

PULSE

VOL 5/ISSUE 1 – SPRING 2016

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STOXX Low Carbon
Indices**
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ETF Growth Strong
& Healthy**
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Performance of Equal
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Risk-Controlled
Smart-Beta Portfolios**



WELCOME TO THE SPRING 2016 EDITION OF STOXX PULSE

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MEET STOXX AT A CONFERENCE

» Apr. 19 – 20, Toronto, Canada
Rod Jones, Head of North America,
will speak at the Exchange Traded
Fund Forum organized by Radius
Financial Education.

» May 9 – 11,
Blue Mountains, Australia
Mr. Kobayashi, Portfolio Manager at MUTB,
will speak at the Fiduciary Investor
Symposium hosted by Conexus Financial.

» May 12, London, UK
Eric Zwickel, Director, STOXX Global Asset
Owners and Consultant Relations will speak
at the Low Cost Investment Strategies for
Pension Funds Conference organized by
SPS Conferences.

» May 23 – 25, Montreux, France
Eric Zwickel, Director, STOXX Global
Asset Owners and Consultant Relations
will speak at the European Pensions &
Investments summit.

» May 26, London, UK
The STOXX annual conference
“innovat:invest” will take place in London
this year. Join us to discover the latest
trends in the marketplace and find out
about the main drivers of innovation in
the industry.

» Jun. 13 – 15,
Amsterdam, Netherlands
STOXX will participate at the Inside
ETFs Conference hosted by ETF.com.
Matteo Andreetto, CEO of STOXX,
will speak at the event.

"INNOVATION HAS BEEN THE DRIVING FORCE BEHIND OUR COMPANY'S AND OUR INDUSTRY'S GROWTH."



Matteo Andreetto
CEO, STOXX Limited

Dear readers,

Welcome to a new issue of STOXX PULSE.

This is a very special moment for me as I start writing this note as the new CEO of STOXX Ltd. As I reflect on the contents of this issue, each of them covering a very specific aspect of our industry, I notice that they all have one thing in common – innovation. Innovation has been the driving force behind our company's and our industry's growth over the past years, and it certainly has been the vision and legacy of my predecessor, Dr. Hartmut Graf, which I now carry forward at STOXX – together with our employees and clients.

In this issue, we focus on the recently introduced STOXX Low Carbon index family, give an insight into the ETF industry, take a closer look at an equal-weight approach in a portfolio and explain the newly developed portable smart-beta program.

STOXX introduced the STOXX Low Carbon index family that offers a range of innovative solutions to reduce a portfolio's carbon footprint. We interviewed Susan Dreyer, Director DACH Region at CDP Europe, who explains their emission-related dataset on which the indices are based.

Susan emphasizes the investors' role in the transformation to a low-carbon economy whose commitment should be common sense after the successful outcome of the COP 21 UN Climate Conference. She sees the STOXX Low Carbon Indices as major building blocks as they "are catering to different investor needs, helping them decarbonize and benefit from the transformation, which is good for them and good for the climate!"

Next you will find an interview with Andrew McCollum, Partner and Managing Director at Greenwich Associates, the global research-based consultancy. Andrew sheds further light on their findings from their 2015 European Exchange-Traded Funds Study, published earlier this year, which demonstrated that more and more institutional investors are turning to ETFs for various tactical and strategic applications. Andrew tells us the key driving factors behind the growing adoption for ETFs and what the future holds for the industry.

Bruno Monnier and Ksenya Rulik, both quantitative specialists at Ossiam, explain the equal-weight approach by comparing an equal-weighted portfolio of European stocks, represented by the STOXX 600 Equal Weight Index, with a market cap-weighted portfolio.

Their research shows that the equal-weighted portfolio outperforms the more traditional investment approach, despite the higher rebalancing activity.

Finally, Gianluca Oderda, Head of Quantitative Investments at Ersel Asset Management SGR, explains the "portable smart-beta" program they developed by focusing on the isolation of a combination of alternative risk premia from a set of four STOXX smart-beta indices. This is an innovative upgrade on "portable alpha" programs. By using smart-beta indices where performance comes from exposure to alternative risk factors, the approach offers inherent advantages of transparency, liquidity and cost.

I hope you enjoy this issue and would also encourage you to visit stoxx.com/pulseonline for more timely updates. For comments and/or suggestions, please contact pulse@stoxx.com.

Regards,

Matteo Andreetto

PULSE ONLINE

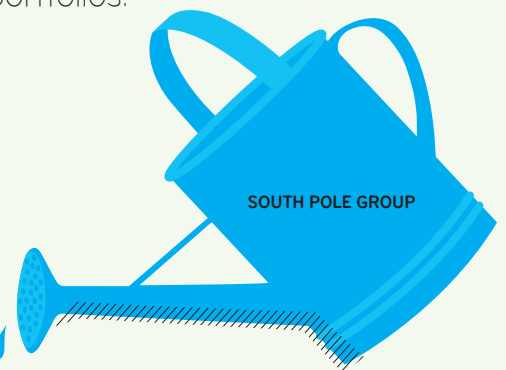
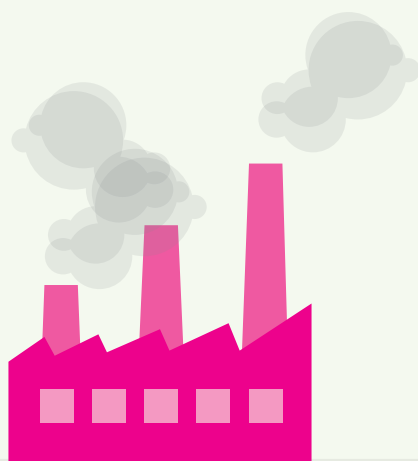
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Susan Dreyer
Director DACH Region,
CDP Europe

>> GOING GREEN WITH STOXX LOW CARBON INDICES

STOXX Ltd. introduced the STOXX® Low Carbon index family in February to help investors limit climate change risks in their portfolios.



"WE PARTNERED WITH CDP AND SOUTH POLE GROUP TO USE THEIR EMISSION-RELATED DATASET."

For the development of the STOXX Low Carbon index family, we partnered with the non-profit organization CDP (former Carbon Disclosure Project) and South Pole Group to use their emission-related datasets as a high-quality source. We talked to Susan Dreyer, Director DACH Region at CDP Europe, about the power of measurement and information disclosure, the investors' role in addressing climate change and the effectiveness of our new indices.

The index family provides various strategies from reweighting broad benchmark and blue-chip indices such as EURO STOXX 50® and STOXX® Europe 600 by overweighting low-emitters and tilting away from high-emitters, all the way to options to divest from high carbon emitting companies. The approaches applied in the STOXX Low Carbon index family allow reduction of the carbon footprint without changing the overall risk and return profile.

1. CDP holds the largest collection globally of climate-related data and provides ratings on a company level. At what kind of data are you looking in the process from reporting to rating?

The CDP reporting framework is designed as a strategy-guidebook to companies, showing them step by step how to understand and manage their

climate change risks and opportunities and the responsibility that comes with it. We start by looking at the management level, what processes are set up, are monetary rewards or other incentives in place etc. We then expect detailed assessments of the anticipated risks and opportunities, including their time horizons and financial implications. Investors are particularly interested in this part and we have also learned of the transformational power these two question parts impose. From there, companies report on the action they take, which includes emission reduction activities but also targets, whether absolute or relative. And of course finally we and our audience want to know the effect of all this work, meaning the actual emission figures, divided into direct emissions, emissions from energy consumption, and emissions across the entire value chain, and then looked at relative to revenue and over the years. This way we can each year come close to a fair judgement whether a company does not only do its best but all that it is within its influence reach to combat climate change.



"CDP DATA ENABLES INVESTORS TO ANALYZE THE ENVIRONMENTAL RISKS AND FINANCIAL OPPORTUNITIES."

2. Over 800 investors, who represent more than a third of the world's invested capital, use the research of CDP. How does CDP's dataset help investors to make better investment decisions?

CDP data enables investors to analyze the environmental risks and financial opportunities across their portfolios, which was also shown to generate sustainable and often superior shareholder returns. This also equips them to engage their investment portfolio companies on natural capital use and help protect their assets against the risk of future regulation in these areas, and alert company management to the risks from these. And it all comes from ranking, scoring and comparing companies – identifying leaders and laggards among potential investments leveraging CDP's awarded and fully transparent scoring methodology which is published every year and works for 5,500 companies worldwide alike. We are extremely happy that through the STOXX index partnership we can now add substantial index coverage for investor benchmarks, some of which are not only innovative but the first ever of its kind.

3. How imperative is it for investors to mitigate carbon risk exposure in their portfolios?

The good news is: it is not only an imperative, it is becoming common sense after the successful Paris COP 21 negotiations, maybe even a legal obligation, and most of all: it is a huge opportunity! The transition of the world to low-carbon, or even zero-carbon, has been signed by 194 states, the biggest ever agreement, and will now be implemented regulatory and pursued. This transition will cause major transformations of business models, and identifying the leaders and laggards will create investment chances. And so it becomes clearer and clearer, speaking with the heart of the non-governmental organization, that doing good for the planet is actually doing good for yourself, and your clients.



“IT IS CRUCIAL TO LOOK AT SCOPE 3 NOW, MEASURE IT, MANAGE IT, AND ULTIMATELY REDUCE IT!”

4. Over the past year, a growing number of large asset owners globally have announced that they invest in low-carbon solutions to reduce their portfolio's carbon footprint, or intend to do. Can you give us more insight into the asset owners' attitude to low-carbon investing?

For asset owners in particular this topic is a question of fiduciary duties. Take pension funds, who are really in for the long-term. If you want to ensure your investments are sustainable in the long run, the sustainability of our economy and of the world we live in should be a natural concern for you. You cannot manage somebody's money for his retirement, but in the meantime until he retires ruin the world through the investment choices with this person's money.

That is why asset owners are leading the way in the decarbonization movement, and it is good that they do that. Because they also have the power to push asset managers along this path. Asset owners are also very active in engaging with companies beyond divestment, which is an important transformational angle.

5. How effective do you think the STOXX Low Carbon Indices will be in the process of the transition to a low-carbon economy?

The STOXX Low Carbon Indices are a major building block in that process. What we really like about them is they not only allow and encourage investment flows into companies with lower emission intensities within their sector or universe, but also track universes of companies who report through CDP. The latter ensures that companies follow the acknowledged CDP reporting framework and as such strategy path, which then ensures the company's climate change strategy can mature, and the investor gets the data in a decent, reliable and comparable format. This is unique among indices. It is particularly exciting to see one of the world's market leaders who owns famous indices like the EURO STOXX 50 or markets the DAX doing that. STOXX combined CDP and South Pole Group data into a comprehensive family of Low Carbon indices, catering for different investor needs, helping them decarbonize and benefit from the transformation, which is good for them and good for the climate!

6. Our STOXX® Global Climate Change Leaders Index is based on CDP's Global Climate A list, including companies that have been identified as leading in their actions to mitigate climate change. Additionally to direct and indirect emissions, the A list also tracks emissions related to a company's supply chain. Why is it so important to also look at the so-called Scope 3 data when considering climate risk?

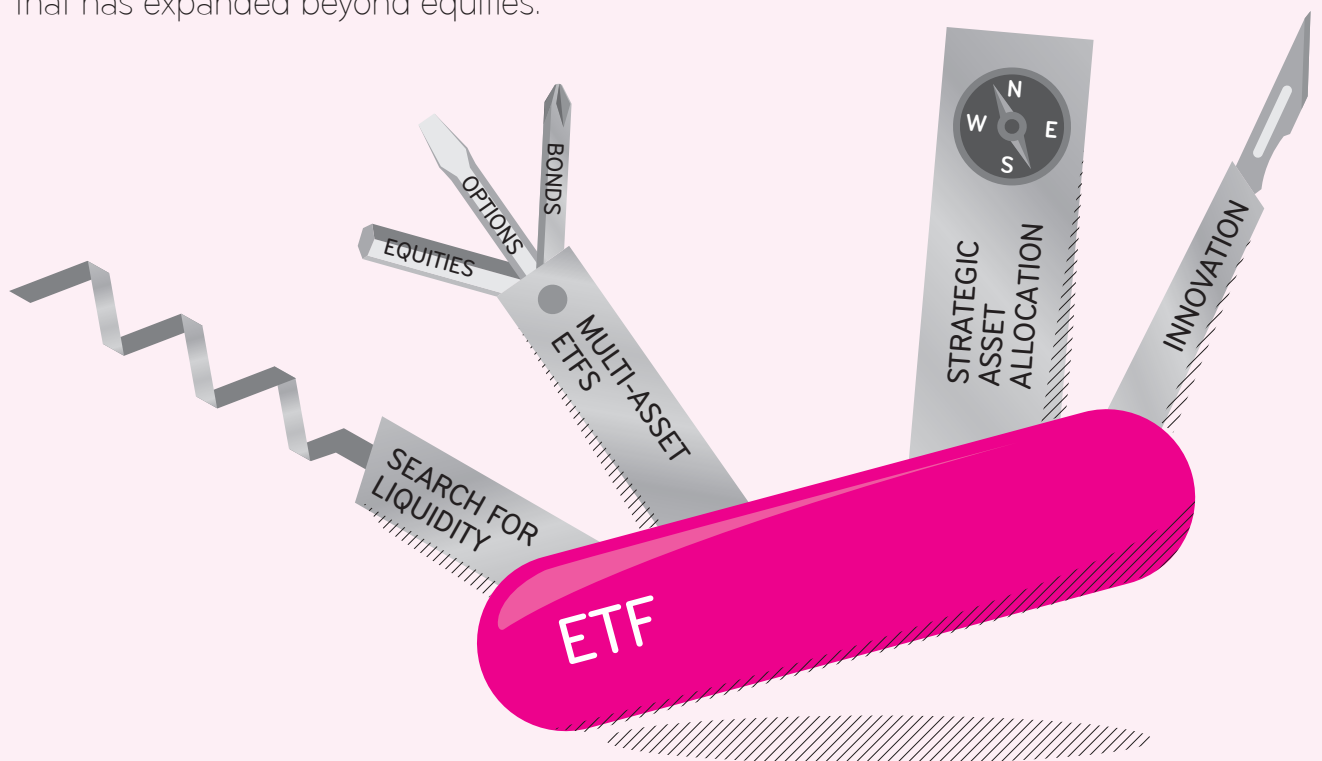
This question rounds up everything and is of the utmost importance. Value chain emissions, in particular emissions from the supply chain and through the usage phase of products, can account for up to three times, in some sectors even eight times the direct emissions a company produces. So not including and managing the supply chain would leave out a significant part of a company's responsibility and influence. It would, for instance, allow companies to simply outsource high-emitting processes. But climate change is a global problem, one ton emitted in China does the same damage as one ton emitted in Europe. So we can only solve it, and we can only successfully decarbonize, if the value chain is part of the management. A lack of data from suppliers diminishes corporate efforts to be accountable for supply chain emissions and to reduce them, presenting companies with significant potential cost increases in later stages. So it is crucial to look at Scope 3 now, measure it, manage it, and ultimately reduce it! Companies awarded the best-possible CDP Climate Score A and thus tracked in the STOXX Global Climate Change Leaders Index are showcasing how this can be done. <<



Andrew McCollum
Partner & Managing Director
of Investment Management,
Greenwich Associates

» STATE OF THE UNION – ETF GROWTH STRONG & HEALTHY

More institutional investors and money managers are turning to ETFs, finding an increasing menu of options that has expanded beyond equities.



"ALLOCATIONS TO ETFs AMONG USERS OF ETFs GREW FROM 7.2% TO 9.3% IN ONE YEAR."

Andrew, your study highlights the immense diversity in the use of ETFs by institutions across the board – from core portfolio allocations to tactical concerns. What are the main uses by which type of institutional investors?

Currently, European institutions use ETFs in their portfolio for both tactical and strategic purposes. The most common application of ETFs is for tactical adjustments, for example, to gain quick exposure to a market or category. Insurance companies were the most likely to mention using ETFs in this way. But, increasingly, European institutions are using ETFs for more strategic purposes, like getting international diversification in their portfolio or even as a long-term core holding. Pension funds and insurance companies are the investor types currently most likely to use ETFs for these longer-term more strategic purposes. Interestingly, their US counterparts are leading the way for ETF usage in core investment exposures – which we think will be gaining momentum also in Europe and will further drive the growth of this investment vehicle in future. For example, amongst our survey responders, there were pension funds representatives who said that they chose ETFs as at times their active managers had difficulty beating their benchmarks and they found in ETFs a considerably less expensive alternative. For others, it started out as a tactical tool to temporarily hold cash and over time evolve into permanent holdings.

You mention in the study that institutional investors "are becoming more careful and discerning in their selections of ETFs" and that the fact that the ETF "matches with exposure needs" is becoming an increasingly important criteria when selecting an ETF. Now that investors are less concerned with the fund structure and implied risks than they were a few years ago, are they viewing the choice of the index and index provider as equally important to the choice of the fund provider?

We were somewhat surprised to find out that from 2014 to 2015, the number of citations increased significantly for many of the selection factors tested. In 2014, no single selection criterion was cited as important by as many as 70% of the institutions in the study. In 2015, no fewer than four factors received that level of mention: alignment with the institutions' exposure needs; liquidity/trading volume; expense ratio; and performance of the funds (including tracking error). But also indeed the underlying benchmark and its provider were identified as key factors by over a third (36%) of respondents. These have remained important selection criteria, as investors need to understand the index that is being tracked and have strong preferences about index providers.

We spoke with Andrew McCollum, Partner & Managing Director of Investment Management at Greenwich Associates and the author of a recent study from Greenwich Associates¹. The study highlights the growing adoption of exchange-traded funds (ETFs) among institutional investors – a trend that was already visible in 2014 and continued its pace also in 2015. According to the annual poll of 123 European pension funds, asset managers and insurers, allocations to ETFs among users of ETFs grew from 7.2% to 9.3% in one year.

1. Greenwich Associates 2015 European Exchange-Traded Funds Study – ETFs in the European Institutional Channel: 5 Key Trends

“INVESTORS HAVE STRONG PREFERENCES ABOUT INDEX PROVIDERS.”



Do asset owners tend to use ETFs in a different way and in a different extend compared to asset managers?

Asset managers have been earlier adopters of ETFs, whereas asset owners have used ETFs in a more tactical way but this is changing; they are now looking more at a longer investment horizon and core applications vs. satellite exposures. In fact, in our research, asset owners now have longer holding periods than asset managers, which is evidence of the more strategic use of ETFs. Less than one-third of asset owners told us that their average holding period is less than a year, compared to about 60% of asset managers.

Do asset owners tend to use different types of funds compared to asset managers (i.e. benchmark versus smart or more precise exposures)?

Over 20% of institutional ETF users in the study are now investing in non-market-cap-weighted/smart-beta ETFs. These funds allow institutions to overlay a set of strategies in one investment with easy access and without incurring additional costs.

Among asset managers currently investing in ETFs, that share approaches 30%. Although asset managers currently use these products more frequently than asset owners, we believe asset owners will catch up quickly. Not only are leading providers marketing these products aggressively, but also non-market-cap-weighted products can provide more efficient exposure to equity risk premium, improve returns and reduce risk.

Do you see differences in terms of type of ETFs being used and the way they are used depending on size of pensions funds?

The larger, more sophisticated pensions are leading the charge to use ETFs in more strategic ways. They tend to have more resources, deeper investment backgrounds, and generally show greater willingness to innovate. But, given the ease of using ETFs, we see pensions of all sizes implementing them in portfolios.

Has this also to do with the cost of ETFs compared to institutional passive funds or segregated mandates?

The flexibility and liquidity of ETFs comes at a cost. Fees are indeed typically cited as one of the hesitations for using ETFs. But, the cost relative to institutional passive funds or mandates very much depends upon the product used. The more liquid, highly-traded ETFs are very competitively priced. And, while fees are always a consideration, institutions are generally willing to pay for products that help them to accomplish their objectives.

Asset allocation implemented through ETFs is more common in the US, according to your study, with 68% of ETFs used as strategic investments. What is the reason behind this, especially considering that Europe was the early adopter of ETFs?

ETFs are an experiential good, meaning the shift from using ETFs for tactical purposes to using them for strategic purposes usually occurs with experience. At this point, US and Canadian users of ETFs have larger proportions of their portfolios allocated to ETFs than European users do. US ETF institutional investors currently allocate almost 20% of their assets to ETFs versus only 9% in Europe.

"INVESTORS ARE INCREASINGLY USING ETFs FOR MORE SOPHISTICATED AND STRATEGIC APPLICATIONS."

What would be the reason of European institutions using ETFs only for tactical reasons, despite the fact that this market should have matured by now after being an early adopter?

Each market has its own idiosyncrasies and trends and while not all trends migrate at the same pace – or even at all – the data we have collected in Europe about ETF utilization implies that usage will increase, though it's too early to tell whether it will reach the same levels that we see in North America.

You mention "25% of asset managers in the study are likely or very likely to offer strategies made only or predominately with ETFs", implementing their view on asset allocation and benefiting from the flexibility, granularity and cost effectiveness of ETFs. Could we see similar strategies be implemented by pension funds?

It's possible that sophisticated pensions managing assets internally could create their own ETF strategies. But, where we have seen the greatest interest in ETF-only strategies is in the multi-asset space. Multi-asset as a category is well-established in Europe, but is beginning to gain traction in the US as well. And, for the reasons you mention – flexibility, cost efficiency, liquidity, ETFs are an effective tool for these products.

Your study points out to the increasing availability of innovative/smart-beta ETFs: in particular min-vol, single-factor and multi-factor ETFs. In your view, what makes these the most favored ones in the current market?

Investors are increasingly using ETFs for more sophisticated and strategic applications. By far the most common of these funds are minimum-volatility ETFs, which are used by 86% of investors in non-market-cap-weighted/smart-beta ETFs. Half of these institutions use equal-weighted ETFs, 43% use multi-factor ETFs and 36% invest in single-factor funds. Minimum-volatility funds are the most widely used in this category, followed by equal-weighted, multi- and single-factor funds. In my view, the reason for this is, the current volatility in the market. Market volatility over the past few years has caused a great deal of angst among institutional investors and min-vol products can be a helpful solution.

Which type of smart beta(s) would you expect to gain more ground in future?

Overall, almost 57% of current users of non-market-cap-weighted/smart-beta ETFs plan to increase allocations to these funds in the next 12 months, with 50% of those expecting to boost allocations by 10% or more. Other new ETF types are also gaining a toehold among European institutions. Approximately 16% of institutions in the study invest in currency-hedged ETFs, which they are using primarily in long-term risk management strategies, and also to hedge short-term exposures and to generate short-term tactical returns. In the U.S., usage of currency hedged ETFs has climbed to 30% of institutions, and we expect these funds to gain popularity among European institutions in coming years, given the ongoing shifts in currency markets.

The markets are faster-moving, more complex, and more volatile than ever before. It's a challenging environment for institutional investors. They have a variety of issues for which they are seeking challenges, including market volatility, funding issues, currency shifts, liquidity, and many more. Increasingly, we are seeing European institutions, and their counterparts around the world, looking towards ETFs to help them solve these challenges. Given that the market environment will probably only get more complicated, we wouldn't expect the growth of ETF usage in the institutional market to slow any time soon. <<





Bruno Monnier, CFA
Quantitative Analyst,
Ossiam



Ksenya Rulik Ph.D., CFA
Head of Quantitative
Research, Ossiam

» BEHIND THE PERFORMANCE OF EQUAL WEIGHT INDICES

The equal-weight approach, giving the same weight to all stocks in an index universe, has been the first successful innovation in alternative equity indexing – known as smart-beta.

1. Source: Bloomberg, Estimation is based on equity ETF with equal-weighted weighting scheme listed in Europe, US and Japan.

2. See for example "10 years later where in the world is equal weight indexing now?", Liyu Zeng, Frank Luo (S&P Research), April 2013; "Equal Weight ETFs" by Anthony Davidow (RydexShares), January 2011; and "Optimal Versus Naïve Diversification: How Inefficient is the 1/N Portfolio?" by Victor DeMiguel, Lorenzo Garlappi and Raman Uppal, Review of Financial Studies, vol. 22, 2009.

3. Underlying data is courtesy of STOXX. The STOXX indices are the intellectual property (including registered trademarks) of STOXX Limited, Zurich, Switzerland and/or its licensors ("Licensors"), which is used under license. None of the products based on those Indices are sponsored, endorsed, sold or promoted by STOXX and its Licensors and neither of the Licensors shall have any liability with respect thereto.

Boosted by the expansion of exchange-traded funds (ETFs), a vehicle that helped to spread and popularize the equal-weight concept, this approach already totaled more than 52.3 billion US dollars in assets under management (AUM) as of Dec. 31, 2015 in ETF wrappers¹.

Research demonstrated that equal-weighted portfolios historically achieved positive and significant excess performance against market cap benchmarks². The outperformance

is attributed mainly to overweighting small stocks compared to a market-cap-weighted portfolio (the small-cap effect), and to a contrarian-like effect due to rebalancing to equal weights. The main concern about this approach is the turnover associated with the rebalancing activity.

We focus here on an equal-weighted portfolio of European stocks, represented by the STOXX® Europe 600 Equal Weight Index over the period from Dec. 31, 2002 to Dec. 31, 2015³.

"EQUAL-WEIGHTED PORTFOLIOS HISTORICALLY ACHIEVED POSITIVE AND SIGNIFICANT EXCESS PERFORMANCE."

That simple? An equal-weighted allocation?

The equal-weight approach, contrary to widespread belief, is not information free: it involves the choice of an index universe, which in itself is a major decision. Relying on constituents of a broad market index results in a basket that:

- is representative of the chosen equity market;
- is subject to strict governance practices of the underlying benchmark index; and
- satisfies reasonable liquidity criteria.

An equal-weighted index allocates the same weight to all its constituents, and is rebalanced periodically (usually quarterly) to restore the equal allocation. Notwithstanding an alternative allocation scheme and periodic rebalancing, the return profile of the equal-weighted index is quite close to that of the market-cap-weighted benchmark. Similar risk profiles and a high level of correlation observed between the two indices reflect the fact that the market factor is the dominant one for both.



"THE BIGGEST CONTRIBUTION TO EXCESS RETURN COMES FROM ALTERING THE GLOBAL SIZE EXPOSURE."

To appreciate the value added by the equal-weight approach, the focus must be placed on excess return – the difference of the returns of the equal-weighted and market-cap-weighted index, shown in Table 1.

Average annual excess return since 2003 (calculated on simulated performance from December 2002 to October 2010 and live index performance afterwards) was 3.6% with a standard deviation of 4.3%. Since the launch of the STOXX® Europe 600 Equal Weight Index, it has outperformed the market-cap-weighted benchmark STOXX Europe 600 three out of five years. In this article we will shed light on the drivers of this excess return.

Effect of size neutrality: One weight fits all?

Size exposure is by far the greatest difference between the market-cap-weighted and equal-weighted portfolio. If we rank the STOXX® Europe 600 universe by market cap and divide it into three terciles (large 200, mid 200 and small 200), in the equal-weighted portfolio the weight of the large tercile will be more than halved, the weight of the mid tercile will be doubled and finally the weight of the small tercile will be multiplied by 6, relative to the market-cap-weighted portfolio.

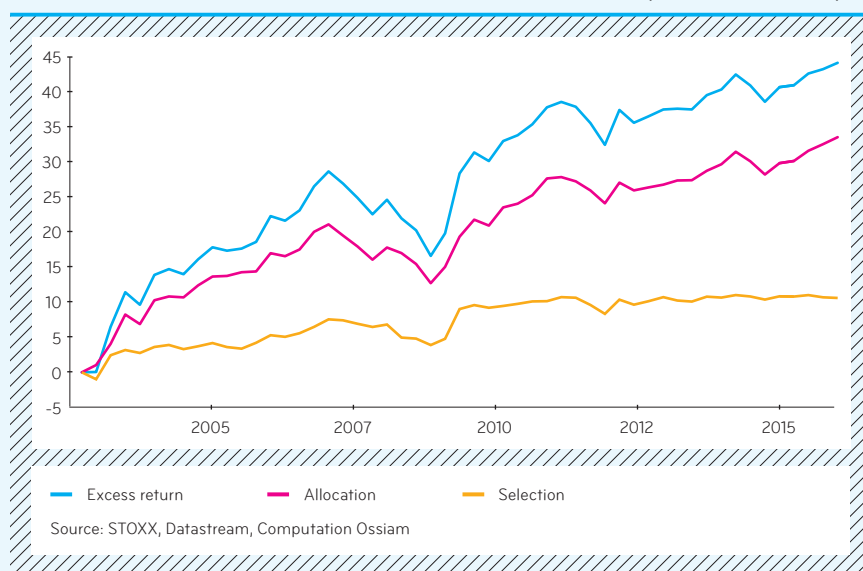
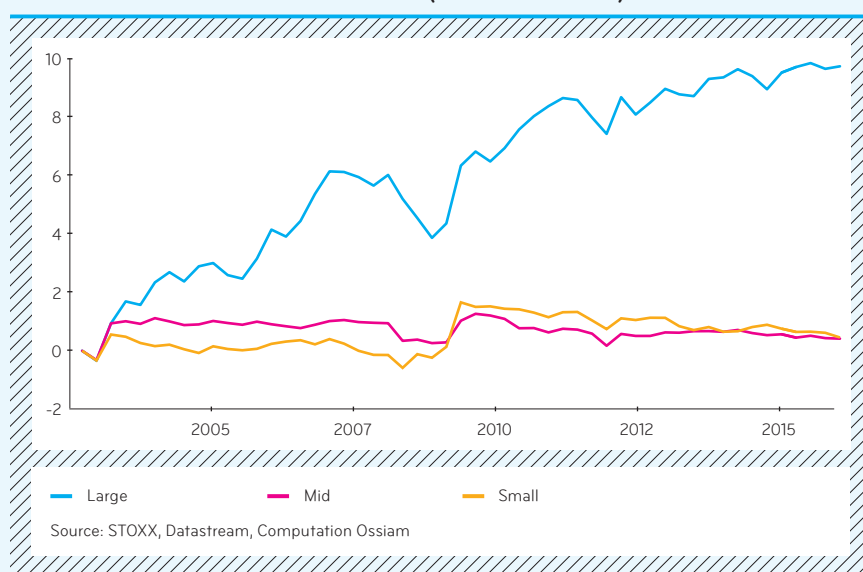
This has an obvious effect on the excess return of the STOXX Europe 600 Equal Weight Index, as over the past decade market-cap-weighted small and mid size sub-portfolios show much stronger performance during bull markets than the large sub-portfolio.

4. Cumulative excess return by quarter, this generates discrepancies with compounded performance figures such as those of Table 1.

TABLE 1: EXCESS RETURN OVER THE PERIOD, IN % (PERIOD 2003-2015)

Index Performance (%)	2003-2010	2011	2012	2013	2014	2015	Total	Std
STOXX Europe 600 Equal Weight	123.0	-14.3	23.6	23.8	7.2	13.5	255.9	19.3
STOXX Europe 600	69.3	-8.6	18.2	20.8	7.2	9.6	159.6	18.9
Excess Return	53.7	-5.7	5.4	3.1	0.0	3.9	96.3	4.3

Source: STOXX, Datastream, Computation Ossiam

FIGURE 1: SIZE AND SELECTION EXCESS RETURN CONTRIBUTION* (PERIOD 2003-2015)**FIGURE 2: SELECTION EFFECT PER TERCILE (PERIOD 2003-2015)**

The total size effect of the equal-weighted portfolio can be better understood in the allocation/selection framework, similar to that of the sector decomposition commonly used in the industry:

- Size allocation: over/under-weighting of different size terciles within the equal-weighted and market-cap-weighted portfolio,
- Size selection: implementing equal weighting inside each size tercile.

We find that for the STOXX Europe 600 Equal Weight Index the major part of the excess performance over the market-cap-weighted index is related to the size allocation effect (Figure 1), driven by the excess performance of mid and small stocks over the large stocks. The selection effect, while significantly positive, accounts for less than a quarter of the total excess performance. On average, the selection effect amounts to 20 basis points per quarter while the allocation effect amounts to 65 basis points.

Interestingly, the size-neutral allocation gives very different results across the three size terciles (Figure 2).

Only the large size portfolio really benefits from the equal-weight allocation. On the contrary, the mid and small size portfolios have essentially flat contribution, apart from the effect of the sharp rebound of the smallest stocks in 2009. This shows that equal-weight allocation can be a useful tool to address asymmetries present in the market-cap-weights, such as the “mega-cap” bias in the large size tercile.

Effect of rebalancing: is it all about being contrarian?

Equal weighting cannot remain passive, since price movements imply an allocation drift. Index components that performed better than the average over a period end up having higher weights in the equal-weighted index; components that underperformed the average turn underweight with respect to the initial equal allocation. Consequently, to restore the equal-weighted allocation, one has to periodically reduce the investment in relative overperformers and increase positions in relative underperformers. Though it may seem a pure maintenance operation, there are claims that it represents one of the performance drivers of the strategy, by benefiting from buying low and selling high⁵. However, this argument was challenged in subsequent research that showed the absence of the rebalancing bonus in Europe⁶.

Figure 3 depicts the total excess quarterly return as well as cumulated gains and losses associated with rebalancing activity over a 13-year period for the equal-weighted European portfolio (rebalancing bonus is measured according to the approach in Rulik⁶).

**FIGURE 3: EXCESS PERFORMANCE:
CONTRIBUTION OF PERIODIC REBALANCING (PERIOD 2003-2015)**

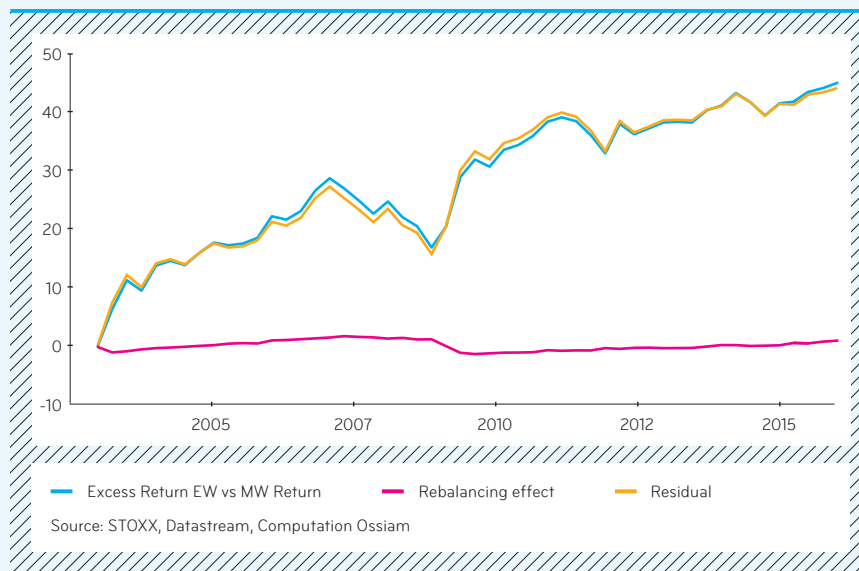


TABLE 2: TWO-WAY TURNOVER DECOMPOSITION (PERIOD 2003-2015)

Turnover (%)	Rebalancing Contribution	Universe Change	Total
Equal-weighted	38.4	14.9	53.2
Market cap-weighted	0.0	4.0	4.0

Source: STOXX, Datastream, Computation Ossiam

"THOUGH EXTREMELY SIMPLE IN CONCEPT, THE EQUAL-WEIGHT ALTERNATIVE RAISES MANY NON-TRIVIAL QUESTIONS."

We find that the rebalancing part is negligible compared to the total excess return and gives no significant positive contribution over the period (the average was 1.7 basis points per quarter, while the excess return of the equal-weighted portfolio was 85 basis points). We conclude that for the European portfolio the rebalancing contribution cannot be deemed a source of outperformance. This adjustment though is essential to the design of the equal-weighted portfolio, as it keeps the portfolio close to the target weights.

What is the impact of portfolio turnover?

Implementing an equal-weight strategy raises some concerns. The most obvious drawback is a higher rebalancing cost than for a market-cap-weighted passive investment. There are two main sources of turnover.

The first one, specific to the equal-weight strategy, arises when stocks already present in the portfolio are rebalanced to the target weights. This kind of turnover is absent in a portfolio that tracks a market-cap-weighted index.

Another source of turnover is linked to changes in the index universe. These changes could be quite frequent in a large basket: stocks previously meeting the inclusion criteria fail to do so upon the current review and are replaced accordingly by the runners-up. Such a turnover

is inherent to both market-cap-weighted and equal-weighted indices, although not to the same extent. The main criteria for inclusion being size, universe revisions affect mostly smaller capitalization stocks. Given that a market-cap-weighted index has tiny weights allocated to the smallest stocks, the stock replacement turnover will be greater for an equal-weighted portfolio that allocates more weight to small stocks. Swapping one small stock for another would generate a turnover of roughly 0.05% for a market-cap-weighted portfolio compared to 0.3% for an equal-weighted portfolio, on the index universe under study. Changes in the index universe represent thus a non-negligible portion of the overall transaction cost. The historical split of annual turnover into the two factors for the STOXX Europe 600 Equal Weight Index is given in Table 2.

The turnover is clearly dominated by the weight-resetting factor, accounting for 72% of the total turnover. Index universe changes result in a turnover of 4% per year for the passive market-cap-weighted portfolio, and an almost four times larger turnover for the equal-weighted portfolio. Still, in absolute terms the total impact of rebalancing cost on the performance is rather small. Assuming a transaction fee of 5 basis points, the transaction cost drag for the STOXX Europe 600 Equal Weight Index would be less than 3 basis points per year.

Conclusion

Though extremely simple in concept, the equal-weight alternative raises many non-trivial questions. The necessary periodic portfolio adjustments come at the cost of higher portfolio turnover. However this rebalancing generates no significant performance drag and the corresponding costs for a broad European equal-weight portfolio can be approximated on average as 3 basis points per year during the past 13 years.

Contrary to the intuitive "buy high, sell low" argument, we showed that there was no guaranteed contribution from the contrarian rebalancing. The total effect of the "rebalancing payoff" for the STOXX 600 Europe Equal Weight Index was slightly positive over the past 13 years.

The major driver of outperformance of an equal-weighted portfolio is the size effect. The biggest contribution to excess return comes from altering the global size exposure (overweighting mid and small stocks), while a smaller but significant part also comes from imposing equal-weight allocation inside each size segment. In particular, the equal-weight scheme works well in the large size sub-portfolio, thus evidencing the benefit of correcting the mega-cap bias. <<

5. Plyakha, Yuliya and Uppal, Raman and Vilkov, Grigory, "Equal or Value Weighting? Implications for Asset-Pricing Tests", 2013.

6. Ksenya Rulik, "Can The Rebalancing Bonus Enhance Beta Return?" Journal of Indexes, November/December 2013.



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» STOXX INDEX-BASED RISK-CONTROLLED SMART-BETA PORTFOLIOS¹

Smart-beta indices share the characteristics of allocating weighting to constituents – not on the basis of market capitalization, but on the basis of other criteria, which can be related to risk, to fundamentals or simply to numbers of constituents.

These indices have become increasingly popular over the last few years, since it has been noticed that in the long term they all seem to have the potential to outperform their market-capitalization-weighted counterparts.

At Ersel Asset Management, we have been focusing since 2013 on the isolation of a combination of alternative risk premiums from a set

1. A longer version of this article, with all the methodological explanations, is available on STOXX website at the address: <https://www.stoxx.com/stoxx-insights-details?articleId=334757200>

2. For a derivation of the four elementary smart-beta index "seeds" we refer to the academic paper by Oderda, G., "Stochastic portfolio theory optimization and the origin of rule-based investing," *Quantitative Finance*-2015, 15:8, pp. 1259-1266

“WE HAVE BEEN FOCUSING SINCE 2013 ON THE ISOLATION OF A COMBINATION OF ALTERNATIVE RISK PREMIUMS.”

On the long side of the strategy, we buy a selection of long-only smart-beta indices provided by STOXX, trying to extract their long-term value added relative to the relevant market-cap-weighted benchmarks. On the short side of the strategy, we sell liquid index futures.

of four elementary smart-beta index “seeds”². We have been developing a “portable smart-beta” program (later referred to as PSB) in analogy to a “portable alpha” program, where the objective is to extract skill (“alpha” in finance community jargon) from a long portfolio of actively managed investment strategies.

If portable performance from smart-beta indices undoubtedly comes from exposure to alternative risk factors and not from investment skill (or alpha), it is well known that in many cases what is sold as “portable alpha” at very high management fees is in reality (at least partly) a collection of risk premia coming from alternative risk factor exposure.



“TO KEEP RISK UNDER CONTROL, WE PROPOSE USING THE VOLATILITY TARGETING TECHNIQUE.”

FIGURE 1: ANNUALIZED EX-ANTE VOLATILITY OF THE PSB STRATEGY BUILT ON THE STOXX EUROPE 600 MINIMUM VARIANCE INDEX (EUR, NET RETURNS, SEPTEMBER, 2002-NOVEMBER, 2015)

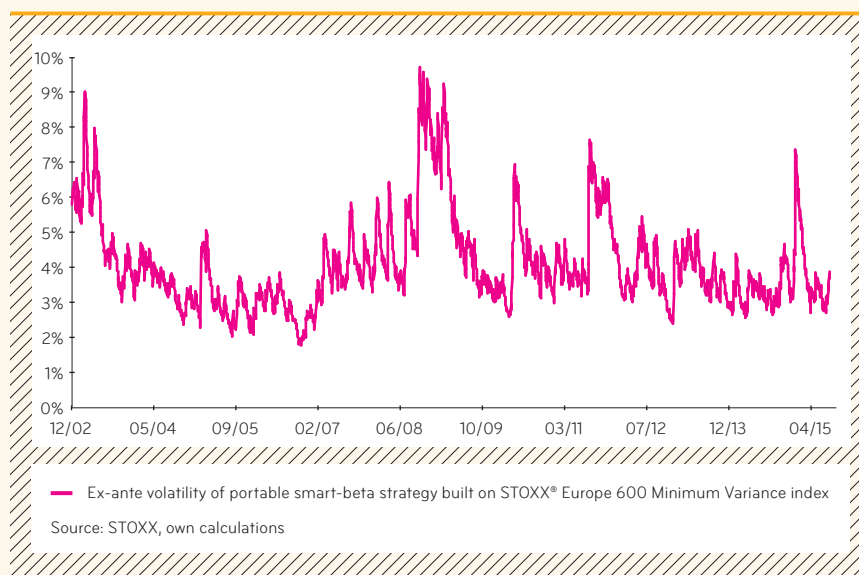
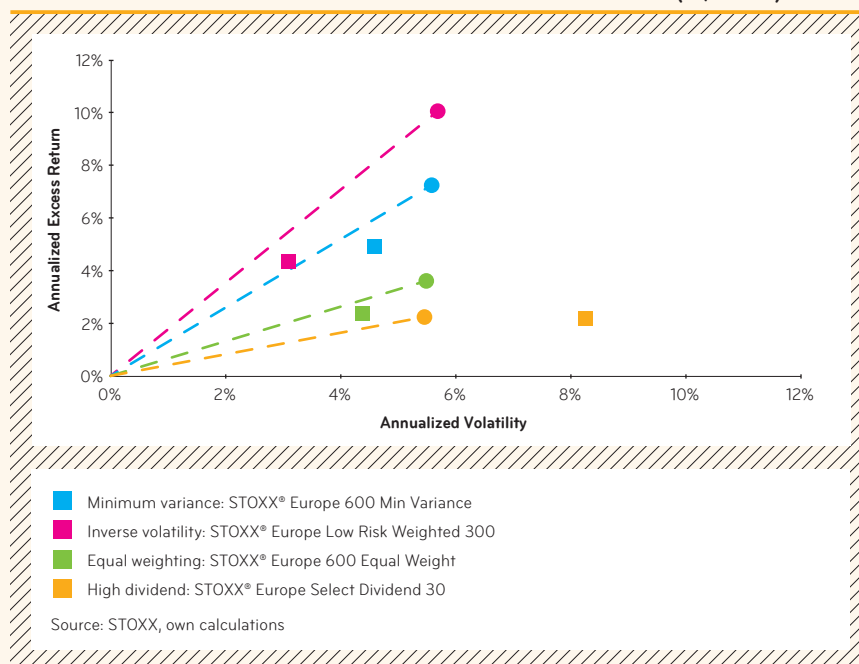


FIGURE 2: EFFICIENCY INCREASE FOR RISK-CONTROLLED PSB STRATEGIES (CIRCLES) WITH RESPECT TO THE CORRESPONDING BETA-HEDGED STRATEGIES (SQUARES)



Compared to a portable alpha program, we believe a PSB strategy offers advantages in terms of transparency, liquidity and cost. The portfolio positions of an actively managed product are disclosed only with delay and at limited frequency (e.g., once a month), whereas the composition of a smart-beta index is immediately available.

While fees of actively managed products tend to be quite high, the cost to get exposure to smart-beta indices are very low, particularly when the investment is done in an unfunded form by means of total-return swaps.

Finally, concerning liquidity, whereas there might be issues with the management of flows in a portable alpha program, smart-beta strategies should benefit from greater liquidity, considering the numerous smart-beta index tracking products which have appeared in the market.

Here we analyze the properties of a simple PSB strategy defined on the European equity market. We proxy the four elementary smart-beta "seeds" by means of the following STOXX indices (we use net returns in EUR): STOXX® Europe 600 Minimum Variance Index (data from July, 2002), STOXX® Europe Low Risk Weighted 300 Index (data from March, 2001), STOXX® Europe 600 Equal Weight Index (data from January, 2001) and STOXX® Europe Select Dividend 30 Index (data from December, 1998).

To build a proper PSB strategy, we believe that three elements really matter:

- The use of a risk-control technique known as volatility targeting.
- A simple trend-following timing rule which allows significant reduction of strategy drawdowns (resulting from non-remunerated risk factor exposures) and improved efficiency.
- Finally, theory predicts that the aggregation into a portfolio of risk-controlled PSB strategies based on different methodologies leads to a dramatic increase in efficiency.

1. PSB strategies: risk control on top of simple beta hedging

The standard technique to extract performance from a long-only smart-beta index is beta hedging, which is designed to achieve the minimum possible variance in a portable performance long/short strategy. Unfortunately, if the correlation

between the smart-beta index and the cap-weighted benchmark breaks down, the variance of the portable performance strategy can dramatically increase. This is what we observe in Figure 1, where we plot the volatility of the PSB strategy built on the STOXX Europe 600 Minimum Variance Index, calculated over a daily data sample using exponentially weighted returns based on the Risk Metrics optimal decay factor.

To keep risk under control, we propose using the volatility targeting technique, which is designed to decrease strategy weighting when volatility increases (and vice versa).

Academic research³ shows that in the long run, irrespective of the underlying strategy and irrespective of the probability distribution of volatility, the risk-controlled version of a PSB strategy should improve its efficiency. The improvement of the expected Sharpe ratio is driven by the volatility of volatility, which plays the role of an "opportunity parameter." The more volatile the volatility of a PSB strategy is, the higher the expected Sharpe ratio improvement of its risk-controlled version would be.

In Figure 2 we graphically show the efficiency improvement obtained when we pass from the simple beta-hedged version of each PSB strategy to the corresponding risk-controlled version. Each strategy has been evaluated on its full history.

3. See for example Giese, G., "Optimal Design of Risk-Controlled Investment Strategies," available at SSRN: <http://ssrn.com/abstract=1893364> or <http://dx.doi.org/10.2139/ssrn.1893364>.



"PASSIVE EXPOSURE TO ANY INDIVIDUAL RISK-CONTROLLED PSB STRATEGY MIGHT IMPLY CONSIDERABLE DRAWDOWNS."

2. Timing risk-controlled PSB strategies

Without a surprise, passive exposure to any individual risk-controlled PSB strategy might imply considerable drawdowns, since we know that the performance is the result of exposure to alternative risk factors.

It would therefore be preferable to time the individual exposures. One way of doing this is to build a fundamental timing model, capable of predicting the performance of alternative risk factors, once the mapping of each PSB strategy on the different factors has been defined.

The problem with this approach is twofold. First, and perhaps most importantly, the predictive power of fundamental timing models is limited. Secondly, the mapping of a given PSB strategy on alternative risk factors is not very stable.

A much simpler approach might be a trend-following model acting on the price time series of each passive risk-controlled PSB strategy, whose purpose is mainly to cut exposure when prolonged drawdown periods are experienced by the passive strategies.

Figure 3 shows the change in the return-versus-risk trade-off when we move from passive risk-controlled PSB strategies to their timed versions, based on a simple trend-following algorithm (with the strategies evaluated on their full history). We observe that strategy volatility is lowered in all cases, along with an efficiency improvement, particularly for the PSB strategies built on equally weighted and high-dividend indices.

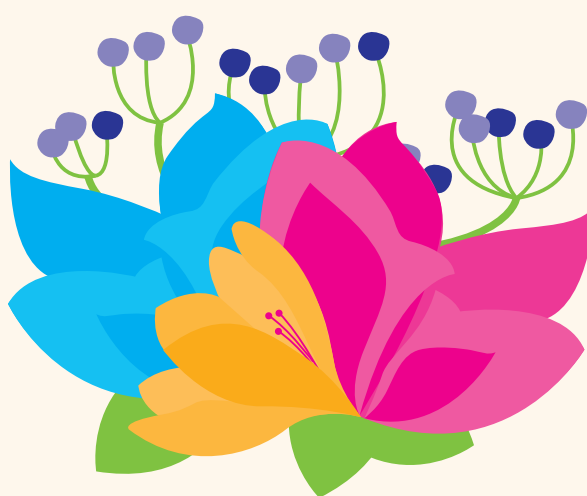
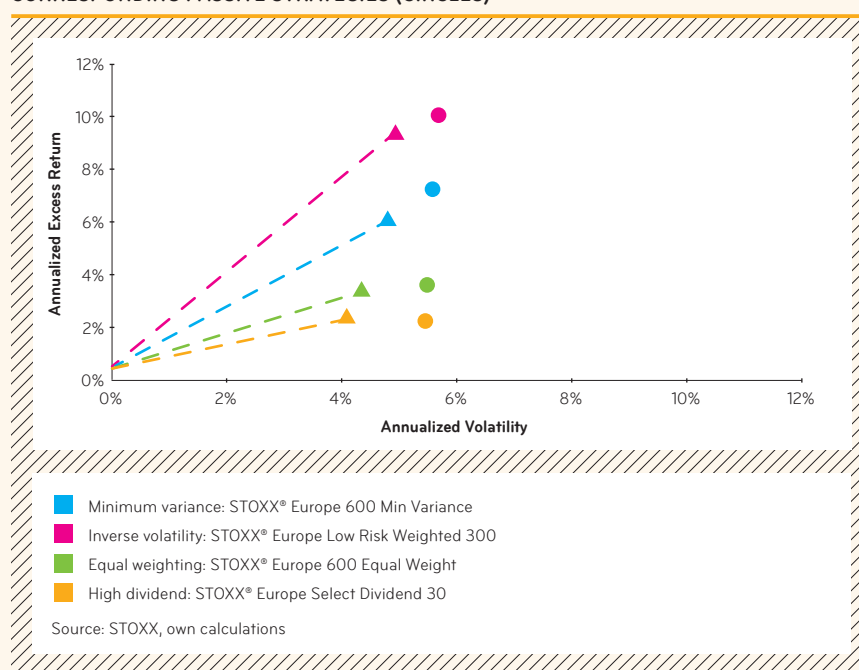


FIGURE 3: CHANGE IN EFFICIENCY FOR RISK-CONTROLLED PSB STRATEGIES SUBJECT TO A TREND-FOLLOWING TIMING RULE (TRIANGLES) WITH RESPECT TO THE CORRESPONDING PASSIVE STRATEGIES (CIRCLES)



"DIVERSIFYING PSB STRATEGIES ON DIFFERENT GEOGRAPHIES IMPROVES STRATEGY EFFICIENCY."

3. Building a diversified portfolio of PSB strategies

Theory says that it is optimal to combine PSB strategies built on the four elementary smart-beta "seeds" in a portfolio. Intuitively, diversification among exposure to different alternative risk factors should lead to an efficiency increase.

Figure 4, panels (a)-(b), allows a visual appreciation of the efficiency increase for the portfolio of risk-controlled PSB strategies relative to each constituent sub-strategy taken on a standalone basis. Panel (a) shows the efficiency gain in the case of passive strategies (subject to beta hedging with volatility targeting at 5% per annum), whereas panel (b) shows the efficiency gain obtained in the case of active (i.e., timed) strategies (subject to beta hedging with volatility targeting at 5% per annum and with market timing).

Figure 5 shows the performance evolution of the portfolio of risk-controlled PSB strategies subject to trend-following timing. We report as a comparison the performance of the underlying market, proxied by the STOXX® Europe 600 Index, to show strategy behavior in different market regimes. The excess performance evolution of the underlying equity market, proxied by the STOXX Europe 600 Index future, is plotted for comparison reasons. Both indexed performances are defined in EUR and have been rebased at 100 on Jul. 31, 2003. The data cover the period July, 2003-October, 2015.

FIGURE 4: EFFICIENCY INCREASE FOR THE PORTFOLIO OF RISK-CONTROLLED PSB STRATEGIES RELATIVE TO EACH CONSTITUENT SUBSTRATEGY TAKEN ON A STANDALONE BASIS

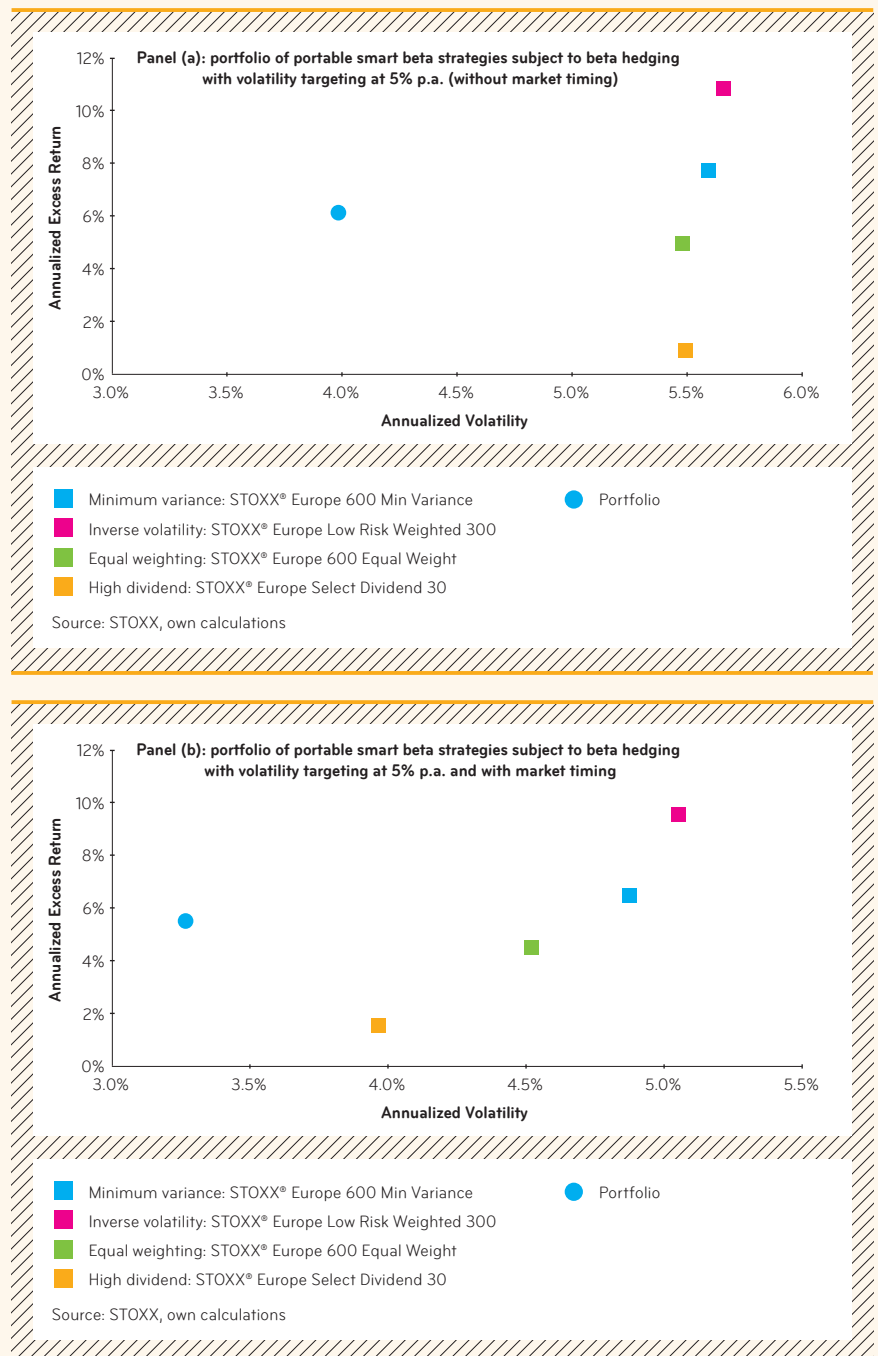
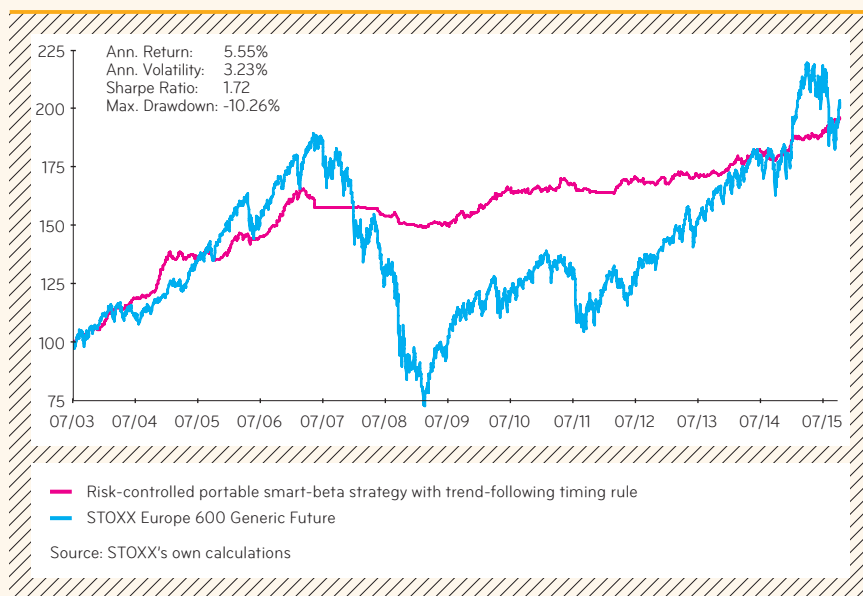




FIGURE 5: EXCESS PERFORMANCE EVOLUTION OF THE PORTFOLIO OF RISK-CONTROLLED PSB STRATEGIES SUBJECT TO MARKET TIMING



Our results show that on a gross basis it was possible to obtain over the period 2003-2015 an annualized excess return of about 5.5%, with an annualized volatility of about 3.0%.

Assuming that the four European smart-beta indices have actual swap fees of about 0.30% per annum and transaction costs equal to 5.0 basis points of traded notional, whenever we increase or decrease swap exposure, we estimate that over the period July, 2003-October, 2015 we would have achieved a net excess return of between 4.0% and 4.5% per annum.

The excess return generated by the equally weighted portfolio of risk-controlled PSB strategies subject to simple trend-following timing can be used to enhance the performance of cash in absolute return investment programs or the performance of an arbitrary benchmark replicated by means of derivative instruments. Additionally, we could think of using the long-only portfolio of STOXX smart-beta indices we introduce in this note as an investment solution that aims to beat the corresponding benchmark of market-cap-weighted indices.

Further results of our research show that diversifying PSB strategies on different geographies (not just Europe, but also North America and Pacific countries) improves strategy efficiency, given that the behavior of alternative risk factors such as size and value depends on the evolution of the market cycle, which may differ from one region or country to another. <<

FEATURED INDICES

STOXX Global 1800	YTD PERFORMANCE	52-WEEK PERFORMANCE	3-YEAR PERFORMANCE
STOXX Global 1800	-6.7%	-10.3%	19.4%
STOXX Global 1800 Minimum Variance	-0.4%	0.7%	32.5%
STOXX Global 1800 Minimum Variance Unconstrained	-0.3%	0.5%	27.8%
STOXX Global Select Dividend 100*	-2.0%	-10.2%	8.7%
STOXX Global Maximum Dividend 40*	-5.9%	-16.5%	0.4%
STOXX Global Strong Quality 50	-5.0%	-9.0%	35.9%
STOXX Global Strong Balance Sheet	-5.5%	-5.8%	34.9%
STOXX Global Strong Balance Sheet Equal Weight	-4.9%	-5.5%	28.1%
STOXX Global Sharpe Ratio 100	-4.1%	-6.1%	20.4%
STOXX Europe 600			
STOXX Europe 600	-8.4%	-14.8%	6.6%
STOXX Europe 600 Minimum Variance	-5.3%	-5.0%	17.2%
STOXX Europe 600 Minimum Variance Unconstrained	-4.2%	0.2%	23.1%
STOXX Europe Select Dividend 30*	-5.7%	-13.5%	11.7%
STOXX Global Maximum Dividend 40*	-5.9%	-16.5%	0.4%
STOXX Europe 600 Equal Weight	-8.2%	-12.1%	12.3%
STOXX Europe Low Risk Weighted 100	-6.8%	-7.5%	18.7%
STOXX Europe Strong Quality 30	-7.5%	-19.6%	-3.4%
STOXX Europe Strong Balance Sheet	-8.1%	-10.2%	16.0%
STOXX Europe Strong Balance Sheet Equal Weight	-6.9%	-6.5%	19.4%
STOXX Europe Sharpe Ratio 50	-7.1%	-4.3%	36.3%
EURO STOXX			
EURO STOXX 50	-9.6%	-18.1%	4.9%
EURO STOXX Minimum Variance	-6.1%	-5.6%	11.8%
EURO STOXX Minimum Variance Unconstrained	-4.9%	-0.5%	18.0%
EURO STOXX Select Dividend 30	-5.1%	-11.1%	19.7%
EURO STOXX 50 Equal Weight	-9.3%	-18.2%	7.6%
EURO STOXX 50 Low Risk Weighted	-8.8%	-17.2%	7.7%
EURO STOXX Small	-8.8%	-12.2%	5.7%

STOXX Asia/Pacific 600	YTD PERFORMANCE	52-WEEK PERFORMANCE	3-YEAR PERFORMANCE
STOXX Asia/Pacific 600	-9.8%	-12.4%	2.1%
STOXX Asia/Pacific 600 Minimum Variance	-1.4%	1.9%	17.0%
STOXX Asia/Pacific 600 Minimum Variance Unconstrained	-2.1%	-2.5%	13.3%
STOXX Asia/Pacific Select Dividend 30*	-2.9%	-14.2%	-8.7%
STOXX Asia/Pacific Maximum Dividend 40*	-6.2%	-13.0%	3.1%
STOXX ASEAN-Five Select Dividend 50	-1.8%	-18.0%	-17.4%
STOXX Asia/Pacific Strong Quality 30	-7.4%	-2.9%	13.4%
STOXX Asia/Pacific Sharpe Ratio 50	-2.3%	-7.5%	2.9%
STOXX China A 50			
STOXX China A 50	-18.2%	-17.8%	9.0%
STOXX China A 50 Equal Weight	-19.5%	-18.1%	6.0%
STOXX North America 600			
STOXX North America 600	-5.2%	-7.7%	31.1%
STOXX North America 600 Minimum Variance	1.3%	0.8%	41.9%
STOXX North America 600 Minimum Variance Unconstrained	2.4%	2.2%	37.8%
STOXX North America Maximum Dividend 40*	1.1%	-7.9%	17.7%
STOXX North America Select Dividend 40*	2.8%	-2.4%	21.6%
STOXX North America Sharpe Ratio 50	1.4%	4.2%	31.9%
STOXX USA 900			
STOXX USA 900	-5.5%	-7.4%	33.9%
STOXX USA 900 Minimum Variance	-0.5%	0.0%	38.2%
STOXX USA 900 Minimum Variance Unconstrained	1.2%	4.6%	45.7%
STOXX USA Strong Quality 50	-3.4%	-7.0%	48.6%
STOXX USA Strong Balance Sheet	-5.1%	-5.1%	44.7%
STOXX USA Strong Balance Sheet Equal Weight	-4.7%	-8.4%	40.1%

All indices are in USD Gross Return versions, except the ones marked with *, which are in USD Net Return versions.
Source: STOXX data as of Feb. 29, 2016

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