For professional investors

ROBECO
The Investment Engineers

Enhanced Indexing

How can you beat the S&P 500 Index?

- Outperforming the S&P 500 Index seems to be a "mission impossible"
- We present four conditions that stack the odds in your favor
- Combined in one strategy they pave the way for stable alpha

The growth of passive investing seems to be unstopable. Currently, approximately USD 6 trillion assets are managed passively, on a global scale.[1] US-based investors set the tone as passive investments represent already over 28% of total assets under management. Investors in US equities also seem to prefer passive as a total of almost USD 3 trillion is invested in passive vehicles that track the S&P 500 Index.[2] Although most of these investors have apparantly given up on outperforming this well-known index, we present in this paper four conditions that stack the odds in your favor when applied in one integrated investment strategy.

The appeal of the S&P 500 is clear: this index offers investors exposure to liquid large-cap stocks from different sectors, that represent over 80% of the total market capitalization of US equities. Vehicles that track the S&P 500 are widely available at low-cost (sometimes as low as a few basis points). Moreover, investors don't need to engage in extensive and expensive manager due diligence. Given its transparency the passive portfolio doesn't hold any surprises with regards to sector or individual stock weights.

With such characteristics, it's not surprising that active managers face a very strong opponent when competing for assets. In fact, given the sometimes high fees that active managers charge, they start the competition at a disadvantage.

Article
For professional investors
October 2018

Jan de Koning, CFA, CAIA, Portfolio Manager
Bart van der Grient, Quant Researcher

[1] Moody's: Passive investing to overtake active in just four to seven years in US (https://goo.gl/z17pKc)
[2] S&P Dow Jones Indices Annual Survey of Assets 2016 (https://goo.gl/H3h48r)

From a theoretical point of view, active management can be seen as a zero-sum game before cost, and a negative-sum game once costs (e.g. fees) are taken into account. In fact, research by S&P confirms that active managers fail to deliver in practice. In 2017, only 37% of the active managers outperformed the S&P 500, after costs. The statistics look even worse on longer time horizons, as Figure 1 shows.

Figure 1: Percentage of U.S. Equity Funds underperforming the S&P-500

Fund category	Benchmark	1-year	3-year	5-year	10-year	15-year
All large-cap funds	S&P 500	63.1%	80.6%	84.2%	89.5%	92.3%

Source: S&P Dow Jones Indices LLC, SPIVA U.S. Scorecard, data as of December 29, 2017. Returns are annualized. Past performance is no guarantee of future results. https://us.spindices.com/documents/spiva/spiva-us-year-end-2017.pdf

These findings seem to confirm what vocal proponents of passive investing, such as John Bogle and Burton Malkiel, have been claiming for many years: there seems to be no rationale for active management. Blindfolded monkeys throwing darts at a newspaper's financial pages (Malkiel said) would be able to get the same results as a portfolio created by the average active manager. Over the last twenty years, investors across the world and especially in the US have apparently heard this message and embraced massively passive strategies. And the end of this trend seems to be nowhere near. In five years' time, over half of US equities is expected to be passively managed, according to Moody's.

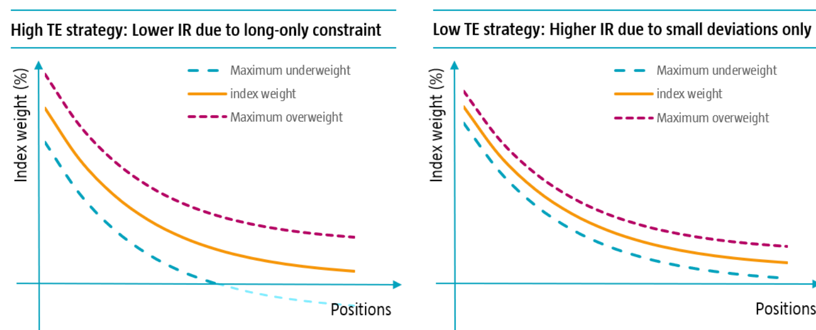
Although many investors seem to have given up on active management, 7% to 15% of active managers do still outperform the S&P 500 Index on a long-term horizon. But what do these winning managers have in common? In particular, we're interested in a method that enables an investor to beat the S&P 500 Index and, at the same time, has the same merits of passive investing (e.g. low-cost and transparency). First, we present four characteristics, for an investment strategy, that stack the odds of outperforming an index in your favor. Next, we combine these characteristics into a single investment strategy and demonstrate its ability to outperform the S&P 500 Index.

Condition 1: Low relative risk

Investors willing to outperform the S&P 500 need to become active risk takers. But how much active or relative risk (in terms of tracking error) is really needed to outperform the S&P-500? Can that be achieved while keeping similar characteristics to passive? One of the merits of passive investing is that the composition of the portfolio is known in advance. An ETF that replicates the S&P-500 will not hold any surprises with regards to key characteristics, such as sector weights. In order to offer the same level of comfort, an active strategy shouldn't deviate too much from these key characteristics either. This is easier to achieve with a low-tracking error-strategy than with a high-tracking error strategy, as the latter will probably lead to large deviations in terms of sector and individual stocks weights.

There is another reason to allocate to active strategies with low relative risk targets: it enables investors to capture the skill of managers in the most efficient way. Investors often judge the skill of active managers by comparing the excess return they generate with the amount of relative or active risk taken, as measured by the tracking error. This is measured by the information ratio. Active managers can show their skill by overweighting stocks that are expected to outperform, and underweighting stocks that are expected to underperform. Very active managers, with high relative risk budgets, will take very large overweight positions in a few very attractive stocks. If these managers are 'bearish' on certain stocks, they will implement their negative views by underweighting these unattractive stocks.

Figure 2: High tracking error managers can implement their skill only asymmetrically

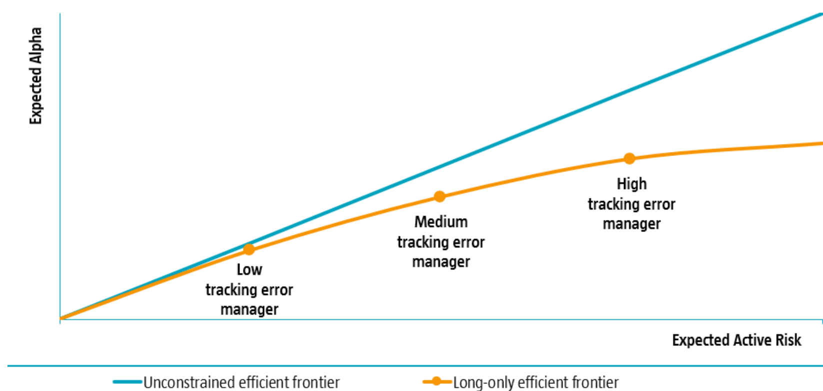


Source: Robeco

However, long-only managers will only be able to express a bearish view on a stock up to a certain point: not to buy it. This will translate in an underweight, or active position, only as large as the weight of the stock in the index. As a result, highly active long-only managers can only implement their skill in an asymmetrical way: fully on the upside, but only up to a certain point on the downside (see also Figure 2).

Waring and Siegel[3] demonstrate (see Figure 3) that, whenever a long-only constraint is applied, the amount of alpha per unit of active risk goes down as the active risk level goes up.

Figure 3: Impact of a long-only constraint on portfolio efficiency assuming constant skill



Source: Waring and Siegel (2003)

For this reason, Kahn argues that low-tracking error strategies belong to the most efficient form of active management.[4]

Condition 2: Low cost

These low-tracking error strategies provide other benefits: they are mostly low-cost, as their level of activeness is between passive and highly active. It therefore doesn't come as a surprise that replacing an active manager by a low-tracking error manager is a popular choice among fund selectors, in order to lower the total fee burden of portfolios. Lower fees matter because the average fund manager delivers a positive alpha before fees and a negative one after fees are applied, as Berk and Van Binsbergen (2015) demonstrate.[5]

So, should investors give up on active management since the probability of outperforming after costs is so low? Perhaps a better option would be to pay relatively low fees as Gerakos et al (2016) demonstrate.[6] These researchers study the gross and net of fee performances of managers, using the database of a global institutional investment consultant over the 2000-2012 period. They document that actively-managed accounts of institutional investors outperformed strategy benchmarks by 0.42% after fees and costs. Since institutional fee levels are much lower than retail fee levels, these results imply that active management can add value provided fees are competitive enough.

Condition 3: Exposure to factors

In 1975, the first index fund was launched by John Bogle. At the time, most academics only considered the market premium as the sole determinant of equity returns. As a result, index funds aimed to provide exposure to the only factor known: the market premium. Now, fast forward forty years of research in asset pricing. Nowadays most academics agree that besides the market premium, well-documented factors such as value, quality and momentum matter for expected equity returns. For those willing to allocate to these premiums many smart-beta or factor-based indices and funds are available. But, despite the extensive empirical evidence and the availability of factor-based indexing strategies, the monthly flows into passive index strategies are still three times larger than those into factor-based indexing strategies, according to Morningstar.[7] In other words: most asset owners still ignore the very existence of factor premiums and continue to invest like it is 1975.

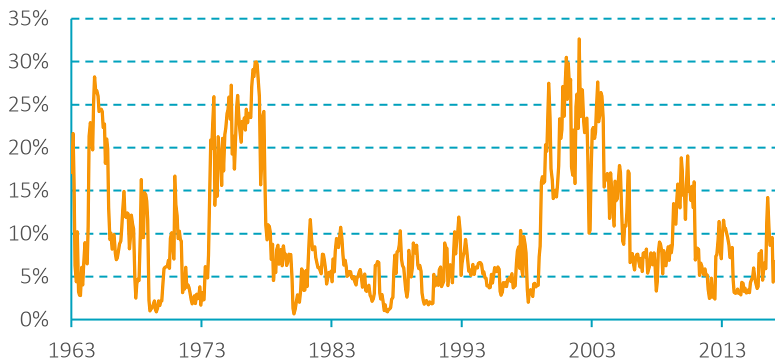
And that is a real pity. After all, academics have not only shown that equity returns could largely be attributed to systematic factors, but they have also demonstrated that investors who allocate to factors perform better than those who don't. Van Gelderen and Huij, for example, studied the returns of US mutual funds over the period 1990 to 2010 and found that mutual funds adopting investment strategies based on factors consistently earn positive abnormal returns.[8] Madhavan et al. studied mutual fund returns over a shorter period of time, but came to similar conclusions.[9] They pointed out that value and quality, in particular, have a positive effect on a stocks' active return.

By definition, index investors must forego all these excess returns as the index committee of the S&P 500 Index only takes the market capitalization and liquidity of a stock into account and not its exposure to certain proven factors. On the contrary, these index investors are exposed to stocks with a low or even negative exposure to these factors. On average, 9.8% of the market portfolio is

[3] Waring, M.B. and Siegel, L.B. (2003), "The Dimensions of Active Management", The Journal of Portfolio Management, Spring 2003, 29 (3) 35-51
[4] Kahn, R. N. (2000), "Most Pension Plans Need More Enhanced Indexing," ETFs and Indexing, Issue 1, Fall 2000, page 65-71
[5] Berk, J and Van Binsbergen, J.H. (2015), "Measuring skill in the mutual fund industry," Journal of Financial Economics 118, 1-20.
[6] Gerakos, J., Linnainmaa, J.T. and Morse, A. (2016), "Asset Managers: Institutional Performance and Smart Betas," NBER Working paper 22982
[7] Morningstar's Fund Flows Commentary, May 2018
[8] Gelderen, E. and Huij, J. (2014), "Academic Knowledge Dissemination in the Mutual Fund Industry: Can Mutual Funds Successfully Adopt Factor Investing Strategies?", The Journal of Portfolio Management Summer 2014, 40 (4) 157-167
[9] Ang, A., Madhavan, A. and Sobczyk, A. (2017), Estimating Time-Varying Factor Exposures, Financial Analysts Journal, Vol. 73, No. 4: 41–54.

exposed to stocks that are expected – based on well-known public available factor models – to earn a return which is lower than the return on 10-year US T-bonds, according to Blitz and Vidojevic (see also Figure 9).[10] Not investing in these stocks would result in a 16% higher equity risk premium. Given these outcomes, one can even argue that institutional investors are breaching their fiduciary duty towards clients if they continue to invest passively on behalf of their clients.

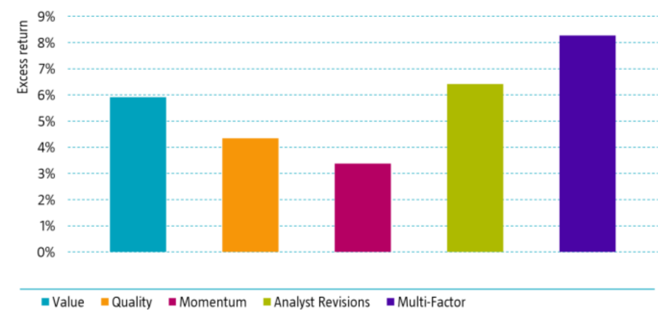
Figure 9: Market portfolio exposure to stocks with expected returns below bond returns



Source: Blitz, David and Vidojevic, Milan, (2018): The Characteristics of Factor Investing

Instead of having an implicit exposure to non-performing factors by investing in an S&P 500 Index tracker, would it be possible to create out of these 500 constituents a portfolio that has an explicit exposure to well-performing factors? In other words: does factor investing work within the S&P 500 Index universe? In order to answer this question, we analyzed the performance of four well-known return factors (value, momentum, quality and analyst revisions). We studied the value-weighted performance of portfolios that held long positions in the 20% best scoring S&P 500 stocks on one single factor (e.g. the best value stocks) and short positions in the 20% worst scoring S&P 500 stocks on that factor, over the 1990-2017 period. We also constructed an integrated multi-factor portfolio that was long (short) the 20% stocks of the S&P 500 that scored best (worst) on all four factors combined. We rebalanced portfolios each month in a sector-neutral way, to keep them positioned to the best (long) and worst (short) scoring stocks within each sector. The excess returns of these portfolios (shown in Figure 10) demonstrate that factor investing also works with S&P 500 stocks.

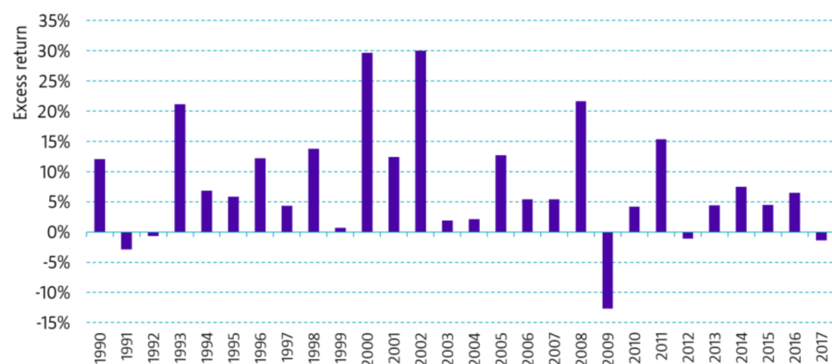
Figure 10: Relative top-bottom performance of Robeco single and integrated multi-factor portfolios for the S&P 500 Index



Source: Robeco. Graph shows the annualized excess return of top-bottom value-weighted single factor portfolios and integrated multi-factor portfolios versus the S&P-500 from 1990 – 2017 based on monthly rebalancing excluding transaction costs. The value of your investments may fluctuate. Past performance is not an indication of future results.

Figure 11 highlights that an integrated multi-factor portfolio delivered especially strong annualized excess returns in 23 out of 28 years (see Figure 11). Although the excess returns might look very compelling for investors aiming to beat the S&P 500 Index by using a factor-based approach, investors should rather focus on the direction instead of the magnitude of these returns. First, not all investors are able or allowed to invest in long/short portfolios. Second, as Huij et al. pointed out, in reality the results of long/short portfolios are mostly lower than theoretical returns due to costs and other implementation constrains that investors face.[11] Third, the high relative returns of the portfolios shown are not suitable for passive investors with limited risk budgets, as they come with high relative risk.

Figure 11: Relative top-bottom performance of an integrated multi-factor portfolio on stocks in the S&P-500



Source: Robeco

Therefore, investors need to implement these factors in their portfolios in such a way that a valid alternative for passive index funds emerges: a long-only strategy with a low tracking error.

[10] Blitz, D. and Vidojevic, M. (2018), "The Characteristics of Factor Investing, Robeco research paper.
[11] Huij, J. and Lansdorp, S. and Blitz, D. and Van Vliet, P. (2014), "Factor Investing: Long-Only versus Long-Short", Robeco white paper.

Condition 4: Disciplined implementation

If adopting a low-cost, low-tracking error and factor-based investment strategy stacks the odds of outperforming the S&P 500 Index in your favor, what kind of implementation – qualitative or rules-based – should be used to increase the odds even further?

Although academic research on the performance of quantitative versus qualitative investment strategies is rather limited, we can argue that a rules-based portfolio management approach qualifies the best for this task. After all, building and managing a low-tracking error portfolio is a different challenge from building and managing a high-tracking error and high-conviction portfolio. In the latter case, a team of fundamental analysts and portfolio managers can select only a few of the best possible index constituents to include into the portfolio and deviating strongly from the benchmark is almost a prerequisite for investors in these strategies.

Managing a low-tracking error strategy entails investing in hundreds of different stocks, from various sectors, with the implicit objective to keep deviations from the index at a minimum. Continuously analyzing the prospects of hundreds of stocks by a group of analysts would impose a real challenge for these professionals and therefore quantitative screening and ranking processes are more suitable. While analyzing, constructing and managing such an index-aware portfolio, with various strict limitations, is a challenge for the human brain, an algorithm can perform this task in just seconds.

Bringing it all together

What should a low-cost, low-tracking error and disciplined investment process look like for an investor that aims to outperform the S&P 500 Index by capturing factor premiums? As a first step, the attractiveness of all S&P 500 stocks needs to be determined. This can be done by scoring and ranking all stocks based on an integrated multi-factor stock selection model. This means that a single stock in the S&P 500 will receive a relative score on the four factors in Figure 10, for example. Next, all constituents can be sorted on their combined relative score from attractive to unattractive. As a low-tracking error manager can't just invest in only those top-ranked stocks that score the best (as it would result in a high tracking error) a different portfolio-construction method is needed, to get the desired factor exposures.

One way to address this is to take the S&P 500 Index as a starting point. By slightly overweighting those S&P 500 constituents that are top-ranked, while slightly underweighting bottom-ranked ones, the desired factor exposure can be obtained. Not all S&P 500 constituents have to be part of such a factor-based portfolio. After all, those bottom-ranked constituents, that have a relative small weight in the index, will be underweighted. This will translate into a zero-weight in the portfolio.

Finally, the portfolio needs to be maintained by closing out over (under) weights in stocks that exhibit a decreasing (improving) multi-factor score. This frequent rebalancing of holdings ensures that the portfolio always features best possible exposure to factor premiums.

The advantage of this rules-based portfolio management process is that it can be tailored depending on a client's relative risk targets, while delivering high factor exposure per unit of relative risk.

Beating the index

Already in 2004 Robeco started to manage low-cost, low-tracking error and quantitatively managed integrated multi-factor portfolios with one single goal: to maximize the net (after costs) information ratio for our clients. Put differently: beat the market after costs with a low amount of relative risk. We call this type of strategies 'Enhanced Indexing strategies'.

Initially, we started managing developed markets strategies, but given the stable alphas and high information ratios delivered, we also started to apply the same strategy in emerging markets in 2007. Nowadays, we manage over USD 20 billion in strategies that aim to outperform different indices for a variety of investors, such as central banks, pension funds, endowments and private clients.

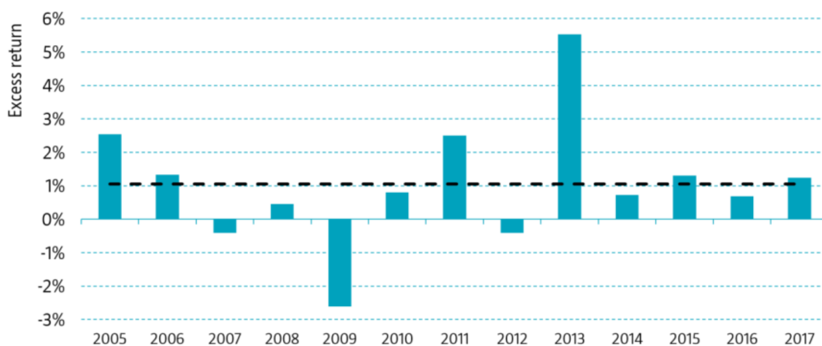
Our investment process has three steps: First, an integrated multi-factor stock selection model assesses the value, quality, momentum and analyst revision characteristics of each stock using enhanced factor definitions, such as residual momentum for example.[12] Next, top-ranked stocks are overweighed, while bottom-ranked stocks are underweighted. To further increase the breadth of our strategies and prevent index arbitrage, these Enhanced Indexing strategies can also invest for a maximum of 5% in off-benchmark stocks. Finally, since the factor characteristics of stocks change over time, we rebalance the portfolio periodically, while keeping a close

[12] Blitz, D., Huij, J. and Martens, M. (2009), "Residual Momentum", Robeco research paper

look at turnover and transaction costs. Most of these portfolios are customized and tailored to fit our clients' risk-budgets (tracking error scaling from 0.5% up to 4%), universe criteria or needs in terms of sustainability criteria.[13]

Based on the longest running track record of a developed markets low-tracking error rules-based strategy (2004), we can demonstrate the ability of this approach to outperform the S&P 500 Index. While the fund itself invests globally, we can extract the US-based part of the portfolio into a carve out. Figure 13 shows the results of the US carve out of this developed markets strategy. This portfolio has been able to beat the S&P 500 in 10 out of 13 years with a gross excess return of 1.05% and a tracking error of 1.2%.

Figure 13: Robeco Enhanced Indexing US Enhanced Indexing (carve out)



Source: Robeco. Based on a carve out of the Robeco QI Global Developed Enhanced Index Equities strategy. Example given for information purposes only, gross of costs. In reality, costs such as managements fees apply and have an impact on performance.

Based on these strong results, we started in October 2017 a US Enhanced Indexing fund that has the objective to outperform the S&P 500 Index, by delivering a stable alpha with a low tracking error.[14] This strategy, Enhanced Indexing, applies the same proven stock selection model and portfolio construction algorithm that has been in use ever since 2004. In addition, our Enhanced Indexing strategies also integrate sustainability criteria at every step of the investment process, without compromising on the excess return delivered.[15] This makes Enhanced Indexing an even more compelling alternative for passive investors as, in contrast to passive investing, there are numerous ways of integrating sustainability in the portfolios.[16]

A not-so-random walk down Wall Street

Burton Malkiel was one of the most influential proponents of passive investing in 1973. In his famous and bestselling book 'A Random Walk Down Wall Street' he urged his readers to 'go passive', as he argued that stock prices followed a random walk. In a recent interview in the New York Times, this former director of Vanguard (he served on their board for 27 years) acknowledged that investors who apply a disciplined approach like Enhanced Indexing can exploit market inefficiencies and deliver outperformance, if fees are reasonably low.[17] We couldn't agree more, and our low-tracking error Enhanced Indexing strategy ticks all these boxes. We are confident that our Enhanced Indexing strategy will continue to deliver a stable alpha over time, as it captures by design all the conditions that stack the odds of outperforming any well-diversified index over time in your favor: having a diversified portfolio with a low-tracking error, offering factor exposure managed by a rules-based investment process at low costs.

[13] Strating, M., De Groot, W. and Zhou, W. (2016), "A partnership to customize your Core Quant portfolio", Robeco client note
[14] Robeco QI US Enhanced Indexing Fund: www.robeco.com/enhanced-indexing
[15] Van der Grient, B., Strating, M., De Groot W. and Van Vliet, P. (2015), ' Sustainability integration in Quantitative Equity strategies', Robeco Research Paper
[16] Blitz, D. and De Groot, W. (2018), "Passive investing and sustainability are incompatible", Robeco client note
[17] Stewart, J.B., "An Index-Fund Evangelist Is Straying From His Gospel', The New York Times, 22 June 2017.

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Additional Information for investors with residence or seat in the United Arab Emirates

Some Funds referred to in this marketing material have been registered with the UAE Securities and Commodities Authority (the Authority). Details of all Registered Funds can be found on the Authority's website. The Authority assumes no liability for the accuracy of the information set out in this material/document, nor for the failure of any persons engaged in the investment Fund in performing their duties and responsibilities.

Additional Information for investors with residence or seat in the United Kingdom

Robeco is subject to limited regulation in the UK by the Financial Conduct Authority. Details about the extent of our regulation by the Financial Conduct Authority are available from us on request.

Additional Information for investors with residence or seat in Uruguay

The sale of the Fund qualifies as a private placement pursuant to section 2 of Uruguayan law 18,627. The Fund must not be offered or sold to the public in Uruguay, except in circumstances which do not constitute a public offering or distribution under Uruguayan laws and regulations. The Fund is not and will not be registered with the Financial Services Superintendency of the Central Bank of Uruguay. The Fund corresponds to investment funds that are not investment funds regulated by Uruguayan law 16,774 dated September 27, 1996, as amended.

Additional Information concerning RobecoSAM Collective Investment Schemes

The RobecoSAM collective investment schemes ("RobecoSAM Funds") in scope are sub funds under the Undertakings for Collective Investment in Transferable Securities (UCITS) of MULTIPARTNER SICAV, managed by GAM (Luxembourg) S.A., ("Multipartner"). Multipartner SICAV is incorporated as a Société d'Investissement à Capital Variable which is governed by Luxembourg law. The custodian is State Street Bank Luxembourg S.C.A., 49, Avenue J. F. Kennedy, L-1855 Luxembourg. The prospectus, the Key Investor Information Documents (KIIDs), the articles of association, the annual and semi-annual reports of the RobecoSAM Funds, as well as the list of the purchases and sales which the RobecoSAM Fund(s) has undertaken during the financial year, may be obtained, on simple request and free of charge, via the website www.robecosam.com or www.funds.gam.com.

Version Q1/18