

NBIM DISCUSSION NOTE

Global equity indices – a comparative study between FTSE and MSCI

In this note we present a review of construction practices and performance of global equity benchmarks from the perspective of a large long-term global asset owner. Our objective is to gain a better understanding of the decisions made by index vendors, and how they impact the risk/reward characteristics of the indices.

Main findings

- We provide a walkthrough of the construction of two global equity benchmarks (MSCI GIMI and the FTSE GEIS) to highlight the practical considerations the benchmark vendors make on behalf of the asset manager. For a global investor, some of these considerations have a measurable impact on positioning; among these are free-float adjustments and companies with ambiguous country classifications.
- We document that both returns-based and holdings-based analysis indicates a convergence in the risk/reward relationship between the two global benchmarks, possibly driven by a market consensus on “best practice” for global equity benchmark construction.
- Recent, well-publicised index benchmark switches might indicate that choice of a global benchmark for equities is mostly a matter of cost for many investors. In our opinion, besides cost, a potential differentiator in the future might be increased transparency in some areas of the index construction process. In this note, we highlight free-float adjustments as one such area.

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ISSN 1893-966X

13/1/2013

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Introduction

Since a substantial proportion¹ of the Government Pension Fund Global (GPF) is allocated to equities, understanding both the risk/reward characteristics and the construction of a specific equity benchmark is important to the management of the fund. Siegel (2003) notes that benchmarks typically serve three purposes for an asset manager: 1) as a tracking portfolio for index funds, 2) as a benchmark for actively managed funds and 3) as a proxy for an asset class. Index-tracking funds and actively managed funds might not share the same criteria for what constitutes a good benchmark. A thorough understanding of key missions for the index provider and governance of the indices will help in understanding how the different views are balanced by the vendor. One could further argue that the third purpose is key in the design of a benchmark, as the benchmark aims to be an appropriate representation of the underlying capital market.

Methodologies for the use and construction of equity benchmarks have gone through major changes over the last century. In 1884, when the Dow Jones Industrial Index was launched, it was the pioneering index, based on a simple price-weighted methodology. In 1923, S&P introduced the S&P 90, a predecessor of today's widely followed S&P 500 index. The S&P 500 index established the concept of the market-cap-weighted index, where each security is weighted according to its total market capitalisation². Up until the 1950s, the investment community was preoccupied with recent developments in intrinsic valuation methodologies as developed by John Burr Williams³. Investors focused on creating concentrated portfolios, based on carefully picked stocks which seemed undervalued. With the development of modern portfolio theory by Harry Markowitz (1952), the role of benchmarks became increasingly important. Now investors were not rewarded for bearing idiosyncratic risk, and the concept of diversification was at the forefront of investing.

With the introduction of the CAPM (Sharpe, 1964), a rationale was created for the market portfolio, and with it a demand for indices of the total market. Creating an index of the total market is not a trivial task, as it should include all assets held for investment (including those where observing a price might be difficult, like human capital and real estate). In practice, the market portfolio is unobservable, and an equity market portfolio is often used as a proxy. Capital International (predecessor of MSCI) responded by launching its world index in 1969, the first global index targeting large- and mid-cap companies. FTSE released its global index in 1987 (then called FT/S&P Actuaries World Indices).

The advent of larger databases of financial information allowed researchers to observe several anomalies in financial markets. One of these anomalies was documented by Banz (1981) and Fama and French (1992). Both of these surveys found that, empirically, small-cap stocks tended to outperform other stocks. Based on these studies, index providers further developed their products to incorporate small-cap stocks. Another study by French and Poterba (1991) documented a home bias among investors – the fact that investors favour investing in domestic stocks over international ones. These research findings have pushed demand in the direction of full coverage, in terms of both market cap and country coverage.

Another important trend in financial markets over the last few decades is increased globalisation. With the removal of exchange controls, and introduction of free market reforms, the investment community has increasingly broadened the investment process. Globalisation has also changed companies, making them increasingly exposed to the global economy, rather than a single country. This trend has also been a driving force in the adoption of benchmarks with exhaustive country coverage.

Not all changes to equity benchmarks are based on empirical research; some stem from purely practical considerations. One of these changes was the introduction of free-float adjustment of indices. This is an adjustment where the index vendor excludes shares which are not readily available for purchase in the calculation of a company's market capitalisation. Free-float adjustments were first introduced in the mid-1980s by the Toronto Stock Exchange, Salomon Smith Barney and Russell. With the adoption

1 The GPF has had a target allocation to equities since 2008 of 60 per cent.

2 Total market capitalisation of a stock equals shares outstanding times the price per share.

3 By intrinsic value, John Burr Williams meant that the value of a security is equal to the present value of its future net cash flows.

of free-float adjustment by MSCI and FTSE in 2000/2001, the practice became a de-facto standard and it is now considered vital for index representation and construction⁴.

A more fundamental underlying change in the investment process has been an increasing shift towards passive management of equities. This has been driven partly by several studies, starting with Jensen (1967), showing that mutual fund managers struggle to beat their benchmark after costs. In the last few years, there has been rapid growth in low-cost exchange-traded funds (ETFs), which allow investors to gain exposure to a broad set of investment strategies. Using industry jargon, one might conclude that many of the historical so-called “alpha” strategies have been redefined as traditional “beta” strategies.

Allocations to index investment vehicles have increased sharply in recent years⁵. Index investment funds have in common a focus on replicating the return of their benchmark. For these funds, having a detailed understanding of an equity benchmark construction is crucial. Active managers will be less inclined to follow an index on a day-to-day basis, but if the fund has a tracking error constraint⁶, substantial methodology changes by an index vendor will force the manager to change the composition of the portfolio and will therefore implicitly be an investment decision. In this note, we will therefore review the most important index construction steps and their implications for the global indices.

There are multiple vendors of benchmarks, with FTSE, MSCI, Russell and S&P Dow Jones all offering global benchmarks. In this note, we have limited the comparison to the global benchmarks that FTSE and MSCI deliver: FTSE Global All Cap (GEIS) and MSCI Global Investable Market Indices (GIMI)⁷. We compare FTSE and MSCI primarily based on their current stated methodology (as at June 2013), but have also analysed historical developments in order to address significant methodology changes and their impact on the indices.

This note is structured as follows. In section 1, we analyse and contrast each provider’s methodology and construction process for its global benchmarks. We explore the high-level differences in index philosophy and then examine how this is reflected in actual benchmark construction rules. In section 2, we present an analysis of risks and returns on the benchmarks under study over time. We start with a returns-based analysis since 1998 and then proceed with a detailed bottom-up analysis since 2005. In the final section, we provide concluding remarks based on our findings.

4 The textbook example of the importance of free-float adjustment is the case of Yahoo!’s addition to the S&P 500 on 7 December 1999. On that day, Yahoo! gained 24 per cent, which was driven by the fact that only 10 per cent of the shares in Yahoo! were available for purchase, while its weight in the S&P 500 was based on full market capitalisation.

5 According to ETFGI’s July 2013 newsletter, assets in exchange-traded funds increased from 74 billion dollars in 2000 to 2,014 billion dollars in July 2013, a 29 per cent compound annual growth rate (<http://etfgi.com/publications/reports/reportid/203>).

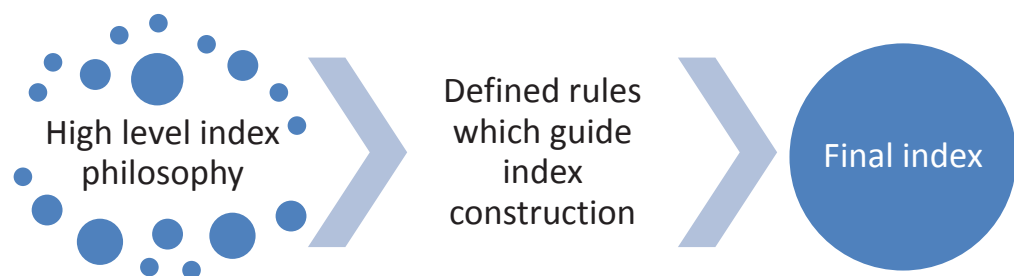
6 The GPFG has a tracking error limit of 100 bp.

7 As explained later in the note, building a constituent-level historical dataset for comparison is not a trivial task.

Section 1: Benchmark methodology and construction

This section presents a detailed description of the benchmarks from a “qualitative” perspective. Our discussion follows the stylised process illustrated in Figure 1. Initially, the index provider defines a set of objectives for the index and makes strategic high-level decisions, such as whether to use a rules-based approach using publicly available data for the selection of the constituents, or to use a proprietary process for inclusions and exclusions (which could be based on rules and/or subjective evaluation). Once these overall decisions are made, a set of specific rules are defined so that the benchmark construction process can be implemented. The day-to-day maintenance and interpretation of these rules then define the final set of securities and their weightings in the index.

Figure 1: Stylised index process



Mission/philosophy of index and provider

FTSE’s stated index mission is as follows⁸:

“Create and maintain a series of high quality indices for the international equity markets for use as a benchmark by the global investment community. The index should be comprehensive, consistent, flexible, accurate, investable, transparent, predictable, representative and user-driven”

MSCI’s stated index mission for its Global Investable Market Indices is as follows⁹:

“Based on transparent and objective rules, the GIMI are intended to provide: exhaustive coverage of the investable opportunity set with non-overlapping size and style segmentation, a strong emphasis on investability and replicability of the indices through the use of size and illiquidity screens, size segmentation designed to achieve an effective balance between the objectives of global size integrity and country diversification, an innovative maintenance methodology that provides a superior balance between index stability and reflecting changes in the opportunity set in a timely way and a complete and consistent index family, with Standard, Large Cap, Mid Cap, Small Cap and Investable Market Indices”

Both these stated index missions give an indication of what the benchmarks are meant to provide for the user, but contain little information about the implementation details. One immediately visible difference between the two providers is related to governance of the indices. FTSE has a clear statement on being a user-driven index, which MSCI does not highlight in the same manner. In practice, both providers use committees and market consultations in the governance of the indices, but with one notable difference. FTSE appoints practitioners who use their indices to the committees while

8 Ground Rules for the Management of the FTSE Global Equity Index Series, Version 4, April 2013, page 4.

9 MSCI Global Investable Market Indices Methodology, MSCI, February 2013, page 10.

MSCI uses internal employees¹⁰. Different users can have very different opinions on what constitutes an appropriate index. An index-tracking fund might emphasise the ability to efficiently replicate the index with the least possible cost and tracking risk. An active manager, on the other hand, might have a long-term view of certain markets or industries, making tracking risk concerns less relevant. Making sure that a broad and diversified set of interests are addressed in these user committees will be key to ensure they serve as wide a cross-section of market participants as possible.

Another difference between the providers emerges when MSCI references stability in their index mission. Arguably, the most important stability criterion of an equity benchmark will be the volume of trading required for an index-tracking fund to replicate the index¹¹. Later, in the section on index maintenance, we present an analysis of the ongoing trading needed to track the two indices.

Overall, differences are limited in the stated index missions of the two providers, and in practice one would expect that the specific rules for each index would be quite similar. Further, a set of similar rules should give indices with little difference in constituents and weightings, resulting in comparable performance from a risk/return perspective. These characteristics imply that equity indices could be looked upon as a commodity by the index user, with a shared set of basic features.

Index construction

As a reference for the rest of the discussion, Table 1 presents the high-level coverage of MSCI and FTSE. There are no material differences between the two indices when it comes to targeted market coverage and size segments. The only difference is the 1 per cent additional targeted market capitalisation coverage in MSCI's GIMI index, with the implication of an additional 1,000 companies (from the small-cap segment) being added to the global benchmark. A coverage target as close as possible to 100 per cent aligns with a long-term investor, as it will make the index a yardstick of the performance which is to be expected from equities in the long run. Neither of the index providers will include securities from frontier markets in the indices, as these markets are seen as difficult for international investors to access efficiently, and including them would be at odds with the focus that MSCI and FTSE have put on investability.

Table 1: High-level coverage for MSCI and FTSE global benchmarks (as at 28 June 2013)

		FTSE	MSCI
	Index name	GEIS	GIMI
	Target coverage	98%	99%
Size segments	Large	X	X
	Mid	X	X
	Small	X	X
	Micro		
Markets	Developed	X	X
	Emerging	X	X
	Frontier		

Index construction will conceptually follow either a rules-based or a subjective approach. A rules-based approach involves selection of constituents for the index based on a fixed set of rules. A subjective approach means that there exists a governing set of guidelines on how to select the constituents of an index, yet these guidelines are not absolute in the determination of the constituents for an index. In practice, the process is a hybrid of these two, where a provider will try to make its process as

10 One example of where the user committees have resulted in differences between MSCI and FTSE is in Japan. Japanese REITs have been excluded from FTSE Global All Cap due to legal restrictions for some index funds and was removed by the FTSE Asia Committee and the Policy Group.

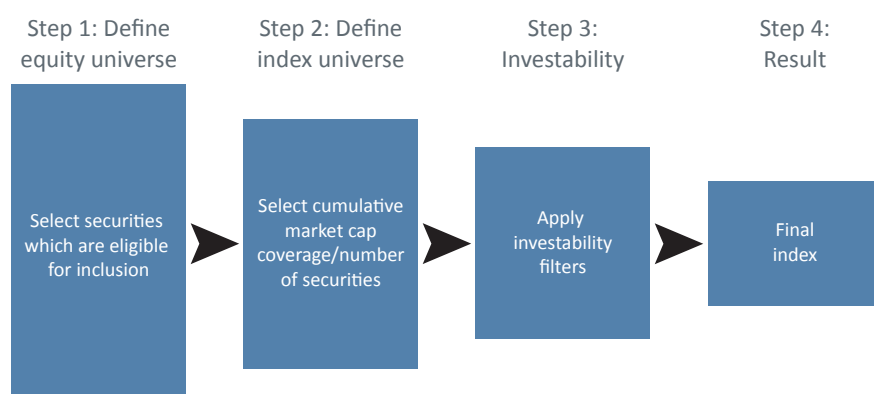
11 If an index vendor continually reclassifies companies' capitalisation size (large-, mid- and small-cap) and country classification, this will increase turnover. For example, for a fund tracking large- and mid-cap securities, the stability of companies in the mid-cap segment can impact turnover. If companies frequently move between mid- and small-cap, a portfolio manager will be forced to rebalance his/her portfolio excessively.

transparent and rules-based as possible. Due to ambiguous cases which cannot be addressed by strict rules, a number of subjective exceptions will have to be used for certain securities which are to be included in the index.

Both MSCI and FTSE follow a rules-based approach to index construction. Figure 2 illustrates such an approach, and the following sections will consider in detail each of these steps. In step 1, eligibility is determined (e.g. is a stock listed in a developed or emerging market, is the security a non-ETF?). The result of this step is a set of securities which we refer to as the *equity universe*. In step 2, providers select a certain cumulative market cap of the universe or a specific number of securities, which we refer to as the *index universe*. Finally, in step 3, both vendors apply a set of investability filters to their index universes (e.g. is there enough liquidity in the stock, can the security be bought by an international investor?). The securities that pass through all steps will end up in the final index product.

Although we believe that Figure 2 captures the relevant steps in the construction of the benchmarks, the actual progressions of the vendors through the framework does not match one-to-one. For example, MSCI has chosen to apply its investability filters directly to the equity universe, and then select the appropriate cumulative market capitalisation coverage, which in practice means that steps 2 and 3 switch places. Even though the providers do not fit neatly into our conceptual index construction process, we have chosen to structure the comparison along these lines.

Figure 2: Conceptual index construction process



Step 1: Selecting securities which are eligible

Selection of securities eligible for inclusion starts out with a determination of which markets ought to be included. This is usually dependent on the maturity of the market. Three common market classifications in use today are developed, emerging and frontier. Both MSCI and FTSE include developed and emerging markets in their broad global benchmarks. Even though the classification of a market might seem straightforward, it is a source of difference between MSCI and FTSE (and other index providers). The most prominent difference between MSCI and FTSE is the classification of South Korea as developed by FTSE and emerging by MSCI. Further information regarding differences in market classification and the specific processes are detailed in Appendix 1.

Another notable difference between the two providers is the treatment of index orphans¹². FTSE will force a security into a country, while MSCI has some securities which fail country classification altogether and will not be included in the index¹³. Based on a list of MSCI index orphans, we have analysed performance in Figure 3 below¹⁴. While the weight of the orphan stocks in the overall index would have been relatively small, their outperformance relative to the MSCI World is quite remarkable,

12 "Index orphan" is a term used by some industry practitioners to classify securities which fail country classification, i.e. a security where it is hard to determine the appropriate country to which it should belong.

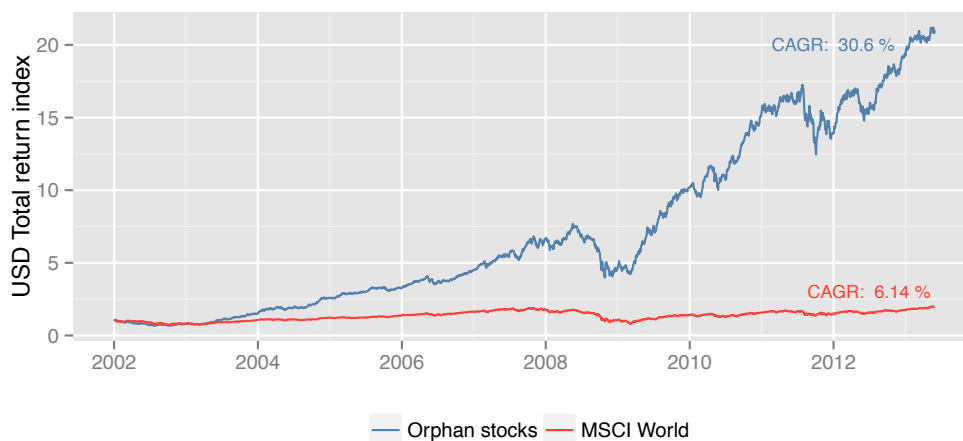
13 One example of a typical orphan stock is Prada. Prada's primary country of listing is Hong Kong, while its country of incorporation is Italy. Since there is no apparent linkage between the country of incorporation and primary listing, Prada is not included in MSCI's global benchmark.

14 MSCI Global Investable Market Indices Methodology, February 2013, page 83. Performance is calculated using a market-cap-weighted portfolio; using an equally-weighted portfolio does not change the result materially.

and excluding these securities would have induced a slight performance drag on a benchmark over the selected time frame we have analysed. As for risk in the selected orphan stocks, annualised volatility has been somewhat higher at 19.56 per cent, compared to 17.86 per cent for the MSCI World over the same period.

For a long-term global asset owner, getting an opportunity set which appropriately reflects the underlying capital markets is important. Exclusions of securities due to ambiguous country classifications conflicts with this and might introduce unintended distortions into the performance of an index. This may not be a large concern for an index-tracking fund, as the main investment objective of the fund is to replicate the return of the index.

Figure 3: Performance of selected index orphans (2 January 2002 = 1, source: MSCI, NBIM)



Once all securities have been assigned to a market, only those in developed and emerging markets are selected into the equity universe. MSCI and FTSE will also exclude companies where the main business is holding equity and other investments from the equity universe. One notable difference between the two providers is that MSCI includes equity investment instruments (ICB subsector 8985), which FTSE excludes. This adds 24 securities to the MSCI index, valued at approximately 25 billion dollars as at June 28 2013, primarily securities of companies regulated as business development companies in the US.

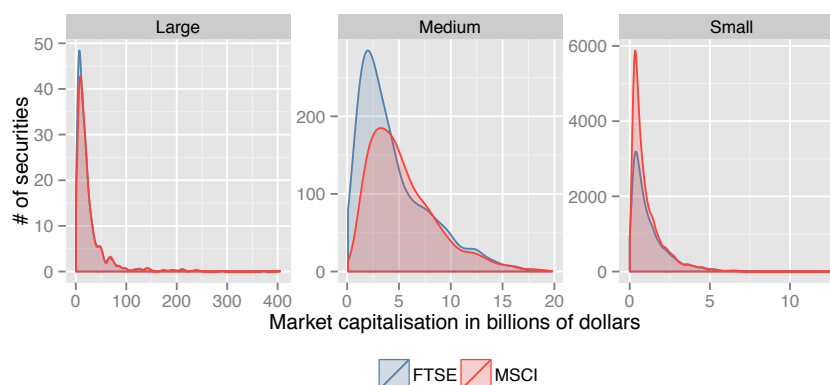
Step 2: Selecting cumulative market capitalisation coverage/number of securities

Once the equity universe is constructed, the appropriate coverage of companies should be selected so as to create the index universe. There are two dominant methods which can be used, either targeting a cumulative market capitalisation coverage (e.g. 95 per cent of cumulative market capitalisation) or targeting a specific number of companies (e.g. selecting the 100 biggest companies by market capitalisation¹⁵). Indices which use cumulative market capitalisation coverage have the benefit of dynamically tracking specific segments of the market (e.g. mid-cap mandates will keep tracking mid-cap companies).

MSCI and FTSE both target cumulative market capitalisation coverage. As shown earlier in Table 1, MSCI targets 99 per cent of the investable market, while FTSE targets 98 per cent on a regional basis. This 1 per cent difference increases the number of securities included in the index. Figure 4 shows the distribution of capitalisation sizes for MSCI and FTSE. In the small-cap segment, it is clear that the 1 per cent extra cumulative capitalisation coverage leads to a larger number of smaller-sized securities.

15 The S&P 500 is an example of an index which tracks a specific number of securities, with 500 securities being included in the index.

Figure 4: Distributions of market capitalisation (as at 28 June 2013, source: FTSE, MSCI, NBIM)



Also of interest in Figure 4 is the difference in the medium-sized segment, where FTSE has a tendency to classify smaller companies as medium-sized than MSCI. The reason is two-fold: first, FTSE has a lower cut-off point for medium size (86 per cent versus 85 per cent cumulative market cap); second, MSCI has a global focus on striking a balance between “size integrity” and coverage, whereas FTSE aims to achieve this at a regional level¹⁶.

For a global long-term asset owner, starting with a large and diversified opportunity set would be preferred. This gives the investor increased flexibility as to how to allocate capital. A broad set of size segments will also allow harvesting of various premiums (e.g. illiquidity premiums for small-sized companies). Index investment vehicles will be less concerned with a large opportunity set and place greater focus on the investability of constituents in the index. This highlights the trade-off between completeness and investability that an index vendor has to perform. Figure 4 also highlights that the determination of size is a subjective matter and differs between index providers.

Selection of securities has been one area of convergence for the large index vendors. Up until 2007, MSCI used a hybrid method (sector sampling) when selecting constituents for its indices. This means that it chose to pick companies from sectors to get the best possible representation of a specific sector, sometimes resulting in large companies being excluded¹⁷. The process was changed in 2007 to a cumulative coverage, bringing MSCI in line with the construction process of FTSE. Another change has been the targeted cumulative coverage which has been sought. Historically, this was typically around 80 per cent, but recent years have seen a move towards indices which track close to 100 per cent of the market.

A detailed discussion of the specifics regarding the construction of an index universe would be too lengthy, and some further guidelines on the process are provided in Appendix 2.

Step 3: Applying investability filters

Once the index universe is constructed, a set of investability filters is applied to each security. These filters are also used to exclude securities that will be difficult for international investors to gain exposure to.

Adjustment for available outstanding shares, also called free float, is one of the filters that are applied to the index universe. Conceptually, free-float adjustments are simple, as they only involve removing shares that are not available for purchase¹⁸ from the benchmark based on publicly available information. Both providers clearly describe the principles behind their adjustments in their methodology booklets. However, publicly available data on company ownership is limited, and data quality often difficult to assess (especially in less-developed markets). In addition, ownership data is often structured and published in a way that will necessitate a qualitative assessment by the benchmark vendor before

16 “Size integrity” implies that for example medium-sized companies should be somewhat comparable in terms of market capitalisation across different markets. The interested reader is referred to MSCI Global Investable Market Indices Methodology, February 2013, page 19 and 28-29.

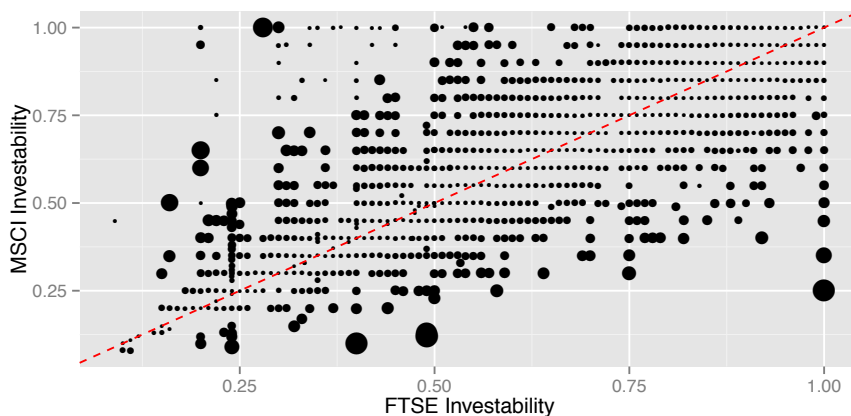
17 See page 17 – 18 in MSCI Standard Index Series Methodology booklet, November 2007, for examples of how this might affect the securities included in the index.

18 For example, the position might be considered a long-term strategic holding, or rules in the market might make it hard or impossible for an international investor to buy the shares.

an adjustment can be made¹⁹. Finally, the vendors do not systematically share or sell information on decisions made and the data sources that have been used. All these factors make it difficult for an end-user to verify these adjustments²⁰. To illustrate the effect of free-float adjustments in practice, we refer to Figure 5, which shows a scatterplot of the adjustments for MSCI and FTSE. In the chart, the size of the circles indicates differences between market capitalisations after free-float adjustments have been made, and the dashed red line indicates a perfect correlation in free-float adjustments. As can be seen, there is a wide dispersion in the investability adjustments that MSCI and FTSE make, clearly showing that the process is not straightforward in practice, even though the providers have clear internal rules.

These differences in investability adjustments can have material implications for portfolio construction. For example, as at 28 June 2013, FTSE uses an investability factor of 82 per cent for Nike, compared to 100 per cent for MSCI. If we use a hypothetical equity portfolio of 100 billion dollars, the difference in allocation to Nike totals 22 million dollars. Clearly, for a large long-term asset manager, there can be a significant impact on portfolio allocation to individual securities based on such variable investability adjustments. Rather than being left to the discretion of index providers, investors might benefit from further transparency in this area.

Figure 5: MSCI vs. FTSE investability on overlapping constituents, size of circles representing difference between market capitalisations after free-float adjustments* (as at 28 June 2013, source: MSCI, FTSE, NBIM)



* The formula used to calculate the size of the circle is $abs\left(\frac{MSCI_{mcap}}{FTSE_{mcap}} - \frac{FTSE_{mcap}}{MSCI_{mcap}}\right)$.

Next, a liquidity filter is applied, intended to exclude companies with limited trading activity. MSCI and FTSE both apply a set of different liquidity measures based on trading volume data for a security. Among the notable differences, MSCI differentiates between developed and emerging markets on liquidity, lowering the bar for emerging markets, while FTSE has a common rule for both market segments. FTSE also has a rule excluding additional security lines (e.g. preferred shares) which are less than 25 per cent in market cap of their primary security line. This rule will, in general, reduce the number of preferred shares that FTSE includes relative to MSCI. Further details on liquidity measures and free-float adjustments are provided in Appendix 3.

Differences in investability adjustments have narrowed: in May 2013 FTSE changed its free-float adjustment methodology from a wide banding approach, to a 1 per cent band. The implication of this change is to move the weights of constituents in MSCI and FTSE indices closer together.

Investability adjustments highlight the trade-off between a broad opportunity set and liquidity in the index construction process. All else equal, the former will be more important for a long-term global asset owner than for the index investment vehicle, for which the latter will be key.

19 The second issue is related to the first, in that to be able to perform the adjustments required, a vendor has to assign enough resources in order to gather data, making sure that it is up-to-date and being consistent over time in terms of adhering to the internal rules of the providers, all of which is costly and performed at the index provider's discretion.

20 In response to requests regarding insight into free-float calculations and the data used, the vendors only agreed to disclose specific information on free-float adjustments that had already been implemented and only on a case-by-case basis, as opposed to sharing information on the entire index universe.

Index maintenance

The ongoing maintenance of the indices is an important part of the benchmark construction process, and determines the trade-off that an index vendor makes between representativeness and turnover levels for the index. In short, index maintenance allows for adding new constituents to an index, removing constituents which no longer meet the criteria for inclusion, and taking account of possible corporate actions where needed²¹. Both MSCI and FTSE adjust for certain changes on a continuous basis, the majority of which happen at predetermined review dates. An extended analysis of differences in index maintenance is available in Appendix 4.

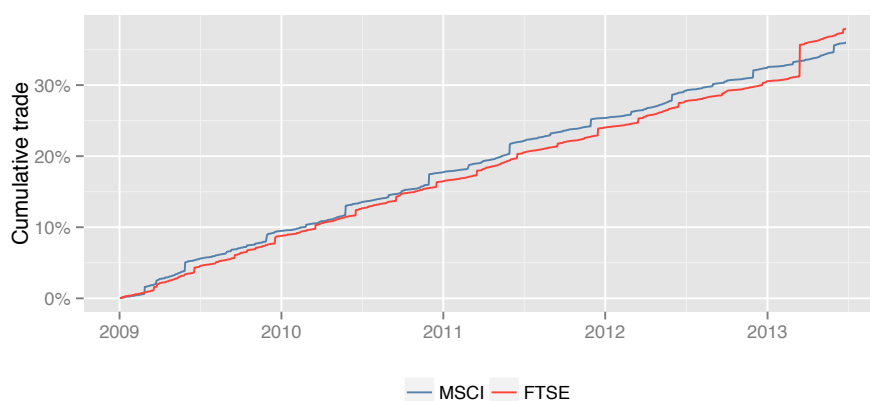
As noted earlier, MSCI states that it attaches importance to the stability of its indices. In order to analyse this, we have carried out a historical comparison of the required trading for the two global indices from 2 January 2009 to 28 June 2013 using the formula below.

$$\text{daily trade} = \frac{1}{2} \sum \text{abs}(\text{weight}_{\text{close}} - \text{weight}_{\text{open next day}})$$

Here, daily trade is calculated as the absolute difference between the closing weights of constituents in the benchmark and the opening weights in the benchmark the following day. By summing the daily trade indicator over time, it is possible to get an indication of the amount of trading that takes place in the two indices. A cautionary remark is in order: the measure will very likely overstate the actual trading which is needed to track the two indices, as we do not take account of corporate actions and overnight gaps in prices, but we still feel that the measure serves as a useful indicator of the relative difference between the two benchmarks²².

Figure 6 shows the implied cumulative trading based on our measure. Prior to FTSE's change of free-float methodology in March 2013, FTSE's total turnover was less than that of MSCI. The average annualised trading indicator for FTSE was 7.17 per cent, compared to 7.70 per cent for MSCI. The trade implied by the methodology change moved the cumulative trading of FTSE above that of MSCI, and the average annualised trading sharply increased to 8.12 per cent. Similar increases are not expected going forward. It is also clear from the chart that MSCI's current framework with biannual rebalancing results in larger trades compared to FTSE's quarterly regional reviews. Going forward, this difference is likely to diminish, as FTSE has moved from a staggered annual review of regions to a global semi-annual review of all regions.

Figure 6: Implied trading needed to follow index, January 2009 to June 2013 (source: FTSE, MSCI, NBIM)



21 Mergers, share issuance, IPOs and so forth.

22 One example is in the case of a rights issue, which is usually funded with cash received from previous dividends. Our naïve measure would reinvest the dividends in the index and then later sell shares in order to fund the rights issue, thus inflating the required turnover relative to what one would expect in practice.

Section 2: Historical quantitative comparison

We now turn our attention to the analysis of performance and risk for the two indices. The first sub-section presents the results from a returns-based analysis since the inception of the Government Pension Fund Global (GPGF) in 1998. The second sub-section presents results from a bottom-up (holdings-based) analysis since January 2005, where we dig deeper into the differences in industry and regional allocation. All returns are total returns (pre taxation) in US dollars.

Returns-based analysis from 1998 until today

The returns-based analysis is conducted using a set of merged indices. In the period from 1998 until 2007, we use the FTSE All-World and MSCI All Country World. Both of these indices include large- and medium-cap securities from developed and emerging markets²³. From 2007 onwards, we use the FTSE Global All Cap and MSCI GIMI, which supplement the previous indices with companies in the small-cap segment.

Figure 7 below compares the performance of the two indices. FTSE has performed slightly better than MSCI over the entire period with a compound annual growth rate (CAGR) of 5.71 per cent, compared to 5.44 per cent for MSCI.

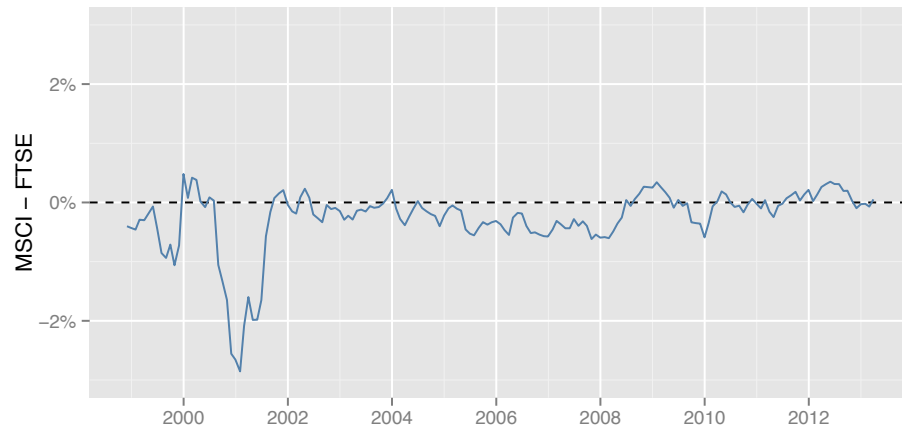
Figure 7: Return indices, FTSE and MSCI (31 December 1997 = 100, source: Factset, NBIM)



As the trend in equity benchmarks has been on a path of convergence, it is interesting to see whether this is reflected in the performance figures. Figure 8 displays the 12-month return difference between MSCI and FTSE since 1998. The bulk of the difference in return came in the period from 1998 until 2002, after which the differences on a 12-month basis have decreased. Since 2010, the difference has been negligible.

23 MSCI and FTSE may have different country classifications, so the countries included in each index may not fully overlap.

Figure 8: Rolling 12-month return differential between MSCI and FTSE (source: Factset)



In Table 2, summary calculations for each index are presented, first for pre and post May 2008, and then for the entire period, allowing us to analyse differences after MSCI changed its sector sampling methodology. Starting off with the returns, FTSE has returned 5.7 per cent since 31 December 1997, while MSCI has had a return of 5.4 per cent. Over the same timeframe, the standard deviation of the two indices has been 17.1 per cent. From a reward to variability perspective (measured as return/standard deviation), FTSE scores 0.42, compared to MSCI's score of 0.41. Maximum drawdown also differs slightly between the two benchmarks. MSCI's largest drawdown in a 12-month window has been 50.9 per cent, against 51.1 per cent for FTSE. MSCI and FTSE exhibit quite comparable negative skew at -0.74 and -0.75 respectively. Both indices also exhibit excess kurtosis²⁴, with FTSE having marginally higher kurtosis than MSCI. The table also shows that most of the difference in returns came before May 2008. After the change in index methodology, returns from the two indices are largely the same, from both a return and a risk perspective.

Table 2: Summary statistics for returns-based analysis of indices (return and standard deviation are annualised)

	Pre May 2008		Post May 2008		Entire period	
	MSCI	FTSE	MSCI	FTSE	MSCI	FTSE
Geometric return	7.1%	7.5%	2.0%	1.9%	5.4%	5.7%
Arithmetic return	8.1%	8.6%	4.4%	4.3%	6.9%	7.2%
Standard deviation	14.4%	14.4%	21.7%	21.8%	17.1%	17.1%
Reward to variability	0.56	0.59	0.20	0.20	0.41	0.42
Maximum drawdown (12-month)	26.7%	26.8%	46.5%	46.6%	50.9%	51.1%
Skewness	-0.67	-0.69	-0.66	-0.65	-0.74	-0.75
Excess kurtosis	0.76	0.80	0.80	0.81	1.49	1.54

24 Excess kurtosis is a measure of tail fatness in the distribution of returns.

Holdings-based analysis from 2005 until today

To be able to perform a holdings-based analysis, a dataset with common country and industry classifications for all constituents in the two global benchmarks had to be constructed. This allows us to drill into the differences between the two indices at a much deeper level. When creating a common constituent set for the two benchmark providers, we addressed the following issues:

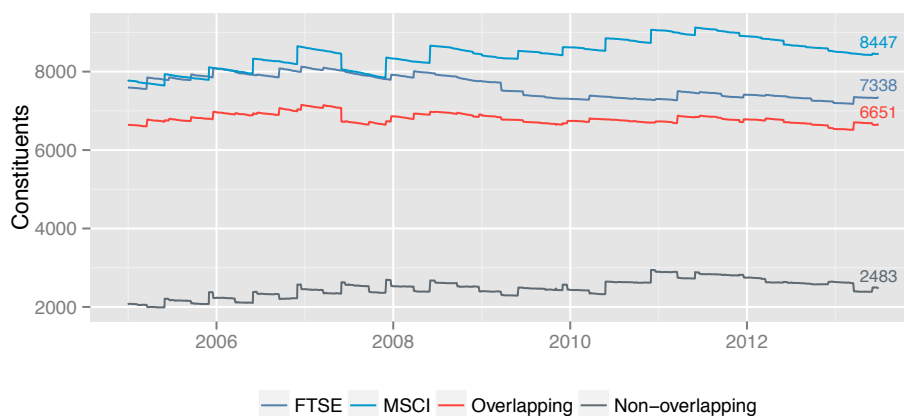
1. Reconciling country classifications (selecting one which is common)
2. Reconciling industry classifications (since FTSE uses ICB and MSCI uses GICS)
3. Constructing FTSE's opening weights prior to 2007 (FTSE does not provide these data)
4. Converting local returns to dollar returns

Further details regarding the construction of the dataset are provided in Appendix 5. Additionally, throughout the analysis below, we have used MSCI as the "active" portfolio and FTSE as the "benchmark" (i.e. measuring MSCI's return relative to FTSE's).

Analysis of constituents

Figure 9 plots the total number of constituents included in the broad equity benchmarks since January 2005 for FTSE and MSCI. Historically, the number of constituents has been quite stable, and until 2008 both MSCI and FTSE seemed to have the same number of constituents. Since January 2008, the number of constituents in the FTSE index has gone down. This coincides with the time when MSCI changed its methodology from industry sampling to full market coverage. It is clear from the chart that these two indices were closer in terms of number of constituents before 2008. As at 28 June 2013, the number of constituents in the two indices was 8,447 and 7,338 for MSCI and FTSE respectively. Also of interest is the number of overlapping and non-overlapping constituents in the two indexes. The number of overlapping and non-overlapping securities has shown little variability since 2005 at around 6,500-7,000 and 2,000-2,500 respectively.

Figure 9: Total number of constituents, both overlapping and non-overlapping (source: FTSE, MSCI, NBIM)



Exploring the non-overlapping names is informative, as it gives an insight into where the two index providers differ in security selection. Table 3 presents the top ten countries ranked by total non-overlapping constituents as at 3 April 2013. The US has 625 non-overlapping constituents, of which 59 are only included in FTSE and 566 are only in MSCI. This is primarily driven by a large number of additional securities added in the small-cap segment by MSCI. The "Weight in country" column indicates the proportion of the country allocation which is accounted for by these constituents. Note that the constituent number for FTSE and MSCI will not completely match the number from official indices, since these figures are based on ICB country classifications.

Table 3: Overview of total non-overlapping constituents by number of non-overlaps (source: FTSE, MSCI, NBIM)

Country	Total non-overlaps	FTSE constituents	Only in FTSE	Weight in country (FTSE)	MSCI constituents	Only in MSCI	Weight in country (MSCI)
US	625	1,946	59	1%	2,453	566	1%
Japan	225	1,201	146	1%	1,134	79	3%
India	166	247	69	12%	275	97	4%
South Korea	165	298	16	1%	431	149	6%
Hong Kong	160	437	35	3%	527	125	2%
Taiwan	137	401	21	0%	496	116	3%
Canada	102	258	14	2%	332	88	2%
UK	84	331	27	1%	361	57	1%
Malaysia	60	89	7	3%	135	53	6%
Brazil	50	141	17	3%	157	33	2%

Table 4 presents the top ten countries based on the weight the non-overlapping constituents account for in the FTSE index. Pakistan and the UAE show up at the top, since these two countries are classified as frontier by MSCI and therefore are not included in the GIMI index. Peru has a total of six non-overlapping constituents, where neither of the indices shares the same constituents. China, Thailand, Singapore and India are the countries which have the highest numbers of non-overlapping constituents.

Table 4: Overview of non-overlapping constituents by weight in FTSE country index (source: FTSE, MSCI, NBIM)

Country	Total non-overlaps	FTSE constituents	Only in FTSE	Weight in country (FTSE)	MSCI constituents	Only in MSCI	Weight in country (MSCI)
Pakistan	15	15	15	100%	NA	NA	NA
Peru	6	2	2	100%	4	4	100%
UAE	14	14	14	100%	NA	NA	NA
China	34	65	20	31%	59	14	9%
Hungary	1	5	1	19%	4	0	0%
Thailand	49	85	23	18%	88	26	12%
Singapore	33	106	15	13%	109	18	4%
India	166	247	69	12%	275	97	4%
Russia	15	31	8	10%	30	7	4%
Philippines	14	39	6	9%	41	8	4%

Benchmark overlap analysis

When analysing benchmarks, it is interesting to see how much weight is allocated to the different constituents. Using a benchmark overlap measure, we can gauge the difference in weight that the two index providers assign to each of the constituents. Benchmark overlap is calculated using the formula below, where the opening weight is used in the calculation.

$$overlap = 1 - \frac{1}{2} \sum abs(weight_{MSCI} - weight_{FTSE})$$

If all constituents are equal and have the same weight, our overlap metric will be 1; however, if a large number of the constituents are unequal, overlap will fall well below 1 (zero being the theoretical minimum). Figure 10 shows the evolution of our overlap measure between the two benchmarks from December 2004 to 28 June 2013. Prior to March 2013, the overlap between the two indices was in the 93-94 per cent range. After FTSE's free float methodology change in March 2013 (from banded to actual) the overlap between the indices jumped to above 96 per cent.

Figure 10: Overall benchmark overlap (source: FTSE, MSCI, NBIM)

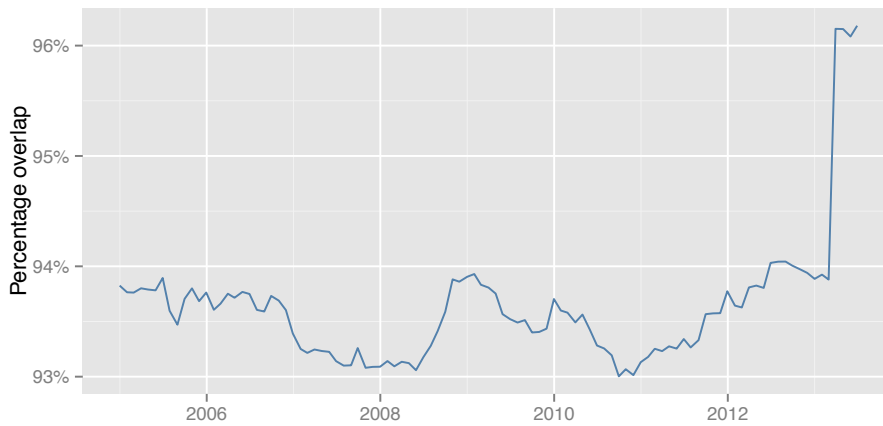
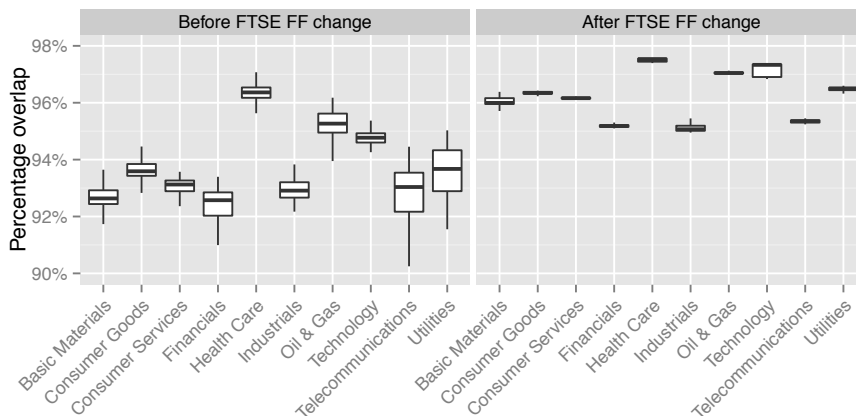


Figure 11 shows a box plot of the daily calculated overlap statistic for MSCI and FTSE before and after FTSE changed its investability methodology in March 2013, broken down by ICB industry. There is some dispersion among the different industries, both before and after the change. Health Care stands out as the industry with the highest level of overlap.

Figure 11: Box plot of daily benchmark overlap broken down by ICB industry, January 2005 – 15 March 2013 = Before FTSE FF change, 18 March 2013 - June 2013 = After FTSE FF change (source: FTSE, MSCI, NBIM)



Regional and industrial allocation between providers

Figure 12 presents year-end regional allocations for the two providers since December 2004, and the current allocation as at 6 May 2013. Several insights from the chart are of interest. Allocations to Europe have decreased over this period. This is a result of the current European debt crisis, which has put pressure on equity markets in the region and in turn reduced Europe’s relative proportion in the indices from 28 per cent in 2005 to 25 per cent in 2013. This has been offset by an increased valuation of Pacific equities, whose allocation has moved from around 15 per cent to 21 per cent. The allocation to America has been stable if we compare December 2004 with May 2013, but there have been large changes during the period. Going into 2008, America’s relative proportion had fallen to around 50 per cent amid increasing valuations in Europe. Since the global financial crisis subsided, America has reverted to around 55 per cent as at May 2013. Another interesting fact is that MSCI tends to have a slightly elevated allocation to America compared to FTSE. In contrast, FTSE tends to have a slightly higher allocation in Europe compared to MSCI.

Figure 12: Regional allocation for MSCI and FTSE indices at year-end (2013 as at 6 May, source: FTSE, MSCI, NBIM)

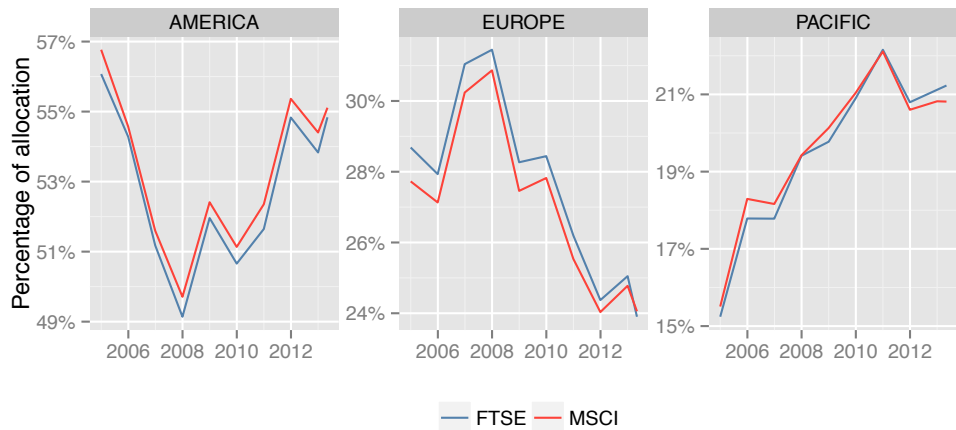
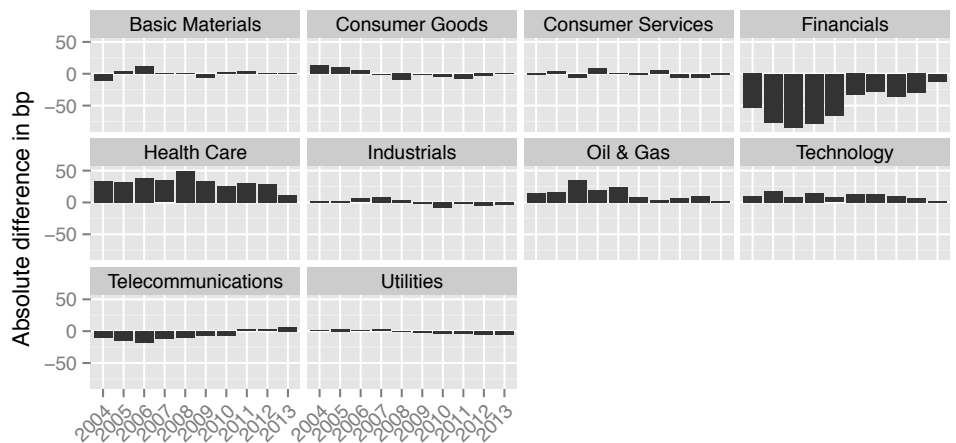


Figure 13 shows the absolute allocation differences between MSCI and FTSE to each of the ten ICB industries. Data are as at year-end for 2004-2012 and 6 May for 2013. Financials and Health Care are noticeably different, with MSCI allocating more weight to Health Care and less to Financials. The differences in allocations have diminished over the last couple of years, but the two industries still stand out with the highest differences in allocations.

Figure 13: Differences in industry allocation for MSCI and FTSE indices at year-end (2013 as at 6 May, source: FTSE, MSCI, NBIM)



Realised return measures

Table 5 summarises the geometric average yearly return and standard deviation since January 2005 for both MSCI and FTSE. In aggregate, the difference in performance is very small, with MSCI posting a return of 5.8 per cent and FTSE a return of 5.9 per cent. This is in line with Figure 8, which showed that the return difference between MSCI and FTSE has been muted over the past eight years. Consumer Goods and Oil & Gas are among the top performers, but Consumer Goods exhibits a lower standard deviation. Financials is clearly the worst performer since 2005 and exhibits the third-highest volatility of all industries.

Table 5: Summary of geometric average return and standard deviation by industry, January 2005 to May 2013 (source: FTSE, MSCI, NBIM)

Industry	MSCI		FTSE	
	Return	Standard deviation	Return	Standard deviation
Basic Materials	7.5%	25.8%	7.7%	25.9%
Consumer Goods	8.8%	14.3%	9.0%	14.4%
Consumer Services	6.6%	16.4%	6.6%	16.5%
Financials	1.5%	23.7%	1.7%	23.6%
Health Care	7.8%	14.2%	8.0%	14.3%
Industrials	6.5%	19.4%	6.7%	19.5%
Oil & Gas	8.0%	26.1%	8.0%	26.0%
Technology	5.4%	19.5%	5.5%	19.4%
Telecommunications	6.2%	16.7%	6.3%	16.6%
Utilities	6.5%	15.9%	6.3%	16.3%
All	5.8%	18.2%	5.9%	18.3%

Figure 14 illustrates the return differences among the ten ICB industries for MSCI and FTSE from 1 January 2005 to 6 May 2013. Utilities and Oil & Gas are the only two industries where MSCI has outperformed FTSE over time. For Consumer Goods, Health Care and Industrials, FTSE has outperformed MSCI by 20bp on an annualised basis.

Figure 14: Annual realised difference in returns, January 2005 to May 2013 (source: FTSE, MSCI, NBIM)

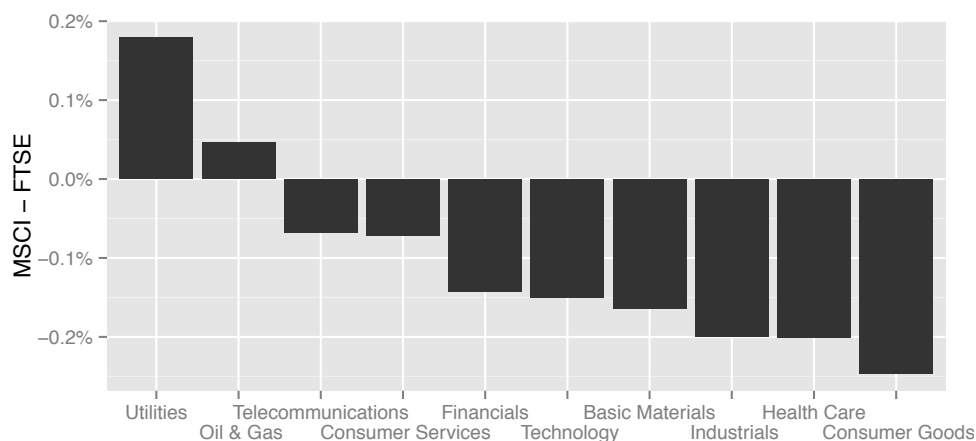
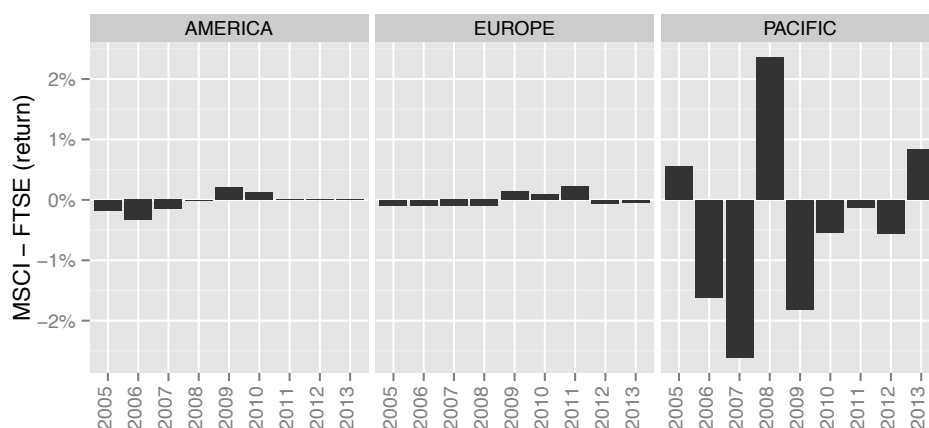


Figure 15 breaks down the return differences among constituent regions. For America and Europe, the differences in returns are negligible, with Pacific standing out as the region where the two providers differ. For 2006, 2007, 2008 and 2009, Pacific shows clearly different returns, with MSCI outperforming FTSE by 2 per cent in 2008. For 2013, MSCI Pacific has so far outperformed FTSE by 1 per cent (based on returns from 1 January to 6 May 2013).

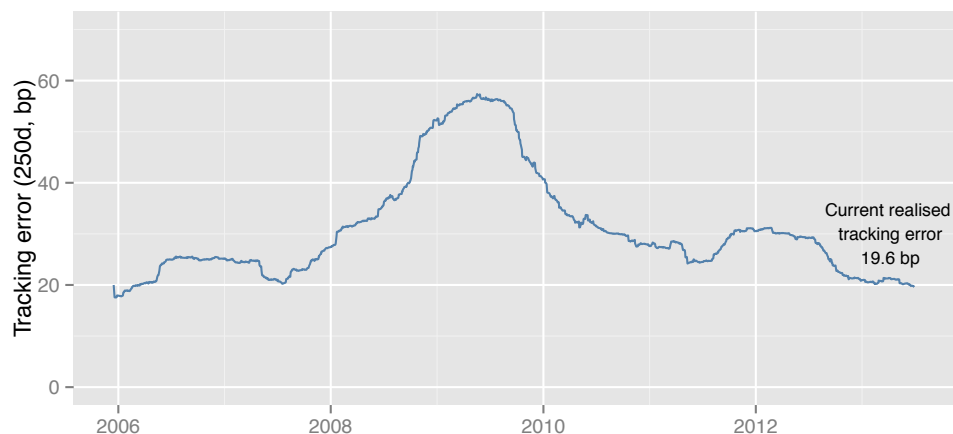
Figure 15: Realised difference in returns for regions, January 2005 to May 2013 (source: FTSE, MSCI, NBIM)



Realised risk measures

Figure 16 shows the 250-day realised tracking error of MSCI relative to FTSE. During the financial crisis, when volatility spiked, tracking error between the two indices was elevated. Once markets cooled down and volatility fell, tracking error reduced considerably. Considering FTSE's change of free-float methodology, we would suspect that tracking error will diminish even further. In order to investigate our expectation, we carried out an analysis of ex ante tracking error as at 15 and 18 March 2013²⁵. On 15 March, the ex ante tracking error was 20bp, while on 18 March the ex ante tracking error was 12bp.

Figure 16: Realised tracking error, MSCI portfolio and FTSE benchmark, 1 January 2005 to 28 June 2013 (source: FTSE, MSCI, NBIM)



25 Our ex ante tracking error is calculated using a three-year historical sampling of security returns for the securities included in the index at the selected dates.

Conclusion

This note has presented both qualitative and quantitative analysis of MSCI's and FTSE's global benchmarks. A fundamental trend in the benchmark industry has been the development of benchmarks from concentrated portfolios covering a specific set of markets, towards full coverage in terms of both company size and regional coverage. The importance of benchmarks has also increased with the recent growth of index funds.

Both MSCI and FTSE follow a rules-based approach when constructing their equity benchmarks, in theory allowing for limited subjectivity in the security screening process. MSCI and FTSE classify markets according to a similar set of rules, although they differ in how they classify South Korea (developed by FTSE and emerging by MSCI). Inclusion of index orphans by FTSE ensures that some companies with ambiguous country classifications are not dropped from the indices. MSCI targets 99 per cent of the investable universe, thus including a larger number of small-cap companies in its index than FTSE, which targets 98 per cent. We showed that MSCI's global focus on size integrity and coverage creates a mid-cap segment which is different from that of FTSE (FTSE classifies smaller companies as mid-cap than MSCI does, a result of FTSE's focus on regional size integrity). Based on a simple indicator of trading, we also showed that less trading has been required to follow MSCI historically (which is only true because of the change in free-float methodology in March 2013, and not necessarily expected going forward).

From a return and risk perspective, our analysis indicates that, over the past ten years, FTSE has had a higher cumulative return than MSCI. Most of this outperformance, however, occurred in 1998 until 2001. Post 2001, performance of the two indices has converged. In terms of index composition, the two indices have historically had an overlap of around 93-94 per cent, while this has moved to around 96 per cent after FTSE's change of free-float methodology. Realised tracking error has gone down over the last couple of years.

Although a walkthrough of the methodology for the two global benchmarks shows that there are multiple differences in the rules that decide which stocks go into the index, we also see that, for a global investor, these differences do not make much of a difference to risk/reward, especially over the last few years. We think this might reflect a convergence over time among practitioners on what the "best practice" for constructing market-cap-weighted indices is. Another possibility is that the convergence is being driven by the needs of the fast-growing ETF sector. For an index fund or an ETF vehicle, where replicating a benchmark is the goal, availability of liquidity (which the vendors try to ensure through relatively complex liquidity rules and narrow free-float bands) at every point in time is of high importance. For an active long-term asset manager, where the benchmark is primarily a yardstick for the performance of an allocation to equities, this would be less of a concern.

Recent, well publicised, index benchmark switches might indicate that choice of a global benchmark for equities is mostly a matter of cost for many investors²⁶. Leaving cost considerations aside, we think a potential differentiator in the future might be increased transparency in areas of benchmark construction, which is difficult and costly for the end-user to verify. In this note, we have highlighted free-float adjustments as one such area, where, due to the lack of clarity on the information used for the adjustments, asset managers will be in a worse position to understand how the final benchmark is constructed and how the weight of each constituent is assigned.

²⁶ Vanguard chose to switch benchmark for a number of funds in 2012, see https://pressroom.vanguard.com/press_release/2012.10.02_benchmark_change.html

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Appendices

Appendix 1: Market classification

Classification of a specific market, like index construction, can follow a rules-based or subjective process. MSCI and FTSE both use a mixed approach in the classification of a market. A similar set of rules along three broad categories are used to guide the decision. These include the economic development of a country, the size and liquidity of the market, and the accessibility of the market for international investors. In each of these categories, the providers will assess the market (using more detailed questions and criteria) and finally decide upon a classification of the market.

There are some cases where markets are classified differently by MSCI and FTSE. Most prominent is South Korea, which is classified as emerging by MSCI and developed by FTSE²⁷. MSCI and FTSE both provide extensive coverage of the reasons behind their decision. In short, the two major issues that MSCI highlights are currency non-convertibility and no omnibus structure and use of in-kind transfer. The next case where MSCI and FTSE differ is Pakistan, which MSCI classifies as frontier. The reasoning behind classifying Pakistan as frontier was the imposition of a “floor rule” in 2008 on the Karachi Stock Exchange, effectively shutting down the exchange for almost four months. The last country classified differently by MSCI and FTSE is the UAE. UAE has not been upgraded to emerging by MSCI due to poor investor protection for international institutional investors. Recently, however, MSCI announced that UAE will be reclassified as emerging, Morocco will be reclassified as frontier and South Korea is still on the watch list for upgrade.

Once all markets are classified, the next step is to determine to which market a specific security belongs. MSCI and FTSE have a common rule where each security is classified into a single country only. The implication of this is that securities with multiple listings in different countries will all be assigned to the same country. When assigning the market of a security, the general rule of both providers is to check whether country of incorporation equals the country of primary listing. If so, this will be the country of the security. If not, further steps are employed to assign a country, which in turn brings about differences. FTSE will turn to its FTSE National Committee, which is responsible for making these country classifications. MSCI will, on its part, revert to a set of specified rules and decide internally the appropriate country for the security.

27 For MSCI, see http://www.msci.com/resources/webcast/korea_an_institutional_perspective.html. For FTSE, see http://ftse.com/Research_and_Publications/2013Downloads/FTSE_South_Korea_Whitepaper_Jan2013.pdf.

Appendix 2: Construction of index universe

A short summary of each provider's process regarding the construction of the index universe is presented below. Common to the two providers is the use of market capitalisation coverage when choosing which securities should be included in the index. In order to calculate the market cap of a security, the number of shares outstanding has to be chosen. MSCI and FTSE have minor differences in methodology regarding updating the number of shares. FTSE states that it updates the number of shares outstanding when there is a 1 per cent cumulative change, which will be applied at the next quarterly review. MSCI will update its shares outstanding if there is a change of at least 0.02 per cent or more than 1,000 shares, at the next index review. In cases of corporate actions, there are further differences. FTSE will update the shares outstanding immediately following the corporate action. MSCI will also update the shares outstanding immediately following the corporate action unless the change is less than 5 per cent, in which case it will wait until the next scheduled index review.

FTSE selection process

For each region, FTSE orders the universe by cumulative full company market capitalisation. It starts with what is called the full regional universe, where all eligible securities are included. Based on this set of securities, companies are ranked by the full market cap of the company (the sum of all security lines of the company) in descending order. Next, cumulative market cap coverage is calculated, and the top 98 per cent of the regional universe is selected. The list of securities which are within the top 98 per cent cumulative company market cap is called the index universe and is used when applying investability filters.

MSCI selection process

MSCI's process of selecting the securities that should be included in the index universe has some notable differences compared to FTSE. Initially MSCI sorts all companies in their developed markets equity universe by their full company market cap. Once 99 per cent cumulative market cap coverage is reached, the full company market size and rank of the company is noted. The full company market size of the last company included is defined as the equity universe minimum size and represents the minimum full market cap of any company which is to be included in the GIMI index. MSCI has an additional constraint, which is that the free-float market cap of a security has to be at least 50 per cent of the equity universe minimum size in order to be included in the index.

Appendix 3: Investability filters

Free-float adjustments

FTSE Global All Cap and MSCI Global Investable Market Indices are both free-float-adjusted indices, where MSCI and FTSE share the basic underlying principles when free float is calculated. Both try to identify what they call strategic investors, which are investors who hold stocks which are not readily available for purchase. This seemingly simple task is often a source of difference between providers. What should be defined as a strategic investor is not always deterministic, so each provider might have differing criteria to classify an investor as strategic. Additionally, calculation of free-float factors requires updated shareholder data, which in many cases might not be available (one cannot rule out that outdated information could be used at times). Once strategically held shares are found, the free-float factor will be calculated according to the formula below:

$$\text{free float factor} = 1 - \frac{\text{strategically held shares}}{\text{total shares outstanding}}$$

Once the free-float factor is found, it is multiplied by the full market cap of the security to give the free-float market cap of a security. Currently, MSCI and FTSE do not use the precise free-float factor. MSCI has a practice of rounding up the free-float factor to the closest 5 per cent, while FTSE rounds it up to the nearest 1 per cent.

Liquidity filters

MSCI and FTSE both apply liquidity filters to each of the securities that they intend to include. While both MSCI and FTSE base their liquidity measures on trading volume, there are differences in the filters. The most prominent difference is that MSCI uses a set of three filters, while FTSE has chosen a single measure.

MSCI has created a filter called the Annual Traded Value Ratio (ATVR), which it evaluates over both a 12-month and a 3-month period. Additionally, it screens on the frequency of trading, which is defined as the number of days that a security has traded. FTSE has a single measure which it calculates based on the median daily trading volume per month. The main difference between FTSE and MSCI is that MSCI differentiates between developed and emerging markets in setting the required thresholds.

FTSE multiple lines filter

FTSE has an additional rule where secondary lines of a company have to have a market cap which is 25 per cent or more of the full market cap of the principal line in order to be included in the index. MSCI does not have this rule, but will generally include preferred shares if they do not exhibit characteristics of fixed-income securities. For illustration, Table 6 shows a list of securities where MSCI has included preferred shares and FTSE has not. For all of these securities, the ratio between the full market cap of ordinary and preferred shares is below 25 per cent, so the securities are excluded under FTSE's rule.

Table 6: Secondary lines affected by FTSE's rule (as at 28 June 2013, source: FTSE, MSCI, NBIM)

	Market cap ordinary, USD bn	Market cap preferred, USD bn	Preferred/ Ordinary
Bayerische Motoren Werke AG	52.6	3.7	7.1%
Buzzi Unicem SpA	2.5	0.3	12.6%
Grupo Argos SA	6.4	1.4	21.4%
Hyundai Motor Co., Ltd.	43.5	2.1	5.2%
LG Chem Ltd.	14.7	0.8	5.0%
Mechel OAO	1.2	0.2	19.1%
RWE AG	18.4	1.2	6.6%
Samsung Electronics Co., Ltd.	173.1	17.7	9.6%
Sberbank Russia OJSC	61.6	2.1	3.5%
Surgutneftegas OJSC	28.2	4.8	17.3%

Appendix 4: Index maintenance

We have summarised the main differences between MSCI and FTSE when it comes to index maintenance in Table 7 below. MSCI currently updates its index four times a year, where two of the updates are full (May and November) and the remaining two (February and August) are partial. A full update means that the entire equity universe is updated, while a partial update implies that only major new changes are reflected and size segments are updated. FTSE reviews its index at quarterly intervals, where a specific set of regions are refreshed. This implies that each region is refreshed annually, but at differing times during the year.

Table 7: Summary of index maintenance

	FTSE	MSCI
Number of reviews each year	4	4
Review method	Staggered annual review per region / moving to semi-annual global reviews from March 2014	Full semi-annual index review (SAIR) and partial quarterly index review (QIR)
Review periods	March: Asia Pacific ex Japan June: Latin America, Emerging Europe and Middle East & Africa September: Developed Europe and Japan December: North America	February: QIR May: SAIR August: QIR November: SAIR

Fast entry/exit from indices and IPO additions

MSCI will include stocks which are classified according to their standard index universe. This means that large- and mid-cap stocks are possible entrants to the indices between reviews. FTSE, on the other hand, only allows stocks which are in the large-cap segment to be added to their indices. Overall, this makes FTSE much stricter when it comes to adding new securities to its indices on an ongoing basis.

The handling of IPOs differs between the providers. FTSE has a rule where IPOs of the correct size are included after five days of trading. MSCI, on the other hand, includes IPOs after ten days of trading. An example of how the providers treat IPOs differently is the recent addition of Facebook to the indices. FTSE included the IPO after five days of trading at a price of 31.91, while MSCI waited an additional five days and included the security at a price of 27.72. This represents a difference of 15 per cent in inclusion prices.

Treatment of suspended shares

Suspended shares are another important part of ongoing index maintenance. Constituents should be removed from the index if there is reasonable belief that normal trading will not resume. Whether there is a reasonable belief that normal trading will not resume is highly subjective, hence differences between MSCI and FTSE arise. Table 8 summarises the main differences between MSCI and FTSE when it comes to stated treatment of suspended shares, with the main difference being that MSCI carries forward a suspended price for 40 days, compared to FTSE's 20 days. In the table, we have also included an analysis of whether the rules are actually followed or not by each index provider. FTSE seems to be much more likely to remove a security from its benchmark due to suspension, having removed 26 securities in 2012 and 2013. MSCI has only removed two securities over the same timeframe. When it comes to including securities that have been excluded, FTSE has reinstated four securities, whereas MSCI has reinstated none.

Finally, we have included a summary of days that a suspended security's price is carried forward. This clearly demonstrates inherent difficulties in determining whether there is reasonable belief that a security will resume normal trading or not. Both MSCI and FTSE have a wide span of days, with around a year for FTSE. The median figure indicates that FTSE has a tendency to keep securities longer than the stated 20 days, while MSCI is inclined to exclude securities before its 40-day limit.

Table 8: Treatment of suspended shares (source: FTSE, MSCI, NBIM)

	FTSE	MSCI
Price on suspended shares carried forward	20 business days	40 business days
Deletion of suspended shares	Usually at the 21st business day after suspension	Where return to normal business activity and trading is unlikely in the near future
Re-addition of suspended shares	<3 months: reinstated at price at which it was removed >3 months: treated as a new issue for the purpose of index eligibility	At next semi-annual index review
Securities removed due to suspension (2012 & 2013)*	26	2
Securities included after suspension (2012 & 2013)**	4	0
Days carried forward (min – median – max) (2009 – 2013)	1 – 27 – 261	1 – 33 – 185

* Securities which are removed are identified with large negative returns, and closing market cap near zero.

** Securities which are included are identified with large positive returns, and opening market cap close to zero.

Appendix 5: Construction of bottom-up dataset

Construction of a dataset with a set of common country and industry classifications was a major part of the work behind the results of this discussion note. The key steps in the construction process are outlined below.

One of the main challenges was to select a single unified industry classification scheme. As at June 2013, FTSE uses the ICB classification system, while MSCI uses GICS. These two classification systems are not equal, so a simple mapping between the two cannot be done. We have had access to the ICB classification universe since 31 December 2004. This universe is broad and covers all securities in FTSE, and close to all in MSCI. For the few missing securities in MSCI, we have mapped these to ICB sectors based on our best estimate. This allows us to dig deeper into the differences between the two providers when it comes to specific securities in each industry.

The next step was to select a common country classification scheme. Again we used the ICB universe, which contains a country classification for the majority of the constituents. This allows us to discover the different regional allocations between the indices. One weakness of using the ICB country classification is that this is not always the same as the FTSE or MSCI country classification. Thus, in some of the analysis, the number of constituents in a specific country might not always be the same as FTSE and MSCI report²⁸.

The third issue that we faced was related to opening weights for constituents in the FTSE index. We do not have access to constituent-level opening weights for small-cap stocks prior to 2007. To be able to include these securities in the comparison, we have subtracted price return in dollars from a closing market cap in dollars. For the entire period from 2003 until today, market caps have been available for large- and medium-cap securities.

The last complication that we had to overcome was related to the choice of total returns and how to convert these into dollar returns. We chose to use each provider's own return for each security. The reason behind this is related to suspended shares. In those cases where securities are removed from an index due to suspension of trading, MSCI or FTSE will set the price to the lowest possible price on the stock exchange. This creates a return of around -99 per cent on this specific day, and if only one of the providers takes the security out, using this return for the other provider will make a difference. This is also a problem in those cases where a security is included after being excluded due to suspension. The price return on the day of inclusion will be calculated using the price when it was taken out of the index (typically 0.0001) and then at the end of the day. This will create a very high price return, and if the security is included in one of the indices on the day, with a normal market cap, this price return will dominate the return of the index. In Table 9, we have illustrated how an inclusion of suspended shares might distort calculations of total return on a specific day. On 15 May 2012, Titan Petrochemicals was reinstated in the FTSE global benchmark after a suspension of trading. The return on the specific day using FTSE data is well above MSCI's total return, but the initial weight that FTSE uses for the security does not create a problem related to the return for the index (in reality the security is added the next day).

Table 9: Inclusion of Titan Petrochemicals in FTSE global benchmark

Date	FTSE market cap (open)	FTSE total return (USD)	MSCI market cap (open)	MSCI total return (USD)
11/05/2012			281.4	0.0%
14/05/2012			281.4	-36.4%
15/05/2012	0.1	200,847.0%	178.9	12.9%
16/05/2012	200.7	0.5%	201.9	0.5%
17/05/2012	201.7	1.5%	202.9	1.5%
18/05/2012	204.7	-1.9%	205.9	-1.9%

28 The main difference here will be that ICB classifications are based on country of primary listing, which moves a large amount of securities from China to Hong Kong (but since we are using the same classification for each benchmark, this will not skew the results).

We have also used local currency returns from both providers and converted these to dollar returns. This is due to some conversion differences where currencies are quoted as inverses, and FTSE truncates at the fifth decimal, whereas MSCI does not.

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