedge funds. Given that the life cycles of these funds tend to vary, the extent to which an index can represent an entire universe of different funds' performances is limited; performance is not known until a fund ends. One approach is to build and refer to an index consisting of publicly-traded private equity companies. Only a handful of these companies are publicly-traded, however; thus, they are not representative of the entire market. Their performance characteristics can also be skewed by the behaviour of other equities, whose performance they will follow to some extent.

(f) Infrastructure

Lack of liquidity and insufficient transparency in valuations are problems that plague infrastructure investment, much as is the case with private equity and hedge funds. There are both direct and indirect ways of approaching infrastructure – by investing either in infrastructure development projects or in infrastructure sector equities, such as utilities or construction companies. Infrastructure investment is designed to deliver long-term returns, and therefore performance cannot be measured at such regular intervals as can be done in many other asset classes, leading to indices' being calculated only infrequently. They are therefore difficult to analyse.

11 Summary

Indices have developed significantly over a relatively short timeframe and there seems to be no likely slowdown in their proliferation in the near future.

What began as basic measures of broad market performance against which actively-managed investments might be measured have evolved to become series of far more complex and sophisticated reference points designed for a multitude of purposes and outcomes. Both the original market capitalisation-weighted indices and new strategy indices can offer detailed means of measuring and analysing investment performance past, present and future, as well as often representing the building blocks for the creation of index-tracking investment products. Indices themselves reflect the remarkable range of options available to investors seeking different exposures and approaches to risk management. As indices continue to develop, it is incumbent upon index providers to ensure that they present their products, objectives, and methodologies transparently, consistently, and reliably, and that they maintain them well.

ust as important: in their use of indices, investors must understand as fully as possible what it is they are choosing, and exactly how they intend to use it.



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The National Association of Pension Funds Limited © Cheapside House 138 Cheapside London EC2V 6AE

T: 020 7601 1700 F: 020 7601 1799 E: napf@napf.co.uk

www.napf.co.uk

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