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Research paper

Evaluating global listed infrastructure indices

Global Listed Infrastructure
June 2015

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Abstract

The purpose of this paper is to update the detailed analysis of the major global listed infrastructure indices we conducted in 2013. This follows the release of two new global listed infrastructure indices, by both FTSE and MSCI, and the decommissioning of the UBS infrastructure index series.[1] The focus of this paper is on whether the indices truly capture the infrastructure characteristics many investors are looking for, including low cashflow volatility from long lived assets, inflation protection, and portfolio diversification benefits[2].

We have again weighed the strengths and weaknesses of these indices against the most common alternative benchmark, being an inflation plus target.

Two years on, the analysis again highlights the significant divergence with regards to the infrastructure 'purity' of the indices, their historical volatilities, and their correlations to global equities. There were also considerable differences with regards to the degree of subjectiveness within the index construction processes. However, all the indices we analysed demonstrated relatively weak linkage to inflation, to differing degrees, as compared to typical investor expectations of the asset class.

We believe an infrastructure manager should be focussed on delivering results across the key characteristics of the asset class such as low cashflow volatility, inflation protection and portfolio diversification. Index choice therefore remains an important consideration for investors.

From our review of the indices, we conclude that the new FTSE Global Core Infrastructure 50/50 Index is now the most superior infrastructure index available. It scores strongly across our qualitative assessments of infrastructure purity and historical volatility, correlation and beta. It is as strong as any other infrastructure index from an inflation linkage perspective, and we rate its index construction highly based on its transparent and robust methodology. For investors who would prefer to use an index as their benchmark we would therefore recommend the FTSE Global Core Infrastructure 50/50 Index.

It is the lack of focus on the inflation linkage aspect of all infrastructure indices, which is understandable due to the complexity involved in evaluating this factor, remains a weakness of the infrastructure indices generally, including the new FTSE Index. Our view is inflation linkage is one of the key characteristics of the asset class, and so should be focussed on throughout the investment process. For this reason we believe that an "Inflation plus" benchmark continues to best align managers with the investment objectives of the asset class.

Notwithstanding this, we are very supportive of the development of the new FTSE Global Core Infrastructure 50/50 Index and expect it to play an important role in the industry going forward. We will adopt it for a number of client reporting functions; such as communicating our investment style with investors, discussing portfolio positioning, considering current portfolio risks, evaluating shorter-term performance, and conducting attribution analysis.

[1] In late 2014, UBS announced that it expected to decommission their suite of GLI indices in early 2015. In January and March, MSCI and FTSE each respectively launched new versions of GLI indices, as potential substitutes for investors previously using the UBS indices.

[2] With regards diversification, we are referring to the addition of infrastructure to a broader investment portfolio (as opposed to the diversification within individual listed infrastructure portfolios). As such, the benefit we are referring to is the relatively low correlation of the infrastructure asset class to other asset classes.

1. Background

In February 2013, we published a research paper entitled “A review of Global Listed Infrastructure indices”. The purpose of the paper was to conduct a detailed analysis of the major global listed infrastructure indices, and in particular to focus on how effectively they capture the key characteristics that investors commonly seek from the asset class. These infrastructure characteristics include low cashflow volatility from long lived assets, inflation protection, and portfolio diversification benefits. We then assessed the strengths and weaknesses of these indices against the most common alternative benchmark, being an “inflation-plus” target.

Our analysis highlighted a significant divergence with regards to the infrastructure ‘purity’ of the indices, their historical volatilities, and their correlations to global equities. There were also considerable differences with regards to the degree of subjectiveness within the index construction processes. However, all the indices we analysed demonstrated relatively weak linkage to inflation.

We believe an infrastructure manager should be focussed on delivering results across the key characteristics of the asset class. From our analysis, none of the main indices capture these characteristics effectively in relation to inflation linkage when looked at in totality.

In our original research paper, we suggested the industry needed to come together to form a better index. That concept has now become a reality with the launched of the FTSE Global Core Infrastructure 50/50 Index, which better addresses the issues previously raised about the existing indices on offer. The catalyst for FTSE launching the new index was an announcement by UBS in late 2014 that they would be discontinuing their calculation and decommissioning all of their existing Infrastructure & Utilities Indices, including the widely used UBS Global Infrastructure & Utilities 50-50 Index. Subsequent to the UBS announcement, a working group of industry participants including both institutional GLI investors, of which we were a part of, and global asset consultants, approached a number of index providers with the aim of creating a “better benchmark”. Part of the working group’s time was spent on capturing the relative importance of key infrastructure characteristics. The common theme was infrastructure purity and we believe the FTSE-created solution is a superior result as compared to any of the other existing benchmarks.

The development of this new index is a positive outcome for the industry as a whole; and if widely adopted would remove what is currently one of the biggest distractions and hurdles for new investors, and enable a clear evaluation of the performance of managers and the risks within infrastructure portfolios.

2. Comparison of available GLI indices

Investing in infrastructure has continued to gain focus as investors note the potentially attractive characteristics of the sector. These features include the essential service nature and strong strategic positions of the underlying assets, which are believed to provide a more defensive equity investment. In a number of cases the revenues of infrastructure assets have a natural link to inflation. It is thereby proclaimed that this results in inflation protection for investors. From a portfolio perspective, the long-dated cashflows from infrastructure assets are seen as an effective match for long-dated liabilities, and the lower correlation to other asset classes can provide diversification benefits.

In our 2013 report, we identified two challenges commonly confronting potential investors in this asset class:

1. Limited historical performance data

Due to the short history of investing in infrastructure, there is little data available with regards to the historical performance of the asset class.[3] Further, the analysis of this index data produces mixed results, which generally do not support the above desired characteristics of infrastructure investing.[4]

2. No agreed benchmark for listed infrastructure

The listed infrastructure industry has not been able to agree on a common performance target/benchmark to be measured against. This has resulted in significant differences between investment strategies, and consequently performance, simply because of the benchmark chosen. It is therefore critical to for investors to select a manager who is measured against a benchmark with attributes matching their investment objectives effectively. Currently the indices vary so significantly in fundamental areas such as volatility, correlation to global equities and, in our opinion, relative inflation protection.

We have conducted this analysis with the genuine objective of weighing the relative strengths and weaknesses of the alternatives available, with no existing bias. We have then used this analysis to identify the benchmark that we believe best suits our investment strategy; although in doing so have also considered how possible differences in investment strategies could have impacted our conclusion. The general choice for investors in Global Listed Infrastructure ("GLI") securities is whether to use an absolute return target as the benchmark or an infrastructure index.[5]

Listed infrastructure indices

The first listed infrastructure securities index was the Macquarie Global Infrastructure Index ("MGII"), which is managed by FTSE and was released in 2005. Since then a number of competing infrastructure indices have been released; including the S&P, UBS (calculated by S&P) and now being decommissioned, Dow Jones Brookfield, MSCI and FTSE infrastructure indices.

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[3] This is especially the case for direct investing in infrastructure, but also the case for listed infrastructure securities – where most infrastructure indices only have data tracking back to the early 2000's. The longest goes back to only 1995.

[4] For example, the expected defensive nature of the assets is in contrast with volatility which in some cases is at, or only slightly below, that of global equities. The correlation to global equities is also relatively high, in some cases around 0.90, which puts into question the diversification benefits. In addition the inflation protection characteristic has not been able to be well demonstrated in the historical data.

[5] The indices analysed are those with broad market acceptance, namely: Dow Jones Brookfield Global Infrastructure Index ("DJB"), FTSE Global Core Infrastructure 50/50 Index ("FTSE 50/50"), MSCI World Core Infrastructure Index ("MSCI Infra"), OECD Total Inflation-Plus ("Inflation-Plus"), S&P Global Infrastructure Index ("S&P Infra"), and the UBS Global Infrastructure & Utilities 50-50 Index ("UBS 50-50").

Appendix 1 summarises of the methodologies of the five indices being reviewed, including the parties responsible for the stock screening of these indices.

We have not conducted a detailed review of the MGII for two reasons. Firstly, the index is no longer commonly used in the market. Secondly, the composition of this index is sub-optimal for the typical objectives of investors – it is heavily dominated by utilities, but specifically integrated utilities that generally operate in competitive markets (and so do not well demonstrate low volatility or inflation protection). Whilst we originally chose not to conduct any analysis on the FTSE or MSCI indices in our 2013 report, we have chosen to do so at this time, due to the launch of their new 'more pure' indices.[6] The conclusions from our updated review are as outlined in the table below:

Index	DJB	FTSE 50/50	MSCI Infra	S&P Infra	UBS 50-50
Equity-Linked	Yes	Yes	Yes	Yes	Yes
Infrastructure Purity	Relatively High 70% cashflow test applied	Relatively High 65% revenue test applied	Average GICS codes only. Includes non-core sectors such as integrated power utilities.	Relatively Low GICS codes only. Includes non-core sectors such as integrated power utilities and many non-infrastructure stocks.	Average 50% infrastructure test applied. Includes non-core sectors such as integrated power utilities.
Methodology	Not transparent constituent selection process and potential for conflict; risk of bias.	Robust and largely transparent construction process	Robust and transparent construction process	Robust and transparent construction process	Robust construction process, with independent committee, but not transparent or formulaic
Independence	No	Yes	Yes	Yes	Yes
Stock concentration	High 10% stock cap Top 10 represent ~44% 94 stocks	Very Low 5% stock cap Top 10 represent ~28% 213 stocks	Low 5% stock cap Top 10 represent ~33% 118 stocks	Average 5% stock cap Top 10 represent ~35% 75 stocks	High 5% stock cap Top 10 represent ~41% 100 stocks
Geographical Diversification	Significant bias towards North America	Some North America bias but very diversified global reach	Some North America bias; Europe is small; excludes EM[7]	Well diversified	Some material country concentrations e.g. Japan; excludes EM
Sectoral Diversification	Significant bias towards oil & gas pipelines; limited exposure to traditional infrastructure (airports and toll roads)	Well diversified to represent the "median manager"; high exposure to regulated utilities, no integrated utilities	Limited exposure to traditional infrastructure (airports and toll roads)	Well diversified; relatively high exposure to transportation infrastructure	Well diversified, but with apparent underrepresentation of pipelines; relatively high exposure to transportation infrastructure

Source: Dow Jones, S&P, FTSE, MSCI, Bloomberg, MBA GLI research.

[6] The previous MSCI index (MSCI World Infrastructure Sector Capped) had what we believed to be an unduly heavy weighting to telecommunications companies. The prior FTSE Global Infrastructure Index had material weightings to "infrastructure related" sectors including commodities, building materials, construction and travel.

[7] MSCI does not purposefully exclude emerging markets across in its infrastructure index, but that the MSCI World Core Infrastructure Index is based on a developed markets parent index for constituent selection.

3. Review of index infrastructure characteristics

To test the impact of the index construction processes on the characteristics of the index, we have conducted a review of each of the approximately 300 stocks that have current weightings in any of the five indices. This exercise replicated the processes in our February 2013 research.

Our objective was two-fold:

1. How "pure" is the index from an infrastructure perspective?
2. How strong is the inflation linkage of the companies within the index?

Infrastructure "purity"

By infrastructure "purity", we are referring to the extent that the assets within the index constituents exhibit what we believe to be the key infrastructure characteristics. Some assets strongly exhibit these characteristics (so we have assigned a 100% "strength factor"), whilst other assets may partly exhibit the characteristics (a factor between 100% and 0%), and some do not exhibit them at all (resulting in a 0% strength factor)[8].

To conduct this analysis, we first calculated the proportion of each company across 20 different sector types[9]. The index purity is therefore the weighted sum of each sector's proportion multiplied by its sector strength factor.

Determining the appropriate sectors and their sector strength factors is clearly highly subjective. We have formed our views primarily based on our experience in the sector, and supported by the recent academic analysis in relation to volatility and inflation protection. Importantly, we have split our sectors based on the commercial arrangements supporting the infrastructure assets, not only based on the physical characteristics of the assets, which is the more common approach applied by the majority of infrastructure investors. We have split the assets in this way as we strongly believe infrastructure sectors should be defined as much by the predictability of the cashflows as they are by the physical characteristics.

The results of our calculations of the infrastructure "purity" of the indices are as follows. Our sectors, their applied sector strength factors and resulting sector splits are shown in Appendix 2[10].

Index	Index "Purity"
FTSE Global Core Infrastructure 50/50 Index	83%
Dow Jones Brookfield Global Infrastructure Index	82%
UBS Global Infrastructure and Utilities 50-50 Index	77%
MSCI World Core Infrastructure Index	75%
S&P Global Infrastructure Index	73%

Source: Bloomberg; FTSE; MSCI; MBA GLI calculations based on original data sourced from index providers.

[8] In setting these strength factors, we have not placed as much emphasis as we otherwise would have on the inflation protection characteristic of the assets, as we have separately analysed this factor in the next section of the report.

[9] In calculating the proportion of these sectors in each company, we generally utilised EBITDA splits. In some companies this information was not available, and so we used the available information and / or spoke to the company to form our best estimate of the split. We do acknowledge limitations with using an EBITDA number, which may mean that it is not an accurate split of the proportional value of the company, however in our opinion it would enable the greatest consistency and accuracy across the group.

[10] Generally we feel the sectors that have weightings of 100% or 0% are self-explanatory. We would be happy to discuss in further detail our rationale for the weightings of any sectors, but particularly those between these extremes, with interested parties.

Our view is these results are consistent with our expectations, and strongly reflect the different methodologies across the five indices. The mechanical approach of the S&P remains the least precise in ensuring infrastructure "purity", as was the case in our 2013 analysis. The higher thresholds of the infrastructure definitions adopted by both FTSE and Dow Jones Brookfield see their respective indices in first and second spots under the same analysis.

Inflation linkage

The second piece of the analysis was to test the strength of the inflation linkage in the constituents of the five indices. **This analysis focussed on the proportion of revenues that are directly linked to inflation for a specified period of time.**

There are certain regions and asset types that show a more direct inflation linkage. In general these are regulated businesses and toll roads in the UK, Europe, Australia, Brazil, Chile, Mexico and some South East Asian countries. Other assets and regions tend to have more indirect linkages, whilst some assets have limited or no inflation linkages.

The updated research show little distinction from the 2013 results. The combined weightings of the companies in the indices whose revenues passed the below inflation linkage tests were as follows. We have relied on an identical process to calculate this analysis as we did in our 2013 research:

Index	Greater than 50% of revenues strongly linked to inflation for more than 15 years	Greater than 50% of revenues strongly linked to inflation for more than 5 years	Greater than 25% of revenues strongly linked to inflation for more than 5 years
FTSE Global Core Infrastructure 50/50 Index	16%	22%	29%
Dow Jones Brookfield Global Infrastructure Index	18%	20%	31%
UBS Global Infrastructure and Utilities 50-50 Index	15%	18%	22%
MSCI World Core Infrastructure Index	14%	20%	27%
S&P Global Infrastructure Index	14%	21%	26%

Source: Bloomberg; FTSE; MSCI; MBA GLI calculations based on original data sourced from index providers.

The results first show that the FTSE and DJB are slightly stronger than the other three indices on this key infrastructure characteristic. Again, we attribute this to the differences in process between the indices. And as per the FTSE, we believe the DJB Index could have been stronger still, except for its regional focus on North American companies, which typically do not have strong inflation linkages.

Of greater importance is that the results show all five indices to have a relatively low proportion of companies with strong inflation protection characteristics. We do not suggest that an infrastructure portfolio should score 100% on this evaluation, or even near 100%, as that would unnecessarily restrict the opportunity set and would likely result in high portfolio concentration risks (for example to individual countries and regulatory frameworks). However, if an objective is to provide a higher level of inflation protection relative to other asset classes, then we believe that the above numbers for the indices are too low.

In our opinion these results are also counter to the perception that the asset class (as a whole) provides direct inflation protection, and may explain why academic analysis on the asset class, when looked at as a whole[11], has not been able to effectively support this proposition. Further, and as proposed in our 2013 White Paper titled "Infrastructure, Risk and Inflation – A Review of Recent Academic Empirical Studies", even to the extent that the indices may have provided a form of inflation linkage over the last 10 to 15 years, the above analysis demonstrates the low likelihood that this trend would continue to be the case in a higher inflation environment.

As such, if inflation protection is a key tenet being sought by investors, then we believe that the makeup of the indices suggests that investors should consider carefully whether they are an appropriate performance measurement tool. Our position is an investment process and philosophy that is properly aligned with an inflation-plus benchmark would result in a higher proportion of investments with a strong inflation linkage than those calculated for the indices in the table above.

[11] As we detail in our White Paper, titled "Infrastructure, Risk and Inflation – A Review of Recent Academic Empirical Studies", stronger results were found in relation to inflation linkage when the data set was reduced to only those infrastructure companies with high pricing power assets. This is consistent with our views of the wide divergence in inflation protection ability across the infrastructure universe.

4. Statistical review of historical performance

Historical beta, correlations and standard deviations for the indices relative to global equities, are calculated below.

Historical standard deviations

	Volatility (% p.a.)		
Index	**3 years**	**5 years**	**7 years**
FTSE Global Core Infrastructure 50/50 Index	9.7%	10.6%	14.0%
Dow Jones Brookfield Global Infrastructure Index	9.7%	11.1%	14.7%
UBS Global Infrastructure and Utilities 50-50 Index	10.7%	11.8%	16.3%
MSCI World Core Infrastructure Index	10.0%	11.7%	15.5%
S&P Global Infrastructure Index	10.4%	13.1%	17.8%
MSCI AC World Index	10.6%	14.5%	18.7%

Source: Bloomberg; FTSE; MSCI; MBA GLI calculations based on original data sourced from index providers.

Notes: USD Total Returns for 3 years, 5 years and 7 years to 31 March 2015. Data as at 31st March 2015.

As shown above, the indices have each demonstrated a materially lower standard deviation to global equities.

It is no surprise that the relative volatilities of the indices closely match the "purity" of the indices (as calculated in section 3). Some of this difference in volatilities we believe can be attributed to different index weightings to individual infrastructure sectors. But in addition, and consistent with our views on correlations, it is our opinion that the **infrastructure "purity" of any infrastructure index or portfolio will directly impact the level of volatility reduction achieved relative to global equities**.

Historical correlations

	Correlation vs. MSCI World		
Index	**3 years**	**5 years**	**7 years**
FTSE Global Core Infrastructure 50/50 Index	0.70	0.81	0.89
Dow Jones Brookfield Global Infrastructure Index	0.73	0.80	0.89
UBS Global Infrastructure and Utilities 50-50 Index	0.76	0.82	0.91
MSCI World Core Infrastructure Index	0.79	0.87	0.92
S&P Global Infrastructure Index	0.81	0.89	0.94

Source: Bloomberg; FTSE; MSCI; MBA GLI calculations based on original data sourced from index providers.

Notes: Correlation vs. MSCI AC World Index based on USD Total Returns for 3 years, 5 years and 7 years to 31 March 2015.

As can be seen from the data above, Global Listed Infrastructure, as represented by the major indices, does provide some diversification benefit to a portfolio.

However, for investors seeking an alternative type investment with an absolute return objective, we would suggest that these correlations on the whole would be somewhat disappointing over the longer time periods, when the time series captured the global financial crisis (GFC). The performance of these indices is clearly tied to the performance of broader equity markets, and was especially so during the GFC period.

Looking at post-GFC data (3 years and 5 years), it is apparent that the relative correlations of the indices to global equities closely matches the infrastructure "purity" of each of the indices (as calculated in section 3). As per our 2013 analysis, the S&P index is most correlated to global equities, whilst the new FTSE and the existing DJB indices provides the greatest diversification benefit. It is our strong opinion that this is not a coincidence, in that the infrastructure "purity" of any infrastructure index or portfolio has a direct impact on the diversification benefit that it will provide to a broader investment portfolio.

Historical beta

Many investors often ask us what the historical betas, as distinct from correlations, of the various indices are with respect to Global Equities. This request is most often accompanied with a view to adding GLI to a portfolio as a more defensive diversifier to their equity portfolio.

	Beta vs. MSCI World		
Index	**3 years**	**5 years**	**7 years**
FTSE Global Core Infrastructure 50/50 Index	0.62	0.58	0.67
Dow Jones Brookfield Global Infrastructure Index	0.65	0.61	0.69
UBS Global Infrastructure and Utilities 50-50 Index	0.75	0.66	0.78
MSCI World Core Infrastructure Index	0.73	0.69	0.75
S&P Global Infrastructure Index	0.78	0.80	0.88

Source: Bloomberg; FTSE; MSCI; MBA GLI calculations based on original data sourced from index providers.

Notes: Equity Betas vs. MSCI AC World Index based on USD Total Returns for 3 years, 5 years and 7 years to 31 March 2015.

The above numbers clearly show a lower than 1.0 beta over all time periods as compared to MSCI AC World. From our perspective, this more defensive exposure is a key attribute generally expected from infrastructure. Again, the spread of data across each of the indices closely matches the infrastructure "purity" of each of the indices (as calculated in section 3). The S&P index remains the index with the highest equity beta, not a surprise given the lowest infrastructure purity score, whilst the new FTSE index appears to be the most defensive . It is our strong opinion that this is not a coincidence, in that the **infrastructure "purity" of any infrastructure index or portfolio has a direct impact on the defensiveness that it can be expected to provide to a broader investment portfolio.**

Also, if we compare the 3-and 5-year data to the 7-year data, it is apparent that betas have generally fallen with the exclusion of data points capturing the global financial crisis, when correlations generally spiked.

5. Conclusions and recommendations

We note that the relative importance of the key infrastructure characteristics to investors is subjective. Some investors, for example, may be less concerned about inflation linkage, but simply want to target a relatively "pure" infrastructure index with low volatility. These desires impact index selection.

1. Preference between indices

In general, we found the FTSE and DJB to have the strongest infrastructure characteristics of the three – as shown in both the stock specific (section 3) and historical statistical (section 4) analysis.

The fact that the FTSE index scored so highly is no coincidence. In our opinion, it is a clear improvement on all others. Its robust and transparent process, relatively pure approach to infrastructure and diversification across country, sector and by stock count, have resulted in a superior index for achieving the vast majority of objectives of most investors. It should be acknowledged that despite the 83% purity score, the FTSE index suffers from a 65% revenue test. Revenue remains the most transparent number, but the hurdle is not particularly high.

Our conclusions on the DJB index were consistent from our 2013 report. Unfortunately it remains the index with the greatest potential conflict of interest, in our opinion, and although Dow Jones has gone to some lengths at rectifying the perceived problems, it is critical that no investment firm has a unique ability to influence the construction of an index, or receive advance notice of potential or actual changes. Our second concern with the DJB is what we continue to see to be a number of unusual regional, country and sector weightings. We believe that the index could be improved by introducing sector caps - in a similar manner to the other two indices - which we expect would address this concern.

Notwithstanding the fact the UBS index is now obsolete, we believe its key advantage has been it being managed by a highly skilled infrastructure team that we feel most in the market would agree is relatively independent. Unfortunately our analysis showed the "purity" of this index, existence of strange concentrations, and its inflation protection characteristics, to be not much stronger than the purely mechanical process of the S&P. The MSCI index is a formidable candidate for an index choice from a robust and transparent construction approach. The key issues with its formulaic process results in an index with inferior infrastructure characteristics, being lower purity coming from the inclusion of integrated utilities, not dissimilar to the UBS and S&P indices.

Our original analysis highlighted the S&P index as being the least subjective index, which led to it having the most robust process. Its infrastructure characteristics continue to be the weakest in relation to infrastructure purity, inflation linkage and volatility, so we see the benefit of the robust process does come at a cost from an infrastructure characteristic perspective. Whilst we had previously recommended this index for investors looking to gain exposure to the broader industry dynamics of the sector, as opposed to being focussed purely on the core infrastructure characteristics, the emergence of the new FTSE index nullifies this argument.

2. Performance of indices as a whole

Across the five indices we saw material divergence with regards to the infrastructure "purity" of the indices and historical volatility. The FTSE and DJB indices did score strongly on both these measures, which prima facie suggested to us that they might sufficiently contain the specific characteristics that infrastructure investors are seeking. Their low betas are also attractive. However, all five indices were disappointing from an inflation linkage perspective. We believe that for the DJB this has partly been caused by the unrestrained nature of the industry weightings leading to some inappropriate sector weightings, which in turn has led to a very large focus on North American infrastructure companies. As well as seeing a more mixed quality of regulatory frameworks and assets

generally, North American infrastructure entities tend to have a much lower level of direct inflation protection. The FTSE index is also detrimentally impacted by this dynamic.

3. Our choice of benchmark

Based on our analysis, the FTSE Global Core Infrastructure 50/50 Index is now the clearly best available index.

To the extent investors want to utilise an index, then this would be our recommendation.

The question then is whether this index is better than an inflation-plus benchmark. The answer to this will depend on each individual investor's preferences.

At Maple-Brown Abbott, we are particularly focussed on delivering what we see as the key characteristics of infrastructure, and as a result, we have retained our existing inflation-plus benchmark as our primary objective. Notwithstanding that, we see the introduction of the FTSE index as providing investors with an improved tool to evaluate the shorter-term performance of managers such as us, as well as the different exposures and risks across portfolios.

Appendix 1

With regards to the indices that we have analysed, they each come in several forms. Generally they have regional and sector sub-indices. We have chosen to focus purely on the global version of each. The data that we have analysed was provided to us by each of the index providers or directly sourced from publicly available information on Bloomberg, and is taken to be accurate as of 31 March 2015.

The UBS index has two distinct global versions – being the UBS Infrastructure and Utility Index (which itself has three variations, for Developed markets, Emerging Markets and a World version) and the UBS Global 50/50 Infrastructure and Utilities Index. The former has a greater weighting to utilities, whilst the latter has capped utilities at 50%. We believe that the former has very similar composition challenges to the MGII – being overly weighted towards typically integrated utilities – and so we have focussed our analysis on the 50-50 index only. The UBS index analysis has been included for historical comparison only, noting that it is being decommissioned.

The Dow Jones Brookfield also has two global versions, either including or excluding Master Limited Partnerships (MLPs). Due to the tax and administrative challenges of holding MLPs for many non-US investors (and indeed many US investors, due to unrelated business taxable income taxation issues), we have focussed on the version that excludes MLPs, which is labelled the Dow Jones Brookfield Global Infrastructure Index.

The third index that we have analysed is the S&P Global Infrastructure Index.

The fourth index that we have analysed is the FTSE Global Core Infrastructure 50/50 Index, as distinct from other FTSE Infrastructure indices. This index was launched on the 2nd March 2015, and so was not previously analysed in our original 2013 report.

The fifth index that we have analysed is the MSCI World Core Infrastructure Index, as distinct from other MSCI Infrastructure indices. This index was launched on the 16th January 2015, and so was not previously analysed in our original 2013 report.

UBS Global Infrastructure and Utilities 50-50 Index (“UBS”)

Unlike the S&P index, constituents of the UBS index are assessed on a qualitative basis. The assessment screens for only those stocks where infrastructure or utilities assets comprise more than 50% of the business. The assessment is conducted by UBS’s sell side research team, with primary responsibility sitting in the Hong Kong office, but with input from analysts globally.

The index comprises 100 stocks, which includes all infrastructure stocks that are in the larger UBS Developed Infrastructure Index, with the balance being the largest of the utilities in that same index. Similar to the S&P index, the weightings are based on specified sector sizes (50% in each of infrastructure and utilities), use a modified cap weighting, and have a maximum individual position size of 5%.

The index calculation is conducted by S&P, and re-weightings occur on a quarterly basis on the third Monday of each quarter. UBS advise users of the updated index several days prior to each re-weighting.

S&P Global Infrastructure Index (“S&P”)

The S&P index comprises 75 stocks that are distributed (by both number and weight) as to 40% to Utilities, 40% to Transportation Infrastructure and 20% to Energy Infrastructure. The stocks within these sectors are determined in a mechanical way using select Sub-Industries from the Global Industry Classification Standard (GICS).

The index uses a modified cap weight scheme that caps individual stocks to 5% at the semi-annual index re-balances. All stocks must be listed on a developed market (although up to one fifth of the stocks can be based in emerging markets), and there are minimum market cap and liquidity rules.

Dow Jones Brookfield Global Infrastructure Index ("DJB")

The DJB index also determines the constituents of the benchmark using a qualitative assessment. Its rules require an entity to have more than 70% of cashflows from infrastructure assets, and they define infrastructure as being Airports, Tollroads, Ports, Communications assets, Electricity Transmission and Distribution, Oil and Gas Storage and Transportation, Water and Diversified. Brookfield Asset Management and S&P Dow Jones, before each rebalance, agree upon the universe of names of pure-play infrastructure names. The index is then created from this agreed upon universe. It is important to note that if new names are proposed by Brookfield, S&P Dow Jones independently verify the analysis behind those names. Likewise, for names that S&P Dow Jones comes up with, the analysis is mutually vetted and agreed upon. Notwithstanding the increased role of S&P Dow Jones in this process, a key concern of the market with this index remains the potential conflict of interest of Brookfield within this structure.

The index comprises all stocks that meet the above definition, subject to float adjusted market cap and liquidity restrictions. The constituent weightings are then calculated on a free float adjusted basis, subject to a maximum individual position size of 10%. The index is different from most others in that it does not specify certain weightings to specific sectors. The index currently has 94 stocks.

FTSE Global Core Infrastructure 50/50 Index ("FTSE")

The FTSE Global Core Infrastructure 50/50 Index was launched early in 2015.

The index has been designed as 50% infrastructure and 50% utilities. The constituent weights for these indices are adjusted as part of the semi-annual review according to three broad industry sectors – 50% Utilities, 30% Transportation including capping of 7.5% for railroads/railways and a 20% mix of other sectors including pipelines, satellites and telecommunication towers. Company weights within each group are adjusted in proportion to their investable market capitalisation.

Index construction has a fundamental overlay. Constituents are selected from the FTSE Global All Cap Index using FTSE's definition of infrastructure, screened by ICB subsector codes. FTSE also applies a minimum infrastructure revenue threshold of 65% to screen out any non-infrastructure stocks captured by the first screen.

MSCI World Core Infrastructure Index ("MSCI")

The MSCI World Core Infrastructure Index was launched in January 2015. It covers securities across 23 developed market countries that are engaged in core infrastructure activities and currently has 118 stocks.

The index is constructed by screening for securities that belong to a specific set of eligible sub-industries according to eligible GICS codes only and is purely mechanical with no fundamental overlay. The weight of each sub-industry is capped at 15% with security caps of 5% to reduce concentration. The index has a pre-determined 40% cap on total infrastructure balanced with a 60% cap on total utilities. The index is rebalanced semi-annually.

The GICS codes that MSCI defines as infrastructure are: Electric Utilities, Gas Utilities, Multi-utilities, Water Utilities, Oil & Gas Storage & Transportation, Railroads, Airport Services, Highways & Railtracks, Marine Ports & Services, Specialized REITS (only telecommunications infrastructure companies).

Absolute return target ("Inflation-plus")

The most common absolute return target for listed infrastructure strategies is an inflation-plus target[12]. The level to which investors have looked to out-perform inflation has typically been set at either 5% or 5.5%.

The attraction of this benchmark is that it is an effective means by which to target the dual objectives of low volatility and inflation protection.[13] As such, we believe that in setting an inflation plus benchmark, investors are positively influencing their manager's behaviour to specifically target these characteristics.[14]

For managers that focus on assets with strong inflation protection characteristics, this benchmark should fit their investment philosophy and process. For example, the probability of a regulated asset in Europe, the UK, Australia, Chile or Brazil (and other countries) achieving a specified real rate of return over the medium term can be readily assessed.

A possible weakness of such a benchmark is that it does not capture the market beta that is inherent within any listed equities asset class, including listed infrastructure. If markets are performing strongly then a poor investor may outperform an inflation plus target, whilst if markets are weak then even the best manager can underperform.

However, we believe that this issue is only a shorter-term issue, and so "through the cycle"[15] an inflation plus target is appropriate. We note that managers using an inflation plus target generally also use an index as a secondary performance measure, in order to enable some form of shorter term measurement.

In summary, we believe that as an inflation-plus benchmark captures the objectives of typical investors in the asset class, it should be viewed as the alternative against which other benchmarks are compared. Also supporting this view is our understanding that this is the benchmark in the sector with the greatest value of funds managed against it.

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[12] In utilising such a benchmark, the market has used different definitions of inflation. Some participants measure inflation using OECD G7 data, however we believe that this is too narrow a calculation considering the diverse geographical opportunity set of infrastructure investments. Further, we believe that a G7 definition will likely set too low a benchmark by overstating the importance of low inflation countries like Japan. As such, when considering an inflation plus benchmark in this paper we are referring to global developed market inflation, and so including all OECD countries.

[13] The inflation linkage is clearly apparent; whilst we believe the setting of an absolute return benchmark increases the focus on low volatility for two reasons:

- Whilst maximising the risk taken may maximise the expected long-term return; provided the return objective has been set appropriately, and so the manager is confident in the underlying assets' ability to deliver this return, the manager will in most cases increase their probability of achieving the return objective in a particular period by reducing their volatility. This is especially the case through shorter to medium term periods.

- Investments that utilise absolute return benchmarks (for example hedge funds) are also typically subject to additional risk analysis. This often includes a focus on volatility of returns, and an analysis of monthly drawdowns. We believe that such tools should also be standard for investors reviewing GLI portfolios that utilise an inflation plus benchmark.

[14] The manager's ability to achieve or exceed the objective will of course still be driven by its skill in stock selection. In particular, this will be its ability to purchase stocks which demonstrated the desired infrastructure characteristics, but also with strong business drivers and at attractive valuations.

[15] We believe that investors should view as at least 5 years, but more typically 7 to 10 years.

Appendix 2

The analysis applied the same methodology as per our 2013 report.

In calculating the “purity” of each infrastructure index, we have applied the following “Sector Strength Factors” to every segment of each constituent company in each index.

Sector splits based on our detailed analysis of the different assets within each index constituent.

Infrastructure Purity		Index Weight				
Sector	Sector Strength Factor	**FTSE**	**UBS**	**MSCI**	**DJB**	**S&P**
Regulated Utility	100%	42%	30%	33%	37%	28%
Retail Energy	0%	2%	2%	1%	2%	1%
Merchant Generation / IPP / Electricity Marketing	0%	4%	6%	5%	1%	9%
Long term contracted energy (excluding wind)	90%	1%	1%	3%	1%	1%
Wind PPAs	90%	0%	1%	1%	2%	3%
Competitive Gas / Marketing	0%	0%	0%	1%	0%	1%
Pipelines & storage - not commodity exposed	90%	9%	4%	10%	19%	10%
Pipelines & storage - commodity exposed	20%	3%	1%	3%	7%	3%
Tollroad	100%	12%	10%	8%	5%	14%
Airport	100%	7%	4%	4%	3%	10%
Port	50%	3%	0%	1%	2%	6%
Passenger Rail	75%	2%	14%	4%	0%	1%
Freight Rail	50%	5%	1%	10%	0%	1%
Below Rail (regulated)	100%	0%	1%	1%	0%	1%
Telecommunication Towers	75%	5%	14%	10%	10%	0%
Satellites	75%	1%	5%	0%	3%	0%
Storage Tanks	50%	0%	1%	0%	1%	0%
PPPs/PFIs	100%	0%	0%	0%	0%	0%
Other Infrastructure	50%	0%	0%	0%	0%	1%
Non Infrastructure	0%	3%	4%	6%	4%	10%
		100%	**100%**	**100%**	**100%**	**100%**