

ENHANCED INDEXATION

IS IT THE CHERRY ON TOP?



Quantitative Research
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Introduction

By March 2002, 35% of assets in the US pension fund industry were indexed, amounting to \$1.5 trillion. The share of indexed pension fund assets in Europe has also increased exponentially and is now at 25% in the UK and 13% in continental Europe.

Core-satellite investing has been a catalyst to indexation growth

A large component of the growth in indexation can be attributed to an increased pension fund utilisation of the **core-satellite** investment technique. Essentially, this involves the creation of a low risk indexed core, complimented by a number of high risk active satellite portfolios.

The successful utilisation of pure indexation as the core portfolio of many funds has perpetuated the growth, particularly in the US, of Enhanced Index funds

The important question implicit in the above is how should index funds, enhanced index funds and active funds be held in the core-satellite structure? In order to be able to answer this question it is important to understand what each method of investing entails. The difference between active management and indexation has been long debated and discussed. Therefore, this paper will be devoted to enhanced index funds and the role they play in the core-satellite strategy.

Enhanced Indexation from an SA perspective

From the perspective of a South African investor, the increased interest in enhanced indexation would seem to be quite logical. Most domestic investors have made the assumption that enhanced index funds offer the best of both world's:

- A portfolio with the risk profile of a highly diversified index fund combined with some value added active management.

The above conjecture is borne out by the fact that pension funds typically go through a **strategic asset allocation process** that carefully balances expected returns against risk. The problem is that once assets are assigned to active managers, large deviations from the benchmark may defeat this risk budgeting process. In contrast, pure index funds allow investors to maintain their desired risk profile. Investors often assume that the advantages of pure indexation can be extrapolated to enhanced indexation, however, this paper will demonstrate that this is dependent on the type of enhancement being performed.

Over 10 years, the median manager has under performed the market

Another reason for the potential development of enhanced indexation in SA is in response to the difficulty of beating the overall market, in the long term. Indeed, the Alexander Forbes Retirement Fund Survey of 2002 reports that, over the last 10 years, the average domestic equity pension fund, after fees, has under performed the market by approximately **50bps pa**. While this may not seem significant, the compounding effect over the long term results in a material differential.

How should Enhancement Strategies be measured?

1. Tracking Error (TE)
 - ❑ This is simply the volatility of the deviation of the active portfolio from the benchmark
2. Information Ratio (IR)
 - ❑ This is the fund's excess return divided by TE. It is a measure of efficiency: the higher the number the better, as it means that more excess return is being added for every unit of incremental risk

Investors should be using IR and Total Risk to measure performance

Typically investors measure performance using TE and IR. However, this paper will analyse whether there are benefits to enhanced indexation by also taking account of changes to the portfolio's "Total Risk"

3. Total Risk
 - ❑ This is a measure of a fund's **overall volatility** resulting from systematic market factors that cannot be diversified away

The results will highlight the dangers of judging performance solely by the IR. This analysis will emphasise that in addition to setting constraints on TE, investors should require managers to keep strict control of their Total Risk.

What is Enhanced Indexation?

An enhanced index fund can be loosely defined as any investment strategy with a TE of less than **200bps**. The goal is to generate between 50bps to 100bps of benchmark out-performance, whilst remaining within these tight TE constraints.

Enhanced Index funds typically have a TE of less than 200bps

Enhanced Indexation strategies can be clearly split into 2 distinctive categories:

- ❑ **Active stock-based** strategies
- ❑ **Derivative based** strategies

It is extremely important for investors to understand the differences between these 2 strategies. Often, when referring to enhanced indexation, investors incorrectly group both techniques under the same umbrella. Another goal of this paper is to highlight the differentiating features of these 2 techniques and then to determine which, if any, is best suited for the SA market.

Active Stock-based Enhancements

Typically, this type of strategy seeks to add value through stock selection. These funds begin with the designated benchmark and then draw on quantitative risk control tools such as multi-factor optimisation models to make investment decisions. No fundamental analysis is done to determine the stock picks. A "**Style Rotation**" quant model would be an example of an active stock-based enhancement. In this approach a multi-factor model will determine whether the fund should have a growth or value bias, relative to the benchmark.

In the next section the paper will elaborate on why active managers, who attempt to take **fundamental or judgemental** bets within very tight TE constraints, should be classified as "Active-Light" managers and not Enhanced Indexation managers.

Are “Active Light” Strategies Nonsensical?

- ❑ Active Manager’s pride themselves on being able to out-perform the benchmark based on superior fundamental analysis. In an “Active Light” strategy the manager must still make the call as to whether, for example, Stanbic will out-perform Nedcor. HOWEVER, the bet will be ‘**watered down**’ by the 200bps TE constraint. Therefore, a client that imposes a 200bps TE will not participate in as much upside as a client that imposes a **600bps** TE. Obviously, we make the assumption that this Active Manager has the skill to out-perform. We can thus conclude that an active manager who is confident in his stock picks should typically prefer a Tracking Error of well above 200bps.

- ❑ It should also be noted that although a 200bps mandate will force the manager to charge a lower fee, there probably won’t be a commensurate reduction in active management costs. The skill, fundamental research and intellectual capital required to make the above Stanbic/Nedcor call will be no different to that required in a 600bps mandate.

*Tight TE
constraints water
down Excess
Returns*

Is “Active Light” useful when Risk Budgeting is done at the Aggregate Level?

In Umbono’s core-satellite strategies a great deal of emphasis is placed upon the analysis of the **Total Aggregated** Portfolio. Typically what we have found is that an Aggregated Portfolio, consisting of 5 Active Managers, each with a TE of between 500 and 600bps, results in a Total Portfolio with a TE of approximately 300bps, relative to the fund’s ‘**Implied**’ benchmark. This ‘**Implied**’ benchmark, more often than not, has been a “50% down weighted Resources” Index.

In order for effective ‘**Risk Budgeting**’ to be performed by the Asset Consultants, each underlying manager’s portfolio should have a Mandated TE that is significantly different to the Aggregated Portfolio’s TE of 300bps. For example, if an Asset Consultant decides to include a number of aggressive active satellite portfolios (**600 to 700bps**), then he will need to counter-act these high risk portfolios with a low risk Passive core (**50bps**). However, if this Passive core was to be replaced by an “Active Light” core (**200bps**), tracking the “Implied” benchmark, then the Consultant would be forced to constrain the active satellite managers by giving them lower Mandated TE’s, thus preventing them from achieving significant alpha.

*“Active Light”
may inhibit
effective risk
budgeting*

The above argument also applies when **fund costs** are analysed at the Aggregate Portfolio Level. The cost of an “Active Light” core will be far higher than the cost of an indexed core. By taking on this higher cost, the investors will have less flexibility to appoint expensive active managers.

Therefore, from a cost/risk perspective, it is clear that the “Active Light” approach is not “Enhanced Indexation” but a ‘strategy in limbo’. It is too risky and too costly to be passive but not risky enough to generate good active alpha.

Derivative Based Enhancements

The second type of enhanced indexing refers to those strategies that make use of derivative instruments. The 2 most common strategies are as follows:

1. Futures Arbitrage

Switching between physical stock and futures can generate riskless profit

In this strategy, the fund manager will constantly compare the difference in price between the underlying basket of index stocks and the corresponding futures contract. The riskless arbitrage profit or excess return is achieved by buying the “cheap” futures and selling the “expensive” underlying basket of stocks and vice versa. This strategy requires the use of a mathematical arbitrage model that, amongst others, takes account of trading costs and implied interest rates.

The above strategy should not be confused with derivative strategies being offered by quant-plus index players. These strategies typically use the investor’s dividends (approximately 3% of fund) to purchase option contracts. However, these are directional active bets and can be very **risky**. If the manager gets the call wrong the fund will have forgone the entire 3% dividend.

2. Cash Management Arbitrage

Cash management arbitrage is very popular offshore

In this strategy an exposure equivalent to the fund’s underlying basket of index stocks is achieved by taking a long position in FTSE JSE stock index futures. The portfolio will have accumulated a large cash holding via the sale of the underlying basket. The fund manager then adds value by generating a return on this cash that is higher than the interest rate implied in the pricing of the futures contract. This can be achieved by taking on some term structure risk, liquidity risk or credit risk. An example of this would be a ‘yield enhancement’ in the form of a corporate bond issue. This type of strategy is often referred to as an “**alpha transportation strategy**” since the value is added in the bond market and then transported back to the stock market.

Information Ratio versus Total Risk

In a typical mandate, the investor assigns the management of assets to a portfolio manager who is given the task of beating the benchmark. When out performance is observed for the active portfolio, the issue is whether the added value is in line with the risks undertaken. To control this, more and more mandates impose a limit on the volatility of the deviation of the active portfolio from the benchmark (Tracking Error).

The fund’s Information Ratio is then derived by dividing the alpha or excess return by the TE (an IR of **greater than 50bps** is considered to be “good”). Enhanced Indexation fund managers are well aware that their performance is being measured using Information Ratios. They therefore ensure that their quantitative, multi-factor models will generate an optimised portfolio that maximises alpha and minimises Tracking Error. However, this approach **ignores the portfolio’s Total Risk** or overall volatility.

Why is “Total Risk” so important?

The concept of **diversification** is key to understanding a portfolio’s total risk. The lower the correlation of the underlying stock picks relative to the benchmark, the lower will be the fund’s volatility or total risk, as the company specific risk will have been diversified away.

As discussed previously, Stock-based enhancements and Derivative-based enhancements both begin with the benchmark and then take quantitative **active bets** to add excess return. This is all done within tight TE constraints

Therefore, although these active bets may have the potential to generate excess return, it is important to ascertain whether they have a high or low correlation to the underlying benchmark. For example, if the active bets within an enhanced portfolio are highly correlated to the benchmark then the fund’s total risk will **increase**. This detrimental impact will not be detected via the Information Ratio.

What is the correlation of the active bets to the benchmark?

In the section below it will be clearly highlighted, via empirical evidence, why the **Total Risk** approach is probably a more comprehensive tool in determining the effectiveness of the two enhancement techniques.

Empirical Analysis

For the purposes of this study, 45 international enhanced indexed funds were chosen. As at May 2001, these funds had a cumulative value of \$363 billion. The funds were classified as follows:

- 29 Stock-based enhanced index funds
- 14 Derivative-based enhanced index funds

1. Information Ratio Analysis

Table One. Excess Return Performance over 10 years

	Stock-based Enhancements	Derivative-based Enhancements
Median Return per annum	0.89%	0.79%
Median Tracking Error	2.20	1.36
Median Information Ratio	0.47	0.70
Median Information Ratio (after fees)	0.28	0.50

Stock-based enhancements generated higher TE's than derivative-based enhancements

From **Table One** above, the following was observed:

*Derivative-based
enhancements
generated superior
IR's, especially after
fees*

- ❑ The average enhancement for the two strategies was very similar at 89bps and 79bps per annum. However, the median TE of the derivative-based approach was **40% lower**, at 136bps versus the stock-based TE of 220bps
- ❑ As a consequence of this superior TE, the derivative-based approach was able to generate a median Information Ratio of 70bps (**50% higher** than the stock-based approach).
- ❑ Finally, the true “value add” should be measured after deducting management fees. In this particular sample, the derivative-based management fees were **25% lower** than the stock-based fees. This resulted in the derivative-based approach generating an ‘after fees’ IR of 50bps, far higher than the 28bps associated with the stock-based approach. (Remember, the general rule of thumb is that an IR above 50bps is “good”)

Conclusion

The empirical analysis, using **Information Ratio**, would suggest that a stock-based enhancement approach adds less value than a derivative-based approach. This conclusion may well be extrapolated to the domestic market, as a number of stock-based enhancement difficulties have been identified.

Stock-based Enhancement Difficulties

Event Driven Models – Index Reconstitution

A common event driven strategy is to attempt to predict the FTSE JSE’s announcement concerning shares to be included or excluded at the upcoming quarterly futures close-out. The enhanced indexation manager’s strategy will be to take long positions in shares that are to be included and short positions in those to be removed.

*Index
Reconstitution bets
are risky*

However, it is important to understand the risks associated with this strategy, as these bets often don’t deliver the anticipated alpha. In **Table 3 and Table 4 on page 10**, we illustrate the actual differences that occurred on the December 20th (2001) and March 20th (2002) close-outs, respectively. It should be noted that in the majority of cases, the share prices actually moved in the opposite direction. This is probably explained by the futures arbitrage traders who may often have a very different agenda to that of the enhanced indexation manager.

Investors should also be aware that with the advent of the new **FTSE JSE Africa** indices it will become more difficult to enhance performance using this methodology. There are a number of reasons for this, including:

- ❑ Index changes becoming more transparent and predictable
- ❑ Due to banding constraints, index changes becoming more infrequent

A look at how the bets can go the wrong way :

Table Two. Index Reconstitution Analysis

20 Dec 2001 FUTURES CLOSE-OUT			
OUTGOING SHARES (these are expected to decrease (-) in value)			
SHARE	INDEX	% CHANGE ON THE DAY OF CLOSE-OUT	% CHANGE FROM DATE OF ANNOUNCEMENT
DTC	INDI 25	+3.32%	+4.12%
INCOMING SHARES (these are expected to increase (+) in value)			
RLO	INDI 25	-0.80%	-7.27%
SPG	INDI 25	+2.27%	-1.10%
WHL	INDI 25	-1.52%	0.00%

The INDI 25 increased by more than the inclusions

The INDI 25 was up 2.78% on Dec 20th 2001

Table Three. Index Reconstitution Analysis

20 Mar 2002 FUTURES CLOSE-OUT			
OUTGOING SHARES (these are expected to decrease (-) in value)			
SHARE	INDEX	% CHANGE ON THE DAY OF CLOSE-OUT	% CHANGE FROM DATE OF ANNOUNCEMENT
CRN	ALSI 40	+1.90%	+2.78%
NAN	INDI 25	+0.94%	+7.00%
INCOMING SHARES (these are expected to increase (+) in value)			
MTC	INDI 25	+1.61%	+2.07%
JDG	ALSI 40	-8.78%	-8.29%

The exclusions went up whilst the ALSI 40 went down

The ALSI 40 was down -1.22% on March 20th 2002

The INDI 25 was down -1.65% on March 20th 2002

Event Driven Models – Arbitrage Trades

Corporate events, such as **mergers and acquisitions**, can give rise to arbitrage profits, however, these are often very sporadic. An example of this was the De Beers delisting.

Another type of stock-based enhancement is called **constituent arbitrage**. This strategy attempts to add value by looking for arbitrage opportunities between holding company stocks and their constituent subsidiaries or between a holding company's ordinary shares and N-shares. However, there are often liquidity constraints associated with this type of strategy. In other words, the opportunity to materially enhance returns, especially in large pension funds, will be infrequent.

2. Total Risk Analysis

Table Four. Risk Adjusted Returns over 10 years

Total Risk was far higher in stock-based enhancement funds

	Stock-based Enhancement funds	Derivative-based Enhancement funds
% of funds with a Total Risk that is greater than the benchmark (Beta > 1)	79%	57%
Risk Adjusted Excess Returns	0.30%	0.52%
Risk Adjusted Excess Returns (after fees)	-0.04%	0.26%

As discussed above, the main driver of Total Risk is the **correlation** of a fund manager's bets relative to the benchmark. From **Table Four**, it is evident that derivative-based indexation funds typically have lower Total Risk than stock-based indexation funds. This would indicate that derivative-based portfolios are far more diversified, as the enhancement techniques being utilised have a low or negative correlation to the benchmark. Therefore, from a '**risk adjusted excess return**' perspective, **Table Four** clearly shows that the derivative-based enhancement approach is value adding (0.26%) whilst the stock-based enhancement approach is value destroying(-0.04%).

Conclusion

As discussed in the introduction to this paper, the aim of the research was to determine whether enhanced indexation can play a role in the core-satellite strategy. At the risk of being repetitive, the core-satellite strategy is a "**holistic**" approach in which the **total** portfolio's forecasted 'risk adjusted excess return' is determined. Once these overall risk-return parameters are in place it becomes possible to select the most suitable core and satellite managers. This selection process will be based on each managers' ability to add value on a 'risk-adjusted' basis.

Should the core be pure indexation or enhanced indexation?

Is an enhanced core superfluous?

There are two main reasons for the use of pure indexation as opposed to enhanced indexation. Firstly, the fund's ability to enhance performance via scrip lending will have increased as an index fund typically has a higher scrip lending "**Usage Rate**" (See **Appendix One on Page 13**). Secondly, the fund's core will have very little risk of under performing its benchmark. With this predictable core in place it is less risky to select aggressive active satellite portfolio managers who have the ability to provide returns in excess of the benchmark. Therefore, in essence, the core-satellite approach, when viewed "**holistically**", is an enhanced indexation strategy. This means that, an enhanced indexation core could be classified as a superfluous extra layer if it does not add value on a 'risk-adjusted basis'

It has been highlighted that stock-based enhancement techniques attempting to generate excess returns, within tight tracking error constraints, will often structure a portfolio that has higher Total Risk than the benchmark. As with the 'Active light' section of the paper it was found that the incremental returns being generated using this approach are often not commensurate to the increase in the portfolio's Total Risk. This is not necessarily the case for derivative-based strategies, as their approach is to transport excess returns (alpha) from the bond market, via cash management, to the equity market.

Ironically, stock-based enhancements are more popular in SA

Although, from an international perspective, the stock-based strategy is the more inferior of the two approaches, it is ironically, the more widely applied in the SA context. This is mainly due to South African trustees being more averse to large derivative exposures, relative to their international counter parts.

Will too many cooks spoil the enhancement?

From the paper it has been ascertained that if investors wish to replace the predictable pure indexation core with an enhanced core, then they must ask the following questions:

- What type of enhancement strategy will the manager be employing?
- What will be the impact on the fund's Total Risk? (Not simply the impact on the fund's Information Ratio)

Asking questions will keep the active managers focused

These type of questions will impress upon the enhanced indexation managers that their attention needs to be focused on their ability to add value on a 'risk-adjusted' basis. They will do this by ensuring that their quantitative models generate stock picks that **maximise the fund's Information Ratio and minimise the fund's Total Risk**. In other words, their active bets will be 'risk-controlled' by having a low correlation to the benchmark.

In conclusion, the use of pure indexation and enhanced indexation will continue to grow within the core-satellite arena. It will be the investors responsibility, however, to ensure that the chosen strategy is value adding on a risk adjusted, after-fee basis.

APPENDIX I**Scrip Lending Illustration**

This information was provided by one of the top 3 scrip lending desks in the local market

For the purposes of this analysis, we have used a **R2.5bn** domestic equity portfolio. According to Umbono's core-satellite analysis, it was determined that **50%** of this portfolio should be placed in an indexed core.

Therefore the value of the indexed core was **R1.25bn** ($R2.5bn \times 50\%$)

We have assumed that, on average, **80%** of the R1.25bn is made available for scrip lending: **R1bn**

To err on the conservative side, we have assumed that a "Usage Rate" of only **65%** is achieved on the R1bn: **R650m**

The revenue earned on this R650m, at today's rates, would be approximately **90bps** per annum, split as follows:

- Lending Desk 25bps
- Client 65bps

This would result in extra revenue earned of **R6m pa**

If the client earns 72% (65bps/90bps) of this R6m, then the revenue earned will be **R4.2m pa**

This R4.2m pa will enhance the index fund's return by **34bps pa**

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