



Investing in listed real estate: a better alternative to market value-weighted indices

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Institutional investors are showing increasing interest in equity strategies which deviate from traditional market value-weighted indices. This is partly due to the higher returns earned by such strategies. The weighting of equities on the basis of fundamental factors, Fundamental Indexation[®], bears no structural relation to equity prices. Consequently, overvalued equities are not structurally overweighted and vice versa. This investment concept is currently rarely applied to listed real estate equities, yet it has also been proved successful for this investment universe. This article discusses the results of our research into the application of a fundamentally-weighted index in a global real estate investment universe.

FUNDAMENTAL INDEXATION[®] IN A NUTSHELL

The Fundamental Indexation[®] principle basically entails a different equity weighting in the index from traditional index weighting. Traditional indices allocate weights to equities on the basis of their market capitalisation, partly based on the Capital Asset Pricing Model (CAPM) theory. Equities with a large market capitalisation are allocated a larger weighting in the index than equities with a small market capitalisation. One benefit is that these are easy to trade, as the greater part of the portfolio comprises the most liquid names. One disadvantage is that in the case of a market capitalisation-weighted index overvalued companies are automatically overweighted in the index and vice versa for undervalued equities.

As an example: say that an index contains two equities, both with a fair value of €10. Their market values differ, however: equity A's value is €12 and equity B's is €8. A traditional index will contain a weighting of 60% for equity A and 40% for equity B, while a fair value index would allocate a weighting of 50% to both equities. If the fair value appreciates by 10% (€1), then the performance of the traditional index is 10%, while the fair value

index earns a performance of 10.42%¹. If the market values also simultaneously undergo a correction to fair value, then the fair value index will earn an excess return of 4.59%². This effect can be explained by the pricing error which is structurally caused by the overweighting of overvalued equities and vice versa.

In contrast, fundamentally-weighted indices weight equities on the basis of fundamental factors instead of market capitalisation. Examples include EBITDA or total revenue. The weighting of an equity in an EBITDA index is, for instance, determined by the earned EBITDA for that equity divided by the total earned EBITDA in the investment universe. Moreover, a composite of various fundamental factors is used to represent the economic size of a company and in doing so reflect the fair value more accurately. Weighting according to fundamentals severs the link between pricing error and the weighting of the equity in traditional indices. Overweights and underweights are evenly divided, which results in both overvalued and undervalued equities being overweighted and vice versa. Pricing errors still occur, but are random and cancel each other out. Consequently, fundamentally-weighted indices

have no structural performance lag³. Other benefits include: less susceptibility to market sentiment and greater diversification across companies with a smaller market capitalisation.

One assumption of Fundamental Indexation[®] theory is that markets are inefficient, otherwise the market value of equities would perfectly reflect the economic size and by definition there would be no overvaluation or undervaluation. If there is price inefficiency, the following is true: the larger this inefficiency, the larger the outperformance which can be earned via Fundamental Indexation[®] compared to market capitalisation weighting.

WHY APPLY FUNDAMENTAL INDEXATION[®] TO REAL ESTATE EQUITIES?

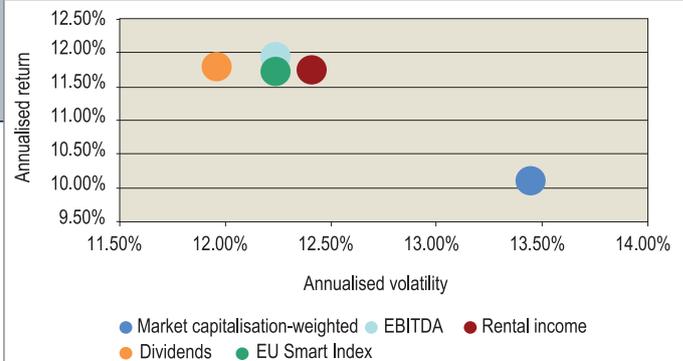
The real estate equity sector has also been proven to contain market inefficiencies. Take the many studies which focus on momentum strategies. Chui et al (2003) studied the returns earned on US REITs in the period 1984 to 2000. They discovered that strategies in which sharply-rising REIT equities are bought and strongly-declining equities are sold led to higher returns. Hung and Glascock (2008) concluded that REIT equity prices contain greater momentum effects in upward markets. Information effects can also form proof of market inefficiencies. In an efficient market, newly-published information would be processed simultaneously into equity prices; if this does not occur, it can result in abnormal returns. Price (2009) surveyed the effects of business news on REIT equities over the period 1994-2005. He concluded that both dividend payments and the purchase and sale of real estate assets resulted in abnormal returns. The listed real estate market contains price inefficiencies and investors can profit from these by making use of fundamentally-weighted indices.

EXISTING RESEARCH

Various studies have been published which have investigated the outperformance which could have been earned if fundamentally-weighted indices had been applied over the past few years instead of market capitalisation-weighted indices⁴. These studies focus chiefly on indices comprising general equities. In broad terms, they do indeed demonstrate the outperformance of fundamental indices.

Figure 1
Annualised risk/return comparison of European real estate equities for various fundamental factors

Research period 1989-2007; 95% statistically significant



Arnott (2008) proved that his fundamental index for US real estate equities earned an annual outperformance of 2.3% over the period 1973-2007 (p115). The fundamental factors used in this research were: revenue, cashflow, book value and gross paid dividend. With respect to European real estate equities, Vaessen (2007) identifies an annual outperformance of 1.6% with slightly better risk statistics over the period 1989-2007. This research is based on a top-100 of companies weighted according to real estate-specific factors, i.e. total rental income, EBITDA and gross paid dividend. Figure 1 contains the results of this research. All the individual factors as well as the composite (Smart Index) earn a higher annual return along with lower volatility than the market value-weighted index.

SMART INDEXING RESEARCH FOR GLOBAL REAL ESTATE EQUITIES

This article focuses on research into the application of a fundamentally-weighted index for global real estate equities called Smart Indexing. Little research has so far been published on this topic. The study looked at whether the Smart Index outperforms the market capitalisation-weighted index with respect to risk and return over a period from 1988 up to and including 2009. A back test was conducted over this period which included the simulation of both a Smart and a market capitalisation-weighted index. The two indices comprise exactly the same investment universe, but are weighted according to two different methods. This provides a transparent return comparison.

The indices were constructed as follows:

- The first step was to select 150 real estate equities with the highest free-float market capitalisation from the investment universe. This guarantees the index's liquidity and enables the index to be replicated in reality;

- The market capitalisation-weighted index then allocated weightings to these 150 equities according to market capitalisation;
- The Smart Index allocated weightings to the same 150 equities on the basis of fundamental factors.

Before this could be done, the fundamental factors had to be selected which are to serve as the basis for the index weighting. These factors must be:

- A fair reflection of the economic size of a company;
- Price-independent, i.e. there must be no relation between weight and valuation;
- The information for each company must be published and calculated in the same way.

Arnott et al (2005) use the following fundamental factors to create a composite fundamental index: revenue, gross dividend payment, cashflow and book value. Revenue is not a relevant parameter for real estate companies as it does not represent the major source of income and therefore does not reflect economic size. Book value comprises a price component because real estate is valued at market value. This factor is therefore not used in this survey. For real estate companies, the following representative fundamental elements were studied ⁵:

- Total rental income
- EBITDA
- Gross dividends

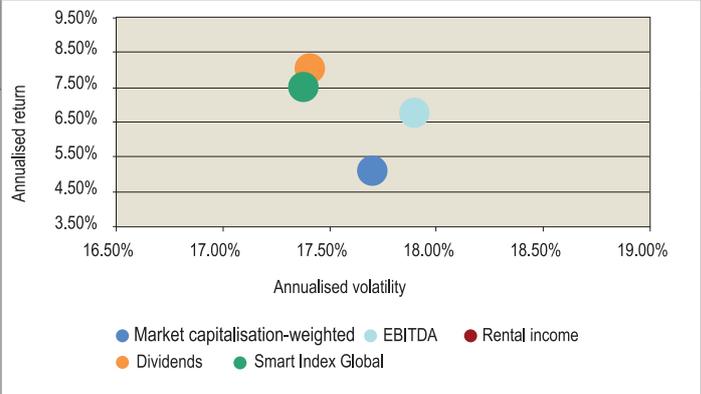
The resulting fundamental index is a composite of these three factors, which are all weighted equally (i.e. 1/3 each). This index is called Smart Index Global (hereafter the SIG). An equal weighting prevents the index having a structural bias towards specific companies; for instance, weighting on the basis of dividends causes a bias towards REITs, which have to pay out almost all their earnings (80%-90%) ⁶. This is explained in more detail in the 'Empirical results' section.

DATA AND METHODS

The indices were calculated over a period of 21 years, from March 1988 to April 2009. The investment universe comprised

Figure 2
Annual risk/return of Smart Index Global versus market capitalisation-weighted index of global real estate equities

Research period March 1988-April 2009; all fundamentals, with the exception of rental income, are 95% statistically significant



European countries, the United States, Canada, Japan, Singapore, Hong Kong and Australia, as these have the most highly-developed real estate markets ⁷. As selection criteria, at least 30% of the companies' revenue must comprise rental income ⁸. The three fundamental factors were calculated by taking the average of the last five years. This avoids huge fluctuations in weightings caused by, for instance, a temporary halt in dividend payments.

The returns which would have been earned if investment had been via Smart Index Global or via the market capitalisation-weighted index were calculated using a back test. The indices were calculated using the same investment universe and under the same conditions. The weighting of the indices was recalculated annually in the third month of each year, allowing the most recent published figures to be used ⁹.

EMPIRICAL RESULTS

Over the analysed period, an outperformance of an average of 2.28% per year is earned with the three fundamental factors ¹⁰. When the performance is compared to the existing GPR 250 Global index, the outperformance is 4.0% per year ¹¹.

It is noticeable that the three fundamental factors complement each other in Smart Index Global. The correlation between the excess returns is an average of 55%, which means that the fundamental indices outperform in different periods ¹². This makes the SIG the most robust index as it combines the three fundamental indices. It is true that the dividend index earns the highest return, but this is strongly affected by fiscal structures. For instance, this is the case for a dividend index as it has a bias towards REITs, which pay out a high percentage in dividends due to their fiscal structure. However, there is no guarantee that these structures will not change in future. The SIG is a more robust index on the basis of the mutual correlations and the elimina-

Figure 3
3-year rolling outperformance of the Smart Index Global compared to the market capitalisation-weighted index

Research period March 1988-April 2009

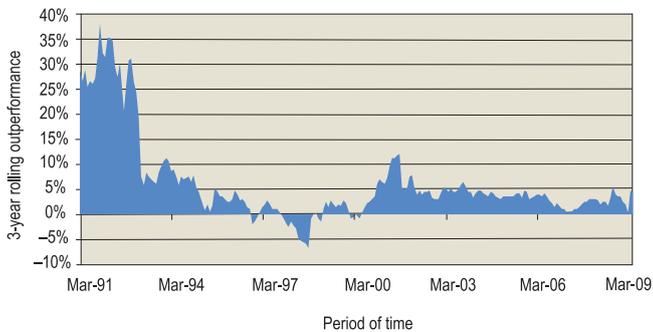
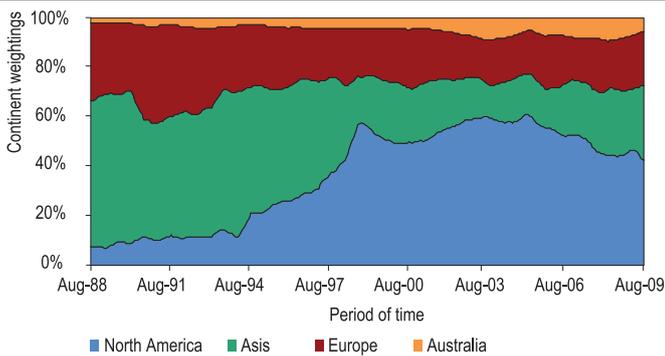


Figure 5
6-month average continent weightings in the market capitalisation-weighted index



tion of bias towards fiscal structures. Furthermore, the SIG is equally-weighted because optimisation on the basis of historical performance cannot guarantee future results.

The fundamental dividend factor may earn the highest return, but it also has a bias towards REITs, which pay out high dividends for fiscal reasons. Moreover, this factor achieves outperformance mostly in downward markets. The SIG is less susceptible to these two effects.

The SIG is the most significant, with an outperformance of 2.28% per year and the lowest volatility. Figure 3 shows the SIG's annual rolling 3-year outperformance compared to the market capitalisation-weighted index. Across the entire study, the SIG only has one extended negative period, which can be attributed to the general preference for growth equities. At this time, in the late 90s, the market capitalisation-weighted index profited greatly from the overweight in overvalued equities while the SIG lagged behind. This corresponds to the predictions for the fundamental indexation® theory of Arnott et al (2008). The SIG recovers when the market undergoes a correction to more realistic valuations and the overvalued equities are particularly affected by this.

Figure 4
6-month average continent weightings in the Smart Index Global

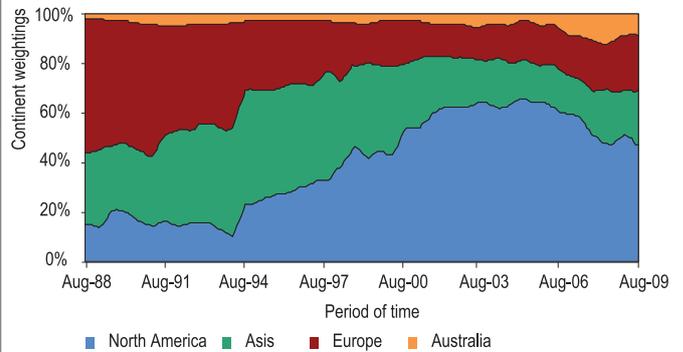
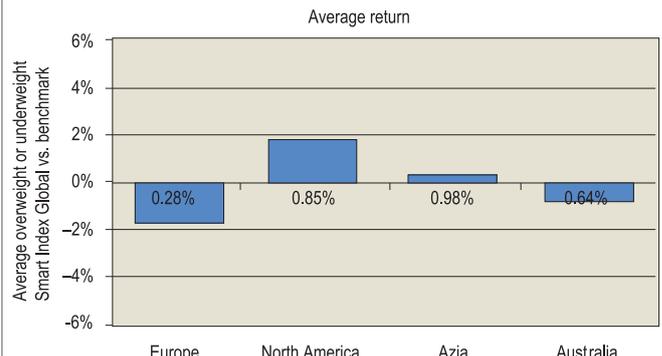


Figure 6
15-year average weightings and monthly returns per continent

Research period March 1994-March 2009



The period 1991-1993 is characterised by the Asian real estate bubble, in which Asian real estate equities were severely overvalued. Their weighting was consequently lower in the SIG than in the market capitalisation-weighted index. Figure 3 shows the 3-year rolling outperformance, including the lag effect of Asia. The effect of the market in Asia leads to an outperformance for the SIG.¹³

GEOGRAPHY: CONTINENTS AND OUTPERFORMANCE

As the survey concerns several countries, it is interesting to see whether there is a link between the continent weightings and the SIG's outperformance versus the market capitalisation-weighted index. The study can be divided into four regions: North America, Europe, Asia and Australia. Figures 4 and 5 show the 6-month average weightings of the continents per index. There are two obvious differences. Firstly, at the start of the survey there is a huge difference in the Asia and Europe weightings in the two indices. The market capitalisation-weighted index has a very large weighting in Asia at the expense of Europe, while the reverse is true of the SIG. The rally on the Asian markets resulted

Table 1
Market capitalisation effect, average overweight or underweight in the Smart Index Global versus the market capitalisation-weighted index

Research period 1988-2009

Market capitalisation	Large cap	Mid/ Large cap	Mid cap	Small/ Mid cap	Small cap
Overweight/underweight vs. market capitalisation	-6.41%	0.45%	3.50%	1.81%	0.63%
Average return	0.56%	0.50%	0.56%	0.50%	0.65%

Table 2
Dividend yield effect, average overweight or underweight in the Smart Index Global vs. the market capitalisation-weighted index

Research period 1988-2009

Dividend yield	High	High/Average	Average	Average/low	Low
Overweight/underweight vs. market capitalisation	7.73%	2.59%	2.62%	-1.18%	-11.76%
Average return	0.71%	0.90%	0.59%	0.44%	0.21%

in overvalued equities, the underlying fundamental factors of which were not robust compared to the rest of the investment universe. Secondly, figure 5 shows a noticeable peak around 1998 for the United States, comparable to the dip in outperformance in the SIG in figure 3.

Figure 6 shows the average returns and relative weights per continent of the SIG compared to the market capitalisation-weighted index. The returns were calculated by taking the average of the monthly returns per equity in the index. The period under examination is 1994-2009 to avoid distortion of the results by the Asian market rally. It is noticeable that the SIG has a natural overweight in the North American and Asian continents, which also earn the highest average returns over the 15-year period. Restrictions at continent level are therefore unnecessary.

The research also looked at whether the outperformance earned could have been caused by a coincidental, unobserved bias in the index. The effects studied were: market capitalisation, dividend yield and the debt/balance sheet total ratio. If these effects largely explain the outperformance, then this weakens the argument in favour for fundamental indexation. Arnott et al (2008) argue that fundamental indices do indeed tend to allocate larger weightings to value equities compared to market capitalisation-weighted indices. This is due to value equities being undervalued compared to their NAVs. Fundamental indices allocate higher weightings to undervalued equities. The argument that they are purely value indices is refuted by, among others, Hsu and Campollo (2006). They demonstrate that fundamental indices generate a higher performance than value indices within a comparable investment universe. Moreover, value indices

contain only value equities, while fundamental indices invest in companies with strongly fundamental elements and therefore also include growth equities.

Market capitalisation effect

When analysing the market capitalisation effect, the research looked at whether a coincidental overweight or underweight of a specific market capitalisation significantly affects outperformance. It is particularly interesting to see whether a small cap (companies with a small market capitalisation) effect exists as, by definition, the Smart Index has a larger weighting in these than the market capitalisation-weighted index. To investigate this, the investment universe was divided into five segments of companies ranging from largest to smallest market capitalisations. See table 1.

Table 1 shows that the SIG does indeed hold a large underweight in large caps, while this quintile performed averagely with respect to return. The best-performing quintile, small caps, has a very slight overweight, while the largest overweight is in mid caps and displays an average performance. The table demonstrates that no consistent bias can be identified, which corresponds to a total attribution effect of 0.05%. The SIG's outperformance of 2.28% per year can therefore not be attributed to the market-capitalisation effect.

Dividend yield effect

The dividend yield effect was also investigated, as the SIG's weighting allocation can be affected by gross dividend payments. See table 2. It should be noted that dividend yield differs from dividend payments, as the former derives from the equity price¹⁴. It is possible that the index selects equities with a high dividend

Table 3

Debt ratio effect, average overweight or underweight in the Smart Index Global vs. the market capitalisation-weighted index

Research period 1988-2009

Debt ratio	High	High/Average	Average	Average low	Low
Overweight/underweight vs. market capitalisation	-1.01%	-0.35%	-1.09%	3.00%	-0.55%
Average return	0.62%	0.46%	0.74%	0.89%	2.50%

yield, which in turn display an above-average performance. The theory here is that companies with greater capitalisation discipline pay out higher dividends and display a better performance. Quintile 1 comprises equities with the highest dividend yields, quintile 5 the equities with the lowest dividend yields.

In line with expectations, a large overweight in companies with high dividend yields can be seen in both quintile 1 and quintile 2. The two quintiles also display a higher performance compared to the other quintiles. There is a large underweight in quintile 5, which also displays the lowest average return. The total dividend yield attribution effect explains 1.16% of the outperformance. This means that selection on the basis of the three fundamental factors allocates an overweight to real estate equities with above-average dividend yields. This can partially be explained by the fact that the total dividend payment counts for 1/3 of the weighting, although a high dividend payment is not equal to a high dividend yield. The conclusion is that dividend yield plays a part in outperformance, but cannot explain the total outperformance.

Debt ratio effect

The final effect studied is the debt/balance sheet total ratio. See table 3. The SIG allocates a higher weight to companies with strong fundamentals, e.g. companies with high rental incomes. Companies with a high debt ratio are deemed to have greater growth potential and therefore higher rental income. Quintile 1 shows the group of companies with the highest debt ratios, quintile 5 with the lowest debt ratios.

The largest and only overweight can be found in the average/low quintile, comprising companies with relatively low debt ratios. This quintile has the second highest return. The average return of the low quintile is remarkable and can be explained by the fact that this quintile contains the most growth equities. The total attribution effect is 0.24%, which only accounts for a very small percentage of the total outperformance.

OUTLIERS

Finally, an analysis was conducted to check whether the outperformance is distorted by outliers, or extreme returns. If this is the case, then this would weaken the Smart Index effect. To this end, the Hit Ratio was calculated; this indicates the average monthly percentage of positive attributions (figure 7).

On average, 49% of the equities, indicated by the trend line, contribute positively each month to the outperformance. Moreover, the fact that the trend line is horizontal implies that the average is consistent throughout the period in question. We can therefore conclude that there is no outlier effect and that Smart Indexing does indeed work.

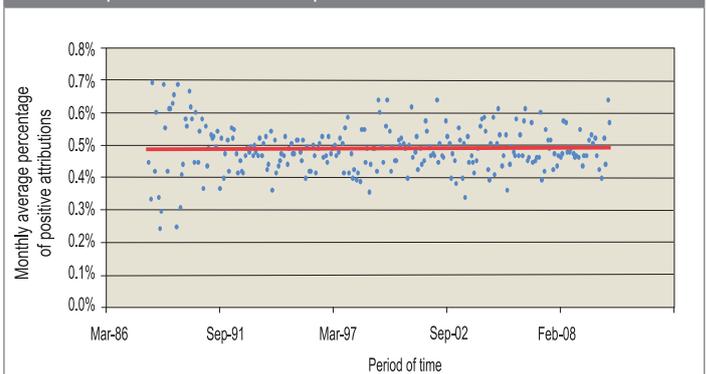
CONCLUSION

Interest is growing in equity strategies which deviate from traditional market value-weighted indices. This interest derives partly from the higher returns these strategies earn compared to market value-weighted indices. The weighting of equities on the basis of fundamental factors, Fundamental Indexation®, bears no structural relation to equity prices. Consequently, overvalued equities are not structurally overweighted and vice versa, as is the case

Figure 7

Hit Ratio, average monthly percentage of positive attributions in the Smart Index Global vs. the market capitalisation-weighted index

Research period March 1988-April 2009



in market value-weighted indices. This investment concept has also been proven successful for the real estate equity investment universe.

In this article, we apply the Fundamental Indexation® theory to the global real estate market over the period from March 1988 to April 2009. Smart Index Global, a fundamentally-weighted index which focuses explicitly on real estate equities, is weighted according to three factors specific to the sector, i.e. rental income, gross dividend payments and EBITDA.

For the investment universe comprising 150 global real estate equities, on average the fundamental index earns a 2.3% higher return than the market value-weighted index. Compared to the (external) GPR 250 Global Index, the outperformance is as much as 4.0%. Furthermore, the outperformance is consistent over time with only one extended period of underperformance, caused by a strong general market preference for growth equities. The effect of three different style factors on Smart Index Global's outperformance is also investigated. Only the dividend yield style factor makes a noticeable contribution to the outperformance.

One limitation of the research is the relatively short period (1988-2009) studied. This is chiefly due to the short history of Asian property funds, for which transparency was poor prior to 1991. It would be interesting in future studies to extend the research period, perhaps by researching the various continents separately. A longer research period would strengthen the argument in favour of fundamental indexation. Finally, more detailed research into the performance of the fundamental index in extreme conditions is also important. In theory, the fundamental index should provide protection as there is no structural link between price and weight. If empirical proof can be found for this, this would also back up the theory.

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NOTES

1. Performance calculation: equity A is $\frac{\text{€1}}{\text{€12}} = 8.33\%$ and equity B is $\frac{\text{€1}}{\text{€8}} = 12.5\%$. Index performance = $0.6 \times 8.33\% + 0.4 \times 12.5\% = 10.0\%$. Fair value index = $0.5 \times 8.33\% + 0.5 \times 12.5\% = 10.42\%$.
2. Calculated as follows: performance of equity A is $(\text{€11} - \text{€12}) / \text{€12} = -8.33\%$ and performance of equity B is $(\text{€11} - \text{€8}) / \text{€8} = +37.5\%$.
3. Treynor (2005) provides empirical proof that indices which are not market value-weighted can generate a higher performance than market value-weighted indices. Hsu (2005) demonstrates that the structural overweighting and underweighting of 60%-40% in this index leads to a performance lag compared to the fundamental index.
4. See among others: Arnott, R.D., Hsu, J., & West, J.M. (2008), *The Fundamental Index a better way to invest*, New Jersey, U.S.A.: John Wiley & Sons, Inc.; Hemminki, J. & Puttonen, V. (2008), *Fundamental Indexation in Europe*, Journal of Asset Management, Vol. 8, Issue 6, pp401-405.
5. The following fundamental weighting factors were considered but not studied: leverage, FFO (Funds From Operations), sales and total leased area. Leverage is not a satisfactory reflection of the economic size of a company as there is no clear correlation with size. FFO is used as a valuation gauge in the US, but is not used globally. Although sales of both newly-developed and existing properties can be a major source of income, this is not the main source. Total leased area is not a satisfactory factor for comparison as there are huge regional differences in value per m².
6. No analysis was conducted of a different weighting of the three factors.
7. Data was obtained using FactSet Universal Screening and subsequently checked against data from Datastream and Bloomberg. The data was checked for survivorship and forecasting bias.
8. The remaining sources of income must be obtained from real estate-related activities.
9. Companies are only added to or withdrawn from the index during the annual reweighting. Removal between reweighting dates only occurs when the company is no longer listed.
10. All the indices are compared on a gross basis, i.e. transaction and management fees are not included in the calculation.
11. Research period 1990-2009 as the GPR index was only created at the end of 1989.
12. The correlation between the extra returns of the fundamental factors is as follows: EBITDA-Rental income (54%), EBITDA-Dividend payment (58%) and Rental income-Dividend payment (53%).
13. If we conduct performance measurement from 1991, the SIG earns an annual outperformance of 1.3%.
14. The dividend index cannot be compared directly with the dividend yield attribution as the latter is a relative figure which contains a price effect. The dividend index works using absolute figures. Consequently, companies with high dividend payments can, for instance, score low on dividend yields.