STATE STREET GLOBAL ADVISORS

June 2018

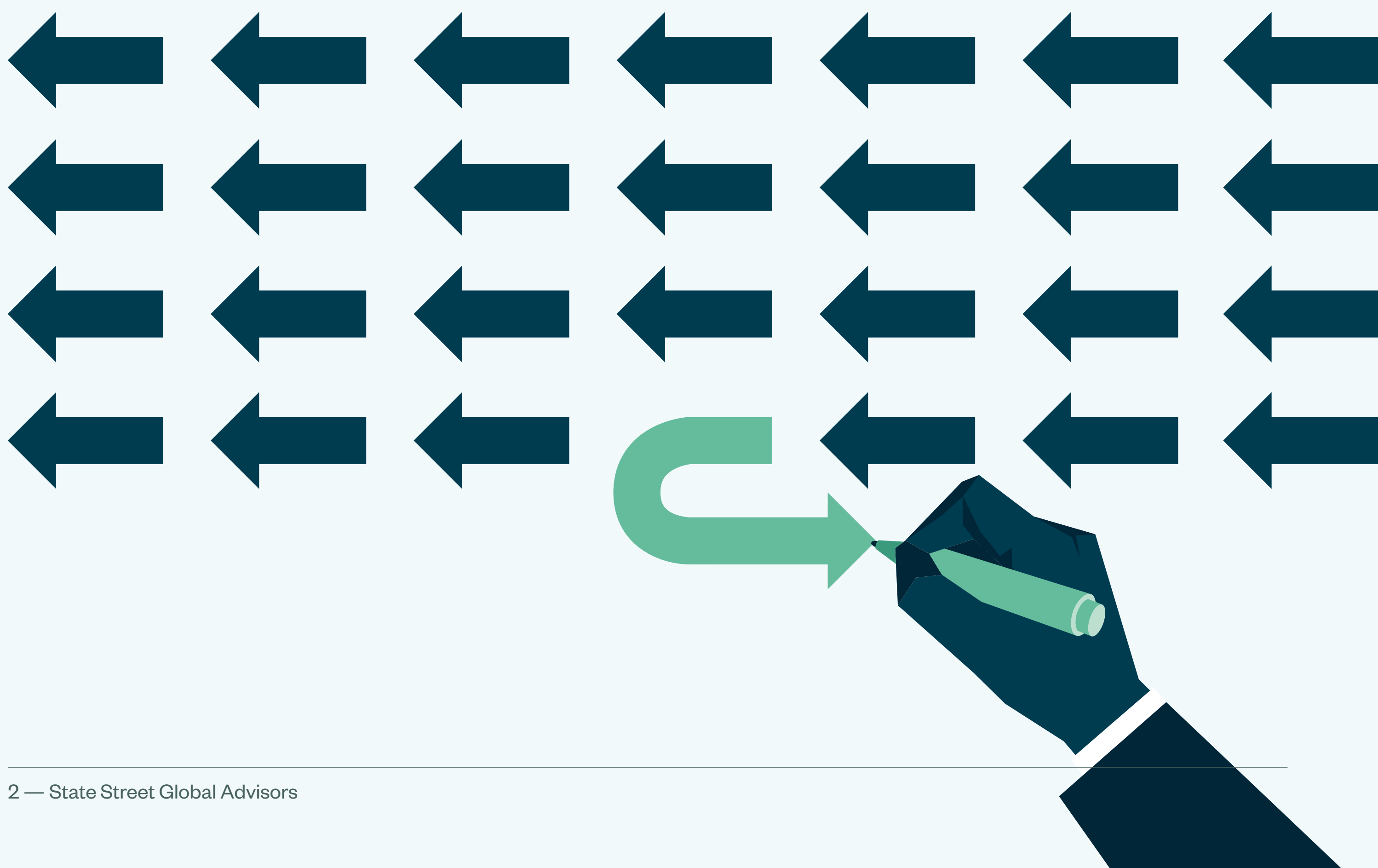
Core Indexing
Delivering the State of the Art

- Forward-thinking, practically focused research helps ensure that core index portfolios are efficient and cost-effective ways to allocate capital and meet investment objectives.
- Indexing effectiveness, with regard to cost and preserving the wealth of clients, is crucially dependent upon the investment manager skillset and the implementation methodology employed.
- The changing and dynamic nature of markets means that skillful investment managers must continue to evolve in both approach and implementation.

Julian Harding
Managing Director,
Global Head of
Core Beta Research

Indexing can provide clear investment objectives, investment efficiency, sound governance, diversification, liquidity, low turnover, low expenses and control over investment allocation. For these reasons, and others, many of the world's largest and most sophisticated investors allocate assets to core beta index funds.

However, the market is always changing and to truly deliver on the promise of indexing, investment managers must keep changing too.



Staying Ahead

Our research is focused on ensuring that the benefits of indexation are realized within the investment portfolios that we manage and that we strike an appropriate balance between return, risk and costs based on client objectives.

Our insight and innovation help us offer clients options. It allows us to allocate their capital more effectively to return-seeking or liability-matching assets.

We review some of our latest core indexing thinking and the research we're undertaking to ensure it remains effective.

Stay Flexible to Maximize Effectiveness

Indexing started in the 1970s as a means to approximate the market portfolio, via the use of market-capitalization-weighted indexing, and thereby capture the associated risk premium of owning the market. It's important to remember that the index is an approximation to the market and not the market itself.

An index can, if carefully chosen versus the client's strategic asset allocation, do a good job of helping to achieve investment objectives, but it is all too easy to give an undue focus to close tracking and to lose sight of the wider objectives of benchmark selection and adding value to client portfolios, turnover reduction and transaction cost savings.

For an index to be readily replicated it needs to have transparent rules and be regularly updated for entrants, exits and weight changes driven by share issue and free-float changes. This periodic updating of the index at close-of-day prices, must be recognized as an approximation to a market portfolio and by definition if solely replicated at close-of-day prices, may on occasions create a demand for liquidity from the index fund which can adversely affect prices.

We undertake robust quantitative analysis to assist our portfolio managers with the effective trading of these index reconstitutions and seek to appropriately balance the index turnover, risk versus the benchmark as well the time, and therefore price, of trading with the aim of ensuring the client's investment objectives are best served with regard to close index tracking and adding value to client portfolios and transaction cost savings.

Working with Less Opportunity The opportunity to add value through index-change trading strategies when traded between announcement date and index rebalance date has consistently trended lower in recent years as more participants have become aware of the opportunity. We have also observed a significant rise in the traded volumes of the relevant securities well ahead of the implementation date, which is consistent with this trend.

Figure 1
MSCI World Value-Add Opportunity

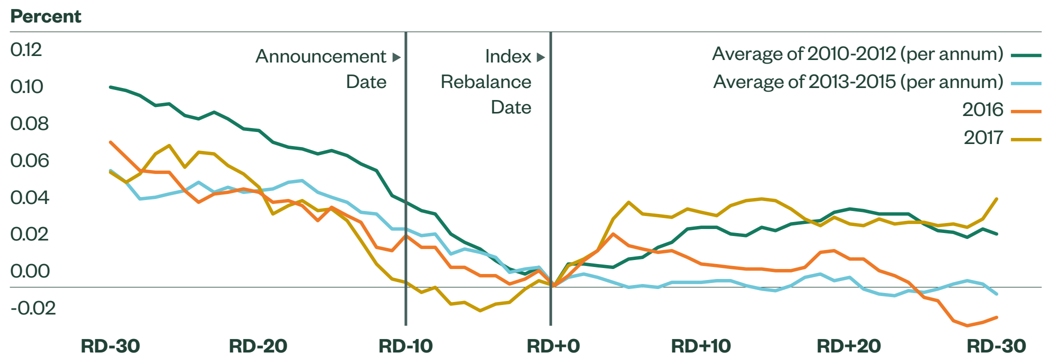
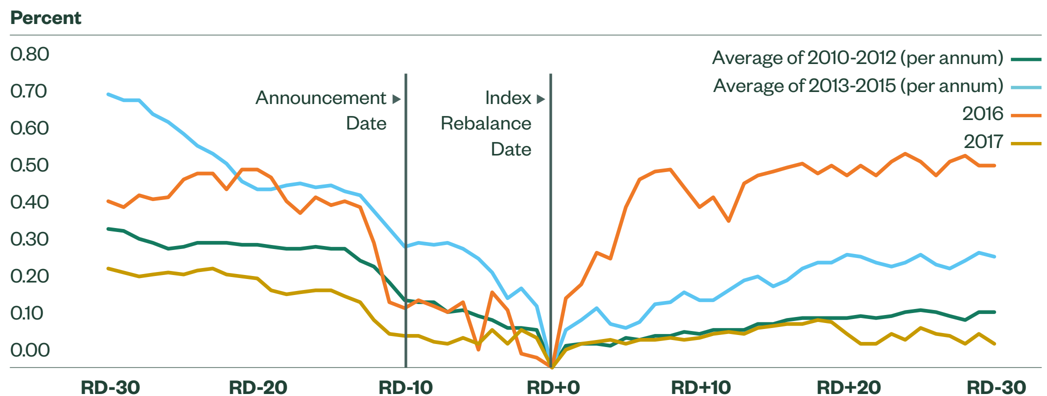


Figure 2
MSCI EM Value-Add Opportunity



Source: SSGA and MSCI. Turnover analysis are as of the date indicated, are subject to change, and should not be relied upon as current thereafter. Third-party marks are the property of their respective owners and the statements in this document do not constitute a recommendation or an endorsement.

Keep Adding Value

We aim to deliver additional value into the index investment process through techniques such as effective index-change trading strategies, corporate action selection strategies (often there are alternatives with different economic outcomes), crossing of securities trading (where the natural mix of buys and sells of a stock can be offset against each other for little or no cost),* stock-lending arrangements and trading strategies designed to best match the risk, return and cost opportunities for client portfolios.

These strategies can augment performance and tracking in a risk-controlled way, providing a valuable uplift that ultimately can assist the investor in meeting their return targets.

Global Organized Trading So that all clients with portfolios managed in our various investment centers can equally gain exposure to these trading strategies, according to their mandate and tracking objectives , we deploy them via our Global Organized Trading (GOT) strategies. In this way we enable all the funds with similar objectives and mandates to be traded concurrently.

Not all index changes encounter the same market dynamics or supply–demand considerations. Our research and analysis of trading patterns and liquidity covers all the major index providers, and separately considers size, region, type of index change (add/delete/free float or shares-in-issue). This enables nuancing as to how and when we trade and helps us target the best risk-adjusted outcome for clients.

With more investors following the same or similar indexes there is growing interest in methods that can be employed to maintain portfolios that do not so readily require liquidity at predetermined or widely known times.

We have been both considering and researching these possibilities for some time and our GOT trading strategies — which diversify trading at and around the index change points – are a good example of how we employ our expertise to maintain and add value.

* Availability of internal crossing at SSGA may be affected by your asset class, vehicle type, jurisdiction, or other factors.

Design for Low Turnover

The right index-change trading and corporate action selection strategies are key but it is critical for our research and portfolio implementation to also focus on turnover reduction strategies. By carefully analyzing each change, it may be that incremental value can be added and the index-tracking capability of the fund can be maintained whilst not necessarily trading some of the smaller changes. This means less trading and so gives rise to lower transaction costs – every dollar saved is another dollar that stays in the client portfolio.

Core indexing is based on market-capitalization-weighted indexes which in the absence of any changes are essentially self-rebalancing, as the price of a stock moves so does its weight, therefore no trading is necessary and the portfolio automatically stays in line with the index. It is however the management of these changes (additions, deletions, free float changes, new share issues, corporate actions and reinvestment of dividend income, to name but a few) that occupies our research efforts and those of the index fund manager.

The fact that core indexing is largely self-rebalancing does effectively remove a proportion of the market from this high turnover investment world; but that's good for investors. Trading is a zero-sum game, actually after costs it's worse than that as in aggregate it doesn't create wealth; for any participant to gain the other must loose and it is only the intermediary – who charges commission and a bid–offer spread on the trade – that wins. Lower turnover investing saves the investor money – less turnover equals less broker commissions, market impact, bid-offer spreads, transaction taxes and custodial fees.

Manage Costs

The explicit and implicit costs when, viewed in isolation, can seem small – however even a small fraction of a percentage point per year when compounded for 20 years, is a corrosive force at work on an investment portfolio. Benjamin Franklin's quote is a great reminder "Beware of little expenses. A small leak will sink a great ship", and looking after even these little expenses is the focus of our research and the job of the index fund manager for the portfolios that they manage.

Indexes have been improved over the years and a number have features like buffer-bands, where there is a rebalancing band through which the size of the stock needs to pass before it is moved into or out of the size cut-off band for the index. This sensibly reduces unnecessary turnover when a security is periodically fluctuating in size at and around the cut-off size for inclusion within the index.

When managing index funds and implementing index-rebalance trading we design strategies that reduce the amount of index turnover that is actually implemented, this is done by maintaining the funds within close tolerances at the security-, sector-, size- and country levels and ensuring the ex-ante tracking error of the portfolio, as measured by a portfolio optimizer, is maintained within close tolerance to the benchmark.

Realized investment gains within portfolios can, for certain investor types, lead to taxation, in these circumstances the tax inefficiency of investments can increase with turnover. It is often not possible to reliably estimate the level of tax inefficiency, but the low turnover index fund can be a useful investment vehicle for this purpose.

The index fund is a very good approximation to the market that it represents and by producing a return in line with the market after costs it is doing a tremendous job.

Truly Understand the Index

Core beta investing is based on the market-capitalization-weighted index, of which there is an ever-increasing range; country, region, size or sector are all used to define an index and there are a range of index providers. With improvements in technology, data availability and analysis capabilities the index providers have come up with an almost endless array of index possibilities.

Most providers use free-float adjustment, similar definitions of universe and comparable methodologies for index construction, there are however differences, which can be material when it comes to when or indeed even if a change occurs within a particular index. Our familiarity and understanding of the various rules is key to ensuring the effective management and trading of these index portfolios.

Influence and Innovate

Indeed, our detailed understanding of indexes and, more importantly, of managing portfolios versus those indexes gives us an array of practical insights into how indexes can be constructed to best serve clients. We utilize that expertise by making representation to index providers through participation in index rule consultations, by sitting on a number of index consultation committees and by providing practical and constructive feedback to index providers. We have recently taken those practical insights one step further and, with an aim of further reducing the costs paid by clients, established a range of ultra-low-cost Exchange Traded Funds based on a self-indexing methodology developed by our research teams in consultation with our index fund managers. In order to ensure a level of oversight we've employed an index calculation agent to maintain and deliver the index.

After many years of noticing an increased granularity of exposures occurring within index investing, we have started to notice and indeed applaud a trend to gaining core beta exposure by investing in broad indexes covering all sizes of security (large, medium and small), global benchmarks without a home country bias, developed markets and emerging markets and a desire from some clients to further reduce the turnover within portfolios or to trade when others are not doing the same and so potentially avoiding any erosion of wealth that may occur due to the demand for liquidity at a point in time.

Figure 3
MSCI Turnover

Analysis of scheduled semi-annual and quarterly rebalances from 2010 – 2017
Includes all Additions/Deletions to the index plus any Increases/Decreases with change in index weight > 2 basis points. Heat-mapped per Change Category.

Change Category	MSCI World (%)	MSCI USA (%)	MSCI Europe ex UK (%)	MSCI UK (%)	MSCI Japan (%)	MSCI Pacific ex Japan (%)	MSCI EM (%)
Total	2.0	2.4	2.9	2.6	2.1	3.8	6.6
Addition	1.2	1.2	1.1	0.9	0.8	1.4	3.1
Deletion	0.4	0.4	0.5	0.3	0.5	0.6	0.8
Increase	0.2	0.4	0.8	0.7	0.4	0.9	1.5
Decrease	0.2	0.4	0.6	0.7	0.4	0.9	1.2

Source: SSGA and MSCI. Turnover analysis are as of the date indicated, are subject to change, and should not be relied upon as current thereafter. Third-party marks are the property of their respective owners and the statements in this slides do not constitute a recommendation or an endorsement.

Consider the Whole Picture

Our investment managers, research teams and trading desks, based throughout the world in our various investment centers, work closely together to ensure that all trading and maintenance of index portfolios is carefully planned with regard to market conditions, liquidity and timing of trade execution. Trade analysis, both prospective and actual is carefully monitored by both our traders, index fund managers and our dedicated Trading Cost Analytics group.

Our quantitative research helps to drive our trading strategies, but it is the global involvement of our portfolio management teams and traders that grounds this in reality and ensures we design, employ and carefully monitor strategies that help to preserve the wealth of client portfolios. We do this, where possible, by carefully reducing turnover, stripping out execution costs and trading at prices that more truly reflect market prices, rather than just the index closing prices on the day of the index change or cash flow.

Align with the Interests of Investors

Indexation is naturally aligned with the interests of the underlying investor in seeking to get passive exposure to, and returns commensurate with, the underlying market. Indeed, the index fund manager is very much day-to-day “sitting in the shoes” of the client and focusing on striking an appropriate balance between return, risk and costs within the portfolio.

The alternatives to indexation are not easy choices and can yield a poorer return. Selecting a manager, who ex-post will outperform the market after costs is harder than most realize. You can look at historic data tables for the returns of active managers and find that the story isn’t as rosy as you might have thought, and this is data that is subject to significant survivorship bias.*

Historical performance tables only show the funds that have existed over these time periods and it is generally only the better performing funds that exist in the long run; the under-performers will have long since been merged into other funds or been closed. Good active management does exist and can make sense when it is based on investment insights and consistently superior analysis and/or decision-making; these skill sets are however a rarer commodity than many realize, not unsurprisingly, as in aggregate when considering the purchase and sale of security each trade destroys wealth as there is no wealth creation in a trade per se only the aggregate removal of costs, brokerage and fees from the clients’ portfolios.

Pay Attention to What Matters

By having a relentless focus on effective trading, research-based analysis of trading strategies, an insightful understanding of the cost and turnover reduction opportunities that exist and a desire to give clients the market return on their investments rather than just the index return after costs, we have as an organization developed an implementation skillset that transcends and permeates the management of the various asset classes and investment styles that we manage, whether index, active fundamental, active quant, equity or bond.

Smart Beta Too Indeed, accessing the transparency and value-advantage benefits of indexing is no longer contained to the core beta market cap-weighted benchmarks. Smart Beta strategies have evolved to provide even greater choice for investors looking to move the dial on cost-efficient, risk-adjusted returns in their portfolio. Indexes target market factors like Value, Size, Low Volatility, Quality and Momentum, or within multifactor portfolios a combination of these. They offer the opportunity to achieve the specific returns of these factors, which were previously the domain of more expensive active investment strategies, whilst at the same time retaining most of the benefits of traditional indexing. Where there is a client focus on improving within their overall portfolio, the returns over time, lowering risk or a combination of the two, these indexes can be viable choices.

A strong focus on implementation is vital for index funds, whether it is core beta or smart beta. Indexing, as a concept is straightforward, but indexing is a complex business and a long institutional memory and index fund management teams that are established, with a significant number of senior index fund management personnel with long tenure is essential, as is the depth and extent of index fund management and trading expertise in the major financial centers globally.

* Source: Standard & Poors SPIVA report. Available online.

Get Trading Right

As previously mentioned, in order to be replicated indexes utilize close-of-day prices on predetermined days to effect the updates in constituent weights and, for total return benchmarked funds, reinvestment of dividend income. This – if the manager were to purely replicate the index at these times, regardless of price – necessitates a demand for liquidity at a point in time.

Don't Be a Price Taker With the above considerations in mind and in order to not be price takers, the research and planning of our trading strategies for maintaining index funds, considers, and sometimes employs, trading at times other than purely at the index-change point. The objective here is to diversify the trading associated with maintaining the index portfolio and thereby achieve a trading price that more appropriately reflects the market price without paying any premium for liquidity. The index fund is a natural long-term home for equity holdings and by careful and patient investing, trading can be timed so that liquidity is favorable and the supply-demand balance can be more attractive.

Reinvest Right The same logic applies when we are investing client money into or out of funds or reinvesting dividend income back into the fund; if this is significant and the mandate allows we would again seek to diversify the trading away from a particular point in time and to achieve a more "natural price" for the execution without paying any premium for liquidity. These considerations are undertaken in advance when planning trade execution and are facilitated by a range of trading strategies that can be deployed. In order to ensure that the execution of the various trading strategies across client portfolios is aligned, precise strategies are defined and straight-through processing routes the orders to our various trading desks in the US, Europe and Asia for simultaneous trade execution.

Look at the Alternatives Market-on-close trades, trading of index changes and month-end investing are all points where there may be a price to be paid for liquidity; we therefore carefully consider liquidity and trading alternatives when deciding how best to implement and maintain client portfolios in order to generate market returns after cost.

Consider Trade Timing Another area of research has focused on designing portfolios where index changes are not implemented at the index rebalance date, but are considered and traded at a later date, thereby moving to a point when there is less trading at the same time as others in the market whilst also maintaining a degree of consistency between the portfolio and benchmark index. These strategies naturally increase the tracking error versus the relevant benchmark but on average, for the limited range of indexes considered over the last few years, have offered a modest improvement in absolute return.*

Low-cost trading opportunities are always considered when trade execution is needed; it might be the trading strategy or timing choice or whether to use futures for efficient portfolio management and cost reduction or the use of internal or external crossing networks.

* Source: SSGA Research 2018.

Predict Index Changes

With clearly defined rules and a ready array of information on liquidity and prices it has become possible to predict the changes that occur within indexes even before they are announced and to therefore potentially gain from any supply–demand imbalance that occurs at or around the index-change point.

These opportunities have been observable for some time and the potential for added value has reduced in-line with the observable increase in traded volumes well ahead of the index-change date and even ahead of announcement.

Predicting index changes is not without its risks. When looked at retrospectively it can seem attractive to see the price movements that occur on some of the index changes, but when the predictions are wrong or when there is significant adverse price movement in the extended time between trading and the index implementation date there is the likelihood of gains as well as losses on any particular index rebalance.

These price movements are often a result of new fundamental news on the particular security, either good or bad; it might be some surprisingly good news on a deletion that you have sold early or some surprisingly bad news on an addition, that still gets announced, that you have traded prior to announcement. The reverse is equally the case and so one should expect more variability of return versus the index benchmark when employing strategies of this type.

To date we have not, as a firm, generally traded index changes ahead of index-change announcement. An exception is where we have sought points of natural liquidity for equity supply and on occasions participated to a limited extent in some IPOs. We have however been researching the opportunity that exists for added value by trading predicted index changes and see that for investors who want to move away from close index tracking by trading away from the rebalance date of the index and prior to announcement of that change, and who are prepared to accept more variability of return, there is the opportunity to add some potential value.

Keep Asset Stewardship and ESG Considerations Foremost

Asset Stewardship through strong corporate governance engagement, together with issues-focused and forward-thinking voting on shareholder proposals has been an important mechanism by which we take a proactive stance on ESG issues for the long-term benefit of investors within index funds.

As index funds hold shares for the long term, we are able to have an ongoing engagement with companies and strongly influence boards with the aim of ensuring that they effectively address issues of waste, pollution, water resource depletion and climate change (Environmental), gender diversity, employee inequality, working conditions, human rights (Social), board diversity, ethics and executive pay (Governance).

Where there is an issue with management, index funds don’t just sell the stock and walk away, we engage with management with the aim of ameliorating it. For example, in 2017, we made it clear to roughly 400 publicly traded companies within the US that we would not tolerate a lack of diversity on boards by voting against the re-election of the chair or most senior board member of the governance or nominating committee on male-only boards.

We have a global ESG Investments and Asset Stewardship team that is dedicated to active engagement with companies thereby ensuring that we are both an effective steward of clients’ assets and that the index funds that we manage come with strong ESG engagement built in.

Index funds, in our opinion, are going to be one of the most effective catalysts for improvements in companies' ESG behavior going forward.

Our more than 30-year commitment to ESG is well recognized. We have around $180 billion of ESG-dedicated index equity assets under management (as at the end of 2017). Our proprietary ESG research is heavily focused on understanding the relative importance of data, from various sources, both quantitative and qualitative and how it can be effectively utilized to build customized ESG portfolios. This and other innovative thinking when combined with our effective design and implementation of index portfolios is helping to drive the creation of solutions that better match clients' total investment objectives.

Focus Pays

With the aim of ensuring that clients' investment objectives are best served with regard to close index tracking, adding value to client portfolios and improving transaction cost savings, we undertake robust quantitative analysis to assist our portfolio managers with the effective trading of index changes and seek to appropriately balance the index turnover, risk versus the benchmark and avoiding trading when significant liquidity is demanded.

We also aim to deliver additional value through techniques such as corporate action selection strategies (often there are alternatives with different economic outcomes), crossing of securities trading (where the natural mix of buys and sells of a stock can be offset against each other for little or no cost) and stock-lending arrangements. These strategies can augment performance and tracking in a risk-controlled way, providing a valuable uplift that ultimately can assist the investor in meeting their return targets.

A strong focus on implementation is vital for index funds, whether it is Core Beta or Smart Beta. Indexing, as a concept is straightforward, but indexing is a complex business and a long institutional memory and index fund management teams that are established, with a significant number of senior index fund management personnel with long tenure is essential, as is the depth and extent of index fund management and trading expertise in the major financial centers globally.

As indexation continues to develop and evolve it is our responsibility to ensure our research, insight and innovation give clients options and enable us to assist them effectively allocate capital.

About Julian Harding

Julian Chartered FCSI ASIP FCA, Managing Director, Global Head of Core Beta Research, State Street Global Advisors (SSGA). Julian leads State Street's Core Beta research and also manages Equity Beta Portfolios for State Street.

He is based in London, a member of the State Street Senior Leadership team and has over 20 years of index fund management experience. Prior to joining State Street in February 2016, Julian was Head of Index Fund Management with Legal & General Investment Management Ltd, which he joined in 2005; he was an executive director with responsibility for the London-based equity and fixed income index fund management teams. Julian worked as a research physicist after university and subsequently qualified as a chartered accountant with KPMG.

He moved into investment management in 1995, managing index, quantitative and other derivative-based portfolios. In 1998 he joined PwC as a senior manager focusing on investment management and in 2000 he joined the quantitative fund management house First Quadrant where he was an executive director.

Julian has first-class honors degree in Physics from Southampton University and is a Fellow of the Institute of Chartered Accountants in England & Wales (FCA), a Chartered Fellow of the Institute for Securities & Investment (Chartered FCSI) and having achieved the ASIP designation is also a member of the CFA Society of the UK.

[1] FTSE Russell, "Smart Beta: 2017 global survey findings from asset owners", May 2017

[2] Oxford University, Arabesque "From the stockholder to the stakeholders", March 2015.

[3] MSCI, "Foundations of ESG Investing. Part 1", November 2017.

[4] From the Stockholder to the Stakeholder: How Sustainability Can Drive Financial Outperformance, March 2015, University of Oxford and Arabesque Partners. Retrieved January 20, 2016; SSGA. The authors reviewed 29 cost of capital studies, 51 operating performance studies, and 41 stock price studies, respectively.

[5] SSGA Q2 2017 Investment Quarterly.

[6] "A Blue print for integrating ESG into equity portfolios," Journal of Investment Management, Bender, Bridges, He, Lester, Sun

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A Smart Beta strategy does not seek to replicate the performance of a specified cap-weighted index and as such may underperform such an index. The factors to which a Smart Beta strategy seeks to deliver exposure may themselves undergo cyclical performance. As such, a Smart Beta strategy may underperform the market or other Smart Beta strategies exposed to similar or other targeted factors. In fact, we believe that factor premia accrue over the long term (5-10 years), and investors must keep that long time horizon in mind when investing.

While diversification does not ensure a profit or guarantee against loss, investors in Smart Beta may diversify across a mix of factors to address cyclical changes in factor performance. However, factors may have high or increasing correlation to each other.

Investments in mid-sized companies may involve greater risks than in those of larger, better known companies, but may be less volatile than investments in smaller companies.

The returns on a portfolio of securities that excludes companies that do not meet the portfolio's specified ESG criteria may trail the returns on a portfolio of securities that includes such companies. A portfolio's ESG focus may result in the portfolio investing in securities or industry sectors that underperform the market as a whole.

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