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FINANCIAL MARKET INDICES: FACILITATING INNOVATION, MONITORING MARKETS

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EXECUTIVE SUMMARY

While the advent of the modern stock market index is usually traced to the creation of the Dow Jones Industrial Average in 1896, it was the pioneering asset pricing work some 60 years later of Harry Markowitz[1] who introduced Modern Portfolio Theory in the 1950's and William Sharpe[2] who developed the Capital Asset Pricing Model in the 1960's which formed the intellectual basis for 'investing in market indices'. Their analysis advocated two-fund separation whereby investors should only consider risk-free investing together with the (efficient) market portfolio; attitudes to risk determined the desired percentages in each category. Subsequently Burton Malkiel[3] and Charles Ellis[4] each wrote forcefully about the case for investing in accordance with financial market indices as an alternative to chasing superior returns by trying to pick the winning funds of active fund managers.

This intellectual firepower led to an investment revolution which offered a new way of investing for both institutional and retail investors. The first institutional index funds were created in 1973, closely followed in 1976 by the first index mutual fund. These important developments were complimented in 1989 with the creation of the first Exchange Traded Fund (ETF). ETFs offer a particularly convenient way to invest in financial market indices. This led to the first US ETF in 1993, and the first one in Europe in 2003. Meanwhile 2002 saw the creation of the first index-based ETF investing in bonds. ETFs based upon financial market indices has allowed investors to access many asset classes and markets that traditionally were only accessible to institutional investors. Additionally, many of these markets, such as, fixed income, currencies, and commodities have given investors the convenience of exchange liquidity, regulation, and transparency to asset classes traditionally only available via over-the-counter markets that are inaccessible for most retail investors.

Another particular benefit to investors of such financial market indices has been the linkage with financial derivative contracts. The broad-based nature of financial market indices has been the main reason why investors have been able to harness derivative products such as futures and options to: manage financial risks efficiently; lower transactions costs; and to achieve better risk-adjusted returns.

All of these important financial market developments and innovations, along with others, required the existence of financial market indices produced by benchmark administrators that were (and are) independent from the investment process itself.

In this brief paper we explain how and why investors use financial market indices and, in so doing, tell the story of this investment revolution. In particular we explain how, via the products created by asset managers, investors benefit from the very competitive index industry which produces a wide range of indices for asset classes with different compositions. The very wide array of competing indices produced by independent benchmark administrators gives investors the opportunity to choose the index that suits them. Anything that might reduce the competition between benchmark administrators would be at the expense of investor choice.

[1] Markowitz, H.M. (March 1952). "Portfolio Selection". *The Journal of Finance* **7** (1): 77–91
[2] Sharpe, William F. (1964). "Capital Asset Prices – A Theory of Market Equilibrium Under Conditions of Risk". *Journal of Finance* **XIX** (3): 425–42; and William F. Sharpe, Portfolio Theory and Capital Markets, McGraw Hill, 1970.
[3] B. G. Malkiel, A Random Walk Down Wall Street, W.W. Norton, New York, 2012 (first published in 1973).
[4] C.D. Ellis, The Loser's Game, *The Financial Analysts Journal*, Vol. 31, No. 4, July/August 1975, 19-26. New York.

1. INTRODUCTION

In May 2014 the investment consultant, Hymans Robertson, published a report on the structure of the UK's £178bn Local Government Pension Scheme (LGPS). This scheme provides the financial backing for the pensions of 4.6 million UK local government employees[5]. One of the main conclusions of the report was that this very important scheme could achieve savings of £420m per year by transferring the management of their bond and equity investments from active fund managers to funds that track financial market indices. This potential cost saving has two, related sources. The first being the higher fund management fees that active fund managers charge relative to those charged by fund managers that offer index tracking, or passive investment products. And the second being the higher transactions costs associated with active fund management, relative to index tracking: these transactions costs are paid for directly by investors in the form of lower investment returns.

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Over the last twenty to thirty years many institutional investors across Europe and the rest of the world have taken advantage of the lower fees associated with index-tracking funds – achieving the sorts of cost savings highlighted by Hymans Robertson in its report. But this lower cost fund management option is not only available to large institutional investors. Index tracking funds are also available to retail investors across Europe and the cost saving, relative to the active fund management option, is similar. For example, one fund manager recently launched a UK equities index tracking fund with an annual management charge of 0.07%pa, this compares with typical active annual fund management charges in the UK of around 1.3%pa.

The potential cost savings from investing in a fund that tracks an index is perhaps the most obvious benefit to investors of financial market indices. But these indices are not just essential for passive investment products. Many investors prefer to invest in actively managed funds and are willing to pay the higher fees because they believe that the skill of their chosen fund manager will produce returns that more than compensate for these higher fees. Financial market indices are used extensively by both active fund managers as an aid to the management process and also by their investors who use the indices to monitor the performance of their chosen active manager.

The existence of financial market indices has led to some important and revolutionary developments in financial markets over the years

But as well as being essential components for both active and passive fund managers and their investors, financial market indices are also an essential part of the financial market landscape. The existence of financial market indices has led to some important and revolutionary developments in financial markets over the years, including recent developments such as the establishment of a thriving Exchange Traded Fund (ETF) industry and the development of innovative, 'factor' or 'smart beta' indices.

In this paper we will explain what financial market indices are, how they are constructed, how they are used, the characteristics that make a good index and their role in financial market innovation.

[5] http://www.lgps.org.uk/lge/core/page.do?pageId=97977

2. WHAT IS A FINANCIAL MARKET INDEX?

The financial markets are made up of millions of individual stocks, bonds, derivatives, other financial securities and currencies. Financial market participants also trade many different kinds of commodities. Financial market indices aggregate vast amounts of price and other information about subsets of financial markets which, amongst other things, help investors keep track of broad market developments.

Financial market indices aggregate vast amounts of price and other information about subsets of financial markets

More specifically, financial market indices represent a way of measuring the performance of a particular segment of a financial market. The names of some of these stock market indices will be fairly familiar to the general public. For example, one of the best known indices in the world is the S&P 500 Index, which was introduced in 1957, and which represents the U.S. market since it is comprised of 500 large capitalisation US stocks. Another well-known equity index is the FTSE-100 index which comprises the 100 largest stocks listed on the London Stock Exchange. In the Eurozone one of the best known stock indices is the Euro Stoxx 50, which comprises 50 of the largest publicly traded companies in the Eurozone; while the MSCI World Index is comprised of stocks listed in 23 developed economy equity markets. But benchmark administrators also produce indices based on other asset classes. For example, the Barclays Global Aggregate index is comprised of investment grade bonds issued in 24 currencies by governments, government agencies and corporations as well as securitised bonds from both developed and emerging economies. The performance of these indices, and many others, is monitored closely by investors, central banks and other regulators, and by the mainstream media.

One of the most important decisions that an benchmark administrator has to make in creating an index, relates to the weights it chooses to apply to the individual components of the index. This is true whether they are constructing equity, bond, or commodity indices. It is probably true to say that the majority of the most popular equity and bond indices produced by benchmark administrators today weight the constituents according to market capitalisation. This means that the largest stock is assigned the largest weight in the index. For example, the last review of the Euro Stoxx 50 revealed that the company with the largest weight in this index was the French energy company, Total, which had a weight of 5.91% owing to its market capitalisation of just over €113bn[6]. While the largest constituent of the MSCI World Index is the tech company, Apple, which at the time of writing had a market capitalisation of just over $596bn, accounting for around 1.8% of this index[7].

The majority of the most popular equity and bond indices produced by benchmark administrators today weight the constituents according to market capitalisation

There are a number of reasons why this is the dominant approach to weighting constituents within an index. Indices based upon market capitalisation-determined weights represent an investable opportunity set; essentially a market capitalisation-weighted index represents a 'slice of the market'. These indices also give the greatest weight to the highest capitalisation stocks which are generally the most liquid, which in turn means that funds that either replicate these indices, or that are based upon them, incur lower transactions costs for their investors.

[6] http://www.stoxx.com/download/indices/factsheets/sx5e_fs.pdf

[7] http://www.msci.com/resources/factsheets/index_fact_sheet/msci-world-index.pdf

Generally speaking, benchmark administrators produce indices that will appeal to potential users, just as any company will produce products or services that are demanded by consumers. Benchmark administrators will normally consult potential users of any index extensively before its launch. It is to the users of financial indices that we now turn.

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3. WHO USES FINANCIAL MARKET INDICES AND HOW/WHY?

We have already alluded to some of the uses of financial market indices. In this section of the paper we expand on how and why these indices are used.

3.1 *BENCHMARKING AND ACTIVE FUND MANAGEMENT*

The fund management industry is responsible for managing the savings of millions of investors worldwide. Globally, almost $29trn was held in mutual funds in September 2013. $14.3trn was held in US mutual funds; $9.0trn in European mutual funds; $3.3trn in Asia-Pacific mutual funds; and $2.3trn in the rest of the world[8]. Moreover, globally, assets in mutual funds have increased by over 700% since 1993. Given the size of the investment industry and the millions of ordinary citizens across the world that have entrusted their savings to it, it is vitally important that there exists a way of evaluating the performance of a fund manager.

To assess the performance of a fund manager investors and their advisors make extensive use of financial market indices. These indices act as benchmarks; a way of measuring how the manager has performed relative to a relevant financial market index comprising the sorts of securities that the manager intends to hold and manage in their portfolio. For example, it might be appropriate to benchmark the performance of a manager of blue chip European stocks against the Euro Stoxx 50, since this index is comprised of blue chip European stocks. However, it would be inappropriate to benchmark a manager of Japanese small stocks against the same index.

… benchmark administrators produce indices based upon a wide range of asset classes, such as stocks, bonds, currencies, commodities, real estate, alternative investments, and derivatives

The good news is that the world's benchmark administrators produce literally millions of indices. As already noted, benchmark administrators produce indices based upon a wide range of asset classes, such as stocks, bonds, currencies, commodities, real estate, alternative investments, and derivatives. Indices are also produced to represent different regions of the world, for example, the Eurozone, and within particular countries. Indices are also constructed according to both broad industrial sectors, for example the Energy sector, but also on sub-sectors of the main sectors, for example, the Oil Exploration sector, which is a sub-sector of the larger Energy sector. Finally, indices are also constructed by grouping securities according to specific security characteristics. For example, stock indices can be categorised according to the market capitalisation of the constituents – "small", "medium", "large" – while bond indices can be sub-divided according to the maturity or credit rating of the bonds.

[8] Source: ICI Global, Research Perspective, March 2014, Vol.1, No.1. (http://www.ici.org/pdf/icig_per01-01.pdf).

The wide range of indices, including all of the sub-indices, means that virtually every conceivable investment strategy can be assigned to an appropriate financial market benchmark

The wide range of indices, including all of the sub-indices, means that virtually every conceivable investment strategy can be assigned to an appropriate financial market benchmark. For example, if a manager is managing a fund comprising 'small cap, Japanese IT stocks', one or more of the world's benchmark administrators will have produced an index appropriate for benchmarking this fund. Equally there will be a financial market index available to benchmark the performance of a fixed income fund focusing on those bonds issued in sterling with a credit rating greater than 'A', and with maturities greater than five years. The manager will usually choose the benchmark produced by the benchmark administrator whose parameters best fits their fund's objectives.

Once an appropriate, independent benchmark has been identified, it is then possible to monitor the performance of the fund against this benchmark. Indeed, fund management companies will often advertise the financial market index that they use to monitor the performance of their fund. This information is very useful for investors since it gives them an idea of the likely risk characteristics of the fund.

As well as specifying their chosen benchmark, managers of 'active' funds will normally specify the amount of additional return they expect to achieve, over and above the return produced by the benchmark index. For example, a manager of blue chip European equities may specify that their benchmark index is the Euro Stoxx 50 index and that they are aiming to manage their fund in such a way that it produces a return that will be, say, 1.0% per annum higher than that produced by the benchmark.

The benchmark index helps the active fund manager in their management of their portfolio. To achieve the additional return the manager normally takes 'active bets' on sectors, and individual stocks relative to their weight in the index. By assuming positions in stocks, or bonds that are different to their weight within an index, or that are not represented at all within an index, the active manager seeks to produce a return that is superior to that produced by the index. These active bets are often referred to as 'off-benchmark bets'. The extent to which the active manager's portfolio differs from any index to which they are benchmarked is known as the manager's 'active risk'. By comparing the performance, for example, of a UK equity fund manager with the performance of an appropriate UK equity index, the fund manager's clients can gain an idea of how well the fund manager is performing relative to the market in general. So the benchmarks, that is, the financial market indices, produced by benchmark administrators form the basis of all performance measurement.

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But financial market indices can be used to delve further into the DNA of the fund manager's performance. By using appropriate financial market indices the fund manager's performance can be decomposed to reveal where the performance did or did not come from. Depending upon the nature of the fund, the performance itself might come from:

- Asset allocation (e.g. stocks, bonds, cash, commodities),
- Sector selection, (e.g. oil, consumer goods, etc.),
- Specific security selection,
- Geographic exposure (U.K., Emerging Asia, etc.), or
- Currency exposure (Euro, US Dollar, Sterling, etc.).

The performance of a bond fund might, in addition, be broken down, amongst other things, into decisions regarding maturity, duration, type of instrument (e.g. sovereign debt, mortgage securities, corporate bonds), and credit rating.

Knowing the source of a fund manager's performance is useful information for the clients of the fund and for the investment management company too. For example, if a fund manager is good at stock selection, but less proficient with sector selection, another fund manager may be asked to advise on the sector selection aspect of the portfolio, allowing the original fund manager to concentrate on stock selection. However, crucial for identifying the sources of an active fund manager's return are independent financial market indices. Often using hundreds of financial market indices, modern performance attribution software can allow fund management companies to drill down into the detail of a fund to reveal all of this performance information.

Financial market indices are therefore not only vital for investors seeking to determine whether the performance of an active fund manager justifies the fees paid, they are also vital for understanding the nature of the returns generated by the fund managers. Imagine the negative impact on investors that might result in a world without financial market indices. In this world investors would be able to benefit from an independent assessment of the performance of their investments. As a consequence, they would probably have to pay higher investment management fees. It is clear then that benchmarks create an eco-system that benefits all.

3.2 *INDEX TRACKING – PASSIVE FUND MANAGEMENT*

Active fund managers that 'index hug', run portfolios that look very similar to the index against which their performance is judged, but charge the higher fees associated with actively managed funds. The main argument for truly active fund management then is that active managers have the skills necessary to 'beat the market'. But the sum of all fund managers managing a particular asset class pretty much is the market; they cannot all outperform it. Similarly every fund manager cannot beat every other fund manager. On average then we might expect half of active fund managers to 'beat' the market and half to 'lose' to it. Looked at like this then the active fund management is a zero sum game ... before fees. After fees it must, by definition, be a negative sum game for investors. After fees we should expect more than half of all active fund managers to under-perform the market. [9]

Active fund management is a zero sum game ... before fees. After fees it must, by definition, be a negative sum game for investors

For those investors who believe in the EMH, or who do not believe in the abilities of active fund managers, or who do not wish to pay the fees, or all three, the existence of independently produced financial market indices offers an alternative, referred to as 'passive investing' or 'index tracking'

Academic support for passive fund management can be found within Burton Malkiel's popular book - *A Random Walk Down Wall Street*. In this book Malkiel explores the logical and practical consequences of Eugene Fama's pioneering work in the early 1970s on the Efficient Market Hypothesis (EMH)[10]. Essentially if financial markets are efficient then there in no way of 'beating the market' on a consistent basis and therefore that all the efforts of active

[9] For more information on these issues we refer readers to the following useful website: www.us.spindices.com/resource-center/thought-leadership/spiva.

[10] Fama, Eugene (1970). "Efficient Capital Markets: A Review of Theory and Empirical Work". Journal of Finance 25 (2): 383–417.

fund managers are in vain. More recent work by Fama and others has revealed that when an active manager has outperformed the market over some time horizon, that most of the time this 'outperformance' is due to luck and not to skill[11].

For those investors who believe in the EMH, or who do not believe in the abilities of active fund managers, or who do not wish to pay the fees, or all three, the existence of independently produced financial market indices offers an alternative, referred to as 'passive investing' or 'index tracking'. Passive, or index tracking funds effectively mimic the constituent holdings in a chosen index. If the index tracking manager is efficient at tracking the index, then the investor can expect the performance of their fund to mimic the performance of the index, before passive fees.

Index tracking funds have a number of key benefits compared to actively managed funds as a way of gaining exposure to markets. Arguably principal among these is that they minimise the risk of under-performing any chosen index, assuming that the fund's management costs and fees are low and that the tracking methodology employed results in minimal tracking error. Second, transactions costs are relatively low because they normally do not need to transact as frequently as an active fund manager. They generally only need to transact when:

- The fund receives new money from investors;
- Investors wish to redeem their holding;
- When dividends from the underlying constituents are reinvested; and
- As the composition of the index being tracked changes, as many do quarterly.

Costs are also kept low because index tracking fund managers do not need to pay for the research provided by investment banks in the form of high transactions costs. The large passive managers, in particular, can negotiate these transactions costs down with investment banks well below the levels typically charged to active fund managers. Finally, costs are also low because they do not have to search for and hire very expensive, active fund managers.

Because the cost of doing business for passive fund managers is lower than for active fund managers, these lower costs can be passed on to passive investors in the form of lower fund management charges.

Because the cost of doing business for passive fund managers is lower than for active fund managers, these lower costs can be passed on to passive investors in the form of lower fund management charges. The fees associated with index tracking investment funds can be substantially lower than active equivalents benchmarked against the same index. This is true whether the fund is tracking: small, medium or large cap indices; bond indices; commodities indices; currency indices, etc. As an example, our analysis of the UK's fund management industry using the Morningstar database identified 21 unique, passive funds that tracked the FTSE-A All Share index, the average annual management fee of these funds is just under 0.50%pa. Using the same database we then identified the annual management fee of all those active funds in the UK All Companies Sector benchmarked against this index; the average annual fee of these funds is just under 1.30%, the modal average annual fee is 1.50%pa.

[11] Fama, Eugene and Kenneth French (2010), "Luck versus skill in the cross-section of mutual fund returns". Journal of Finance 65 (5): 1915-1947.

The investor in a passive fund does not buy the index on which the fund is based – they invest in, or buy the fund. On behalf of their investors the fund manager chooses and buys individual securities – the investor invests in the securities chosen by the manager

However, it is important to recognise the distinction between an index and the product that an investor buys. For example, the investor in a passive fund does not buy the index on which the fund is based – they invest in, or buy the fund. On behalf of their investors the fund manager chooses and buys individual securities – the investor invests in the securities chosen by the manager. This means that as far as the investor is concerned, it is not the constituents of the index that matter, but the constituents of the fund or product. Indeed, given that an active manager has many choices in constructing their portfolio and that a passive fund manager may not wish to replicate an index precisely, it may not be very helpful for investors to know the index constituents anyway[12].

3.3 *MONITORING OF MARKETS*

Financial market indices play a crucial role in the fund management industry, for investments that are managed both actively and passively. However, they play a further, crucial role in financial markets. Because financial market indices are often based upon very large numbers of securities, they can be seen as a barometer for both the related financial market and the wider economy. For example, the performance of both equity and government bond indices are often seen as good proxies for underlying economic conditions, or at least sentiment about economic conditions.

Nearly all central banks analyse the performance of broad financial market indices in their regular assessments of the health of their respective economies. For example, chapter 2 of the ECB's Monthly Bulletin, and Chapter 1 of the Bank of England's quarterly Inflation Report both present analysis of financial market conditions using financial market indices. Most other central banks, including the US's Federal Reserve, also make extensive use of financial market indices in their regular assessments of their economies as an integral part of their interest rate setting process.

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Other financial market participants also make extensive use of financial market indices. Strategists and investment consultants will use the indices in much the same way as central banks, but as a way of trying to understand the likely prospects of one market relative to another. The information they glean from these indices is then used to enrich strategic positions in funds or, in the case of investment consultants like Aon Consultants and Towers Watson, to help their pension and insurance clients make better-informed investment decisions for their scheme members and policy holders.

Finally, the widespread availability of financial market indices covering virtually all asset classes and sectors, means that the media can also write better-informed articles on financial market developments; thus bringing these developments to the attention of the wider public.

3.4 *SUMMARY*

Financial market indices play a crucial role for both retail and institutional investors, whether they choose funds that are managed on an active or on a passive basis. Either way, it is important to

[12] See Appendix for a brief explanation of the three main indexing techniques that fund managers use.

remember that investors *do not* 'invest in an index'; instead they invest in investment products, usually provided by fund managers, that may be based upon a financial market index.

As well as being essential for both the active and index tracking fund management fraternities, financial market indices also provide a vital way of condensing the huge amounts of information embedded in the prices of hundreds of thousands of stocks, bonds and commodities making it accessible to investment strategists and consultants, but also for other parties such as government and, via the media, the wider public. They essentially provide an important set of barometers of the health of financial markets and, ultimately, the real economy.

4. WHAT DO INVESTORS WANT FROM AN INDEX?

Financial market indices are in widespread use throughout the finance industry; in this section of the paper we focus on the key attributes that index users require from an index.

4.1 *THE DESIRABLE CHARACTERISTICS OF A FINANCIAL MARKET INDEX*

There are a number of criteria that go in to making an index that fund managers, institutional investors, regulators and the media will trust and therefore use.

- *Transparency.* The rules governing the construction of an index, for example, those rules relating to the weighting of individual index constituents and the method used to calculate index returns, should be clear and unambiguous. This clarity should also extend to the process used for additions to and withdrawals from the index. To this end, all responsible benchmark administrators make the index methodology for their indices accessible to clients on their websites.

- *Data integrity*. A reputable benchmark administrator has to identify a reliable source from a reputable administrator for the data needed for index construction. In many cases the data used by benchmark administrators is sourced from highly regulated securities or commodities exchanges, such as the London Stock Exchange. In other cases, benchmark administrators source the data they require from regulated market participants, notably banks, based upon the most recent traded prices for the securities (for example stocks, commodities, etc) bonds that comprise the index. To facilitate the transformation of raw data into an index, benchmark administrators will establish robust procedures to ensure, as far as possible, the integrity of the data inputs and therefore the quality of the index.

- *Independence.* We have used the word “independence” frequently in this paper so far, without explaining why it is important. Essentially independence between the benchmark administrator and index product providers has proven important in practice in reducing any potential conflicts of interest and has served the industry well. Furthermore, the collation of the prices that go in to the index construction should be (and are) independent of the construction process itself, giving another degree of independence. It is also important for investors to know that the performance of their investments can be measured against benchmarks that have been produced by benchmark administrators who are independent from those charged with the responsibility of managing their investments.

These are three key attributes of an index that would be acceptable to both investors and fund managers. However, some financial market benchmarks do not embody these attributes. We will now describe some which do not.

4.2 *PEER GROUP BENCHMARKS*

It is common practice in some parts of the finance industry to benchmark fund managers, not against independently calculated financial market indices, but instead against the performance of managers of similar funds. This practice is known as 'peer group benchmarking' and is most prevalent in retail fund management. This is because retail investors often wish to know, for example, how the performance of the manager of US equities that they have chosen has performed relative to other managers that they could have chosen.

In many cases the fund managers subjected to this peer group assessment will benchmark their own funds against a financial market index, but if their remit is to be, for example, in the top quartile of performers within their peer group they may try to 'second guess' the positioning of their competition.

4.3 *OTHER TYPES OF FINANCIAL BENCHMARKS*

Arguably the index that has received most attention in the media recently is the LIBOR benchmark. The London Interbank Offered Rate (LIBOR) is a measure of the average rate at which banks are willing to lend money to other banks over a pre-specified timeframe, for example, overnight, 1 week, 1 month etc. Historically LIBOR was based upon an average of lending rates quoted by major international banks based in London. Every day, until recently 16 major banks submitted these lending rates to the British Bankers' Association (BBA), the organisation responsible for calculating and disseminating this index of lending rates. To calculate the LIBOR rate for each lending period, the BBA ignored the four highest and lowest quotes from the banks and calculated the average from the remaining 8.

One of the chief concerns for regulators with regard to this index was that banks were asked to quote lending rates to other banks over time periods where they did not typically lend to one another. Indeed, the longer the maturity of the lending period the less lending activity there would be between the banks. As such the LIBOR rate was based upon an assessment of a likely financial price – in this case a rate of interest – rather than on prices derived from actual trades, or firm price quotes from regulated exchanges or market participants.

Although the process for calculating LIBOR was transparent (unlike peer group benchmarks), the LIBOR benchmark fell short in terms of data integrity, independence; and indeed governance

It is important to distinguish between benchmarks like LIBOR that are effectively constructed by surveying market participants on the one hand, and on the other those that are based upon actual transactions or committed market quotes from regulated entities, and from regulated exchanges, and which are then constructed by independent benchmark administrators.

Although the process for calculating LIBOR was transparent (unlike peer group benchmarks), the LIBOR benchmark fell short in terms of data integrity, independence and indeed governance – an issue we focus on more specifically in Section 5.

5. BEST PRACTICE IN INDEX PRODUCTION

In section 3 of this paper we emphasised the crucial role that financial market indices play in financial markets. It is therefore vitally important that index users can trust the index data – and the consequences of relying on a financial market index/benchmark like LIBOR, that fell well short in terms of data integrity, independence and governance are all too clear. The operational processes adopted by all responsible, independent, benchmark administrators therefore needs to be robust.

In July 2013 the International Organisation of Securities Commissions (IOSCO) published a report entitled Principles for Financial Benchmarks

To a significant extent the interaction between fund management companies (particularly those that operate index tracking funds) and regulators, including central banks, provides an important cross-check on the accuracy of indices, since these organisations often have access to all of the data that goes in to producing an index, and an incentive to see that the indices accurately reflect this information. However, to enhance best practice in index construction further and in an effort to define and establish industry-wide standards, in July 2013 the International Organisation of Securities Commissions (IOSCO) published a report entitled *Principles for Financial Benchmarks*[13]. The catalyst for the report was the investigations into and concerns about certain interest rate benchmarks, such as LIBOR, as explained in section 4.3 above. The report proposed principles covering four aspects of index construction:

- Governance;
- Benchmark quality;
- Methodology;
- and accountability.

It is our understanding that many of the world's largest benchmark administrators have agreed to adopt the suggestions provided in the IOSCO paper[14]. Of course most responsible benchmark administrators already follow robust procedures, but their public support for the principles outlined by IOSCO establishes a clear commitment to maintain high operational and governance standards in their production of financial market indices. It is also important to note that to maintain the standards espoused in the IOSCO paper, requires a continued commitment on the part of benchmark administrators to invest in their systems and to research and development.

The "LIBOR scandal" has precipitated a change in the way the LIBOR benchmark is calculated so that it conforms more closely to the principles espoused by IOSCO in its paper

6. INDUSTRY INNOVATION

The IOSCO principles seek to establish best practice with regard to all aspects of production, dissemination and maintenance of index data, but without restricting the ability to innovate. Indeed, arguably the IOSCO framework for financial benchmarks creates common standards that can only help to aid further index innovation. Innovation is the key to growth and development in all industries, and the financial index industry is no different.

[13] http://www.iosco.org/library/pubdocs/pdf/IOSCOPD415.pdf

[14] Including the members of the Index Industry Association (IIA).

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The index industry has been responsible for fostering significant financial market innovations that have benefited investors by providing more choice, in the form of both new products and new ideas. We have already discussed the most obvious financial market development that is a direct result of the innovation of the index industry – passive fund management – a development that could be rightly described as a revolutionary development for the institutional and retail investment markets alike. Those investors that do not believe in the net-of-fee abilities of active fund managers can, thanks to the availability of financial market indices, choose to have their investments managed on a passive, indexed basis.

Index funds were first made available to US investors in the 1970s, and their popularity has grown with investors across the world ever since then. However, it is perhaps important to bear in mind that the index fund revolution was preceded by the launch of financial market indices, not the other way around. For example, the S&P 500 was launched in 1957; the FTSE_A All Share index was launched in 1963; and the MSCI World Index was launched in 1969.

It is perhaps important to bear in mind that the index fund revolution was preceded by the launch of financial market indices, not the other way around

There are also more recent examples of financial market innovation that are either the indirect or direct result of the existence of financial market indices. And it is to these other developments, that are also a part of the investment index revolution, that we now turn.

6.1 *NEW MARKETS AND NEW ASSET CLASSES*

Arguably the finance industry is the most dynamic of all global industries. New markets, new securities, new ways of trading and new financial institutions seem to emerge continually. At the same time other aspects of the financial markets can disappear as the needs of investors' change over time.

In order to provide the sorts of indices that their clients demand, the index industry needs to be on top of and in many cases, ahead of these developments. To help in this aim benchmark administrators retain close contacts with index users, their clients, to make sure that the range of indices offered is able to cater to investor's needs.

For example, benchmark administrators have increased their provision of indices covering many aspects of emerging markets, not just publicly traded equities, but also emerging market fixed income securities. The expansion of indices focusing on different aspects of developing economy capital markets over time has mirrored investor interest in these markets, enabling both active and passive fund managers to offer investment products based on emerging market securities that are appropriately benchmarked and against which they can be appropriately indexed.

6.2 *DERIVATIVES AND FINANCIAL MARKET INDICES*

Financial market participants soon realised that derivatives based on indices would be a useful way of accessing the returns and risk characteristics of groups of securities quickly and efficiently

Because financial market indices allow us to monitor the average performance of large numbers of securities, financial market participants soon realised that derivatives based on indices would be a useful way of accessing the returns and risk characteristics of groups

of securities quickly and efficiently. Perhaps the best known of these derivatives are those based upon the well-known stock market indices, such as the S&P 500 and the FTSE-100 stock market indices. The futures contracts based upon the S&P 500 index were first introduced to the markets via the Chicago Mercantile Exchange in 1982, while the futures contract based upon the FTSE-100 was introduced in 1984 by the LIFFE derivatives exchange. Indeed the launch of derivatives on the FTSE-100 index coincided with the launch of the index itself, which was created specifically for this purpose and as such represents a good example of how benchmark administrators work with financial market participants to give them the indices they need.

Today nearly every stock market around the world has an associated index which forms the basis of equity index futures contracts

Today nearly every stock market around the world has an associated index which forms the basis of equity index futures contracts. Usually investors can also trade options based on these futures contracts. Both equity index futures contracts and the options that are written on them allow investors to gain exposure to the underlying stock market at a fraction of the price that it would cost, for example, to gain exposure to all 500 stocks that comprise the S&P 500 index by buying the individual components in the cash market. But another benefit of these contracts is that they allow investors to hedge the risk represented by all or just some portion of their equity portfolios. These derivatives contracts today are therefore crucial risk management tools for institutional investors and, via structured products, increasingly for retail investors too.

Derivatives products based on indices of commodities and corporate bonds are also used widely by investors, and they play the same important role in facilitating cheap and efficient access to these markets for investors. But whether the derivative product is based upon an equity, bond or commodity index, the crucial ingredient for providing investors with such a wide range of risk management tools is always the relevant financial market index itself.

6.3 *FACTOR INDICES*

In section 2 of this paper we explained that the most common approach to weighting index constituents is to use the constituents' market capitalisation. However, over the past ten years some investors have shown an appetite for benchmarking their investments against indices where the weights are not determined by the market capitalisation of the constituents. Academic research[15] has shown that constructing equity indices according to the volatility of a stock's return; or based on sophisticated optimisation techniques; or according to 'company fundamentals' such as annual cash-flow, or annual sales etc, can produce attractive risk-adjusted returns for investors. Such indices attempt to encapsulate an investment strategy and are often referred to as factor indices (they are also known as 'smart beta' indices). Although it is difficult to generalise, these indices are effectively based upon rules-based investment strategies that offer investors a part passive and part quantitative investment option.

Benchmark administrators have been able to marry academic research with their index production skills to offer investors a wider investment choice

Factor indices are an extremely important development in the index industry because they allow investors to benchmark their exposures against the key risk characteristics of financial markets. These

[15] See research by Clare et al (2013) at: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2242028 or http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2242034

indices are becoming more and more popular with investors. Their growth shows how benchmark administrators have been able to marry academic research with their index production skills to offer investors a wider investment choice. The family of investment strategy indices now available for investment demonstrates how benchmark administrators continue to innovate to meet client needs.

6.4 *THE ETF INDUSTRY*

The traditional investment vehicle for retail investors is the mutual fund. A mutual fund is a pooled investment vehicle, often comprising many hundreds of individual equities, or bonds. Investors buy units in the fund which is managed by a fund manager. By investing in mutual funds in this way with relatively small amounts of money investors can get exposure to many different securities, enabling them to take advantage of the benefits of diversification that they would not be able to achieve on their own. In the European context the UCITS legislation has encouraged such diversification: these funds can be marketed within all countries that are a part of the European Union, provided that the fund and fund managers are registered within the domestic country. Note that the regulation recognises that each country within the European Union may differ on their specific disclosure requirements.

Exchange Traded Funds (ETFs) provide investors with very similar benefits as mutual funds. An ETF is an investment company whose shares can be traded throughout the day on a regulated stock exchange. But the 'company' itself, is made up of underlying securities, just as a mutual fund is comprised of individual securities. As we noted earlier, ETFs first appeared around 25 years ago. The first ETF was introduced in 1993 in the US and was designed to track the S&P 500 Index. As such it could be seen as being similar to a mutual fund indexed against the same benchmark. The crucial point for this paper then is that a huge proportion of the ETFs currently available to investors are based upon financial market indices. These ETFs that track a pre-determined financial market index, are referred to as '*index-based ETFs*'.

One of the main differences between a mutual fund and an equivalent ETF is that ETFs are traded on stock exchanges in broadly the same way that ordinary stocks are traded

One of the main differences between a mutual fund and an equivalent ETF is that ETFs are traded on stock exchanges in broadly the same way that ordinary stocks are traded. By contrast the price of a mutual fund is valued and fixed at a predetermined point in the day (for example, 4pm in the US, and 12pm in the UK). An investor wishing to sell their units in a mutual fund has to wait until this point in the day, when all trades are cleared at the fixed daily price.

So given the similarity between a passive mutual fund and an ETF both based upon the same financial market index, why has the ETF industry been such an innovation?

First, the relative ease in which ETFs can be traded and the fact that the can be bought and sold throughout the trading day, has given investors much more flexibility in the way that they manage their investment portfolios. Using ETFs discretionary fund managers, retail investors, and/or their advisors can make adjustments to investment portfolios almost as easily as the largest institutional investors. Second, the wide range of indices produced by benchmark administrators has made it relatively easy for ETF providers to expand the range of sectors and asset classes, giving ETF investors liquid access to parts of the financial markets that they were unable to access previously. This expansion in ETF coverage has made it relatively easy for small investors to construct and manage multi-asset portfolios – with exposure to different domestic and international equity, bond and commodities markets. Essentially in collaboration with benchmark administrators, ETF providers have empowered small investors.

ETF coverage has made it relatively easy for small investors to construct and manage multi-asset portfolios

ETF providers also produce other types of ETF, for example, some are based on active fund management, but the catalyst for the industry was undoubtedly the existence of well-respected indices coupled with a demand from investors for a more flexible way of investing across the different countries, asset classes and investment styles that were covered by the major benchmark administrators. We should also note that there is a growing number of investment strategy indices that are now available in an ETF format.

The flexibility of ETFs has meant that the industry is growing rapidly. According to Deutsche Bank, there were 3,581 ETFs traded globally and total assets were $2.25trn. Europe's 1,360 ETFs accounted for 19%, or $397bn of this total. Deutsche Bank estimates that global ETF assets under management should surpass $2.5trn by the end of 2014.

Deutsche Bank estimate that global ETF assets under management should surpass $2.5trn by the end of 2014

6.5 *OTHER INVESTMENT PRODUCTS*

The wide range of well-known and reliable financial market indices produced by independent benchmark administrators has meant that many other financial products have at their heart an index. As explained above, index tracking mutual funds (including products that UCITs compliant) and many ETFs are dependent upon such indices, but the prices of other financial products such as Exchange Traded Notes (ETNs) and Structured Notes are also determined by a financial market index.

6.6 *SUMMARY*

Benchmark administrators have been the source of much financial market innovation in the past, giving investors the confidence to invest in new markets, giving them access to the latest investment ideas from academia and the finance industry, and giving them new investment products to help them gain exposure to risk that they can manage more efficiently.

7. CONCLUDING REMARKS

In this paper we have sought to explain why and how financial market indices produced by independent administrators have, over the years, revolutionised the investment landscape. For the fund management industry which at the end of 2013, via mutual funds, was responsible for managing almost $29trn of investors' savings globally ($14.3trn in the US and $9.0trn in Europe), financial market indices are a crucial tool for producing the huge range of investment products that investors desire today. For retail and institutional investors, financial market indices do not only offer the choice between active and passive investment funds, they crucially also provide an independent means of assessing the performance of this multi-trillion dollar industry. Furthermore, because financial market indices condense the huge amounts of information embedded in the prices of hundreds of thousands of stocks, bonds and commodities, this information becomes accessible to investment strategists and consultants, to central banks, to governments and to regulators and, through the media, to the wider public too.

Financial market indices are a crucial tool for producing the huge range of investment products that investors desire today

Given the important and widespread use of financial market indices it is equally important then that the indices produced by independent benchmark administrators are of a high quality. To this end, many of the world's largest index providers have agreed to adopt the suggestions provided in the IOSCO

Principles for Financial Benchmarks. Of course most of the benchmark administrators on which the financial markets rely already practice the Principles laid out in the IOSCO paper, but their public support for them establishes a clear commitment to maintain high operational and governance standards in their production of financial market indices.

The very competitive nature of the index industry which strives to meet the changing needs of financial market participants has, in turn, produced the wide range of indices demanded by investors and, crucially, a wide choice of indices. Anything that might reduce the competition between independent benchmark administrators would be at the expense of investor choice.

APPENDIX

CREATING INDEXED PORTFOLIOS: HOW DO THEY DO IT?

Indexed portfolios, also referred to a 'passive funds', or 'tracker funds' typically adopt one of three indexing methodologies:

- *Full replication.* Full replication involves the fund holding every security in the index in accordance with each constituent's index weighting. Certain funds use this method because of the cost of buying and holding every constituent in the index. By its very nature, a full-replication strategy should produce minimal tracking error, although discrepancies sometimes arise, due to management and transaction expenses. Most funds tracking major national index benchmarks containing predominately a smaller number of large-cap liquid stocks would use full replication, subject, of course, to the size of the fund.

- *Stratified sampling.* Sometimes full replication of a financial market index is not feasible, due to the illiquidity of the underlying securities, or the sheer size of the index. In these cases a stratified sampling approach to the problem can be applied. Stratified sampling involves the application of statistical techniques to select a subset of the stocks in the index that reflect the characteristics of the index as closely as possible. Stratified funds typically overweight larger more liquid stocks and hold fewer, if any, of the smaller illiquid names in the index. In so doing, this methodology balances an acceptable level of tracking error against the lower resulting transactions costs and allows the portfolio to match the basic characteristics of the index without full replication. Stratified sampling is a popular methodology for tracking indices with a large number of constituents and those that benchmark the performance of smaller companies.

- *Synthetic indexing.* Synthetic index tracking funds usually use one of two derivative instruments to track the chosen index: either a combination of futures contracts and cash or a total return swap. Both approaches generally perform their function admirably and at a reasonably low cost.