GET MORE FROM YOUR CORE
IQ magazine provides the most relevant thought leadership from State Street Global Advisors, published quarterly.

At a time of lowered return projections and higher return demands, fresh ideas for strengthening the often-neglected investments at the very center of institutional portfolios.
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A volatile new market environment demands a different kind of regimen to work core exposures harder and smarter.

It is common to think of equity markets as a forecasting tool because they feature in many leading economic indicators. But their predictive properties are fallible, especially in the case of China. Not only is the Chinese A share market extremely volatile, history has shown it to have little correlation with the performance of the Chinese economy. Using the recent 43-percent plunge (or the 150-percent run-up that preceded it, for that matter) as a forecast of the Chinese economy would require an adventurous use of econometrics to say the least.

That said, investors have experienced a growing disquiet regarding the People’s Republic related to two key areas. First, there have always been doubts about the veracity of Chinese economic data, so during periods of slowdown there is a tendency to seize on any “hard” data such as Purchasing Manager Indices and electricity consumption reports.

Volatility during the summer months is common, and there is always a fundamental driver reported as the backdrop.

This summer it was the prospect of a meltdown in China that loomed over the daily spasms of the Nikkei, Eurostoxx and S&P 500. In our view, there are plenty of concerns that distinguish the recent market turbulence from previous “buy-on-the-dip” opportunities. However, we think investors may be making too much of the immediate contagion risk from China. A fully valued US stock market, faltering near-term earnings prospects and a rising discount rate from the expected first US Federal Reserve (Fed) hikes in nine years together form an ugly enough beast without over-extrapolating from the problems spilling over from the world’s second largest economy.
When some of those numbers showed meaningful drop-offs this summer, they seemed to confirm everyone’s worst fears. Second, the same investors who were keen on the speedy intervention of the Chinese government in the economy through monetary and fiscal policy are now reacting with alarm to its interference in financial markets. This has struck many as a step too far and as a sign that Chinese policymakers may be panicking a little.

We take a decidedly more middle-ground view of the developments in China. It’s become clear the leadership is determined by hook or by crook to cushion the working population from the effects of the country’s economic restructuring. Meanwhile, the transition from a credit- and export-driven economy to a more sustainable consumer-oriented model is going to take time. No amount of stimulus or stock market boom is going to change that. The slowdown in growth from 7 or 6 percent (or whatever percentage it really was to start) will continue as the mission of changing the economic model proceeds and the misallocation of resources (the ghost cities, the bridges to nowhere) from the last credit-fueled boom are worked through. Still, the global knock-on effects, reflected in swooning commodity prices, emerging market currencies and select euro-zone exporters, have long been anticipated by markets. China is certainly another complicating factor for a global economy suddenly full of them, but, despite certainly some risks to the downside, we still think it’s more likely to be another of the protracted, grinding variety.

**No Pain No Gain**

When future returns look meager, investors can work their assets harder, take more risk or both. We favor more of the former over the latter, but also believe investors should take particular care with their risk budgeting. In an environment where others may be taking inappropriate risks, you can get caught in the backlash unless you have your own plan for keeping things on an even keel when prices dive and liquidity dehydrates in a hurry. Better, in our opinion, to work all parts of the portfolio more strenuously.

Now challenged on multiple fronts, investors need to work on their core with the same vigor that they typically devote to the more-marquee, less-liquid portfolio muscle groups. Not to put too fine a point on it, but they should get the core in performance shape.

We aren’t usually in the habit of drawing inspiration from fitness magazines for our portfolio advice, but in this case the parallels are too apt to pass up. In an exercise context, working on your core involves an especially persistent kind of grueling intensity. Less dedicated gym goers will often give it short shrift or merely focus on the most visible aspects of the musculature. The same might be said of investors’ core equity and fixed-income portfolio exposures, which are typically the largest and increasingly the most neglected portion of their capital. During a period when investors are assailed with challenges on all fronts, we believe they should work on their core with the same vigor that they typically devote to the more-marquee, less-liquid parts of their portfolio. Not to put too fine a point on it, but in this environment investors should get their core in performance shape.

So, why has the core become neglected? Perhaps because many investors have a relatively straightforward view of its current return profile, which runs along the following lines:

- Projected returns for the core might be quite low in the medium term, but the sources of beta and alpha are well understood, so the best way of assembling the pieces is via an efficient consensus-oriented index approach;
- Capital market opportunities will vary across geographies and asset classes, but these differences will wash out over time and are essentially either unpredictable or bear a close enough resemblance to the past that current cap-weightings are a suitable guide;
- Time and effort devoted to alpha seeking is better spent on riskier opportunities, which often have the added advantage of sounding “smart” to investment committees.

We have some good news! We believe many of these views are wrong. With the right strategy and fee diet, returns can potentially be enhanced by making better choices among core assets.

**Inch by Inch**

Our Investment Solutions Group and their clients have noted a paradox: As you seek more alpha and cast your net widely to diversify its sources, it seems to slip through your fingers and you are left holding an expensive index fund with some factor tilts. In a paper that serves as a kind of reveille for our core-improvement program, Ric Thomas, ISG’s head of research, quantifies this problem and traces its roots back to the sorts of misperceptions outlined above. He also outlines our new policy for constructing investment policies, which is based on a combination of lower-cost smart beta building blocks.
and more focused active management. Such an approach naturally starts to un-anchor the conventional core-satellite model from its cap-weighted moorings and even more importantly, he argues, ties it more closely to its ultimate investment objective.

Delving more deeply into equities and fixed income, two other pieces showcase our new approaches to extracting the systematic part of the returns from these classic core asset classes.

For example, a go-anywhere fixed-income strategy will often have a systematic bias toward less-liquid, lower-quality credit issues in which the manager has confidence at the specific issuer level. Our systematic approach is to maximize the difference between the return we earn, in the form of the option-adjusted spread, and the risks we incur, in the form of more objective measures of quality and default. This is akin to “quality at a reasonable price,” but because we seek out this premium across the fixed-income sectors, including investment grade, BBB and high yield, we can avoid a more unconditional systematic tilt toward lower-credit issuers.

Similarly, our advanced beta equity strategies extract some of the well-known return drivers, such as value premium, and tilt toward other attractive characteristics, such as quality or low volatility. Recently, however, we have been seeking ways to extract these returns even more effectively by giving more consideration to the interaction between these different characteristics. In keeping with our smart beta philosophy of transparency, Jennifer Bender explains the methodology and the magnitude of improvement from altering the traditional “top-down” approach for combining sleeves of factor tilts in the same portfolio and moving instead to a “bottom-up” approach that takes into account these interactions at the security level.

In recent weeks, market volatility has been accompanied by very high trading volumes in some of the most popular exchange-traded funds (ETFs). We believe this provides further grounds for an argument we’ve been making for some time: ETFs can begin to take the place of derivatives as convenient position-taking and hedging tools. At the same time that regulatory and other forces are increasing the costs of futures, the heightened liquidity of ETFs means their total expense ratio has come down. Even when it comes to the kinds of incremental returns that can be wrung from the investable cash that investors keep on hand as part of their core, there are distinct ways to get more from it.

The Shape of Things to Come

Many are looking at the history of Japan for clues to the future of China. However valid and relevant this analysis may be, we also see significant potential for change in Japan itself, which after all is still a major holding of many international core portfolios. The “three arrows” of Prime Minister Shinzo Abe’s Grand Revitalization Plan were designed to shock the Japanese economy. In addition to introducing sweeping monetary and fiscal change, Abe’s reform agenda also includes important economic and social dimensions. As investors, we tend not to be too keen on revolutions, but as highlighted in “Japan’s Shareholder Revolution” we are encouraged by the new focus of Japanese companies on delivering returns to shareholders. Japanese profit margins have persistently trailed those from companies in other regions of the world, but we now see the potential for this gap to close.

The opportunity brought on by shareholder reform in Japan could be characterized as a “factor” return, but the different responses of individual companies to similar circumstances might suggest that fundamental analysis will also pay off. This is a theme that we expound on in the last article in the issue, authored by our Active Quant Equity team. If getting more from your core often starts with determining which factors can be extracted systematically and at scale while not overpaying for them, it also involves recognizing the limits of that approach and where and when to start focusing one’s efforts elsewhere. Interestingly, as the AQE team points out, there are times that have proven more favorable for active management. As stock correlations weaken and we find ourselves on the brink of the Fed raising US interest rates, we think this could be one of those times. For those of us looking to get portfolios in top form, that leaves us with a fitting motto for the bracing return environment ahead: When not working on your core, stay active.

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OUTLOOK & POSITIONING
JAPAN’S SHAREHOLDER REVOLUTION

William Killeen, Ph.D, CFA, Portfolio Manager, Fundamental Equities
Mark Prentice, CFA, Research Analyst, Fundamental Equities

The recent introduction of shareholder friendly corporate governance reform in the world’s third largest equity market could prove to be one of those watershed moments investors always remember.

Since Prime Minister Shinzo Abe shot the first of the “arrows” in his grand Revitalization Strategy (aka “Abenomics”) in April 2013, the Japanese stock market has gained more than 25 percent (in US dollar terms). Of course, during the same period the Euro Stoxx 50 Index advanced by a similar percentage and the S&P 500 Index rose more than 40 percent. Moreover at current valuations, the Nikkei 225 Index is still only about three-quarters of where it was in 2000 and less than half its peak of 1990. Considering its history of market recoveries followed by disappointment, the same question remains: What, if anything, has changed to cause Japan to break out of a range-bound stalemate that has lasted some 20 years?

We think investors may have finally received their answer earlier this year in the form of a series of corporate governance measures that could reshape the entire dynamic of how Japanese companies relate to their shareholders. Relative to the world’s other major developed equity markets, corporate governance has long been a source of tension for those investing in Japan. In contrast to the US and UK, where shareholders’ interests come first, Japan’s industrial revolution was built on the “multiple stakeholder” model where value is shared with all interested parties, including workers, creditors, public authorities and other corporations. The initiatives now underway suggest an emerging appetite to increase focus on the creation of value for the providers of share capital.

For the first time, each Japanese corporation is encouraged to meet a minimum return on equity target (8 percent) and to have at least two independent directors on its board.

In recent years, we have seen the shareholder dynamic in Japan begin to change, as more Japanese companies initiated dividend hikes and share buybacks to widen their international shareholder base. The drawing up of the Japanese Stewardship Code in early 2014 was an important milestone, ratcheting up pressure on the institutional investor community to “refine their dialogue” with Japanese corporations. Another key development has been the creation of the JPX Nikkei 400, an index composed of companies with capital efficiency and investment-friendly management cultures. Last October, in a sign of how seriously the government planned to throw its weight behind the shareholder-friendly movement, the Government Pension Fund transferred a large block of fixed-income holdings into passively managed equity mandates indexed against the JPX Nikkei 400 Index. Even more controversially, it has also placed money with activist investors.

With the recent finalization of the corporate governance code, however, the government builds on these earlier gains and moves the ball considerably downfield. For the first time, Japanese corporations are encouraged to meet a minimum return on equity (ROE) target (8 percent). New standards of board independence must also be met — the sine qua non of corporate governance — with all publicly traded companies now required to have at least two independent directors. The measures follow a “comply or explain” approach that subjects corporate managers to very public regulatory and shareholder pressure if they fail to meet the standards in a timely manner. Parallel to these actions, International Shareholder Services has announced it will recommend voting for management change in any Japanese company with an ROE of less than 5 percent.

It is hard to overstate the impact these recent developments could have on corporate behavior and ultimately shareholder value creation.

QE MEETS ROE

According to the Ito Review, the government-commissioned whitepaper by university professor Kunio Ito, much of what has ailed the Japanese stock markets these past several years can be...
traced to a failure of managers to embed measures of corporate performance such as ROE into day-to-day financial calculus. As seen in Figure 1, ROE in Japan is far lower than in other developed nations. By our own calculations, only about 50 percent of Japanese companies would meet the 8 percent threshold recommended by the Ito Review.

Conventional wisdom would have it that this is primarily a balance sheet management issue — i.e., more a problem with the denominator, or the “equity,” in the net earnings/equity ratio that determines ROE. To examine this, we carry out a classic Dupont composition of ROE, splitting it into its five constituent parts (Figure 2). Profitability, or numerator, metrics are shaded in blue. Balance sheet, or denominator, metrics are shaded in gray.

Interestingly, in our analysis, the denominator metrics for Japan are not glaringly out of sync with international peers. Leveraged, represented by assets/equity (row E), reflects the ability of a company to employ debt to fund profit expansion. Just looking at row E, it might seem that leverage in Japan is roughly on a par with levels in the rest of Asia and only modestly below those in the US.

However, if we delve a bit more deeply into the nature of the balance sheet, as shown in Figure 3, a somewhat different picture emerges. As we can see, cash and investments — including cross-holdings (where companies own shares in other companies) and separate parent-subsidiary listings — as a percentage of total equity are far higher in Japan than in other markets. This is consistent with our own observations of Japanese management policies. Many Japanese companies are debt-free, with cash earning very little return. Dividend payouts are also much lower in Japan than in other developed markets. In the process, capital tends to get accrued through retained earnings, the balance sheet becomes bloated, and the transmission mechanism of shareholder value creation eventually breaks down.

So what would be the impact on corporate performance if we eliminated excess cash and cross-holdings through share buybacks, as the new reforms encourage? In Figure 4, we work through this hypothetical exercise. We looked at the data from the 300 companies in the MSCI Japan Index as of March 2015 and considered a scenario whereby each company returns 50 percent of cash and investments on the balance sheet to shareholders through share buybacks (movement from orange dot to blue dot). As excess capital is returned to shareholders and equity...
shrinks, there are two effects: The market-rating multiple of capital (price/book) and ROE (net income/equity) both increase. This much is to be expected. What’s particularly telling, though, is that the change actually shifts ROE from the left of the critical hurdle rate line recommended by Ito (8 percent) to the right. Insofar as this reflects the minimum return expected by shareholders contributing capital to a company’s operations, this represents a potentially significant shift in the ability of Japanese companies to move the value-per-share creation dial.

Margin Improvement and the Multiple Stakeholder Society

Still, balance sheet shrinkage on its own cannot create sustained, long-term growth. Issuing dividends and share buybacks can certainly move share prices (and, in fact, to some extent may already be “in the price” of the recent Nikkei Index gains), but such announcements can easily be a one-time adjustment. They create the potential for longer-term, more sustainable stock price appreciation. For that potential to be realized — for the ROE dots in Figure 4 to shift from blue all the way over to purple — we need to go back to our DuPont decomposition in Figure 2 and focus on the numerator metrics. Higher corporate tax rates (row A) are one issue that stands out. (We should note, however, there has recently been meaningful progress on this front, which we’re likely to see continue as reduced tax rates hit income statements.) Clearly, operating margins are a much bigger issue as they are roughly half of those in the US.

Figure 5 offers another view of operating margins, plotting them against other regions over the last decade. If anything, the pattern is even more apparent. So why are margins so low? Some reasons have to do with structural issues — energy and material costs and labor market inflexibility — beyond companies’ control. But there are also opportunities to enhance cost competitiveness. The Ito Review suggests that one good place to start is management incentive practices. Executive compensation is modest relative to international peers, and even more to the point, notes the report, it is only tentatively aligned with corporate performance.

The Japanese corporate sector is also heavily reliant on bank financing; indeed, in many cases, companies list banks among their biggest shareholders. This has created a network of interlocking cross-holdings and board directorships that has largely internalized corporate risk and sealed off corporate Japan from the more demanding providers of capital in the bond and equity markets.

For much of the postwar era, corporate Germany was very much the product of the multi-stakeholder society. Then, in the mid-1990s, Bayer, Hoechst and Daimler Benz broke ranks, and the rest is history.

All of these factors hinder the effectiveness of capital allocation. Changing such practices is nearly always challenging. However, there is precedent to suggest that once critical mass is achieved in the governance arena, the transformation can occur more quickly than one might think.

For much of the postwar era, corporate Germany was very much the product of the multiple stakeholder society. Not unlike Japan, ties between banks, insurance companies and corporations sheltered the corporate sector from the pressure to become more efficient. In the mid-1990s, companies such as Bayer, Hoechst, and Daimler Benz broke ranks to embrace the concept of shareholder value creation, and others followed. In response to the improvement in economic returns, the German stock market underwent a dramatic re-rating that lasted until the late 1990s. Even after the bursting of the tech bubble in 2000, earnings power remained double that of the
mid-1990s. With some bellwether Japanese corporations already having embraced governance in a public fashion in 2015, the portents for the future are good.

If operating margins were to increase by 2 percent, the price-to-earnings ratio would fall from 15.6x to 11.8x, almost half the level in the US. Markets wouldn’t be able to ignore that.

For illustrative purposes, in Figure 4 we simulate how an increase in Japanese operating margins from today’s levels to European levels might further increase Japanese corporate performance. The light purple and dark purple dots simulate a 1 percent and 2 percent rise in Japanese operating margins, respectively. The accompanying boost to economic returns is dramatic, with ROE rising from 9.5 percent to 12.6 percent in the latter case — putting it close to ROE in the US. However, the real story is the change in price to earnings (P/E). If operating margins were to increase by 2 percent (all else being equal), the price to trailing actual earnings ratio would fall from 17.8x to 13.5x, far below the level (18.0x) in the US. It’s unlikely the markets would be able to ignore an increase in earnings power as enticing as that. Even if the current Japan stock market valuation is pricing-in balance sheet restructuring, clearly it is not pricing in a significant improvement in operating margin. At a time when some major developed markets are still looking rich, the game-changing governance reforms mean there is still a lot to play for in Japan.

The Barbell Approach

In the short time since these reforms have been introduced in Japan, the number of announcements of share buybacks and dividend hikes has increased significantly. The prospect of inclusion in the JPX 400 could be a significant motivation for companies to focus on making those returns to shareholders. Still, we believe a sustained improvement in ROE will demand a new innovation to drive value creation over the long haul. After addressing the low-hanging fruit of capital management, there is further

Figure 4: Scenario Analysis — Moving the Value Creation Dial

Figure 5: EBIT Margins in Japan, Asia Pacific Ex-Japan, USA and Europe 2004–2015

Source: SSGA, MSCI, FactSet, as of August 24, 2015. P/E is the price to earnings ratio based on actual reported earnings. This hypothetical scenario is for illustrative purposes only.

Source: FactSet, SSGA Fundamental Equities, as of August 24, 2015. EBIT = EBIT/Sales. MSCI Indices include (MSCI USA, MSCI Europe, MSCI Asia Pacific ex-Japan, MSCI Japan, excluding financials.)
room for improvement in margins through the culling of low-margin businesses. For that to happen, though, all players in the investment chain must buy into value-creation principles. This is Professor Ito’s aspiration of an “asset management nation” defined by the “careful management of long-term assets.” The early signs are good.

So which Japanese companies will be the greatest beneficiaries of governance reform? On the State Street Global Advisors Fundamental Equity team, we are tackling the opportunity by taking a “barbell” approach. We think companies with a dominant market share, strong franchise and a significant international shareholder base, but low ROE, have the potential to fare well. Also, firms with productive core businesses where ROE is diluted by clearly identifiable, underperforming, non-core businesses may be of interest. On the other end of the barbell are companies starting from a very low ROE base that might take the opportunity to adapt to the new principles. Firms with an ROE close to zero might very well produce the most dramatic changes.

As value investors, we seek to invest where we see good upside potential, and corporate governance reform in Japan could crystallize such opportunities. We also recognize the risk that execution could fall short of the most optimistic expectations. As Germany showed in the mid-1990s, if enough corporations embrace the new governance culture others will undoubtedly follow. Even if US-style shareholder-centricity is a bridge too far, German-style shareholder-sensitivity is potentially within reach. Ultimately, we believe Japan’s use of governance as an instrument of economic policy could prove even more impactful for its stock market than Abenomics’ broader strokes. At the very least, the latest reform creates a much more fertile environment for active investors.

1 Bloomberg, as of August 17, 2015.
2 Bloomberg, as of August 17, 2015.
6 Japan’s Corporate Governance Code [Final Proposal]: Seeking Sustainable Corporate Growth and Increased Corporate Value over the Mid- to Long-Term (March 2015). Council of Experts, FSA, Tokyo Stock Exchange.
7 Companies Act, originally published in June 2014.
8 If no improvement is evident over the preceding five years.
9 The Industry Competitiveness Enhancement Act of December 2013 was passed to promote restructuring of long-term low-profitability companies.
10 SSGA FE, Factset as at August 2015.
11 FactSet, as of August 24, 2015.
ARE ETFS THE FUTURES?

Matthew J. Arnold, CFA, Head of Institutional ETF Sales, EMEA, SPDR ETFs
Antoine Lesne, Head of Research, EMEA, SPDR ETFs
David B. Mazza, Head of Research, SPDR ETFs and SSGA Funds
Robert C. Trumbull, Head of Asset Owner ETF Sales, Intermediary Business Group

What the Volcker Rule, increasing “roll” costs and the explosive growth of ETFs have to do with the way you keep investable cash from burning a hole in your portfolio.

Given the lack of market buzz surrounding the occasion, it may come as a surprise that this past July 21 marked the official full-compliance deadline for the Volcker Rule. Named for former US Federal Reserve (Fed) Chairman Paul Volcker, the provision all but eliminates the proprietary trading activities of America’s largest investment banks and is a central tenet of the Dodd-Frank Wall Street Reform and Consumer Protection Act, one of the most sweeping financial reform laws in history. Of course, for all intents and purposes, the institutions and customers most directly affected have been playing by the new rule since about 2012. A similar pattern has played out with Basel III (and now IV) and with many of the other regulations that have cropped up since the 2008 crisis to reshape the global financial system. Generally speaking, the marketplace has done a pretty thorough job of processing the changes well in advance of the official start dates.

But not completely. One key trickle-down effect of the new regulatory environment that is just now being fully sized up by institutional investors is the impact on the relative merits of futures and exchange-traded funds in managing the cash they keep on hand as part of their core portfolio exposures.

Futures-vs.-ETFs is one of those debates that has quietly raged within the asset management industry for the better part of a decade. Institutions frequently find themselves needing a timely and cost-effective way to invest the cash in their portfolios. It may be that an asset manager has taken in new flows and needs time to figure how to deploy the assets more strategically. Or that a pension fund is transitioning between managers. Or perhaps an investment committee has simply gotten in the habit since the crisis of maintaining a larger liquidity budget to afford itself a greater degree of flexibility and security.

In any event, with yields on traditional short-term fixed-income instruments hovering near zero, such investors have increasingly wanted to “equitize” this cash. And the most popular way to do that is with a quick infusion of long-beta equity exposure via a short-term (quarter- or month-long) exchange-traded contract in one of the most liquid financial markets in the world. It hardly matters that such institutions have little use for some of the chief selling points that futures provide to the more speculative trading community, i.e., the ability to short the market and employ leverage. In the competition for the hearts and minds of institutions looking to eliminate cash drag, futures have generally been viewed as less expensive than ETFs.

Enter Volcker and the considerable body of other new financial regulations phased in since the crisis. From the Fed’s supplementary leverage ratios to Europe’s EMIR and MiFID, the reforms have been aimed at reducing the potential for significant systemic shocks in the future. In the process, though, they seem to have increased the costs incurred by the world’s major investment banks in writing futures contracts. We believe these higher costs stem from two main sources:

1. **Additional Operational Burdens**
   Historically, a large portion of futures writing activity sat with investment banks’ proprietary trading desks. Under Volcker and other European rules, banks must now show that such transactions are performed as part of the basic fee-based services they provide to clients.

2. **Higher Capital Costs**
   Added capital requirements mandated by Basel and the supplementary leverage ratio mean that, among other things, the banks must keep a larger percentage of risk-free assets on their balance sheets for every riskier asset they hold. This
includes the baskets of securities they promise to deliver at a set date and price as part of a futures contract. With the rate banks can earn on risk-free assets continuing to decline, the “net funding cost” to the institutions holding those securities (or the other assets they hold on their books to hedge out the first-level exposure) has thus gone up as well.

Still, many postulate that the higher execution costs resulting from the regulatory changes might not have been as much of an issue if not for other price pressures resulting from recent supply and demand dynamics in the futures market itself. As stock prices have gained, the market price that banks are able to charge for long futures (based on demand for the contracts and expectations of the market’s direction) has also generally crept up. In addition, a rising market has meant fewer parties are willing to take the short positions on the other side of an institutions’ bets. A decrease in short sellers means those that are in the market — the banks themselves, hedge funds or other counterparties the banks engage to hedge their own positions — can

Figure 1: J.P. Morgan — Summary of Global Equity Index Futures Roll Cost
As of July 2015

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<td>MSCI Singapore</td>
<td>QZ</td>
<td>Monthly</td>
<td>26-Aug-15</td>
<td>0.71</td>
</tr>
<tr>
<td></td>
<td>KLCI IK Monthly 30-Jan-15</td>
<td>IK</td>
<td>Monthly</td>
<td>28-Aug-15</td>
<td>-5.86</td>
</tr>
<tr>
<td></td>
<td>MSCI Indonesia</td>
<td>IDO</td>
<td>Monthly</td>
<td>28-Aug-15</td>
<td>-8.31</td>
</tr>
<tr>
<td>Europe</td>
<td>Euro Stx50</td>
<td>VG</td>
<td>Quarterly</td>
<td>18-Sep-15</td>
<td>0.42</td>
</tr>
<tr>
<td></td>
<td>FTSE 100</td>
<td>Z</td>
<td>Quarterly</td>
<td>18-Sep-15</td>
<td>0.39</td>
</tr>
<tr>
<td></td>
<td>DAX</td>
<td>GX</td>
<td>Quarterly</td>
<td>18-Sep-15</td>
<td>0.35</td>
</tr>
<tr>
<td></td>
<td>SMI</td>
<td>SM</td>
<td>Quarterly</td>
<td>18-Sep-15</td>
<td>0.04</td>
</tr>
<tr>
<td></td>
<td>FTSE MIB</td>
<td>ST</td>
<td>Quarterly</td>
<td>18-Sep-15</td>
<td>0.51</td>
</tr>
<tr>
<td></td>
<td>CAC</td>
<td>CF</td>
<td>Monthly</td>
<td>21-Aug-15</td>
<td>0.37</td>
</tr>
<tr>
<td></td>
<td>OMX</td>
<td>QC</td>
<td>Monthly</td>
<td>21-Aug-15</td>
<td>0.04</td>
</tr>
<tr>
<td></td>
<td>AEX</td>
<td>EO</td>
<td>Monthly</td>
<td>21-Aug-15</td>
<td>0.42</td>
</tr>
<tr>
<td></td>
<td>IBEX</td>
<td>IB</td>
<td>Monthly</td>
<td>21-Aug-15</td>
<td>0.69</td>
</tr>
<tr>
<td>Americas/EM</td>
<td>S&amp;P 500</td>
<td>ES</td>
<td>Quarterly</td>
<td>18-Sep-15</td>
<td>0.18</td>
</tr>
<tr>
<td></td>
<td>S&amp;P Mid 400</td>
<td>FA</td>
<td>Quarterly</td>
<td>18-Sep-15</td>
<td>0.10</td>
</tr>
<tr>
<td></td>
<td>Russell 2000</td>
<td>RTA</td>
<td>Quarterly</td>
<td>18-Sep-15</td>
<td>-0.71</td>
</tr>
<tr>
<td></td>
<td>NASDAQ 100</td>
<td>NO</td>
<td>Quarterly</td>
<td>18-Sep-15</td>
<td>0.27</td>
</tr>
<tr>
<td></td>
<td>Dow Jones Industrial Avg</td>
<td>DM</td>
<td>Quarterly</td>
<td>18-Sep-15</td>
<td>0.39</td>
</tr>
<tr>
<td></td>
<td>S&amp;P/TSX 60</td>
<td>PT</td>
<td>Quarterly</td>
<td>17-Sep-15</td>
<td>-0.36</td>
</tr>
<tr>
<td></td>
<td>MSCI EM Mini</td>
<td>MES</td>
<td>Quarterly</td>
<td>18-Sep-15</td>
<td>-0.06</td>
</tr>
</tbody>
</table>

Source: J.P. Morgan Research, Global Equity Index Futures Roll Chartbook, August 3, 2015, Copyright 2015.

*Average of roll cost and percentile of the latest roll cost based on the data since 2007 (since June 2009 for US listed futures, since September 2011 for MSCI EM and since 2010 for S&P/TSX 60).

** For China, Korea, Taiwan, India, Malaysia, Indonesia and Thailand, the roll costs in the table above are based on offshore rates.

^ S&P ASX 200 and Thai SET 50 futures now have monthly contracts while their liquidity has yet to pick up.
command higher premiums. The heavier demand and lighter supply have, in turn, contributed to higher “roll” costs that have the potential to hit investors each time they renew their contracts for another month or quarter.

Figure 1 illustrates how this confluence of regulatory and market forces has played out in the futures markets for many key indices in the years since the crisis.

**New Math**

Meanwhile, the price dynamics for ETFs have trended in an entirely different direction. Economies of scale and fierce competition have driven ETF providers to trim total expense ratios (TER) on a range of products, most notably those funds that track bellwether equity indices. For example, the three US-listed ETFs tracking the S&P 500® Index have net expense ratios of less than 11 basis points (0.11 percent). Figures 2 and 3 show total assets in S&P 500 ETFs domiciled in Europe and the US as well as the average TER for the products over time.

The price advantage offered by ETFs starts to widen out after just one month and continues to grow the longer the positions are held.

The other cost associated with ETFs, of course, is the bid/ask spread involved in purchasing the shares. Here, too, costs have come down as the world’s largest ETFs have achieved higher levels of liquidity. Indeed, there are currently more than 600 ETFs globally that have assets of at least $500 million.²

---

**Figure 2: Europe and US Domiciled S&P 500 ETF Assets**

<table>
<thead>
<tr>
<th>Year</th>
<th>Europe</th>
<th>US</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan 2008</td>
<td>100</td>
<td>200</td>
</tr>
<tr>
<td>Jun 2015</td>
<td>400</td>
<td>600</td>
</tr>
</tbody>
</table>

Source: Morningstar Direct. Month-end total assets in European and US domiciled ETF tracking the S&P 500 (22 funds included in this universe — see Figure 4). Does not include hedged, short or leveraged ETFs. Last reading as of June 30, 2015.

**Figure 3: Average Total Expense Ratio on Europe and US Domiciled S&P 500 ETFs**

<table>
<thead>
<tr>
<th>Year</th>
<th>Europe</th>
<th>US</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>0.25</td>
<td>0.20</td>
</tr>
<tr>
<td>2015</td>
<td>0.15</td>
<td>0.10</td>
</tr>
</tbody>
</table>

Source: Morningstar Direct. Average year-end total expense ratios for European and US domiciled ETF tracking the S&P 500 (22 funds included in this universe — see Figure 4). Does not include hedged, short or leveraged ETFs. Last reading as of June 30, 2015.

**Figure 4: Comparison of Assets Under Management and Trading Volumes for S&P 500 ETFs and Futures**

<table>
<thead>
<tr>
<th></th>
<th>US ETFs</th>
<th>European ETFs</th>
<th>Futures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Vehicles</td>
<td>3</td>
<td>19</td>
<td>2</td>
</tr>
<tr>
<td>AUM in bn$</td>
<td>270.50</td>
<td>43.23</td>
<td>341.48</td>
</tr>
<tr>
<td>Total ADV in mn$</td>
<td>25,085</td>
<td>105</td>
<td>165,912</td>
</tr>
<tr>
<td>Max ADV (single fund) in mn$</td>
<td>24,105</td>
<td>41</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Source: Bloomberg, Morningstar Direct, J.P. Morgan, as of June 30, 2015. For futures, we show open interest in E-mini and standard contracts.

ETF average daily volume for June 2015. Volume for European ETFs is dollar trading line.
In addition to compressing spreads, this explosive growth means investors now have fewer capacity constraints on their ability to use ETFs to take large positions in a broad range of sectors, styles and geographies. One knock on futures has always been that, as enormous as the market is, it’s limited to a relative handful of indices. ETFs, in contrast, allow investors to construct beta-replication strategies for their most liquid positions that more closely mirror the rest of their core.

Make no mistake, futures may still provide certain advantages, including access to same-day cash. (Like other stocks, ETFs are generally T+3.) But in the cost-benefit analysis of equitizing with futures or ETFs, the balance of power has shifted some — particularly as it relates to costs. Figure 5 highlights the cost differential between futures and ETFs in the current market. The chart shows that the price advantage offered by ETFs starts to widen out after just one month and continues to grow the longer the positions are held.

Even with something as well-telescoped as post-crisis financial reform, it can take time for habits to change and for new rules and realities to be fully absorbed. It would appear the time has come for the ETFs vs. futures paradigm to at least get a fresh look.

1 The European Market Infrastructure Regulation (EMIR) is a European Union regulation designed to increase the stability of the EU over-the-counter (OTC) derivative markets. The Markets in Financial Instruments Directive (MiFID) is a European Union law that provides harmonized regulation for investment services across the 31 member states of the European Economic Area (including its three non-EU members, Iceland, Lichtenstein and Norway).

We know from our discussions with boards and investment teams that there is something about the way many large institutions approach their investment programs today that simply isn’t working. Here we put our finger on that something and propose a construct for the way forward.
Large institutions face unique challenges in overseeing investment programs, and a recent analysis we performed for a prospective client illustrates one of the problems.

The client, a large public pension plan, had asked us to take a look at its equity program. The program had marginally trailed the index for several years, but it was not immediately clear why. Like a lot of institutions its size, the pension plan had constructed its portfolio in classic “core-satellite” fashion, with roughly half the assets passively managed against the standard cap-weighted policy benchmark and the rest spread among more than a dozen top active managers. It was only as we dug deeper that we noticed a pattern: While each active manager delivered a high degree of active risk on its own, beyond a certain point the managers were effectively canceling each other out. In fact, our analysis of the pension plan’s composite equity holdings found an ex-ante active risk of less than 1 percent. The vast majority of that could be explained by a smaller-cap bias, which likely just as easily could have been achieved through smaller-cap index exposure. Compounding the problem was the fact that the plan was paying a considerable sum in active management fees, which, in addition to further eroding returns, had drawn the scrutiny of the local press. Although the plan’s financial professionals had clearly been motivated by the best intentions and followed the conventional wisdom, our conclusion was inescapable. For all their efforts to construct a well-balanced and high-active-share program, they had essentially built the equivalent of a very expensive index fund.

We suspect this pension fund is not alone. As a recent FundFire article attests, many institutional investors today might be surprised to discover that they, too, have fallen into similar over-diversification traps. We think it stems from an even more fundamental issue. For many large institutions, the traditional core-satellite approach that has long been accepted as the paradigm for constructing an investment plan may quite simply have outlived its usefulness.

How to Build the World’s Most Expensive Index Fund

Whatever an institution’s macro forecast is for the coming years, it probably doesn’t involve 8-plus percent growth from the standard benchmark exposures. Indeed, our own Long-Term Multi-Asset Class Forecasts contain not one asset class with projected nominal returns that high over the medium- to long-term. Large institutions increasingly must attempt to square the circle of traditional historical return expectations with the reality of diminished future return expectations. Because these institutions frequently have leeway in their satellite mandates, adjusting the scope and composition of their active manager program may be a logical area on which to focus their efforts. However, given the large nature of the sums these institutions have to invest and the capacity constraints of the typical active manager, that often means adding more people to the mix. Few of the institutions we speak with consider this an ideal situation. Most are sensitive to the fees and various operational headaches involved in hiring and monitoring 10, 12 or 15 active managers. What fewer seem to realize is just how quickly the law of diminishing returns can come into effect in the active management space. Above (Figure 1), we showcase a simulation similar to the analysis we ran for the large public pension plan. We have designed a roster of active, large-cap US managers by randomly selecting from the pool of top institutional managers in the Large-Cap Blend Morningstar US Mutual Fund database over the past five years.

Figure 1: Total Active Risk by the Number of Active Managers

<table>
<thead>
<tr>
<th>Number of Managers</th>
<th>1</th>
<th>3</th>
<th>5</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fundamental Characteristics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Security Count</td>
<td>522</td>
<td>574</td>
<td>622</td>
<td>708</td>
</tr>
<tr>
<td>Active Risk</td>
<td>1.88</td>
<td>0.92</td>
<td>0.65</td>
<td>0.43</td>
</tr>
<tr>
<td>Port. Ending Active Share</td>
<td>48.30</td>
<td>37.07</td>
<td>31.95</td>
<td>23.63</td>
</tr>
<tr>
<td>Asset Specific Risk</td>
<td>52.20</td>
<td>43.35</td>
<td>51.37</td>
<td>57.33</td>
</tr>
<tr>
<td>Factor Risk</td>
<td>47.80</td>
<td>54.65</td>
<td>48.63</td>
<td>42.67</td>
</tr>
</tbody>
</table>

Source: Axioma, SSGA, Morningstar, as of December 31, 2014.
years. This emulates the behavior of many institutions, which tend to focus on the top managers when beginning an active search.

We then set out to design a classic active core-satellite program, with 50 percent allocated to an index (S&P 500) and 50 percent to an active manager program. For the active program, we first allocate to the manager with the highest active risk and then make additional allocations to managers in descending order of active risk. We utilize the Axioma risk model to rank the managers based on their holdings as of December 31, 2014. In each case, we equally weight our active managers. So, if we have two managers, each gets 25 percent, and if we have 10 managers, each gets 5 percent.

As we move from left to right, we increase the number of active managers while still keeping the overall 50-50 passive-active split. In fairly short order, we see a material decline in active risk and active share. With one active manager, the equity program achieves an active risk of 1.7 percent and a high degree of active share at 46.3 percent. After five managers, active risk falls to 0.65 percent, and it tails off to 0.43 percent with 10 managers.

We also found that the ratio between asset specific risk and factor risk remains relatively constant as we increase the number of managers but only because the total risk from each declines (Figure 2). For example, the risk model estimates a significant small-cap bias from the first manager of -0.13 standard deviations away from the index. This is the largest factor risk incurred by the first manager. But this bias collapses to 0.01 at 10 managers. In other words, the portfolio factors get diversified away and ultimately converge toward the index.

To further illustrate this challenge, we look at the active sector exposures (Figure 3). Notice again how the active exposures decline relatively quickly as we expand the number of managers in the program. The first manager clearly favors materials and industrials, but other managers naturally have a different opinion. Hence at 10 managers any overweight virtually vanishes. In fact, the composite active weight is inside of 1 percent for each sector, further illustrating the index-like characteristics obtained from excess diversification.

### Figure 2: Estimated Active Factor Exposures

<table>
<thead>
<tr>
<th>Number of Managers</th>
<th>1</th>
<th>3</th>
<th>5</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market (%)</td>
<td>-0.00</td>
<td>-0.00</td>
<td>-0.01</td>
<td>-0.00</td>
</tr>
<tr>
<td>Dividend Yield</td>
<td>-0.09</td>
<td>-0.09</td>
<td>-0.01</td>
<td>-0.02</td>
</tr>
<tr>
<td>Exchange Rate Sensitivity</td>
<td>0.01</td>
<td>0.03</td>
<td>0.01</td>
<td>0.03</td>
</tr>
<tr>
<td>Growth</td>
<td>0.00</td>
<td>-0.03</td>
<td>-0.02</td>
<td>-0.02</td>
</tr>
<tr>
<td>Leverage</td>
<td>-0.04</td>
<td>-0.06</td>
<td>-0.04</td>
<td>-0.06</td>
</tr>
<tr>
<td>Liquidity</td>
<td>0.08</td>
<td>0.02</td>
<td>0.01</td>
<td>-0.01</td>
</tr>
<tr>
<td>Market Sensitivity</td>
<td>0.08</td>
<td>0.04</td>
<td>0.02</td>
<td>0.03</td>
</tr>
<tr>
<td>Medium-Term Momentum</td>
<td>-0.12</td>
<td>-0.06</td>
<td>-0.01</td>
<td>0.00</td>
</tr>
<tr>
<td>Return-on-Equity</td>
<td>-0.07</td>
<td>-0.04</td>
<td>-0.02</td>
<td>0.00</td>
</tr>
<tr>
<td>Size</td>
<td>-0.13</td>
<td>-0.07</td>
<td>-0.04</td>
<td>0.01</td>
</tr>
<tr>
<td>Value</td>
<td>0.03</td>
<td>0.02</td>
<td>0.03</td>
<td>0.04</td>
</tr>
<tr>
<td>Volatility</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
<td>-0.00</td>
</tr>
<tr>
<td>Industries</td>
<td>-0.00</td>
<td>-0.00</td>
<td>-0.01</td>
<td>-0.00</td>
</tr>
</tbody>
</table>

Source: Axioma, SSGA, Morningstar, as of December 31, 2014.

The model portfolio performance shown was created by ISG. The model portfolio performance does not reflect actual trading and does not reflect the impact that material economic and market factors may have had on SSGA’s decision-making. The results shown were achieved by means of a mathematical formula. The model performance shown is not indicative of actual future performance, which could differ substantially.
Figure 4: Moving from Core-Satellite to a Factor-Based Approach

<table>
<thead>
<tr>
<th>Fundamental Characteristics</th>
<th>Classic Core-Satellite</th>
<th>Factorized Core Portfolio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Security Count</td>
<td>708</td>
<td>737</td>
</tr>
<tr>
<td>Active Risk</td>
<td>0.43</td>
<td>1.21</td>
</tr>
<tr>
<td>Portfolio Ending Active Share</td>
<td>23.63</td>
<td>31.76</td>
</tr>
</tbody>
</table>

**Risk (%)**

<table>
<thead>
<tr>
<th></th>
<th>Classic Core-Satellite</th>
<th>Factorized Core Portfolio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asset Specific Risk</td>
<td>57.33</td>
<td>22.71</td>
</tr>
<tr>
<td>Factor Risk</td>
<td>42.67</td>
<td>77.29</td>
</tr>
<tr>
<td>Total Fees (%)</td>
<td><strong>0.28</strong></td>
<td><strong>0.19</strong></td>
</tr>
</tbody>
</table>

Source: Axioma, SSGA, Morningstar, as of December 31, 2014. For illustrative purposes only.

The characteristics are derived from using the Axioma US Fundamental Equity Risk Model Medium Horizon 3.

The total fees for the Classic Core-Satellite and the Factorized Core Portfolio chart above represent our estimate of IM fee for each portfolio. To make it simple, we assumed all of the active managers charged 0.5%, a passive S&P fund charged 0.05%, and the smart beta portfolio charged 0.08%. For the 50% Passive/50% Active, it calculated to 0.28%. For the 75% Smart Beta/25% Active it calculated to 0.19%. Please see the chart below for actual fund IM fees.

**MUTUAL FUND INVESTMENT MANAGEMENT FEES for the Top 10 Funds Selected**

<table>
<thead>
<tr>
<th>MUTUAL FUND INVESTMENT MANAGEMENT FEES</th>
<th>FEES</th>
<th>Composite Portfolio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active Fund’s (sorted by highest to lowest active risk)</td>
<td>Average Fee of Equal Weight (EW) Active Portfolio (%)</td>
<td>50% S&amp;P 500 @ 5 basis pts. / 50% EW Active Portfolio (%)</td>
</tr>
<tr>
<td>Fund 1</td>
<td>0.95</td>
<td>0.95</td>
</tr>
<tr>
<td>Fund 2</td>
<td>0.59</td>
<td>0.77</td>
</tr>
<tr>
<td>Fund 3</td>
<td>0.72</td>
<td>0.75</td>
</tr>
<tr>
<td>Fund 4</td>
<td>0.3</td>
<td>0.64</td>
</tr>
<tr>
<td>Fund 5</td>
<td>0.7</td>
<td>0.65</td>
</tr>
<tr>
<td>Fund 6</td>
<td>0.7</td>
<td>0.66</td>
</tr>
<tr>
<td>Fund 7</td>
<td>0.35</td>
<td>0.62</td>
</tr>
<tr>
<td>Fund 8</td>
<td>0.6</td>
<td>0.65</td>
</tr>
<tr>
<td>Fund 9</td>
<td>0.6</td>
<td>0.65</td>
</tr>
<tr>
<td>Fund 10</td>
<td>0.45</td>
<td>0.63</td>
</tr>
</tbody>
</table>

Source: Morningstar, as of 6/30/15.

*Actual Investment Management Fee for the 10 funds listed above. This fee may not include other fees/costs associated with owning these funds. Some funds have other fees like: transfer agent fees, 12B-1 fees or any other fees that could drive the total cost of owning the fund higher.*
The New Paradigm

Does this mean that investors should give up on active management? Hardly. In fact, for smaller and mid-size investment plans, we believe active managers will continue to play a central role in helping these investors meet their return objectives. Larger investors, too, will also continue to seek out successful active managers. However, to scale their active programs appropriately and avoid the perils of over-diversification, they may first need to challenge some basic assumptions governing their core exposures. Without abandoning the obvious cost, transparency and risk advantages of passive management, we’d argue the time has come for institutions to press reset on the traditional total-market-beta Capital Asset Pricing Model and think in terms of the additional market factors that they can harvest to potentially boost returns and further mitigate risk.

In our initial example, the public pension plan was getting the vast majority of its risk from a simple smaller-cap tilt. This is certainly a reasonable strategy. Smaller companies often generate more alpha than larger ones. But, because it was merely indirect fallout from the underlying active manager positions, the plan was paying a high price for that exposure. A factor approach could, in theory, allow the plan to capture the same risk premia more directly and also more cheaply.

But, as a large pension fund with a regular stream of liabilities that must be met through all manner of market conditions, the plan may decide that smaller-cap, or “size,” is not really the factor it wants the most exposure to at all. Maybe the factor that most closely meets its needs is a tilt toward lower-volatility stocks. Research has shown that such a tilt, while sacrificing some returns during high-momentum market periods, will generally outperform the cap-weighted benchmark over the long term with a higher Sharpe ratio. Or, perhaps an investor wants to capture the benefits of low volatility while also catching the tailwinds that can accompany more high-momentum and value-oriented stocks. In each case, re-framing the portfolio in terms of factors allows the investor to be more intentional with its bets at lower costs. Even more important, it allows the investment team to reset core return expectations so they may be more in line with the return streams the institution is trying to achieve.

Figure 4 on the previous page illustrates this approach, with each circle representing a distinct allocation. Note our “After” core is now a collection of factor-based portfolios designed to specifically harvest factor-based return premiums over time. With a portion of our active risk now coming from specific, passively managed smart-beta exposures, we have been able to reduce the active management allocation to 25 percent. That leaves 75 percent allocated to the newly factorized core. Staying mindful of capacity constraints, we have kept the size of each active mandate the same and simply halved the number of managers. Although, if we slightly increased the mandate size, we might have reduced the number even more. Compared to our earlier classic core-satellite approach with twice as many active managers, active risk in the new factor-based configuration is nearly three times (1.2 vs. 0.43) higher. And fees have dropped by about 10 basis points.

The New Benchmark

The factor-based approach is not without its own challenges. Specifically, the higher tracking error of the core exposures may raise a red flag for investment committees. And some factor approaches will have an even higher tracking error than the one in our illustration. Many single-factor minimum volatility portfolios, for example, are designed in a benchmark agnostic fashion. A pure managed-volatility approach may have a beta of 0.7. By design, it will behave much differently when the market rises 20 percent than when it falls 20 percent. Implementing a low-volatility tilt and measuring its success purely in terms of its ability not to stray too far from the market index is a recipe for failure.

That’s why we frequently encourage clients to consider using two simultaneous benchmarks when designing a factor-based approach: the standard cap-weighted benchmark and a more specialized one based on their specific goals. This can be particularly effective when employing a multi-factor portfolio. As Jennifer Bender explains in her article on the latest evolution of multi-factor portfolios (see “Bottom Up: A Smarter Form of Beta”), a multi-factor approach will likely be more balanced and behave with a reasonable level of active risk (often less than 4 percent) than any single factor in isolation. Even measured against the traditional cap-weighted framework, a multi-factor approach will fare reasonably “well,” and the standard reference benchmark will still provide meaningful orientation against which to chart overall progress.
Active management no longer means just adding alpha. It means actively managing a plan to meet the objectives of the plan.

The second benchmark, meanwhile, should answer these questions: Are you achieving your goals? Are you reducing your funding-ratio deficit? If you’re an endowment, are you able to meet planned building expenses or meet grant commitments? In short, are your investments meeting your policy objectives? While these benchmarks are harder to construct and quantify than simply comparing returns to a cap-weighted index, we believe they can be even more relevant. This, also, is the new definition of active management. Active management no longer means just adding alpha. It means actively managing a plan to meet the objectives of the plan, whether through cap-weighted exposures or active risk or something in between.

The New Policy “Policy”

We believe we are only at the beginning of a significant paradigm shift among the biggest institutional investors. We expect that large institutions will cull their active managers, focusing on those that can provide truly idiosyncratic alpha. Additionally, these institutions will adopt more of a factor-based approach to investing, directly targeting desired factor exposures at the plan level. Yes, this means larger allocations to smart beta equities, but it also means extending these concepts to other asset classes such as fixed income and hedge funds. To carry out the new vision, institutional investors will need to change the way they organize staff. We expect large investors to spend less time looking at external active managers and more time focusing on their portfolio holistically, ultimately making conscious decisions on their asset allocation and factor bets. Instead of picking managers, they will pick factors.

The adoption of strategic partnerships with credible investment management organizations will help accelerate this movement. Plans that are large enough may in-source their money management. But, to transition to this new model, they may need to form partnerships with asset managers specializing in asset allocation. For large investors, asset allocation — including factor allocation — will become the new active, because it has the greatest potential to meaningfully impact total returns.

In the meantime, we believe active managers will still thrive, but their target market may evolve. Concentrated active managers will be best matched with mid- and small-sized institutional investors for whom capacity constraints are less likely to lead to over-diversification. In turn, larger investors may find they gravitate to active quantitative managers given the ability of such managers to target factor exposures dynamically at scale. And then finally, the days of over-allocating, over-diversifying and over-paying for underperformance will end.

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Companies with large market capitalizations go in and out of favor based on market and economic conditions. Larger companies tend to be less volatile than companies with smaller market capitalizations. In exchange for this potentially lower risk, the value of the security may not rise as much as companies with smaller market capitalizations.

Investments in mid / small-sized companies may involve greater risks than in those of larger, better known companies.

Although subject to the risks of common stocks, low volatility stocks are seen as having a lower risk profile than the overall markets. However, a portfolio comprised of low volatility stocks may not produce investment exposure that has lower variability to changes in such stocks’ price levels.

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It wasn’t long ago that the use of simple rules-based approaches to extract excess returns seemed like a pretty radical idea. Now, these rules are being widely adopted and applied in increasingly complex ways. Through multi-factor portfolios, smart beta is being turned on its head.

Jennifer Bender, Ph.D.
Director of Research
Global Equity Beta Solutions

Taie Wang, CFA
Deputy Head of Advanced Beta Research
Global Equity Beta Solutions
If there has been a disruptive force in the asset management industry in recent years, it would have to be smart beta. In bridging the gap between active and passive management, smart beta has been instrumental in helping investors rethink their core exposures (See “The New Policy Policy,”) and a key tool for maximizing risk-adjusted returns more efficiently. As with any new innovation, though, best practices for implementation remain, well, in beta. In this article, we take a fresh look at the approach that we helped pioneer and is considered by many to be the current go-to technique for constructing core “set-it-and-forget-it” smart beta portfolios. We think there may be an even better way to maximize smart beta. In our previous approach, we identified the risk premia, or factors, on which we wanted to focus. We then created individual sub-portfolios weighted according to each and merged them “top-down” into one combination portfolio. In the more evolved approach, we seek to harness the powerful interaction between factors by weighting securities based on the simultaneous attractiveness of each security across multiple factors, thus constructing the portfolio from the bottom up.

The Factor Diversification Effect
In the 1970s, academics began to find that some of an active manager’s outperformance had less to do with superior stock selection than previously thought. These researchers found it could actually be chalked up to systematic risks or mispricings associated with distinct, identifiable market factors. Since the 2008 financial crisis, smart beta has emerged as the mainstream realization of those early ideas. It’s an answer to the default exposures contained in the cap-weighted market index, enabling investors to be more intentional with their bets while still benefiting from the transparency and low costs associated with passive investing. More recently, portfolios combining multiple factors have become popular. The rationale comes down to a simple issue of diversification. While factors such as value, size (reflecting the premia associated with small-cap stocks), volatility (low-volatility stocks), quality and momentum have historically earned a long-run premium over the market, each has experienced periods when it has fallen out of favor with investors and underperformed. They have not, however, experienced periods of underperformance at the same time. Some factor pairs such as value and momentum naturally diversify each other.

**Figure 1: Correlation of Excess Returns (Gross USD Monthly Returns)**
March 1993 to December 2014

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Volatility</th>
<th>Size</th>
<th>Momentum</th>
<th>Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valuation Tilt</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low Volatility Tilt</td>
<td>0.13</td>
<td>-0.02</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low Size Tilt</td>
<td>0.60</td>
<td></td>
<td></td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Momentum Tilt</td>
<td>-0.42</td>
<td>0.23</td>
<td>-0.22</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Quality Tilt</td>
<td>-0.38</td>
<td>0.53</td>
<td>-0.36</td>
<td>0.31</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Underlying factors are shown in the first row with the relevant tilted strategy underneath. Excess returns are the returns to the tilted strategies minus the benchmark (MSCI World).

Source: State Street Global Advisors (SSGA), FactSet. Data are from March 31, 1993 through December 31, 2014.

The correlation coefficient measures the strength and direction of a linear relationship between two variables. It measures the degree to which the deviations of one variable from its mean are related to those of a different variable from its respective mean.

The calculation method for value-added returns may show rounding differences.

The data displayed is a hypothetical example of backtested performance for illustrative purposes only and is not indicative of the past or future performance of any SSGA product. Backtested performance does not represent the results of actual trading but is achieved by means of the retroactive application of a model designed with the benefit of hindsight. Actual performance results could differ substantially, and there is the potential for loss as well as profit. The performance may not take into account material economic and market factors that would impact the advisor’s actual decision-making. The performance does not reflect management fees, transaction costs and other fees a client would have to pay, which would reduce returns. Please reference Appendix for the model methodology and other important disclosures. A complete list of the firm’s compositions and their descriptions is available upon request.
other based on their definition. When a stock’s price rises, it often becomes more momentum-like (as long as its price is rising faster than others) and simultaneously less value-like (since value is typically defined as book-to-price, earnings-to-price or some other fundamental-to-price). Other factors tend to diversify each other based on cycles of investment sentiment. Quality and volatility are a good example of this principle.

Smart beta has been instrumental in helping investors rethink their core exposures. As with any new innovation, though, best practices for implementation remain, well, in beta.

Figure 1 shows the correlation of representative factor portfolios from March 1993 to December 2014. The portfolios were developed with market securities from the MSCI World Index. The securities ranked higher on the relevant factor were overweighted relative to the benchmark while the securities ranked lower were underweighted. (The definitions for the factors are the ones commonly used in the literature. The construction of these portfolios is discussed in Bender and Wang [2015].) Correlations are generally low and are sometimes negative. The highest correlations are between value and size and between volatility and quality. The lowest correlations are between value and momentum, and value and quality.

Rolling excess returns averaged over the preceding three years are shown in Figure 2. For example, between 2004 and 2007, quality and momentum significantly underperformed the market, but value and size significantly outperformed it. There have been only a handful of periods, all short-lived (for instance, during the abrupt shift out of the prolonged post-dot-com-bubble in 2003), where all the factors were trending downward.

In short, we believe the evidence for deploying a portfolio consisting of multiple factors is persuasive. The multi-factor portfolio is better suited for all seasons, potentially reducing the chances for extended periods of underperformance and the temptation to try to time one’s factor bets, which is never an easy task. Yet even though we helped to develop the multi-factor approach and use it to manage portfolios, we recognized that the way we combined factors was perhaps ripe for further refinement.
Diversification + Interactions: An Even More Powerful Combo

The most common way to create a multi-factor portfolio is to combine single factor portfolios (such as the ones shown in Figures 1 and 2) into one portfolio. Providers generally start by scoring and sorting every security based on its relative attractiveness according to each factor. For example, they’ll have one portfolio with all of the securities scored first to last on their value characteristics as measured by price-to-book, earnings-to-book or another metric. Another portfolio will rank all of the securities on their low-volatility characteristics, as measured by historical volatility, historical beta and other criteria. Then they’ll apply multipliers to the securities (or subsets of securities) that reflect the rankings in each factor pecking order. The ultimate weights are assigned to the securities based on their average rankings across the four sleeves.

This combination approach is analogous to “building blocks.” It benefits from clear performance attribution and flexibility in reallocation across factors. Still, we have long realized it contains an inherent flaw.

The flaw has to do with the interaction effects between factors, the importance of which was first highlighted by AQR’s Cliff Asness in his research on the give-and-take between value and momentum. The easiest way to appreciate the concept is with a quick thought experiment. Imagine a universe of stocks and divide each of them into quartiles for Factor A and again for Factor B. Assign each of these eight...
individual quartiles a numerical value (0, 1, 2 or 3) from the least to the most desirable. Then combine the portfolios for Factors A and B by summing the scores. That leaves us with 16 unique combinations (aggregate scores) for the pairing, as shown in Figure 3.

Now, let’s move our thought experiment into the real world. Let’s assume Factor A is value, Factor B is quality, calculate the scores and aggregate them. Next, let’s repeat this assuming Factor A is value and Factor B is momentum. As shown in Figure 4, the distribution of stocks that score the best (with a combined score of 6) on value-quality is quite different from the distribution for value-momentum. Many more stocks log the highest possible score on both value and momentum than on value and quality. If multipliers were applied to the sub-portfolios shown in Figure 4, a much higher percentage of securities in the value-momentum multi-factor portfolio would receive the highest multiplier. But those differences in the joint distribution of the factors would fail to be captured when using a top-down approach.

To understand how these factor interactions impact real portfolios, we tested the impact of a “bottom-up” portfolio versus a top-down, “combination” approach in global developed-market equity portfolios. We considered four factors — value, volatility, quality and momentum — in our portfolio using the same definitions as those used in Figures 1 and 2. We constructed the experiment as follows:

### Combination Portfolio

We created single-factor portfolios, calculating and sorting the security scores for each of the four factors. We divided each factor portfolio into 20 ranked sub-portfolios, where each sub-portfolio held five percent of market-cap weight. Then we applied a fixed set of multipliers (linearly interpolated between 0.05 and 1.95 in increments of 0.10) to each sub-portfolio. The multipliers are shown in Figure 5. Finally, we rescaled the weights so that they summed to 100 percent. The combination portfolio was an equally weighted average of the four individual factor portfolios, rebalanced monthly.

### Bottom-Up Portfolio

As in the combination portfolio, we assigned scores to securities for each factor. But, instead of first creating four individual sleeves, we averaged all of the scores (equally weighting the factors) so that each security was ranked based on its attractiveness with regard to each of the factors simultaneously. Then, as before, we grouped the securities into 20 sub-portfolios, each of which held five percent of market cap based on their average scores. We then applied the same fixed set of multipliers. Finally, the weights were rescaled so that they summed to 100 percent. The factor definitions, universe and rebalancing frequency were the same as above.

The results of the backtests appear in Figure 6. The bottom-up portfolio backtested annualized returns are higher than any of the underlying component factor returns and higher than the combination. The difference is not insignificant — a spread of 86 basis points. Moreover, the volatility of the bottom-up portfolio is significantly lower while the risk-adjusted return increases from 0.73 to 0.84 between the two approaches.

Will the bottom-up approach always produce better performance than the combination? This outcome cannot be guaranteed in all cases. However, we suspect that for various combinations of the most well-known factors — including value, quality, volatility and momentum — investors will likely benefit from the

---

### Figure 6: Combination Vs. Bottom-Up Approach, Four-Factor Global Developed-Market Portfolios

**January 1993 to March 2015, Gross USD Returns**

<table>
<thead>
<tr>
<th></th>
<th>Value Portfolio</th>
<th>Low Volatility Portfolio</th>
<th>Quality Portfolio</th>
<th>Momentum Portfolio</th>
<th>Combination Portfolio</th>
<th>Bottom Up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annualized Return (%)</td>
<td>11.63</td>
<td>10.69</td>
<td>10.40</td>
<td>10.91</td>
<td>10.94</td>
<td>11.80</td>
</tr>
<tr>
<td>Annualized Volatility (%)</td>
<td>17.85</td>
<td>13.77</td>
<td>15.05</td>
<td>15.07</td>
<td>15.06</td>
<td>14.12</td>
</tr>
<tr>
<td>Risk-Adjusted Return</td>
<td>0.68</td>
<td>0.78</td>
<td>0.89</td>
<td>0.72</td>
<td>0.73</td>
<td>0.84</td>
</tr>
<tr>
<td>Excess Return (%)</td>
<td>3.49</td>
<td>2.55</td>
<td>2.26</td>
<td>2.77</td>
<td>2.08</td>
<td>3.66</td>
</tr>
<tr>
<td>Tracking Error (%)</td>
<td>7.12</td>
<td>5.19</td>
<td>4.43</td>
<td>4.52</td>
<td>4.78</td>
<td>5.10</td>
</tr>
<tr>
<td>Information Ratio</td>
<td>0.49</td>
<td>0.49</td>
<td>0.51</td>
<td>0.61</td>
<td>0.59</td>
<td>0.72</td>
</tr>
</tbody>
</table>

Source: SSGA. Data are from January 31, 1993 through March 31, 2015.

The data displayed is a hypothetical example of backtested performance for illustrative purposes only and is not indicative of the past or future performance of any SSGA product. Backtested performance does not represent the results of actual trading but is achieved by means of the retroactive application of a model designed with the benefit of hindsight. Actual performance results could differ substantially, and there is the potential for loss as well as profit. The performance may not take into account material economic and market factors that would impact the advisor’s actual decision-making. The performance does not reflect management fees, transaction costs, and other expenses a client would have to pay, which would reduce returns. Please reference Appendix for the model methodology and other important disclosures. A complete list of the firm’s composites and their descriptions is available upon request.
ability of our updated methodology to take advantage of the interaction effects between factors.

The bottom-up portfolio returns are higher than any of the underlying component factor returns and higher than the combinations. The difference is not insignificant — a spread of 86 basis points.

As previously noted by our team, we first introduced the approach in 2012. We have been using it to manage our multi-factor portfolios since. At this point, you might even say it’s out of beta. For investors ready to consider replacing some of their passive, active or even earlier-iteration smart-beta exposures, we think it represents another small leap forward.

The backtested results shown do not represent the results of actual trading using client assets but were achieved by means of the retroactive application of an investment process that was designed with the benefit of hindsight, otherwise known as backtesting. Thus, the performance results noted above should not be considered indicative of the skill of the advisor or its investment professionals. The backtested performance was compiled after the end of the period depicted and does not represent the actual investment decisions of the advisor. These results do not reflect the effect of material economic and market factors on decision making. In addition, backtested performance results do not involve financial risk, and no hypothetical trading record can completely account for the impact of financial risks associated with actual investing.

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The backtested performance may be reported on a gross of fees basis. Additional fees, such as the management fee, would reduce the return of an investment product that utilized one of these investment processes. For example, if an annualized gross return of 10% was achieved over a 5-year period and a management fee of 1% per year was charged and deducted annually, then the resulting return would be reduced from 61% to 54%. The performance includes the reinvestment of dividends and other corporate earnings and is calculated in US dollars.

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Although subject to the risks of common stocks, low volatility stocks are seen as having a lower risk profile than the overall markets. However, a portfolio comprised of low volatility stocks may not produce investment exposure that has lower variability to changes in such stocks’ price levels.

Diversification does not ensure a profit or guarantee against loss.

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2. Value is measured as exponentially weighted five-year averages of earnings, cash flow, sales, dividend and book value in the denominator and price in the numerator. The five price/fundamental ratios are equally weighted. Low volatility is measured as 60-month variance of returns. Quality is measured as return-on-assets, debt-to-equity and five-year variability in earnings per share. These three measures are equally weighted. Momentum is measured as trailing 12-month return minus the last month’s return.
5. The data shown are as of May 20, 2015. Momentum is defined as previously discussed. Value here is proxied by annual P/B, and quality is proxied by return on equity.

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The backtested performance shown was created by the Global Equity Beta Solution teams at SSGA. The data used was only the data which would have been available at the time when the historical portfolios were generated, now what is available now. These processes help to eliminate various forms of survivorship bias, both in terms of a “smarter model” and in terms of making decisions based on information that was not available at the time. The backtested performance depicted is not reflective of any SSGA investment product or Strategy, and is provided only as an illustrative example of nonspecific Advanced Beta investment processes, over the twenty-two year period from 1993–2015.

The testing methodology is a rules-based process to generate historical portfolios. The stocks in the universe are ranked and allocated into different buckets according to its corresponding factor score such as value, low volatility, quality, momentum or combined factor score. A fixed linear multiplier is then applied to each bucket in the way that stock’s cap weight is tilted by this fixed ratio. The final security weight is then normalized such that the total weight adds up to 100% to form the final portfolio.

The bottom-up portfolio returns are higher than any of the underlying component factor returns and higher than the combinations. The difference is not insignificant — a spread of 86 basis points.

---

Bottom Up: A Smarter Form of Beta
With concentration and duration risk building inside the Barclays Aggregate bond indices, fixed-income investors around the world have been tempted to abandon the classic investment-grade benchmark. But what if, like a lot of major institutional investors today, you can’t simply “bag the Agg”? There is another way.
Ultralow interest rates due to loose monetary policies are one of the most challenging trends for investors across the globe. The thirst for yield has spawned investments outside the traditional arena and led to a growing sense of unease over the possible fallout once rates eventually start to rise.

For institutional investors with fixed-income portfolios anchored to the standard Barclays Aggregate (Agg) indices, the issues are particularly acute. The unprecedented policy and market developments since the global financial crisis (GFC) have meant that the Global Aggregate yield has fallen below two percent to historical lows. At the same time, duration of the Global Agg has risen to 6.52 (versus 5.30 before the financial crisis). For those invested in regional proxies such as the US or Euro Agg, the picture is no better. To be sure, passive Barclays Aggregate Index (Index) investors have reached such a boiling point that a kind of meme has taken hold in the industry to scrap the benchmark completely, or “Bag the Agg.”

In reality, it is frequently not such a simple operation to bag the Agg. For investment committees with billions of dollars under management as well as boards and investment policy statements to answer to, the Agg is a critical frame of reference because it represents the most diversified exposure to the investment-grade bond universe. This flagship benchmark includes fixed-rate treasury,
government-related, corporate and securitized bonds from both developed and emerging market (EM) issuers. It’s one of the most comprehensive and reliable ways to describe and access the liquid-grade bond universe.  As a result, institutional investors have turned — by degrees — to active management. While still benchmarking their performance against the Index, they might restrict their holdings to the Agg’s universe of investment-grade securities but permit the manager to shift the sector weightings accorded to government-related, corporate, securitized and credit sectors to name just a few. Or, on top of their allocation leeway, the manager might also get a 10 percent out-of-benchmark budget to invest in high-yield or EM debt. Unfortunately, given the large body of research demonstrating the difficulty of outperforming the Agg (not to mention the higher fees charged by active managers), such decisions are often entered into with a degree of skepticism and ambivalence.

But there is another option. The Agg, after all, is not only an amalgam of fixed-income sectors, or “sleeves,” but also a combination of factor or risk premia. In general, investments in fixed income may generate returns due to exposure to credit factor premia (default risk), term factor premia (higher risk as maturity is increased), or liquidity factor premia (risks surrounding the ability to freely trade an instrument). Looking at the Agg as a grouping of factor premia and then extracting those can be an effective way of potentially improving risk-adjusted returns while remaining within benchmark weights.

In other words, instead of bagging the Agg, or ripping it apart and attempting to create a bespoke version, investors can potentially improve the performance of the various individual sleeves by tilting each toward more optimal levels of factor premia through systematic rules-based investment strategies commonly known as advanced, or “smart,” beta. We call it “Advancing the Agg.” And, whether this is done with the Agg in isolation or in combination with an active strategic allocation approach, we think it could potentially improve the risk/reward ratio for investors and lower fees relative to those imposed by funds with active management.

Using Fixed-Income Smart Beta to Advance the Agg

Smart beta has gained popularity as a nice marriage between passive and active management. These strategies are not purely passive, as they do not simply seek to match the exposures of an index. But nor are they active, as they apply a systematic, rules-based approach to investing rather than actively picking securities.

Looking at the Agg as a grouping for factor premia and then extracting those can be an effective way of potentially improving risk-adjusted returns while remaining within benchmark weights.

Most investors think of smart beta in the context of equities. Some of the most widely studied factors in equity returns have produced smart beta equity strategies that apply rules to take advantage of the well-established premia shown to exist for higher-quality, lower-volatility, higher-yield-bearing, smaller-cap or more-momentum-driven stocks. It turns out, though, that factor premia investing is also relevant to fixed income — just not exactly in quite the same way.

Figure 1: A Breakdown of Factor Premia Embedded in the Barclays Agg

<table>
<thead>
<tr>
<th>Factor Premia</th>
<th>Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sovereign Credit</td>
<td>6.71%</td>
</tr>
<tr>
<td>Securitized (Mortgages and ABS)</td>
<td>15.50%</td>
</tr>
<tr>
<td>Corporate Credit</td>
<td>17.95%</td>
</tr>
<tr>
<td>Government Treasuries</td>
<td>53.45%</td>
</tr>
<tr>
<td>Government (Agencies)</td>
<td>6.38%</td>
</tr>
</tbody>
</table>

Source: Barclays, as of June 5, 2015. Allocations are as of the date indicated, are subject to change and should not be relied upon as current thereafter.

42% of investors say they have already committed a portion of their portfolios to advanced beta.
same way, given the more fragmented and complex nature of the bond markets. While each firm has a single stock, it may have multiple bonds in its capital structure. In addition, bonds are offered on both primary and secondary markets, and liquidity is an ongoing challenge particularly for smaller or earlier-issued bonds. As a result, the same factors that produce factor premia in investment-grade credit or EM may not necessarily produce premia in the US Treasury market. Before any tilting can begin, then, the key is to identify which factor premia — credit, liquidity or term — is most relevant to each sleeve (Figure 1).

**Corporates: The Biggest Quality Dividend**

Because the Barclays Aggregate indices are market capitalization weighted, they have been enormously affected by the macroeconomic and policy forces that have buffeted the fixed-income markets in recent years. In the aftermath of the GFC, governments around the world issued vast amounts of long-dated bonds to stimulate their economies while at the same time corporations largely curbed or even curtailed their borrowing activity. As a result, the Global Agg currently constituted by 60 percent government debt and just 18 percent corporate credit (Figure 1). But don’t be fooled by the smaller percentage of corporate versus government-related bonds in the Agg. We can show that corporate credit performance has historically had an impact on overall Agg returns.

Data show that there is a strong degree of co-movement between the corporate credit sleeve and the overall Agg (Figure 2). The return of the Global Agg is over 80 percent correlated to the excess return of the Barclays 10+ (Year) Global Corporate Credit Index. We can also see this correlation in terms of the variance

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**Figure 2: The Corporate Sleeve Has the Biggest Impact on Overall Global Agg Returns**

Principal Components of Excess Returns to Sectors of Global Agg

<table>
<thead>
<tr>
<th>Principal Components*</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
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<tbody>
<tr>
<td>Percentage Explained (%)</td>
<td>81.0</td>
<td>9.7</td>
<td>3.9</td>
<td>3.0</td>
<td>1.3</td>
<td>0.7</td>
<td>0.5</td>
<td>0.1</td>
<td>0</td>
</tr>
</tbody>
</table>

Source: FICC Quantitative Research, as of June 2015.
Past performance is not a guarantee of future results.

Co-movement between First Component and Corporate Credit Sector Excess Returns

Source: FICC Quantitative Research, as of May 29, 2015.
Past performance is not a guarantee of future results.

*Principal components analysis or PCA is a way to identify the independent sources of variation in the data, in this case in excess returns of each sector in the Global Agg. The factors are not defined in advance, but are merely a product of the data. Through PCA, we use linear algebra to create “optimal” factors to explain excess returns of the Global Agg.

Numbers 1 through 9 on the x-axis refer to different principal components in order of explained variance of excess returns, highest variance (1) to lowest variance (9). The first principal component is the component that explains the largest proportion of variance (the factor with the most explanatory power).

In the bottom chart, we see that the first principal component is highly correlated with corporate credit returns, revealing that the corporate sleeve has an impact on the variation in Agg returns.
DEFFINING QUALITY IN CORPORATES

Quality means doing it right when no one is looking.
— Henry Ford

The smart beta tilt in the corporate sleeve aims to unearth securities with greater default risk priced into OAS levels than fundamentals imply. To determine the fundamental credit profile of a company in a rules-based, transparent way, the smart beta strategy incorporates the “expected default frequency” (EDF) metric from Moody’s Investors Service KMV models. That metric measures the probability of a firm defaulting in the forthcoming year. We combine the EDF with the loss-given-default metric for each sector, along with fundamentals (such as profitability, operational efficiency, leverage and liquidity of issuers, to get a fair value spread.

By using EDF, we are not trying to predict default. Credit ratings already offer a tidy measurement of default risk. Rather, we aim to uncover mispricings within the various ratings brackets as we have found ample evidence of mispricings not only in high-quality bonds, but also in BBB’s, BB’s and CCC’s.

For many portfolio managers, EDF acts as a screening tool. If a bond has an EDF greater than some default threshold, they do not allocate to that bond. By contrast, we use EDF as a valuation tool. Nonetheless, we find that our corporate portfolios have lower EDFs than the benchmark. Essentially, the quality tilting may offer a level of protection against overall default risk as well as way to capitalize on the market’s inefficiencies in grasping the particulars.

of Global Agg returns. A principal component analysis (PCA)13 of the excess returns for the constituents of the Agg suggests that more than 75 percent of the variance is explained by the first principal component. When we regress the first principal component against the excess returns for industrials, utilities and financials, the correlation in each case is well over 95 percent. Enhancing the risk/reward profile in the corporate credit sleeve can thus potentially have a material impact on performance relative to the global Agg.

The primary factor premia in the corporate credit sleeve is “credit,” which is closely related to default risk. We map both to the factor embodied in the concept of “quality.” In general, quality investing aims to identify companies with superior quality characteristics as measured by clearly defined fundamental rules. Definitions can differ by asset class, but in fixed income we define “quality” as a low level of default risk consistent with high profitability, low earnings variability and low leverage. (See “Why Quality Investing,” SSGA, 2014). We then compare this to the default risk priced in the market as measured by the options-adjusted spread (OAS) of the issuer and look for where the mispricings are.

People often ask us, what distinguishes your approach from the ratings the major credit agencies already perform on a company’s fixed-income securities? The answer is simple: Ratings focus on a company’s perceived default risk. Our measure focuses on the difference between that perception, already priced in, and the truer level of default risk reflected in a firm’s fundamentals.

Credit ratings focus on a company’s perceived default risk. Our measure focuses on the difference between that perception, already priced in, and the truer level of default risk reflected in a firm’s fundamentals.

To implement our strategy, we tilt to quality names and borrow the weights from the remaining beta portion of the portfolio. This gives us room to create different weights for clients with various risk appetites.

Figure 3 represents an application of this quality tilt using the specific weights corresponding to it. As shown in our backtests, the tilted strategy improved the risk-adjusted returns of the benchmark during the period of quantitative easing following the GFC.14 While the strategy suffered a drawdown during the GFC itself (primarily driven by weakness in euro investment-grade credits), the drawdown was lower than that of the benchmark as the flight to safety boded well for our quality tilt.

The same pattern could be important as we enter a US rate hike cycle. Some market analysts have expressed concern that investors who have “asset jumped” from Treasury to investment-grade bonds to boost yields (without dramatically increasing risk) may jump back into Treasury when rates rise.15 A quality tilt could mitigate losses from a broad sell-off in corporates, as fundamentally better credits could see their valuations less impacted.

Bear in mind that the risk/reward benefit from the corporate sleeve (Figure 3) is calculated with a 25 percent overweight to a quality tilt in corporates. By increasing the overweight to, say, 50
Figure 3: During the Period January 2007 to April 2014, the Smart Beta Quality Tilt Outperformed the Benchmark in Our Default Risk Model (Hypothetical Modeling)

Selected Backtested Portfolio Data

<table>
<thead>
<tr>
<th>Security Selection</th>
<th>Portfolio</th>
<th>Reporting Terms</th>
<th>Before Transaction Costs</th>
<th>After Transaction Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Annual Return (%)</td>
<td>Annual Standard Deviation (%)</td>
<td>Annual Information Ratio</td>
</tr>
<tr>
<td>Combo</td>
<td>Overweights</td>
<td>2.14</td>
<td>2.54</td>
<td>0.84</td>
</tr>
<tr>
<td></td>
<td>Active (Unfunded)</td>
<td>2.23</td>
<td>2.62</td>
<td>0.86</td>
</tr>
<tr>
<td>Duration Neutral Treasury Overlay</td>
<td>Data Benchmark</td>
<td>9.42</td>
<td>10.68</td>
<td>0.88</td>
</tr>
<tr>
<td></td>
<td>Total Weights</td>
<td>11.65</td>
<td>11.08</td>
<td>1.05</td>
</tr>
</tbody>
</table>

Source: SSGA, Barclays POINT, as of April 2014.

Backtested Return Comparison (25% Overweight to Benchmark)

<table>
<thead>
<tr>
<th>Benchmark: Barclays Global Aggregate Investment Grade Corporate Bond Index</th>
<th>Before Transaction Costs</th>
<th>After Transaction Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Annual Return (%)</td>
<td>Standard Deviation (%)</td>
</tr>
<tr>
<td>Unfunded</td>
<td>5.00</td>
<td>7.05</td>
</tr>
<tr>
<td>Funded</td>
<td>5.23</td>
<td>7.31</td>
</tr>
<tr>
<td>Tilted Portfolio: Global Investment Grade (Restricted to Ratings A and Above Only)</td>
<td>Unfunded</td>
<td>8.38</td>
</tr>
<tr>
<td>Funded</td>
<td>13.38</td>
<td>11.03</td>
</tr>
<tr>
<td>Improvement in Risk-Adjusted Returns (bps)</td>
<td>Unfunded</td>
<td>40</td>
</tr>
<tr>
<td>Funded</td>
<td>49</td>
<td>55</td>
</tr>
</tbody>
</table>

Source: SSGA, Barclays POINT, as of April 2014.

For both the index and the model portfolio, data are from January 2007 through April 2014. The customized benchmark is constructed from all bonds for which default data is available in the global investment grade credit universe. Our default risk model covers approximately 80% of the corporate credit universe of the Barclays Global Agg as of April 2014. The data displayed is a hypothetical example of backtested performance for illustrative purposes only and is not indicative of the past or future performance of any SSGA product. Backtested performance does not represent the results of actual trading but is achieved by means of the retroactive application of a model designed with the benefit of hindsight. Actual performance results could differ substantially, and there is the potential for loss as well as profit. The performance may not take into account material economic and market factors that would impact the advisor’s actual decision-making. The performance does not reflect management fees, transaction costs and other fees a client would have to pay, which would reduce returns. Please reference the disclosures for the model methodology and other important disclosures.

Note that funded versus unfunded are two different returns calculated for descriptive purposes. The terms do not refer to the funding status of the portfolio. Unfunded returns refer to the excess returns to the over and underweights in the strategy over the benchmark.

Funded returns are the returns to the active weights plus the benchmark. Hence these are the nominal returns after costs to the complete strategy.

Standard deviation is a historical measure of the volatility of returns. If a portfolio has a high standard deviation, its returns have been volatile; a low standard deviation indicates returns have been less volatile. Standard deviation is normally shown over a time period of 36 months, but the illustrations noted in this material may reflect a shorter time frame. This may not depict a true historical measure and shouldn’t be relied upon as an accurate assessment of volatility.

Past performance is not a guarantee of future results.

Results shown after costs. In credit, we have assumed 35 basis points of transaction cost, doubled between fall 2007 to fall 2009. In sovereign credit, we have assumed 10 basis points for euro-zone and global, 25 basis points for emerging.
percent, investors could potentially see even more outperformance relative to the standard benchmark. Additionally, while our analysis is based on the Global Agg — which has a corporate sector, after all, that is a cap-weighted combination of US and European investment-grade credits along with proportional representation from other smaller local Aggs — we can also apply smart beta quality tilts to the corporate sleeves of the US or Euro Agg as separate, stand-alone applications.

The corporate quality tilt is duration neutral. This is done intentionally, to avoid a duration bet that differs from what is already embedded within the Index. In that sense, we are truly “advancing” the Agg rather than upending it. We isolate the element of default risk premium that is pronounced within corporate credit, extract that premium and leave all other features in line with the benchmark.

Squeezing Out More Value: Quality and Sovereigns

The notion of a quality tilt can also be used to advance the sovereign sleeve of the Agg by overweighting regions with lower sovereign credit risk and underweighting riskier regions.

In the process, this also helps to address concentration risk, one of the most pressing challenges for passive Global Agg investors.21 Concentration is particularly an issue in the sovereign sleeve, where 53.49 percent of market cap stems from the largest global issuers (Japan and the US).22 To combat concentration risk, many competitor strategies will re-weight investors around a new metric other than market cap. For example, some funds may weight constituents by debt to gross domestic product (GDP).23 However, this may or may not get to the heart of the problem. For example, Russia has an 8.3 percent debt to GDP ratio, while South Korea has 36.4 percent (Figure 4).24 But given its governance and macroeconomic challenges, Russia has significantly more sovereign risk and less stability than South Korea. In other words, using a sole metric to weight constituents — whether it’s liquidity, market cap or equal weighting — may reduce concentration risk, but it also discounts other measures of risk.

Our rules-based approach can aggressively underweight a market when negative sentiment spikes, further helping to capture the evolving nature of sovereign credit risk.

Instead of a single arbitrary static measure, we take a range of macrofundamental criteria into account. Along with debt to GDP, our model considers the level of external debt to GDP, growth forecasts and investor protection in markets, among other metrics. We also consider market sentiment, historically a major driver of sovereign yields. Our rules-based approach can aggressively underweight a market when negative sentiment spikes, further helping to capture the evolving nature of sovereign credit risk. (See “Advanced Beta Strategies in Fixed Income,” SSGA, 2015).

Based on all these inputs, our macrofundamental and market analysis

---

Backtested Quality-Tilted Global Credit Portfolio Returns

Source: FICC Quantitative Research, as of April 2014. Data is from January 2007 through April 2014. The customized benchmark is constructed from all bonds for which default data is available in the global investment grade credit universe. Our default risk model covers approximately 80% of the corporate credit universe of the Barclays Global Agg as of April 2014. The data displayed is a hypothetical example of backtested performance for illustrative purposes only and is not indicative of the past or future performance of any SSGA product. Backtested performance does not represent the results of actual trading but is achieved by means of the retroactive application of a model designed with the benefit of hindsight. Actual performance results could differ substantially, and there is the potential for loss as well as profit. The performance may not take into account material economic and market factors that would impact the advisor’s actual decision-making. The performance does not reflect management fees, transaction costs and other fees a client would have to pay, which would reduce returns. Please reference the disclosures for the model methodology and other important disclosures.

Allocations are as of the date indicated, are subject to change and should not be relied upon as current thereafter.
Figure 4: Russia’s Bond Yields Have Shot Higher Than South Korean Yields Due to Geopolitical Turmoil

Yield to Worst of Government Bonds

![Graph showing the yield to worst of government bonds for Russia and South Korea from 2008 to 2015.]

Source: Barclays Capital POINT, as of February 27, 2015.

Past performance is not a guarantee of future results. Allocations are as of the date indicated, are subject to change and should not be relied upon as current thereafter.

Public Debt to GDP Ratio (%)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Russia</td>
<td>8.79</td>
<td>8.79</td>
<td>9.19</td>
<td>9.09</td>
<td>7.80</td>
<td>6.10</td>
<td>6.30</td>
</tr>
<tr>
<td>South Korea</td>
<td>28.30</td>
<td>30.98</td>
<td>31.82</td>
<td>33.26</td>
<td>34.79</td>
<td>35.55</td>
<td>36.40</td>
</tr>
</tbody>
</table>

Source: FactSet, World Bank, as of June 30, 2014.

Consensus GDP Growth Forecasts

![Graph showing consensus GDP growth forecasts for Russia and South Korea from 2008 to 2015.]

Source: FactSet, World Bank, as of February 28, 2015.
Figure 5: Returns Have Improved from Quality Tilting the Sovereign Sleeve
Versus a Basic Buy-and-Hold Index Strategy*

Unhedged Performance, Selected Backtested Portfolio Data (12/31/2002–04/30/2015)

<table>
<thead>
<tr>
<th></th>
<th>Benchmark: Barclays Global Treasury Index*</th>
<th>Alternative Sovereign Index Solution, Benchmarked Against Barclays Global Treasury Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual Return (%)</td>
<td>4.28</td>
<td>4.50</td>
</tr>
<tr>
<td>Annual Risk (%)</td>
<td>6.77</td>
<td>6.77</td>
</tr>
<tr>
<td>Return/Risk</td>
<td>0.63</td>
<td>0.66</td>
</tr>
<tr>
<td>Total Ret Max DD</td>
<td>-9.28</td>
<td>-9.08</td>
</tr>
<tr>
<td>Excess Ret Max DD</td>
<td>-10.91</td>
<td>-10.82</td>
</tr>
<tr>
<td>5th Ptile. Ret.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annual Turnover (%)</td>
<td>23.49</td>
<td>32.46</td>
</tr>
<tr>
<td>Hit Rate (%)</td>
<td></td>
<td>56</td>
</tr>
<tr>
<td>Tracking Error Volatility (%)</td>
<td></td>
<td>0.30</td>
</tr>
<tr>
<td>Excess Ret/TE Volatility</td>
<td></td>
<td>0.72</td>
</tr>
<tr>
<td>Total Return (%)</td>
<td>69.39</td>
<td>73.95</td>
</tr>
<tr>
<td>Correlation of Excess Returns</td>
<td></td>
<td>-0.3</td>
</tr>
</tbody>
</table>

*The Barclays Global Treasury Index was created in 1992, with history available from January 1, 1987. Source: Barclays.

Index returns are unmanaged and do not reflect the deduction of any fees or expenses. Index returns reflect all items of income, gain and loss and the reinvestment of dividends and other income.

Importantly, when replaying the euro-zone crisis, our quality tilt would have had us underweighting the periphery (including Greece) ahead of the benchmark by about six months. Currently, the tilt steadily underweights Japan, as low growth in the Japanese economy creates uncertainty about the future success of Abenomics. On the other hand, strong recent growth and fundamentals in South Korea and Poland augurs improvement and prompts overweighting in these regions relative to the benchmark.

On and Off: The Liquidity Premia in Treasuries

For investors in the US Agg, a well-recognized liquidity premium creates opportunities to advance the Agg in the government-related credit sleeve. In particular, for US Treasury bonds, investors could in some cases benefit from a smart beta strategy that tilts toward liquid bonds, particularly in periods of market volatility. Treasuries carry a clear liquidity premium for “on-the-run” bonds — the most recently issued bonds of a particular maturity — vs. “off-the-run.” Academic evidence shows that you can extract the liquidity premium in Treasury by overweighting on-the-run securities. However, we note that it does not always pay to be in on-the-run names. There can be long periods where owning on-the-run exposure may actually underperform given market dynamics that could boost returns for illiquid bonds.

Another Rule to Live By: Liquidity Controls

While the liquidity premia is most pronounced for US Treasury, we also take liquidity into account in other sectors. Given the enormous regulatory changes that have reshaped the debt markets in recent years — especially...

generates a sovereign credit score for each country. We apply this score to the Barclays Global Treasury Index, for example — achieved steady outperformance relative to that Index from December 31, 2002 to April 30, 2015 even with fairly conservative overweights and underweights relative to the benchmark (Figure 5).

When replaying the euro-zone crisis, our quality tilt would have had us underweighting the periphery (including Greece) ahead of the benchmark by about six months.

Advancing the Agg
Cumulative Return Comparison: Barclays Global Treasury Index Vs. Backtested Alternative Sovereign Index Solution

Cumulative Excess Returns of Backtested Alternative Sovereign Index (Vs. Benchmark)

Source: State Street Global Advisors and Barclays. Data are from December 31, 2012 to April 30, 2015.
The data displayed is a hypothetical example of backtested performance for illustrative purposes only and is not indicative of the past or future performance of any SSGA product. Backtested performance does not represent the results of actual trading but is achieved by means of the retroactive application of a model designed with the benefit of hindsight. Actual performance results could differ substantially, and there is the potential for loss as well as profit. The performance may not take into account material economic and market factors that would impact the advisor’s actual decision-making. The performance does not reflect management fees, transaction costs and other fees a client would have to pay, which would reduce returns. Please reference the back of the document for the model methodology and other important disclosures.
SSGA does not yet manage actual assets to this strategy. A complete list of the firm’s composites and their descriptions is available upon request.
Past performance is not a guarantee of future results. Index returns are unmanaged and do not reflect the deduction of any fees or expenses. Index returns reflect all items of income, gain and loss and the reinvestment of dividends and other income.
YOU GET WHAT YOU PAY FOR, BUT CAN YOU GET IT CHEAPER?

For investors who cannot simply “bag the Agg” but still want to improve yields, a typical move is to hire a fundamental manager with a proven track record. In addition to having the leeway to re-weight the Agg’s various sector sleeves, these managers will frequently get a budget for out-of-benchmark allocations. In corporates, for example, they may limit the manager to the same universe of securities as is in the Agg — except for a 10 percent out-of-benchmark allocation to, say, BBBs or high-yield bonds.

Taking out-of-benchmark allocations is a very common way to gain premium, and most active managers will exercise this option. Still, our own informal analysis suggests that many actually seem to be getting most of their excess returns from these out-of-benchmark allocations. This begs the question of whether investors are really paying for active stock selection or, in some cases, paying for systematic allocations — something that fixed-income smart beta strategies can do with even more transparency and lower fees.

As with any smart beta strategy, the tilted benchmark strategy we propose is neither active nor passive; it’s somewhere in between. The costs of the strategy, therefore, are somewhere between active and passive. But if active managers are simply designing their strategies as “benchmark plus,” advanced beta could offer a lower-cost, even more systematic and transparent way to get to the same place.
those that restrict the inventories maintained by large broker dealers who traditionally provided a ready source of supply and demand — liquidity has become an increasingly nettlesome issue for fixed-income investors. To help ensure we don’t design strategies too costly to fill, we use liquidity cost scores from Barclays in the construction of our portfolios to lean toward more liquid bonds.

Still, we note that the quality premium is the main focal point of the smart beta tilted strategy. We do not choose bonds on a liquidity basis alone, and we are not constrained by rules to sell bonds simply because they’ve become more illiquid. This is important; if a liquidity event (such as the money market blowup in 2008 following the Lehman bankruptcy) were to force us to sell bonds we could be forced to sell in a costly way. Our strategy is to earn a liquidity premium, but only when it makes sense from a quality perspective.

Advance and Expand

Our strategy starts from a place of advancing existing sectors of the Agg. However, it is also a natural complement to the out-of-benchmark allocations many investors use to try to boost yield by reaching deeper into riskier parts of the fixed-income spectrum such as EM or high yield. In fact, it can make for an efficient way of actually managing those risks involved.

In high yield, the key is to differentiate fallen “angels” — those companies with strong fundamentals that may improve operationally in the future — from falling “knives.”

Given the long-term bull market in bonds, yields across asset classes such as EM and high yield are currently more favorable than traditional fixed-income assets. (See “Income & Total Return: Solutions for a Low Yield Environment,” SSGA, 2014). High yield has a higher exposure to default risk than investment-grade credits. Still, by applying the same rules-based quality strategy that we do to investment-grade credits, we can potentially take advantage of mispricings in the default risk in the high-yield market and tilt our portfolio to better manage the risk and return trade-off.

For example, we commonly invest in strong BBs offering the “crossover premium” earned by dropping one notch down from investment grade. The key is to differentiate fallen “angels” — those companies with strong fundamentals that may improve operationally in the future — from falling “knives,” or those that could fall further into junk territory. By systematically identifying mispricing in fallen angels, our smart beta approach allows us to potentially benefit from a bounce back in those names.

Similarly, sovereign credit crises frequently become an issue in the context of EM. The ratings downgrades and spikes in yields seen in Russia, Brazil and emerging Europe are just some of the flashpoints that have flared over the past year. But, as with high yield, there’s a premia to be found, which we extract by applying the same sort of regional scoring system used to tilt intra-Agg sovereigns. In this way, we can separate those EM names painted with the broad brush of contagion from those with intrinsically risky fiscal dynamics.

Plug and Play

Advancing the Agg through factor premia strategies in fixed income seeks to offer a solution to fixed-income investors faced with the quandary of still-exceedingly-low yields despite secularly rising rates. We take an incremental approach of identifying the factor premia compensated in each sleeve and then tilting to gain a greater exposure and compensation for this risk, and then using the same approach to evaluate and efficiently manage discreet out-of-benchmark budgets. By doing so, investors can generally stay within familiar benchmark constraints but pick up yield and lower volatility across their traditional “passive” and “active” exposures. With opportunities to advance the Agg in corporates, US Treasury and sovereigns (including EM), investors can “plug and play,” deciding what sleeves of the benchmark to apply smart beta to and where to expand the envelope, offering a modular way to find more yield while navigating the tricky trajectory of the rising rates ahead.

Acknowledgements Anna Han Wang, Adam Chrissis and Richard Munclinger.

1 Barclays, as of June 5, 2015 (Global Aggregate Yield to Worst).
2 Barclays, as of May 26, 2015 and December 29, 2006 (Barclays Global Aggregate Option Adjusted Duration).
3 Barclays, retrieved from https://index.barcap.com/Benchmark_Indices/Aggregate/Bond_Indices, 2015
5 Morningstar.com, various portfolio reporting, 2015.
Investing involves risk including the risk of loss of principal. Risk associated with equity investing include stock values which may fluctuate in response to the activities of individual companies and general market and economic conditions.

The backtesting method used to generate performance for the hypothetical portfolios described in this article was performed by applying the particular rules-based investment process of the portfolios, to historical data. The particular investment process used for the different portfolios is outlined in the body of this article. The data used was only the data which would have been available at the time when the historical portfolios were generated, not what is available now. These processes help to eliminate various forms of survivorship bias, both in terms of a “smarter model” and in terms of making decisions based on information that was not available at the time.

The results shown do not represent the results of actual trading using client assets but were achieved by means of the retroactive application of an investment process that was designed with the benefit of hindsight, otherwise known as backtesting. Thus, the performance results noted above should not be considered indicative of the skill of the advisor or its investment professionals. The backtested performance was compiled after the end of the period depicted and does not represent the actual investment decisions of the advisor. These results do not reflect the effect of market and economic conditions on decision making. In addition, backtested performance results do not involve financial risk, and no hypothetical trading record can completely account for the impact of financial risks associated with actual investing. No representation is being made that any client will or is likely to achieve profits or losses similar to those shown. In fact, there are frequently significant differences between backtested performance results subsequently achieved by following a particular strategy.

Backtesting results are shown after costs. In corporate credit backtesting, we assumed 35 basis points of transaction cost, doubled between the fall of 2007 to fall of 2009. In sovereign credit backtesting, we assume 10 basis points for the eurozone and global, and 25 basis points for emerging markets.

International Government bonds and corporate bonds generally have more moderate short-term price fluctuations than stocks, but provide lower potential long-term returns.

All the index performance results referred to are provided exclusively for comparison purposes only. It should not be assumed that they represent the performance of any particular investment. Moody’s is a registered trademark of Moody’s LLC.

The information provided does not constitute investment advice and it should not be relied on as such. It should not be considered a solicitation to buy or an offer to sell a security. It does not take into account any investor’s particular investment objectives, strategies, tax status or investment horizon. You should consult your tax and financial advisor. All material has been obtained from sources believed to be reliable.

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This document may contain certain statements deemed to be forward-looking statements. All statements, other than historical facts, contained within this document that address activities, events or developments that SSGA expects, believes or anticipates will or may occur in the future are forward-looking statements. These statements are based on certain assumptions and analyses made by SSGA in light of its experience and perception of historical trends, current conditions, expected future developments and other factors it believes are appropriate in the circumstances, many of which are detailed herein. Such statements are subject to a number of assumptions, risks, uncertainties, many of which are beyond SSGA’s control. Please note that any such statements are not guarantees of any future performance and that actual results or developments may differ materially from those projected in the forward-looking statements.

The values of debt securities may decrease as a result of many factors, including, by way of example, general market fluctuations; increases in interest rates; actual or perceived inability or unwillingness of issuers, guarantors or liquidity providers to make scheduled principal or interest payments; illiquidity in debt securities markets; and prepayments of principal, which often must be reinvested in obligations paying lower interest at lower rates.
At SSGA, we think systematic, rules-based approaches can get you much of the way toward return goals. But not all the way. In this active-manager punch list for the passive-plus era, we help you identify truly idiosyncratic forms of alpha worth paying extra for, where we believe to look for it, and when the added effort is likely to prove most fruitful.

Marcus Schulmerich, Ph.D., CFA, FRM  
*Vice President and Global Portfolio Strategist*  
*Active Quant Equities*

Vladimir Zdorovtsov, Ph.D.  
*Managing Director, Director of Research*  
*Active Quantitative Equities*

Brett Collins, CFA  
*Chief Operating Officer*  
*Investment Solutions Group*
What is true skill in active management?
Holistically speaking, it’s an ability to deliver improved risk-adjusted investment outcomes through proprietary insight. Some in the investment management industry still cling to old definitions of active skill (i.e., beating cap-weighted benchmarks). But new definitions may not suffice either. Increasingly, we observe that what may at first seem like genuine alpha is actually the result of tilts toward commoditized factor premia, coupled with basic off-the-shelf portfolio construction tools. We ask, does this really amount to skill, worthy of active fees? And if not, where are we most likely to find true proprietary skill and how and when can this skill best be used?

As the scope of smart beta solutions expands, the bar continues to rise for active management, thinning the herd and shining a brighter spotlight on those who genuinely deserve to be considered “active.” The response of State Street Global Advisors’ Active Quantitative Equities team to this trend has been: Bring it on! We are ready for this challenge and have been proactively undertaking analyses documenting our true skill, its origins and its evolution — while continuing to pedal ahead to ensure it doesn’t erode. In our view, active management has a favored place in many markets, regardless of the economic cycle, and, given persistent behavioral biases and market frictions, we believe there are opportunities for astute investors to generate alpha. Indeed, with growing interest in active quantitative equity management, investors clearly still see an important role for active investing.

*Hint: Now could be an opportune time.
Back to Basics for Active: Is There a Truly Prescient Manager?

In thinking about where proprietary value can emanate from, we go back to basics and look at stock forecasting. One of the ways to tackle how active managers can add value is through the Fundamental Law of Active Management. In this law, active managers’ performance is a function of three basic drivers: the precision of their forecasts, the number of independent forecasts they can tap into and the degree to which they can incorporate these forecasts into their portfolios.

In other words, and in our experience, it helps to have more accurate forecasts, a larger quantity of active forecasts and a smaller number of impediments preventing those forecasts from informing your bets. A good active manager can add value on each of these dimensions. Practically speaking, this means determining the proper return drivers and then applying them in new and different ways, including:

- Embedding proprietary refinements into existing, well-known return drivers (e.g., a smarter version of the basic momentum factor that better captures the underlying reaction mechanism);
- Discovering new factors that have not been included in smart beta products or are not otherwise in the public domain. This could include predicting earnings of retail outlets by monitoring foot traffic in retail stocks (partly driven by the “big data” movement);
- Identifying better ways of blending the above and other elements (e.g., finding insights into how they may interact with each other and condition each other’s behavior);
- Varying exposures to all of these return drivers over time, recognizing that their efficacy will ebb and flow in ways that can often be amenable to forecasting (e.g., adapting portfolio positioning to risk-on/risk-off market swings or macroeconomic conditions);
- Making improvements to risk modeling and portfolio construction. This could include building proprietary risk models, dynamic portfolio construction settings or proprietary transaction-cost models.

As the domain of “skill” expands to new return factors, areas previously considered unpredictable shrink, and the application of skill to the portfolio increases. Intuitively, what were once risks to the portfolio that needed to be constrained are now areas that can be forecast and potentially captured as additional sources of alpha. In other words, skill, the quantity of forecasts, and the transferability of these forecasts improve, boding well for active performance.

If at some level even Warren Buffett is just an extraordinarily effective factor investor, what hope is there for the rest of us?

This is true proprietary skill-based active management. Such processes can ensure that the performance of the portfolio is driven by forces on which active managers can apply their skills, while mitigating the effects of those forces outside of managers’ control.

The Building Blocks of Active Management Returns

How many active managers pass this litmus test? It’s a valid question. In 2012, Frazzini et al. analyzed Berkshire Hathaway’s high and consistent alpha. Remarkably, they found that once they controlled for “betting-against-beta” and “quality-minus-junk” factors, the alpha became insignificant. Or, in the words of Swedroe et al, “It is Warren Buffett’s strategy, or exposure to factors, that explains his success, not his stock-picking skills.” Swedroe does acknowledge that choosing the right factors is, in itself, a measure of investing skill. Still, if at some level even Warren Buffett is just an extremely effective factor investor, what hope is there for the rest of us?

Below we take a scientific look at an actively managed portfolio to show how one can start to tease out whether a manager’s returns are really emanating from skills that cannot be captured by smart application of simple, passive well-known factor-based investing.

We analyzed the returns of an SSGA active strategy — SSGA Active Quantitative Equity (AQE) Global Managed Volatility Alpha — to break out what can and cannot be captured by a collection of smart beta vehicles. The strategy is marketed globally.

We regressed SSGA AQE Global Managed Volatility Alpha gross returns on some of the most common return drivers: value, momentum, size, volatility and quality. Recall that in linear regression analysis, the calculations result in a “best fit” line among data points. In a simple algebraic line, the intercept shows the value of the line on the y-axis, when the x value is 0. Similarly, in our regression analysis, the “intercept” shows how our portfolio would perform when returns from the
common smart beta factors are “0.” The intercept in this regression is the so-called Jensen’s alpha, the measure of monthly value-add (in basis points) above and beyond what smart beta can deliver.\(^{12}\)

Figure 1 shows the results of the regression, with statistically significant results\(^ {13}\) in bold. The chart shows that the strategy does have some exposures to common smart beta return drivers. However, the measure of true value-add (the intercept) is statistically as well as economically significant.

It is not unexpected — nor necessarily undesirable — to have an active strategy show material exposures to smart beta returns. A chef would still use basic ingredients like salt, flour, eggs and water to create gourmet meals, but his or her value-add is in the allocation of those (and potentially less basic) components, the recipe followed, and the cooking technique. Similarly, an active manager’s performance should show the ability to go beyond what “basic ingredients” (factors) and common-knowledge “recipes” (index-tracking allocations) can offer.

With the math in Figure 1 showing an example of active management delivering statistically significant returns over smart beta investing, we now focus on how to go active — starting with where the soil is most fertile for alpha generation.

**Which Market Segments Are Most Attractive for Active Managers?**

The word “inefficiency,” particularly in the context of the stock market, is generally met with shudders and cold shoulders from economists who champion free markets. But for active managers, inefficiency can be a good thing. It is pretty intuitive: Less efficient markets go hand in hand with mispricings that can provide more opportunity for active managers to generate outperformance. But inefficiency alone may not be sufficient. Investors must home in on markets where mispricings should be identified in high quantities.

Just how do we spot inefficient markets? Inefficient markets tend to be less liquid, with higher transaction costs, where trading is not as fluid and mispricings are more common. In most cases, these conditions spring from two sources:

- **Irrational human error.** Humans make all kinds of irrational decisions in their daily lives, and investing is no different. Investors tend, for example, to naively extrapolate the past too far into the future, to excessively focus on certain information and to be overly confident or overly fearful of losses.\(^ {14}\)

- **Market frictions.** Despite the vast improvements in information technology, we do not operate in a frictionless market. Information is not instantaneously available to everyone, and market participants aren’t always able to act on the available information in an uninhibited fashion. Investors with the wherewithal to obtain and process more pricing-relevant information can glean unpriced insights that aren’t readily available to others. Still, as Grossman et al note, prices cannot be fully efficient all the time, nor can they reflect all the information available to informed agents.\(^ {15}\)

To identify markets where either or both of these forces come into play, investors can seek markets with lower levels of analyst coverage (where mispriced assets are easier to uncover). Numerous publications have reviewed the impact of analyst coverage and market inefficiency in generating active returns.\(^ {16}\)
In determining where to go active, the mutual fund database is a good place to start. Of all the Morningstar categories, emerging markets equity, international equity and intermediate-term bond funds are the only three where over the past five years more than 50 percent of the active managers have outperformed their passive peers.  

Investors can also focus on markets with greater performance dispersion between the best and worst performers (where pricing opinions are less likely to hover around a mean level). Another key variable is the nature of a market’s investor base. Markets with a heavy retail skew — the China A share domestic stock market is a prime example — tend to exhibit more fickle inflows and outflows, prompting more inefficiency and thus mispricings.

Of course, as demonstrated by the recent turmoil in the A share market, any investment strategy can suffer if efficiency drops too low. Such conditions often give rise to manmade “speed bumps” (trading suspensions, short-selling constraints, etc.) that slow all market participants equally. Really, then, what an investor is looking for are pockets of opportunity where the market is just inefficient enough that passive managers may have difficulty overcoming trading costs to deliver benchmark-like returns, but not so inefficient that the more aggressive managers can’t execute their trades.

Morningstar’s Active/Passive Barometer, an annual performance analysis of US active mutual funds vs. their passive competitors, does not, in general, point to consistent outperformance by active strategies. However, the results, while restricted to the US, do suggest that more than 50 percent of active emerging markets equity, international equity and intermediate-term bond funds outperformed their respective indexes over the five-year period ending in December 2014 (Figure 2). This makes sense to us. Other research has shown that emerging market stocks are more illiquid than those in the developed markets, and intermediate-term bonds are more illiquid than short-term bonds.

In a sense, it’s a simple process of elimination. The analysis will tell you whether the genuine alpha lurks beneath the top-line return number or not.

To be clear, we believe more efficient markets (such as the large-cap US equity markets) can also benefit from active management. Given enough resources, a highly skilled manager can carve out an edge almost anywhere. Still, it’s apparent that there are certain sweet spots where less-accessible data are just available enough.

### Figure 2: Illiquid Market Segments Outperformed Their Benchmarks by More than 50% in the 5-Year Period Ending December 2014

<table>
<thead>
<tr>
<th>Category</th>
<th>1-Year</th>
<th>3-Year</th>
<th>5-Year</th>
<th>10-Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>US Large Blend</td>
<td>32.7</td>
<td>25.6</td>
<td>25.1</td>
<td>21.6</td>
</tr>
<tr>
<td>US Large Value</td>
<td>21.3</td>
<td>49.0</td>
<td>24.4</td>
<td>38.2</td>
</tr>
<tr>
<td>US Large Growth</td>
<td>42.3</td>
<td>26.0</td>
<td>12.2</td>
<td>16.9</td>
</tr>
<tr>
<td>US Mid Blend</td>
<td>36.5</td>
<td>34.5</td>
<td>23.8</td>
<td>13.7</td>
</tr>
<tr>
<td>US Mid Value</td>
<td>20.9</td>
<td>34.8</td>
<td>13.5</td>
<td>54.4</td>
</tr>
<tr>
<td>US Mid Growth</td>
<td>48.0</td>
<td>37.0</td>
<td>31.1</td>
<td>26.8</td>
</tr>
<tr>
<td>US Small Blend</td>
<td>40.7</td>
<td>35.5</td>
<td>37.1</td>
<td>38.9</td>
</tr>
<tr>
<td>US Small Value</td>
<td>25.2</td>
<td>22.0</td>
<td>47.7</td>
<td>48.4</td>
</tr>
<tr>
<td>US Small Growth</td>
<td>51.4</td>
<td>40.8</td>
<td>38.2</td>
<td>24.4</td>
</tr>
<tr>
<td>Foreign Large Blend</td>
<td>47.0</td>
<td>44.8</td>
<td>52.8</td>
<td>40.2</td>
</tr>
<tr>
<td>Diversified Emerging Markets</td>
<td>58.2</td>
<td>70.4</td>
<td>65.8</td>
<td>36.6</td>
</tr>
<tr>
<td>Intermediate Term Bond</td>
<td>47.9</td>
<td>73.0</td>
<td>89.7</td>
<td>42.2</td>
</tr>
</tbody>
</table>

Source: Morningstar, as of December 31, 2014. For full details on these categories and what is included, see Morningstar, “Morningstar’s Active/Passive Barometer: A new yardstick for an old debate,” June, 2015.

Past performance is not a guarantee of future results.

### Outing the Closet Indexers

As noted at the outset, increasingly there seem to be active managers who achieve commercial success building portfolios with risk profiles, if not actual holdings, closely matching those of their performance benchmarks. These managers seek to outperform a benchmark by maintaining a handful of static over- or underweights to common attractive/unattractive common risk factors. Very little of their strategies’ benchmark-relative variance is derived from correctly identifying and implementing less common factor exposures — the true value-add of active managers.

In our view (setting Mr. Buffett aside), investors should refuse to pay active fees for such “closet indexers.” Investors should only be willing to pay for true alpha that cannot be replicated by a fully transparent, static and systematic investment process leveraging factors in the public domain. The box above highlights a method used by our Investment Solutions Group in the diagnostics they perform on clients’ active programs to break down
**TWO WAYS TO DO THE MATH**

**Is My Portfolio Running on Common Factors or Skills?**

In Figure 3, a stylized low-active risk portfolio has the bulk of the factor risk attributed to an underweight to size and an overweight to volatility. If the portfolio maintained a similar risk profile consistently over a period of months, one could infer that excess returns were driven by the portfolio’s factor exposures; however, we do note that the investor chose his specific factor weights to generate these specific results.

In Figure 4, we execute a returns-based analysis on a higher active risk strategy. Our returns-based analysis does not show factor bias in the portfolio; the adjusted $R^2$ of the regression is fairly low at 0.12, which implies that the portfolio’s excess return is potentially being driven by stock-specific risks or by factor risks other than those included in our analysis.

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**Figure 3: Holdings-Based Analysis**

Factor Risks in Hypothetical Low-Active Risk Portfolio

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Coefficient</th>
<th>T-Statistic</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>0.05</td>
<td>0.60</td>
<td>0.55</td>
</tr>
<tr>
<td>Value</td>
<td>-0.07</td>
<td>-2.31</td>
<td>0.02</td>
</tr>
<tr>
<td>Exchange Rate Sensitivity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leverage</td>
<td>-0.06</td>
<td>-1.91</td>
<td>0.06</td>
</tr>
<tr>
<td>Momentum (Medium time frame)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Growth</td>
<td>-0.06</td>
<td>-1.25</td>
<td>0.22</td>
</tr>
<tr>
<td>Momentum (Short time frame)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liquidity</td>
<td>-0.02</td>
<td>-0.80</td>
<td>0.42</td>
</tr>
<tr>
<td>Volatility</td>
<td>0.07</td>
<td>1.36</td>
<td>0.18</td>
</tr>
</tbody>
</table>

Source: SSGA, Axioma, as of June 30, 2014. These are stylized portfolios, and we are showing sample regression output data. We are not showing actual portfolio data.

The information contained above is for illustrative purposes only.

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**Figure 4: Returns-Based Analysis**

Factor Risks in Hypothetical Higher Active Risk Portfolio

<table>
<thead>
<tr>
<th>Coefficients</th>
<th>T-Statistic</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>0.05</td>
<td>0.60</td>
</tr>
<tr>
<td>Value</td>
<td>-0.07</td>
<td>-2.31</td>
</tr>
<tr>
<td>Momentum</td>
<td>-0.06</td>
<td>-1.91</td>
</tr>
<tr>
<td>Small Size</td>
<td>-0.06</td>
<td>-1.25</td>
</tr>
<tr>
<td>Low Volatility</td>
<td>-0.02</td>
<td>-0.80</td>
</tr>
<tr>
<td>Quality</td>
<td>0.07</td>
<td>1.36</td>
</tr>
<tr>
<td>Adjusted R-Squared</td>
<td>0.12</td>
<td></td>
</tr>
</tbody>
</table>

Source: SSGA, Bloomberg, FactSet, Axioma, from the period October 2006 to May 2015. These are stylized portfolios, and we are showing sample regression output data. We are not showing actual portfolio data.

The information contained above is for illustrative purposes only.

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Performance along these lines. In many ways, it’s a simple process of elimination: The analysis will tell you whether the genuine article lurks beneath the top-line return number or not. If not, then the investor knows there may be a way to source that return more efficiently. And if yes, then the harder work begins trying to identify where in the chain of the investment process — from data, to obtaining clearer signals from the data, to combining those signals statically or dynamically — the proprietary elements are coming from, how compelling they are and whether they’re worth it.

**Is There Any Alpha Left for the Investor after Fees?**

Of course, investors pay higher fees for active management than they would for traditional passive or advanced-beta investing, and management fees create a bar for strategies to clear before returns accrue. The higher the fees, the higher the bar.

Unsurprisingly, the data show that lower-cost managers tend to deliver better results than higher-cost managers. However, the pattern is even more pronounced than one might guess. Morningstar’s Active/Passive Barometer showed that in all 12 categories covered by the analysis, over the 10 years ending in December 2014, active funds in the lowest-cost quartile outperformed passive competitors more frequently than did active funds in the highest-cost quartile. Furthermore, in all 12 categories, the lower-cost active
funds outperformed the higher-cost ones over the same period based on asset-weighted average performance by fee quintile (Figure 5). The lower-return enhanced space provides an interesting example of the power of low fees. Figure 6 illustrates return data from our AQE enhanced strategies. As can be seen, the strategies outperform the benchmark and show compelling returns before costs for the three- and five-year periods. Importantly, these returns are derived from an alpha goal of just 0.75–1 percent p.a. Indeed, alpha technically isn’t even the goal of enhanced managers — maximizing risk-adjusted returns through a higher information ratio is. Given the low alpha and that the tracking error is just 1 percent, one might conclude that enhanced is a closet indexing strategy. But, in this case, one would be wrong. Instead, it’s a strategy intended as an alternative to passive developed- and emerging-market equity that was specifically designed to help investors strike the right balance of returns and fees.

**Is This a Good Time to Invest With an Active Manager?**

In our view, a skilled active manager can add value in all economic cycles and markets. But, it turns out that active management as a whole has tended to perform better in certain economic periods, namely, when stock correlation is low, dispersion is high and interest rates are increasing.

Stock Correlation and Dispersion

It’s clear that correlations picked up considerably during and in the years right after the Global Financial Crisis. However, they have also been steadily decreasing since their peak at the end of 2011. In other words, we think the market environment may be reaching an important inflection point regarding active investing.

Another way of looking at these trends is to focus on dispersion, which of course tends to move in the opposite direction of correlations. For some active quantitative approaches that employ a static multi-factor approach, low dispersion — indicating that all factors or themes are working in sync — could be preferred if performance is on a positive trend and the investor is betting it will continue. For most of the active quant approaches we observe, however, individual factor strength is the biggest

<table>
<thead>
<tr>
<th>Category</th>
<th>Lowest Cost</th>
<th>Highest Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>US Large Blend</td>
<td>29.7</td>
<td>9.9</td>
</tr>
<tr>
<td>US Large Value</td>
<td>66.3</td>
<td>18.6</td>
</tr>
<tr>
<td>US Large Growth</td>
<td>28.9</td>
<td>14.2</td>
</tr>
<tr>
<td>US Mid Blend</td>
<td>21.7</td>
<td>4.6</td>
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<tr>
<td>US Mid Value</td>
<td>68.2</td>
<td>27.3</td>
</tr>
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<td>US Mid Growth</td>
<td>47.1</td>
<td>13.4</td>
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<td>US Small Blend</td>
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<td>US Small Value</td>
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<td>US Small Growth</td>
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<td>Foreign Large Blend</td>
<td>58.5</td>
<td>34.2</td>
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<tr>
<td>Diversified Emerging Markets</td>
<td>47.4</td>
<td>22.2</td>
</tr>
<tr>
<td>Intermediate Term Bond</td>
<td>54.9</td>
<td>30.5</td>
</tr>
</tbody>
</table>

Source: Morningstar, as of December 31, 2014. For full details on these categories and what is included, see Morningstar, “Morningstar’s Active/Passive Barometer. A new yardstick for an old debate,” June 2015.

The universe for the above data is all ETFs and open-end mutual funds (excluding fund-of-funds and money-market funds) in each Morningstar category that existed at the beginning of the relevant period (including funds that did not survive to the end of the period) defined the eligible universe. To be included, the fund’s inception date must precede the start of the period and the obsolete date cannot predate the start of the period. In addition, each must have asset data for at least one share class in the month prior to the start of the sample period (the beginning of the trailing 1-, 3-, 5-, or 10-year period) to facilitate asset-weighting.

Data used by permission from Morningstar. Past performance is not a guarantee of future results.
determinant of outperformance. And factor strength is typically a function of higher stock dispersion. For example, if quintile spreads are strongly positive for value factors (presenting an opportunity for generating alpha from value stocks), it’s likely because dispersion is high among value and less-value-oriented securities.

**Interest Rates**

The prospect of rate hikes in the United States this year may also bode well for active managers. Since 2000, stock return dispersion has typically been positively correlated with interest rates, while stock correlation is negatively correlated. Figure 8 highlights this relationship over the period 2000–2013 vs. 1987–1999. This supports the view that active managers have the capacity to perform well in a rising rate environment in particular.

In a 2014 study, Christian Chan focused on the role of interest-rate volatility. In data from 1992 to 2014, he found a strong negative relationship between interest-rate volatility and the US Federal Reserve (Fed) funds rate. Low-rate, liquidity-driven market environments like the one we’ve found ourselves in these past several years are actually associated with higher interest-rate volatility. Just think of some of the swings we’ve experienced in recent months, like the large swing in US Treasury bonds that occurred in October 2014. If the two-year Treasury yield starts at 0.5 percent, even if it only moves up to 1 percent, that’s a relatively huge change; ditto when it slides a few months later back down to 0.7. It’s important to remember, too, that those changes don’t just send tremors through the bond markets; they are also felt by corporate treasurers trying to plan their cash-flow estimates for the next quarter.

But here’s the thing: In such an environment there is relatively little that a company can do to distinguish itself from other companies dealing with the same low-level stressors. At least, in a rising rate environment balance sheet strength and other fundamentals play
more into how successful a company is in navigating the higher funding costs over the long term. And all else being equal, we have seen that active managers generally prefer environments driven more by hard, investable fundamental data and stock-specific factors.

This Is Where, When and How

Analyzing fund data and risk-model simulations, we can see that active management can potentially generate alpha over and above what’s created from smart beta, assuming one knows how to look.

In general, where to go active involves finding markets where mispricings are identifiable and available, such that active managers can exploit those circumstances and flex their muscles as forecasters of investment performance.

As for when, we believe today’s market environment — with its decreasing correlations and higher levels of return dispersion — could prove ideal for active managers. The prospect of higher rates in the United States, coupled with lower rate volatility, could also prove highly constructive. For active managers seeking to generate alpha based on skill and the investors seeking to harvest it, there are times for tilling the soil and times when the fruit starts appearing on the vine. We think this may be one of those times to watch that fruit grow and ripen.

![Figure 7: Market Correlations Relative to Large-Cap Manager Performance](image)

Source: SSGA, Period March 1990 through April 2015.
Past performance is not a guarantee of future results.
Index returns are unmanaged and do not reflect the deduction of any fees or expenses. Index returns reflect all items of income, gain and loss and the reinvestment of dividends and other income.

![Figure 8: Interest Rate Vs. Stock Return Dispersion and Stock Correlation](image)

Past performance is not a guarantee of future results.
Index returns are unmanaged and do not reflect the deduction of any fees or expenses. Index returns reflect all items of income, gain and loss and the reinvestment of dividends and other income.
Data subject to rounding errors.
Definitions

Active Risk  Risk created by an active investment manager attempting to outperform its benchmark.

Adjusted R-Squared  A version of R-Squared that has been adjusted for the number of predictors in the model.

Beta  A measure of the risk of a portfolio from systemic, or market movements, rather than idiosyncratic factors.

Coefficient  In simple linear regressions, the independent variable coefficients represent the rate of change of the dependent variable with a 1-unit move in the independent variable.

Correlation Coefficient  The correlation coefficient measures the strength and direction of a linear relationship between two variables. It measures the degree to which the deviations of one variable from its mean are related to those of a different variable from its respective mean.

Factor Risk  A systematic risk in multi-factor models describing the investment manager’s style and deviation from the benchmark.

Information Ratio  A unit of measure showing the difference between a portfolio’s return and that of its benchmark index, per unit of volatility.

Intercept  In simple linear regressions, the intercepts represent how the dependent variable would perform when independent variables are “0.”

Leverage  A factor risk from debt held by a company.

Low Volatility  A designation for stocks with relatively less movement in share price.

Momentum  The tendency for a stock price to maintain a certain direction of price trajectory.

P-Value  A statistical measure of how likely it is that sample data will “reject the null hypothesis (the hypothesis that the data is actually not proving what the researcher sets out to prove), even when the null hypothesis is true. High p-values imply your data are likely with a true null. Low p-values imply your data are unlikely with a true null. Therefore, results of regressions with low p-values are generally considered more reliable results and suggest that the researcher can reject the null.

R-Squared  The coefficient of Multiple Determination. It represents the percent of the variance in the dependent variable that can be explained by all of the independent variables taken together. That is, the strength of the independent variables in explaining the value of the dependent variable.

Sharpe Ratio  A unit of measure showing the difference between a portfolio’s return and that of the risk-free rate, per unit of volatility.

Specific Risk  Idiosyncratic, uncorrelated risk emanating from individual securities.

T-Statistic  T-tests are statistical tests measuring the difference between population means or between the population mean and a hypothesized value. The t-value measures the size of the difference relative to the variation in the sample data. Or, the t-statistic is the calculated difference between means represented in units of standard error. The greater the magnitude of T, the greater the evidence against the null hypothesis (the hypothesis that the data is actually not proving what the researcher sets out to prove). The closer T is to 0, the more likely there isn’t a significant difference in the sample mean.

Tracking Error  The standard deviation of a portfolio’s excess returns over a benchmark, annualized.

Value  A designation for a stock that tends to trade below the price suggested by the company’s fundamentals.

Where and When to Go Active

1 Morningstar, as of various dates.
2 “Prior to the development of the three factor model, actively managed funds could produce higher returns than a benchmark, such as the Russell 3000 Index or the S&P 500 Index, by ‘tilting’ their portfolio to either small or value stocks, thus giving them more exposure to size and value factors than the benchmark index. The fund would then claim its outperformance was, in fact, alpha. Today, regression analysis would show that their outperformance was simply the result of exposure to certain factors: In effect, what was once alpha has now become beta, or loading on a factor, which could be purchased in a less expensive way.” Swedroe, L.E., and Berlin, A.L. “The Incredible Shrinking Alpha,” Buckingham, 2015.
5 There is a tendency for asset prices to underreact to news in the short-run. Momentum traders attempt to profit from this underreaction via a trend-following strategy, investing in stocks with rising prices that have not fully priced in latest news or fundamental changes. Hong, Harrison, and Stein, Jeremy C., “A Unified Theory of Underreaction, Momentum Trading and Overreaction in Asset Markets,” National Bureau of Economic Research, December 1997.
6 Big data seeks to pull enormous reams of rapidly available data from various forms (including social networking sites, GPS, sensors or other sources), and to use it for analytics. See McAfee, Eric, and Brynjolfsson, Erik, “Big Data: The Management Revolution,” Harvard Business Review, October 2012; https://harvardbiz.org/2012/10/big-data-the-management-revolution/ar.
8 This behavior of tilting toward high-beta assets suggests that risky high-beta assets require lower risk-adjusted returns than low-beta assets, which require leverage. Therefore, betting against beta (or underweighting high-beta assets) is one factor strategy taken by some investors. Frazzini, A., and Pedersen, L. E., “Betting Against Beta,” Journal of Financial Economics, 111, 2014.
9 Quality-minus-junk is a factor strategy that goes long on high-quality stocks and shorts low-quality stocks. This strategy earns significant risk-adjusted returns in the United States and globally across 24 countries. Clifford S. Asness, Andrea Frazzini and Lasse H. Pedersen, “Quality Minus Junk,” October 9, 2013.
10 At SSGA, we define quality as high profitability, low earnings variability and low leverage, and believe that these safe, profitable and solid businesses will produce superior returns over the long term. See Taie Wang and Bruce Zhang, “Why Quality Investing,” State Street Global Advisors, 2014; http://www.iq.ssga.com/article/why-quality-investing.
Forbes blog post, July 17, 2014. 
Net of fee performance is typically stronger within an institutional investment strategies, thus active manager Morningstar’s results are based on net of fee the potential benefits of active management outside the where active outperformed passive and does not illustrate not necessarily constitute an exhaustive list of categories reflect results from separately managed accounts. 

3 Correlation calculates how the returns of two stocks over time are correlated. You can do this pair-wise for companies in an index such as the S&P 500 Index, for example. One could look at the 500 stock returns within the S&P 500 on a particular trading day and calculate the cross-sectional correlations of those: How do they interact? If the market is going up steadily, one would expect low correlation as all stocks need to go up (more or less) in such a situation. By contrast, dispersion measures a spread; e.g., view the P/E ratios of the S&P 500 Index stocks, and then take the difference between the highest and lowest value. This is the dispersion. If the dispersion is low, the market thinks similarly about all stocks. 
Bloomberg, October 2014.


Bloomberg, October 2014.

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AUSTRALIA
State Street Global Advisors, Australia Ltd.
Level 17, 420 George Street
Sydney, NSW 2000
T +61 2 9240 7600
F +61 2 9240 7611
(ABN 42 003 914 225) is the holder of an Australian Financial Services Licence (AFSL Number 238276).

BELGIUM
State Street Global Advisors Belgium
Chausse de la Hulpe 120
1000 Brussels, Belgium
T +32 (0)2 633 2036
F +32 (0)2 672 2077
State Street Global Advisors Belgium is a branch office of State Street Global Advisors Limited. State Street Global Advisors Limited is authorized and regulated by the Financial Conduct Authority in the United Kingdom.

CANADA
State Street Global Advisors Ltd.
770 Sherbrooke Street West, Suite 1200
Montréal, Quebec, H3A 1G1
T 1 514 282 2400
F 1 514 282 3048
State Street Global Advisors Ltd.
30 Adelaide Street East, Suite 500
Toronto, Ontario M5C 3G6
T +647 775 5900
F +647 775 6800

FRANCE
State Street Global Advisors France Immeuble Défense Plaza
23-25 rue Delarivière-Lefoullon
92064 Paris La Défense Cedex
T (+33) (0) 1 44 45 40 00
F (+33) (0) 1 44 45 41 92
Authorized and regulated by the Autorité des Marchés Financiers. Registered with the Register of Commerce and Companies of Nanterre under the number 412 052 680.

GERMANY
State Street Global Advisors GmbH
Brienner Strasse 59
D-80333 Munich
T +49 (0)89 55878 100
F +49 (0)89 55878 440

HONG KONG
State Street Global Advisors Asia Ltd.
68th Floor
Two International Finance Centre
8 Finance Street
Central, Hong Kong
T +852 2103 0288
F +852 2103 0200

IRELAND
State Street Global Advisors Ireland Ltd.
Two Park Place, Upper Hatch Street
Dublin 2
T +353 1 776 3000
F +353 1 776 3300
A branch office of State Street Global Advisors Limited; authorized and regulated by the Financial Conduct Authority in the United Kingdom.

ITALY
State Street Global Advisors Ltd.
Sede Secondaria di Milano Via dei Bossi, 4
20121 Milan
T +39 02 32066 100
F +39 02 32066 155

JAPAN
State Street Global Advisors (Japan) Co. Ltd.
39F Midtown Tower
9-7-1 Akasaka, Minato-ku
Tokyo 107-6239, Japan 39
T +813 4530 7380
F +813 4530 7364

NETHERLANDS
State Street Global Advisors Netherlands Ltd.
Adam Smith Building,
Thomas Malthusstraat 1-3
1066 JR Amsterdam
T +31 (0) 20 7181701
F +31 (0) 20 7085601
A branch office of State Street Global Advisors Limited; authorized and regulated by the Financial Conduct Authority in the United Kingdom.

SINGAPORE
State Street Global Advisors Singapore Ltd.
168 Robinson Road, #33-01 Capital Tower
Singapore 068912
T +65 6826 7500
F +65 6826 7501
Company Reg. No: 200002719D

SWITZERLAND
State Street Global Advisors AG
Beethovenstrasse 19
Postfach, CH-8027 Zurich
T +41 (0)44 245 70 00
F +41 (0)44 245 70 16

UNITED ARAB EMIRATES
State Street Bank and Trust Company (Representative Office)
Boulevard Plaza
Tower I
Suite 1703, 17th Floor
Dubai, United Arab Emirates
T +971 (0)4 437 2800
F +971 (0)4 437 2818

UNITED KINGDOM
State Street Global Advisors Ltd.
20 Churchill Place
Canary Wharf, London, E14 5HJ
T 020 3395 6000
F 020 3395 6350
Authorized and regulated by the Financial Conduct Authority. Registered in England, Number 2509928; VAT No. 578591 81.

UNITED STATES
State Street Global Advisors
State Street Financial Center
One Lincoln Street
Boston, MA 02111-2900
T 617 664 7727
F 617 664 4024
Worldwide Locations

Australia
Sydney*

Belgium
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