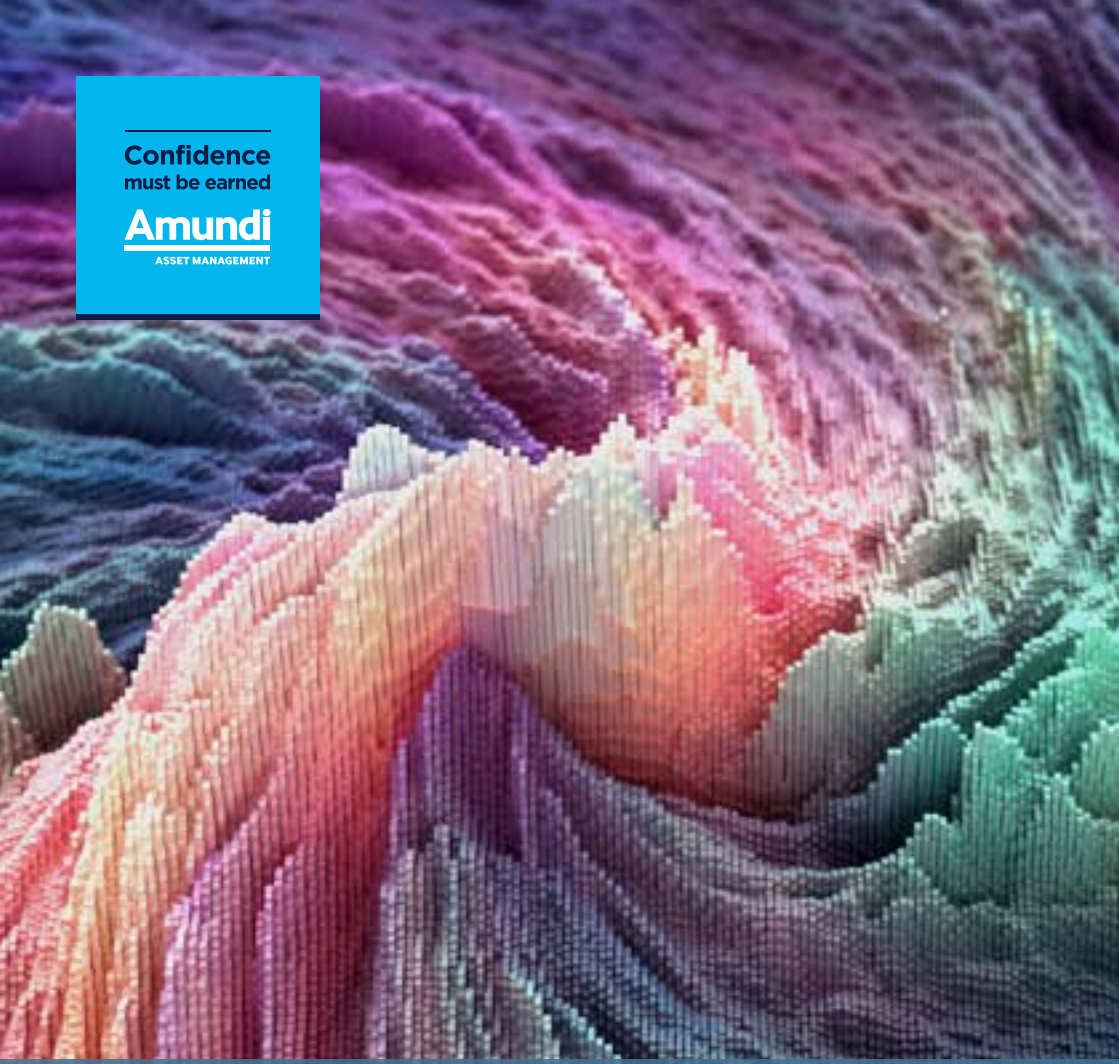

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Amundi
ASSET MANAGEMENT

Discussion Paper | CROSS ASSET Investment Strategy

DP-32-2018

Setting objectives for your asset allocation

RESEARCH STRATEGY & ANALYSIS

Setting objectives for your asset allocation

AMUNDI ASSET ALLOCATION ADVISORY*

Finalised in March 2018

Abstract

The objective of this paper is to describe how an investor can define a target return, split between that of Strategic Asset Allocation (SAA) and excess return derived from active portfolio management. The balance between these two major sources of return clearly depends on the investor's definition of what is relevant to Strategic Allocation and to active management. Our observation here is that the impact of SAA rebalancing and structural tilting towards certain assets and factors are generally included within strategic return, whereas active management encompasses the contributions of Tactical Asset Allocation (TAA) and of manager or security selection.

In order to quantify the excess return target for their portfolio, investors tend to rely on information ratio assumptions, and these depend on the investor's belief in the added value of active management and on the structure of their portfolio. Our analysis shows that active managers have generally performed favourably within the Global Fixed Income and Global Equity asset classes, justifying positive information ratio

* *This Discussion paper has been inspired by advisory work conducted for a major institutional investor by a project team coordinated by Éric Tazé-Bernard, Chief Allocation Advisor, and under the scientific supervision of Marie Brière, Head of Investor Research Center. The other team members were Alice de Bazin, Caroline Declerck, Karin Franceries, Viviana Gisimundo, Jung Kim, David Lévy, Edmond Lezmi, Thierry Morel, Jean-Gabriel Morineau, Bruno Veillet-Lavallée, and Lauren Yeh.*

assumptions there. The size of the investor's assets relative to those of the underlying markets is also a meaningful factor, especially for large institutions holding a significant share of their domestic markets. This leads us to discuss the issue of capacity and, as an illustration, we try to quantify the relationship between the size of assets under management and the target tracking error of an active portfolio to be invested in international equities.

> "Setting an excess return target for your portfolio is a soft matter. Investors should conduct this exercise by combining different approaches, including an analysis of their peers' practices as well as the quantitative methodologies which we recommend"
>
> *Éric Tazé-Bernard*

We then describe the most common practice, following interviews with a sample of major institutional investors. We observe in particular that excess return targets tend to have a "motivational" purpose and are designed to instil ambition in portfolio managers. There is a rather wide divergence around an estimated 45bp average target, which is determined either top-down, based on a mix of experience and academic background, or using a bottom-up approach, based on the aggregation of the expected contributions of the different components of the portfolio. Our observation is also that excess return target seems to be negatively correlated with asset size, as the largest global investors make more extensive use of passive management in particular, and that it is positively correlated with the total return target for the portfolio, with a median ratio of about 10% between both.

Based on these observations, we propose two quantitative methods to help investors set the excess return target for their portfolio. The first one is derived from the following constraint: ensuring that the negative outcome of active management in a worst-case scenario over a long-term horizon (say 10 years) does not represent more than one year of the investor's strategic expected return. The second approach derives the implied excess return consistent with Markowitz optimality conditions based on observing the tracking error of active management and its correlation with the total portfolio return.

Combining the conclusions of academic studies with peers' observations as well as with the quantifications that we propose, we believe investors are equipped with a diversified toolbox to help them set the target excess return for their portfolio of assets.

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I. Defining the expected return of your SAA

When constructing its portfolio of assets, any investor aims to achieve a certain return target compatible with its risk appetite and liability constraints. The focus of this paper is to elaborate on how institutional investors should set their return objective, with a specific emphasis on the excess return component, i.e. the portfolio's return in excess of the return of the strategic portfolio.

Setting the expected return of the investor's portfolio implies a clear definition of the various expected contributions to return. It needs to be based on the investor's philosophy and on a clear definition of the scope of investment opportunities which will be susceptible to generate excess return.

The investor's portfolio can in fact be defined as the sum of a Strategic Asset Allocation (SAA) and of an active portfolio, designed to add value relative to this SAA through Tactical Asset Allocation (TAA) and selection decisions. The total expected return of the investor's portfolio is the sum of these two components.

1.1. Strategic Asset Allocation, a function of the investor's risk profile

SAA is typically based on the investor's liabilities, constraints, objectives and investment horizon. **The strategic expected return is then a function of the investor's risk profile and should be viewed as a long-term reference target.** Our expected return assumptions for the SAA are based on Sharpe ratio assumptions for the major asset classes that make up the investor's portfolio. The Sharpe ratio is indeed the most widely-used indicator relating return and risk. When estimating volatility and correlations, we use historical figures, as they tend to be relatively stable over long cycles.

For the sake of simplicity, we suggest defining the long-term reference portfolio as a mix of bonds and equities, with bonds generally represented by a domestic reference index, and equities by either a domestic or international reference index, depending on the geographical structure of the investor's assets. In order to build balanced portfolios, we use a constant Sharpe ratio assumption for these assets based on a forecast-free approach. Our recommended Sharpe ratio estimate is 0.3, in line with historical observations over the very long term, at least for major equity markets, and we decide to apply it to major bond markets as well, because:

- using historical figures (with an observed 0.63 Sharpe ratio on US bonds over the past 30 years for instance) would be unrealistic as the spectacular performance of bond markets during this period cannot be expected to persist,

- using normalised figures, assuming a return of bond yields to their long-term level, would translate into a very low assumption, making bonds unattractive in any portfolio.

A more granular SAA, including a potential split of the allocation across geographies, credit ratings or factors can then be designed for the medium-term horizon (typically five years). Factors related to valuation and the economic cycle should be incorporated at this stage, and expected return forecasts over this horizon can be translated into implicit Sharpe ratios and then compared to the above-mentioned 0.3 normal level. As an illustration, our medium-term expected return forecast currently implies a low (0.1 to 0.2) Sharpe ratio for high-grade bonds, a sign of their high valuation compared to historical levels.

1.2. Splitting expected return between SAA and active management

Different sources of performance can then be expected to contribute to the investor's return target, in addition to that of the reference portfolio.

1-2-1. SAA rebalancing

As far as SAA is concerned, a number of investors consider its rebalancing as a meaningful source of portfolio return, to be captured over long-term horizons, and academic studies support this observation. Under standard assumptions, Samuelson (1969) and Merton (1969, 1971) have shown that when asset returns are not predictable, the optimal allocation of an investor maximising its expected utility requires rebalancing to constant weights. Rebalancing is an active strategy. It involves buying back assets with decreasing weights due to unfavourable market movements and selling those with increasing weights. This is a counter-cyclical investment strategy, often difficult to sustain in practice because it involves taking risks when markets have fallen sharply.

When asset returns follow an autoregressive process with mean reversion, a hedging demand appears in optimal portfolio weights. It means taking more risk during periods when markets are heavily depreciated. In practice, the strategy of rebalancing towards constant weight (see the famous example of the equally-weighted portfolio) is very profitable. It is similar to a short volatility strategy, and difficult to beat even with sophisticated investment strategies (De Miguel et al., 2009).

In terms of actual implementation, rebalancing is frequently handled on the basis of systematic rules, such as changing the portfolio's allocation towards the middle of the allowed pre-defined ranges whenever the weighting of an asset class moves out of these. The analysis conducted by our Quantitative research team has shown that the most efficient rebalancing schemes are

those which do not lead to frequent transactions – quarterly or even annual rebalancings should be favoured over monthly ones – as well as those leading to rebalancing the portfolio towards the middle rather than the border of the allowed range.

1-2-2. Tilting the SAA towards certain assets or factors

Another source of improvement in portfolio return may also lie in tilting the SAA towards certain asset classes which are expected to outperform the benchmark, due to their higher expected return, typically based on valuation indicators, or if the institution believes in its capacity to add value through active management on these asset classes. For instance, increasing the weight of alternative investments relative to their weight in the SAA can be an attractive opportunity for large institutional investors which can afford to bear the illiquidity risk attached to these assets: in this area, both academic literature and institutional practice show that size can be an advantage, through lower management fees as well as a better capacity to select the most rewarding projects.

Investors may also decide to invest in assets which are referenced against different benchmarks than those used in the reference portfolio. **Institutional investors have in particular been increasingly attracted towards smart benchmarks,** with the objective of outperforming standard market-capitalisation benchmarks due to their over-exposure to certain factors (such as low size, high momentum or quality...) which have proved to be rewarded over the long term. In this case, deciding that all or part of the investor's equity allocation will be exposed to these factors can be a structural source of excess return for its portfolio.

1-2-3. Tactical Asset Allocation

In addition to these generally structural sources of performance, excess return can be generated through more tactical management. Tactical Asset Allocation (TAA) consists in the decision to overweight or underweight the asset classes included in the investor's universe depending on its investment process, generally on the basis of valuation and technical considerations. Selection then consists in identifying securities (stocks or bonds) or managers (in the case of multi-manager portfolios) set to outperform the reference index of the asset class.

The split between Strategic allocation and active management may vary depending on the investor's approach, but it appears appropriate to base this split in terms of the decisions' investment horizons. Using this approach, all decisions related to structurally over- or under-weighting asset classes against their weight in the reference portfolio, or designed to tilt the allocation towards certain factors, can be attached to SAA, whereas the more tactical ones would pertain to active management of the portfolio and of its exposure to each major asset class therein.

We will now specifically focus on how to define the excess return target of the active management of the portfolio.

II. Excess return targeting: methodologies and key issues

In this section, we will start by explaining why the information ratio is the most often used indicator to define an excess return target. We will then discuss how such a target can be quantified on major international asset classes. Then, observing that asset size may be a meaningful explanatory factor in the case of very large institutions, in particular when they hold a significant share of their domestic markets, we will discuss its impact on expected return targets.

2.1. Using information ratio as a key indicator

The law of active management relies on the notion of information ratio, which relates the active return of a portfolio to its active risk (or tracking-error).

Grinold (1989) was the first to propose modelling the information ratio of any active manager in the following form:

$$IR = IC * \sqrt{N}$$

IR is the fund's Information Ratio

IC the active manager's skill, measured as the correlation between forecast and realised return

N is the breadth, i.e. the number of independent signals

This law is based on strong assumptions: the sources of information are independent, the same level of skill applies to all allocation choices, and **transaction costs are absent**. In the presence of transaction costs in particular, some tactical bets cannot be implemented, which reduces the number of independent bets that can be considered.

Following this seminal work, a number of studies highlighted that Grinold's law works poorly in practice. Clarke et al. (2002, p50) point out that "a common rule of thumb in practice is that the theoretical information ratio suggested by the fundamental law should be cut in half."

Clarke et al. (2002) attribute the reduction in performance to the constraints in the portfolio construction process and propose the concept of "transfer coefficient". Constraints in portfolio construction (such as maximum country or sector exposures, short-selling restrictions, etc.), lead to suboptimal

portfolio weights, thus reducing the maximum achievable Information Ratio. They develop a framework to measure the deviation of the optimal constrained weights from optimal non-constrained weights and propose a generalised fundamental law as follows:

$$IR = TC * IC * \sqrt{N}$$

TC is the Transfer Coefficient. Typical transfer coefficients lie between 0.3 and 0.8.

While the prescriptive approach does not accurately predict the information ratio of a given manager, it offers some interesting lessons. In addition to skill, the performance of active management depends on the number of independent signals that can be used to build active strategies. Thus, asset classes offering more return dispersion in their universe (for example fixed income compared to equities) also offer more opportunities to build independent signals and ultimately a stronger contribution from active management (Aglietta et al., 2012).

When setting an excess return target over a benchmark, institutional investors as well as asset managers therefore need to rely on information ratio assumptions, whose calibration is influenced by a number of factors, such as:

- The **breadth of investment opportunities:** the broader the opportunity set, the higher the information ratio potential.
- The **skill of the investment manager**: the higher the skill, as illustrated by the manager's track-record, the higher the information ratio.
- **Market conditions:** information ratio is variable over time, and the potential information ratio tends to decline at times of high volatility in financial markets, through both an increase in the correlations between asset class returns in periods of market stress, and a positive relationship between market volatility and tracking-error of active management.
- It can also be added that information ratios lose most of their significance when they are applied to very low active risk portfolios, as the weakness of the denominator can then lead to very high but not really meaningful figures for information ratios.

It is generally assumed that a skilled specialist investment manager is one able to deliver at least a 0.5 information ratio over the long term. Long term is defined as covering a full market cycle, i.e. at least five years and preferably 10 years in order to ensure that it includes both favourable and unfavourable market conditions.

Skill can be limited by investment constraints, such as restrictions on the use of derivatives which are helpful to swiftly modify asset allocation, or by size. As we will show in the analysis of institutional practices, size often has a negative impact on the expected information ratio. In the case of large institutional investors, it is negatively affected by their use of passive managers for a generally significant part of their portfolio, or the necessity to diversify their portfolio across a large number of individual managers, as even with strong selection skills, some of the managers in their portfolio will not do as well as others. The split between active and passive managers is actually definitely going to influence the information ratio and excess return targets for the investor's portfolio. This is why we now address the issue of whether active management can generate consistent excess return.

2.2. Does active management add value?

2-2-1. A short academic review

There is a vast body of literature that analyses the performance of active management, in particular for hedge funds. Do they generate on average alpha beyond the management fee? Are their performances persistent? Which fund characteristics predict their future performance? **A number of studies have also focused on the performance of institutional management.** Results depend heavily on the database used and the study period**, but interesting lessons can be drawn from these.**

Manager alpha does seem to exist and to show persistence. Persistence seems to be stronger on fixed income than on equities. In particular, Andonov, Bauer and Cremers (Feb. 2012) claim to be the first to provide a comprehensive overview of pension funds' asset allocation, market timing and security selection decisions over two decades, using a database of 774 US and Canadian pension funds for the period 1990-2008. Their results tend to suggest that pension funds in the sample have an ability to outperform, although subject to liquidity limitations. And they document strong performance persistence for both market timing and security selection. Persistence among winners has also been found by Busse, Goyal and Wahal in "Performance persistence in institutional management" (2007), particularly in domestic equity and domestic fixed income. They also show alpha persistence in international equity portfolios over one year, but it then declines and becomes insignificant over long horizons.

Some studies (see Kacperczyk, Van Nieuwerburgh and Veldkamp (2011) on time-varying manager skill) also emphasise **a positive link between security selection and market timing skills.** According to them, successful managers are the same ones who pick stocks well in booms and time the market well in recessions. Institutions can therefore benefit from skilled active managers to get information about underlying economic trends and market outlook.

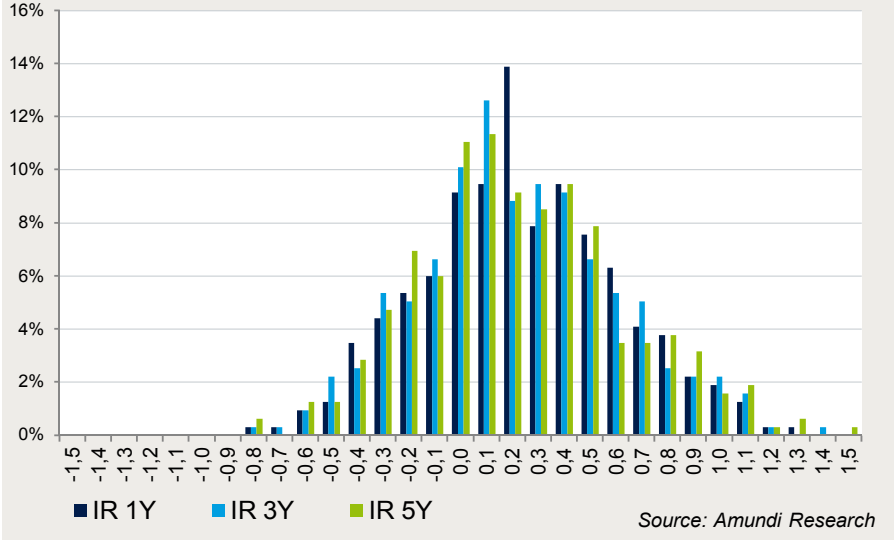
Finally, **size does seem to matter.** The issue of whether the size of the funds, or the size of the active management industry could be a constraint and reduce investment opportunities and therefore the performance of active management is widely debated. Regarding institutional management, Andonov et al. show that large pension funds achieve economies of scale in alternative asset classes, especially real estate, but that they experience diseconomies of scale in equity and fixed income markets, mainly due to liquidity constraints.

2-2-2. Output of our quantitative analysis

We have conducted our own quantitative analysis of the performance of institutional portfolios on the basis of the eVestment database over the last 10 years (from July 2007 to June 2017). As an illustration, we will now focus on the results we have obtained on the Global Equity (317 portfolios split by investment style and market capitalisation) and the Global Fixed Income (44 portfolios) universes. In order for our statistics to be more significant, we present them over the last five years.

Within Global Equities, we have observed a significantly positive average excess return over the period, close to 200bp for instance for the first quartile of portfolios within the Large Cap Growth category. Within the same category, the median information ratio has been 0.35. The following graph shows the concentration of the distribution of information ratios around the 0 to 0.5 bracket for our universe of Global Equity portfolios over one, three and five years.

1 - Observed distribution of information ratios of global Equity portfolios



Within Global Fixed Income, average excess return has also been quite high, at 1.63% over the past five years, for the first quartile of Global Aggregate managers. Information ratios can in fact be particularly high on this asset class as tracking error is generally lower for Global Fixed Income than for Global Equities funds. It has indeed been 0.69 for the first quartile of managers over five years. It should nevertheless be noted that the average information ratio has been negative for Global High Yield funds, a disappointing result which has been confirmed by institutional investors we have interviewed on this topic.

Table 1: First quartile Global Fixed-income Managers

	Excess return	Information ratio
	5 years	5 years
Global FI GA	1.63%	0.69
Global FI HY	-0.47%	-0.04

We have also found that there has generally been persistence in performance within Global Equity and Global Fixed Income portfolios over this period, as illustrated by the fact that the average excess return in these asset categories is very similar over 1, 3 and 5-year horizons. This observation should nevertheless be challenged in the case of changing market conditions.

The monetary policy and market environment could in fact be the major explanation behind our observation of a significant positive correlation between excess returns generated by Global Equity on the one hand and Global Fixed Income portfolios on the other hand over the past few years. Factors driving performance have probably been similar within these two asset classes, with easy monetary policies favouring both high beta/long risk equity strategies and long credit premia strategies within Fixed income. Any change in this market environment, linked for instance to rising interest rates, could lead to a deterioration in the average active management performance, even though it could be more favourable to a more diversified and flexible active management style able to exploit relative value opportunities.

Moreover, active management skills within Global Equity and Global Fixed Income portfolios are higher when market dispersion is high, thereby providing stronger breadth and increasing investment opportunities for managers. As an illustration, we have analyzed the link between global correlation (average correlation between different asset classes, as measured by certain market correlation indices, such as the Morgan Stanley Global Correlation index) and the difference of performance between the best and the worst quartile within equity funds over the past 5 years, and have observed that this difference is the most significant when global correlation is negative or low. This is also

a confirmation that the analysis of manager skill should take into account global market conditions.

Our own quantitative analysis therefore tends to confirm that manager skill does seem to exist, and that the observed information ratio over recent years is highest for Global Fixed income portfolios. When building a portfolio of managers, investors should nevertheless be aware that common factors tend to impact performance across asset classes, and that assuming an absence of correlation between excess returns of different managers is certainly too optimistic. We also confirm that active manager performance depends on market conditions, skill being mostly apparent when dispersion is high between asset returns within the investment universe.

2-3. Impact of size on target return

The Tracking Error budget dedicated to active management and the resulting excess return target have to take into account market size in each major segment of the investor's portfolio. Managing capacity means in particular trying to allocate the tracking error budget to strategies that are more "size friendly", such as private investment, where size is often seen as an advantage due to a better ability to source deals and the need for strong investment resources to select and monitor investments.

Size tends to limit capacity in certain liquid asset markets, either with high turnover (e.g. momentum), or in small caps, whereas value investing (which can be seen as liquidity-providing strategies with small turnover) will see less alpha decay. Academic papers have been published on the institutional approach to defining investment capacity, how it differs across asset classes, with a particular focus on equity strategies in concentrated markets (such as Australian and emerging markets), and how to address it when employing external managers. One of their key take-aways is that **large funds should address this capacity issue specifically**, especially when they hold a significant share of their domestic markets.

Capacity is defined as the amount of AUM beyond which a strategy is no longer able to achieve its stated investment objective (Vangelisti). It depends on the investment approach: the turnover of the strategy and the concentration of the bets bring obvious limitations.

We propose to investigate the issue of capacity and its impact on portfolio performance in the case of very large institutional investors through two illustrations:

- That of an institution holding a significant share of its domestic equity market.
- That of an institution investing in global equities through a diversified portfolio of managers.

2-3-1. Domestic equity exposure

Let us first try to define the maximum active amount an institution could hypothetically decide to manage internally on its domestic equity market without compromising its alpha generation capacity.

Capacity can be defined as the ability to trade each position in 10 days with 15% Average Daily Volume (ADV) per day (to have a limited market impact), based on ADV data for stocks in the index. Based on these parameters and on ADV data for the different groups of stocks in the portfolio according to their market capitalisation, the share of the investor's portfolio that can be invested actively depends on the following portfolio characteristics:

- Total portfolio size
- Return objective: benchmark + X%
- Tracking error target
- Number of securities and minimum weight in the portfolio that are deemed appropriate on the underlying market, on the basis of the investor's experience.

On this basis, the capacity of a given strategy can be estimated depending on the characteristics of the investor's portfolio. Capacity can only become an issue for very large investors and when the target market is not highly liquid, such as in the case of an institution in an emerging country, managing more than a few dozen billion dollars and investing a significant share of its assets in its domestic market. In such a case, capacity can be increased by adding to the number of managers in the investor's portfolio, but that will be at the cost of a marginally decreasing information ratio, as it is very hard to select the best managers. As an illustration, given that without any selection skill, an investor would have a 25% chance of selecting a first quartile manager, representative of a 0.5 information ratio, the probability, when selecting two managers, of having both of them in the first quartile would decline to 6.25%, and 1.56% with three managers, and so on. This shows that even with good selection skills, keeping a high excess return is very challenging when increasing the number of strategies in the portfolio.

2-3-2. Foreign Equity exposure

As shown in the previous section, Global Equities is an asset class where it is possible to identify portfolio managers with the potential to generate excess return, through stock selection or through exposure to factors (small caps in particular) and in some cases country allocation.

Size nevertheless needs to be taken into account and is liable to limit a large investor's capacity to generate excess return on this asset class.

In order to be more precise, we have tried to build a portfolio of Global Equity managers, on the basis of our manager selection expertise and on

our knowledge of the available capacity of each of the selected managers. The portfolio has been built using 12 highly-skilled Global Equity managers selected by our Manager selection experts, providing diversification in terms of style. In order to define portfolio weights, we have assumed:

- A target weighting range per manager of 5% to 15%, to ensure manager diversification,
- A maximum holding ratio varying between 10% and 25% per manager, in order to ensure that those managers are not excessively dependent on inflows or outflows from the investor.

We have checked with all selected managers the capacity remaining in their strategies, and then applied the above-defined portfolio diversification rules. We have obtained the following results linking the Investment capacity in the proposed portfolio to the maximum holding ratio per strategy. These figures may obviously change over time and depending on the composition of the portfolio:

Table 2: Active management in USD bn

Max holding ratio / per strategy	10%	15%	20%	25%
Final Investment capacity in USD bn	26.6	37.4	46.2	52.5

Assuming a 20% holding ratio per manager, which seems reasonable from a large institutional investor's standpoint, we see that if the investor is willing to allocate more than $46.2bn to Global Equities, part of the portfolio will need to be invested in other strategies, and most probably in passive ones. This would naturally limit the tracking error of the total Global Equity portfolio, taking into account the 2.5% estimated tracking error of the active portfolio against the MSCI World and the much lower one for the part of the portfolio that would then have to be invested in passive strategies. Combining this tracking error target (1.5% in the case of a 60% Active/40% Passive portfolio) with the weighting of the asset class in the investor's portfolio and an information ratio assumption on this asset class would then lead to a target excess return contribution to the investor's portfolio.

Most institutional investors who believe in active management set a target information ratio of 0.3 to 0.4 on asset classes such as Global Equities and Global Fixed income for which the track-record of active managers has been positive over the past 10 years. This is admittedly higher than the average information ratio observed among active managers in the very long term, but it nevertheless reflects a target for which investment management teams can strive.

It also has the advantage of being in line with the Sharpe ratio assumption we use at Amundi for major asset classes to define strategic returns, as described

in Section 1.1. Such coincidence between the Sharpe ratio to be derived from being exposed to risky assets in the long term, and the information ratio to be expected from active portfolio management, does not result from a strong academic basis. It nevertheless reflects a certain balance between the remuneration of active risk and that of systematic risk in generating portfolio return.

The close to $50bn capacity limit that we have just described in the case of a Global Equity portfolio (to be refined depending on the investor's constraints and investment approach of course) will appear very large and unbinding to most institutions, but it will vary depending on the asset class and be lower in particular in the case of less liquid markets. This is a factor that the largest institutional investors should undoubtedly integrate in constructing their portfolio and setting their excess return target. For smaller institutions, it may also become an issue if the maximum holding ratio they have set is more modest, or if they target a more specialised and less liquid asset class.

III. Standard practice at major institutions

In order to better understand actual practice in terms of setting return and risk targets for an institutional portfolio, we conducted interviews with a number of large investors. We do not pretend this sample to be statistically representative of the universe of institutional investors, as each of them is specific in terms of investment philosophy, asset allocation structure, size or share of domestic assets. We nevertheless believe that a number of interesting observations are worth sharing.

We found that the investors' average realized or expected excess return is slightly below 50bp. Manager Excess Return provides the main identified contribution, followed by Tactical Asset Allocation, whereas the complement is brought by other factors, that differ depending on the institution. These may include the "benchmark impact", that is the benefit of choosing a more efficient benchmark than the one used for setting the SAA. For others, it will be the "rebalancing impact", that is the benefit of systematically rebalancing and benefiting from a trend of reversion to the mean.

The size of assets managed by these institutions seems to have a negative impact on their excess return target, especially when they own a significant share of their domestic markets and are therefore constrained in terms of liquidity of their investments. As an illustration, some very large institutions, owning close to 10% of their domestic equity and fixed-income market, have decided to essentially manage these portfolio buckets in a passive manner, thereby limiting their excess return target on a significant part of their portfolio.

We also observe that excess return targets can be based on a top-down or a bottom-up approach. In the former case, the excess return target is normative and directly set at the total portfolio level. It then clearly has a normative or "motivational" nature, which is why it can be stable over time. In the latter case, institutions define a target for each component of their portfolio (whether it be in terms of asset class or even individual manager), adding them up to obtain the target at the total portfolio level. One institution having faced this debate between setting targets using a top-down or bottom-up approach, stressed that it was key to maintain a close dialogue between these two levels, and to make sure that specialist investment teams do not lose sight of the overall target return at the institution's level.

As an example, one of the surveyed institutions has set its target at 50bp. While the rationale behind this target was not fully formalised, and mainly resulted from experience, the CIO mentioned to us that he deemed it both consistent with the risk/return objective of the institution and feasible, albeit challenging, as has been vindicated by the track-record of the institution.

When setting an excess return target, a balance must indeed be found between:

- **Modest targets**: these have the advantage of being realistic, but their drawback is that they lack ambition and may not incentivise investment managers to display skill.
- **High targets**: these have the advantage of inciting managers to display skill, but their drawback is that they may lead investment managers to take an excessive risk level, which can be dangerous unless they have a clear demonstrated skill. They may also cause the performance of the total portfolio to significantly diverge from that of the strategic allocation. In this sense, the excess return target can be the expression of the investor's confidence vis-à-vis their active management skill relative to the design of a Strategic Allocation in line with their long-term objectives.

We also observe that **there tends to be a relationship between excess return and total return targets**, with a ratio between these two targets that typically ranges between 5% and 20%. This modest proportion is understandable: as was put to us by one of the interviewees, "you do not want to suffer from too much deviation from your strategic benchmark in case things go wrong". Moreover, getting back to the size issue, the institutions in our sample that have a ratio close to 5% are the ones with the largest assets.

Another source of influence on the excess return target is linked to the institution's investment philosophy, some institutions stating very clearly that they do not believe in the potential value added of active management, either through active asset allocation or through the choice of managers.

In this case, sources of value added will be concentrated on benchmark selection or on systematic rebalancing of SAA.

Even those institutions which believe in active management admit that the ability of underlying managers to generate excess return depends on the asset class and the geography. It is very difficult in particular to outperform standard market benchmarks on US equities, a highly efficient market, or on high-yield debt, due to the difficulty to faithfully replicate a benchmark when a security is excluded from it following a rating change.

Regarding the methodology used to set excess return targets using a bottom-up approach, most of the institutions use tracking error and information ratio targets. Some institutions tend to set the same information ratio objective for all asset classes while others differentiate by asset class.

For instance, one institution converts the tracking error of the respective portfolio managers into an expected excess return, using a fixed information ratio. Another institution defines a target information ratio for each active mandate (external and internal) based on past information ratios and on a subjective view of the expected performance of these active mandates (depending on market conditions). An optimisation process using the target information ratio and past historical volatilities and correlations of active mandates allows it to set the active risk budget (TE objective) dedicated to each active mandate. This TE objective can be modified ex-post if it exceeds the active fund managers' "comfort zone" or to comply with the global budget constraint set by the institution on external fees.

Overall, information ratio and excess return targets can be defined as either realistic targets, as closely as possible to long-term observations, or "motivational" targets, setting an ambitious objective to investment teams. The advantage of such "motivational" targets is that, as they tend to be roughly-defined figures, with round numbers, they do not need to be changed over time. More precisely, we found that tracking errors typically range between 1% and 1.5%, for information ratios ranging from 0.25 to 0.5.

IV. Estimating excess return target: keeping a balance with the total return target

As already underlined, the most important decision for a pension institution with a very long-term investment horizon is to set a target return consistent with its liabilities and investment objectives. **SAA, being a reflection of investors' long-term investment objectives, should be their key return driver for their portfolio,** while variability of returns around the long-term trend should remain limited.

The conclusion we draw from this observation is that investors will try to keep their excess return target to a limited proportion of their total return target. This is all the more so if their confidence in their capacity to deliver outperformance is small relative to their confidence in reaching their total expected return target over a long-term horizon.

Let us try to quantify such balance, on the basis of the following assumptions:

- Let ER be the portfolio's annual expected return over the long term
- Let IR be the target information ratio of active management

We recommend expressing the risk budget to be allocated to active management in terms of risk of maximum potential loss from the active management over a horizon of T years, with a certain probability, which we have defined as a 2-standard deviation event, assuming a normal return distribution. This can be estimated at $2 * \sqrt{T} * TE$, or $2 * \sqrt{T} * \alpha/IR$, from which we can deduce that α = ER * IR / $2*\sqrt{T}$. The higher the information ratio expected from your active management, the higher you can set the excess return target. Likewise, the higher your expected return target, the more you can afford to "sacrifice" in terms of potential loss from active management.

If we take rather standard assumptions of a 0.3 information ratio, a 6% total return target and a 10-year horizon, we find that α = 28 bp.[1], while the maximum loss from active management over the 10-year horizon is in this case 6.32%. In other words, the negative outcome of active management in the worst-cast scenario represents about one year of the investor's total expected return (ER).

This assumption of not losing more than one year of total return through active management over a ten-year horizon corresponds to a one to ten ratio between relative return and total return, in line with institutional practice and well-known observations according to which the variability of returns of institutional portfolios is 90% explained by strategic allocation and only 10% by active management. Likewise, in the case of a 50% Equity / 50% Fixed Income portfolio, the volatility of which can be roughly estimated at 10%, this 90% / 10% variance split would correspond to an approximate 3% tracking-error, which is quite consistent with our observation of the management of such balanced portfolios.

[1] *We have considered in this simulation that excess return was already included in the total return assumption and that we did not have to consider it mathematically as the expectation from active management. This is in line with our view that expected return is a motivational and normative target, which does not necessarily correspond to actual observations.*

V. Taking into account the correlation between active management and total portfolio return

We consider an investor able to scale exposure to strategic asset allocation (passive by nature) and active management, thanks to leverage or use of derivatives. We suppose that the relative contribution of active management is scaled in a way that optimises the risk-return trade off of investor wealth as according to Markowitz. For a given level of expected excess return and correlation between strategic asset allocation and active management, one can solve for the optimal level of tracking error. Conversely, by observing tracking error and correlation, it is possible to derive the implied alpha level consistent with optimality conditions: below this level, one should reduce allocation to active management, and above this level, increase it.

Given that TE is an increasing function of alpha[2] and a decreasing function of correlation (in other words, an increasing function of diversification), it can be found by reverse optimisation that implied alpha is an increasing function of tracking error and a decreasing function of correlation. The formalisation of this relationship is presented in the box below.

Estimating excess return based on global portfolio parameters*: relationship between excess return of active management, its tracking-error and its correlation with strategic asset allocation.

Thierry Morel, CFA, Fund Selection and Advisory - Amundi

We consider an investor having access in addition to cash to N investment strategies. Between these N strategies, we can distinguish between long only strategies (passive portion of the portfolio, with expected returns defined over cash) and long short strategies (active portion of the portfolio, with excess returns defined over benchmarks). Let W_P denote the vector of exposures to these strategies, Ω be their covariance matrix, and μ be their vector of expected excess returns.

We assume that leverage is allowed such that the sum of weights does not have to equal one. Investors can lend and borrow under the risk-free rate, and increase (or decrease) the magnitude of their bets without being constrained by overall cash exposure. Portfolio return can be expressed as the sum of risk free rate plus the linear

* *The approach adopted here can also be found in the paper "The Active Risk Puzzle: implications for the Asset Management Industry" written for Goldman Sachs by B. Litterman in 2004, except that Litterman assumes zero correlation between active management and strategic asset allocation.*

[2] *See our comments on the notion of Information ratio in Section 2-1.*

combination of weights – which do not necessarily total one – and excess returns of available strategies, calculated versus cash or versus benchmark returns. This common assumption, although it may look simplistic in practice, enables us to derive straightforward optimality conditions.

We consider portfolio optimality as according to Markowitz as follows: given the volatility σ_P of the portfolio, expected return is maximised. More formally: W_P should be a solution to the following optimisation problem:

$$MAX_W \quad W'\mu \quad under\ constraint \quad W'\Omega W \leq \sigma_P^2$$

Let Λ be the lagrangian of this problem and $\lambda/2$ be the lagrangian multiplier. W_P is a solution of the equation $\frac{\partial \Lambda}{\partial W} = 0$

$$\Lambda = W'\mu - \left(\frac{\lambda}{2}\right) * W'\,\Omega W$$

$$\frac{\partial \Lambda}{\partial W} = 0 \quad \Longrightarrow \quad \mu - \lambda * \Omega W = 0 \quad \Longrightarrow \quad \Omega W_P = \frac{1}{\lambda} * \mu \ (1)$$

For simplicity we assume now N=2 and consider two assets with returns X and Z. We write Y the return of the portfolio invested in respective proportions W_X and W_Z in the two assets ($Y = W_X X + W_Z Z$). As covariance is bilinear we find that:

$$\Omega W_P = \begin{pmatrix} V(X) & cov(X,Z) \\ cov(X,Z) & V(Z) \end{pmatrix} \begin{pmatrix} W_X \\ W_Z \end{pmatrix} = \begin{pmatrix} W_X cov(X,X) + W_Z cov(X,Z) \\ W_X cov(X,Z) + W_Z cov(Z,Z) \end{pmatrix}$$

$$= \begin{pmatrix} cov(X, W_X X + W_Z Z) \\ cov(Z, W_X X + W_Z Z) \end{pmatrix}$$

$$\Omega W_P = \begin{pmatrix} cov(X,Y) \\ cov(Z,Y) \end{pmatrix}$$

Thus equation (1) comes to:

$$\begin{pmatrix} cov(X,Y) \\ cov(Z,Y) \end{pmatrix} = \frac{1}{\lambda} * \begin{pmatrix} \mu_X \\ \mu_Z \end{pmatrix} \ (2)$$

We compute the value of lambda by calculating the expected return of the portfolio:

$$\mu_Y = W_X * \mu_X + W_Y * \mu_Y = \lambda * [W_X cov(X,Y) + W_Y cov(X,Y)]$$
$$= \lambda * cov(W_X X + W_Z Z, Y)$$
$$\mu_Y = \lambda * V(Y)$$

Equation (2) can now be reformulated as:

$$\begin{pmatrix}\mu_X\\ \mu_Z\end{pmatrix} = \mu_Y * \begin{pmatrix}\frac{cov(X,Y)}{V(Y)}\\ \frac{cov(Z,Y)}{V(Y)}\end{pmatrix} = \mu_Y * \begin{pmatrix}\beta(X,Y)\\ \beta(Z,Y)\end{pmatrix} \quad (3)$$

Where $\beta(X,Y)$ and $\beta(Z,Y)$ are the betas of X and Z relative to Y, which by hypothesis is assumed to be an optimal portfolio. These relations are valid if and only if allocations to X and Z are optimal.

Our idea is now to model the portfolio of an investor as the sum of strategic asset allocation and active management.

We write **P = S + A**, where P are pension fund excess returns over cash, S excess returns from SAA and A excess returns from active management. For this purpose, we set S= $* X$, A= $Wz * Z$, P = Y.

Relying on relation (3), expected return from active management can be expressed as:

$$\boldsymbol{E(A) = \frac{cov(A,P)}{V(P)} * E(P) = \beta(A,P) * E(P)} \quad (4)$$

Which is true as Z = A / Wz

It could be shown that if expected excess return coming from active management was above this level, it would be optimal to increase active management, while it would be optimal to reduce active management otherwise.

Keeping the same notations as above, we make assumptions on $\rho = \rho(S,A)$ and $\sigma(A)$ (σ represents standard deviation while V represents variance, the square of standard deviation).

Let us write:

$$cov(A,P) = cov(A,S) + cov(A,A) = cov(A,S) + V(A) = \rho * \sigma(A)\sigma(S) + V(A)$$

$$V(P) = V(S+A) = V(S) + V(A) + 2 * \rho * \sigma(S)\sigma(A)$$

$$\beta(A,P) = \frac{cov(A,P)}{V(P)} = \frac{\rho * \sigma(A)\sigma(S) + V(A)}{V(A) + V(S) + 2 * \rho * \sigma(A)\sigma(S)}$$

$$E(P) = E(S+A) = E(S) + E(A)$$

From equation (4) we find that:

$$E(A) * \big(1 - \beta(A,P)\big) = \beta(A,P) * E(S)$$

And we deduct implied excess return coming from active management:

$$E(A) = \frac{\beta(A,P)}{(1-\beta(A,P))} * E(S) \quad (5) \text{ with } \beta(A,P) \text{ a function of } \rho(S,A) \text{ and } \sigma(A)$$

We can also express implied information ratio:

$$\frac{E(A)}{\sigma(A)} = \frac{E(S) * \beta(A,P)}{\sigma(A) * (1-\beta(A,P))}$$

As an illustration, the following table presents the calibration of the relationship between the analysed variables under the following assumptions: Strategic Asset Allocation S has a volatility of 6% (a level in line with a 30% Equities / 60% Fixed income / 10% Alternatives mix) and expected excess return of 3% over cash, leading to a 0.5 Sharpe ratio. The results would need to be adapted in case of different assumptions regarding the Sharpe ratio, volatility and SAA return.

Implied Excess Return table (results expressed in percentage)

Correlation Between Active Management and Strategic Asset Allocation

Tracking Error coming from Active Management in % (volatility on SAA assumed to be 6%)	-0.5	-0.4	-0.3	-0.2	-0.1	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
0.2	-0.05	-0.04	-0.03	-0.02	-0.01	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10
0.4	-0.09	-0.07	-0.05	-0.03	-0.01	0.01	0.03	0.05	0.07	0.09	0.11	0.13	0.15	0.16	0.18	0.20
0.6	-0.13	-0.09	-0.06	-0.03	0.00	0.03	0.06	0.09	0.12	0.14	0.17	0.20	0.22	0.25	0.28	0.30
0.8	-0.16	-0.11	-0.07	-0.03	0.01	0.05	0.09	0.13	0.17	0.20	0.24	0.27	0.30	0.34	0.37	0.40
1	-0.18	-0.13	-0.07	-0.02	0.03	0.08	0.13	0.18	0.22	0.27	0.31	0.35	0.39	0.43	0.46	0.50
1.2	-0.20	-0.13	-0.06	0.00	0.06	0.12	0.18	0.23	0.28	0.33	0.38	0.43	0.47	0.52	0.56	0.60
1.4	-0.21	-0.13	-0.05	0.02	0.10	0.16	0.23	0.29	0.35	0.41	0.46	0.51	0.56	0.61	0.66	0.70
1.6	-0.22	-0.12	-0.03	0.06	0.14	0.21	0.29	0.35	0.42	0.48	0.54	0.60	0.65	0.70	0.75	0.80
1.8	-0.21	-0.10	0.00	0.10	0.19	0.27	0.35	0.42	0.50	0.56	0.63	0.69	0.74	0.80	0.85	0.90
2	-0.20	-0.08	0.04	0.14	0.24	0.33	0.42	0.50	0.58	0.65	0.71	0.78	0.84	0.89	0.95	1.00
2.2	-0.18	-0.04	0.08	0.20	0.30	0.40	0.50	0.58	0.66	0.74	0.81	0.87	0.93	0.99	1.05	1.10
2.4	-0.15	0.00	0.14	0.26	0.38	0.48	0.58	0.67	0.75	0.83	0.90	0.97	1.03	1.09	1.15	1.20
2.6	-0.11	0.05	0.20	0.33	0.45	0.56	0.66	0.76	0.84	0.92	1.00	1.07	1.13	1.19	1.25	1.30
2.8	-0.06	0.11	0.27	0.41	0.54	0.65	0.76	0.85	0.94	1.02	1.10	1.17	1.23	1.29	1.35	1.40
3	0.00	0.19	0.35	0.50	0.63	0.75	0.86	0.95	1.04	1.13	1.20	1.27	1.33	1.39	1.45	1.50
3.2	0.07	0.27	0.44	0.60	0.73	0.85	0.96	1.06	1.15	1.23	1.31	1.37	1.44	1.50	1.55	1.60
3.4	0.16	0.37	0.55	0.70	0.84	0.96	1.07	1.17	1.26	1.34	1.41	1.48	1.54	1.60	1.65	1.70
3.6	0.26	0.47	0.66	0.82	0.96	1.08	1.19	1.29	1.37	1.45	1.52	1.59	1.65	1.70	1.75	1.80
3.8	0.37	0.59	0.78	0.94	1.08	1.20	1.31	1.41	1.49	1.57	1.64	1.70	1.76	1.81	1.86	1.90
4	0.50	0.73	0.92	1.08	1.21	1.33	1.44	1.53	1.61	1.68	1.75	1.81	1.86	1.91	1.96	2.00

Table calibrated for E(S)=3% and σ(S)=6%

We indeed confirm that, for a given tracking error target for active management, the higher the level of correlation between these two sources of return, the higher the implied excess return target should be set. If such correlation is 0 (resp. 1), the generation of excess return necessary to reach a certain level of tracking error for the active management of the portfolio is very modest (resp. very high).

Let us illustrate this relationship with an example.

- **Correlation assumption:** our observation is that active management has on average been positively correlated with global market trends over the past 5 years, in a period of positive conditions for risky assets, when active managers tended to be long on risky assets, such as investing in spread strategies for fixed-income managers, and overweighting momentum and small-cap stocks, which are historically high-beta strategies, in the case of equity managers. Likewise, some Multi-Asset managers tend to structurally overweight equities as a source of excess return in their tactical asset allocation. We have tested these assumptions in the case of several key institutional investors. Taking the example of NBIM[3], we found that the correlation between the excess return of their portfolio with their total portfolio was 0.8 over the past 20 years, based on annual data, and 0.4 when excluding the years 2008 and 2009 which were characterised by very strong portfolio drawdown, and very negative excess return in 2008, followed by a coincident rebound in portfolio value and excess return in 2009. The same calculation on official return data provided by a Nordic pension fund leads to the following results: 0.4 historical correlation over the 2001-2016 period, and 0.2 when excluding the 2008-2009 period. For the sake of the illustration, let us use a 0.5 estimate.
- **Tracking error assumption:** the answer depends on the institution's appetite for active risk, but our experience of managing large Multi-Asset portfolios for sovereign institutions is that tracking error targets are usually modest, in line with the narrowness of the allowed fluctuation bands around their SAA. Taking the example of CalPERS, they mention in their official reports that the tracking error target for their active management is 1.5%, half of it coming from TAA and half from selection. Most institutions also report a historical tracking error below the maximum budget, one reason being that tracking error has been pushed down over the past few years by the low volatility level which has prevailed on financial markets. A 1% tracking error assumption for the active management of a large institution therefore looks reasonable.

[3] *Source: Source : Norges Bank Investment Management Performance Results GIPS Report, 2016..*

Taking together this 1% tracking error assumption and a 0.5 correlation assumption then leads to a 31bp implied excess return, which translates into a 0.31 implied information ratio for the active management, which is very close to the 0.3 Sharpe ratio assumption we use for major asset classes to define strategic returns. This closeness between the Sharpe ratio to be derived from being exposed to risky assets in the long term, and the information ratio to be expected from active portfolio management, is supported by our practical experience as portfolio managers. We consider that it reflects an appropriate balance in the remuneration of active vs. systematic risk.

Even though it is difficult to define an excess return target on the basis of this relationship, due to the high degree of uncertainty related to the different indicators, it is worthwhile for an institution to conduct a consistency check between the excess return generated by the active management of its portfolio, the tracking-error generated by such active management and the correlation between the excess returns from active management and the returns of the total portfolio. The estimates to be used when performing such a check should be normative ones, but regularly reviewed to take recent observations into account.

We therefore confirm that **the more active management is correlated to strategic asset allocation and to portfolio returns, the higher one should set the information ratio or excess return target for a given tracking-error level,** in order to offset the limited diversification offered by active management to the total portfolio return.

Conclusion

Setting an excess return target for your portfolio is a soft matter, and no hard rule can pretend to provide "the" appropriate solution. We believe that investors should conduct this exercise by combining different approaches, including the output of academic papers, an analysis of their peers' practices as well as the quantitative methodologies which we recommend and can serve as consistency checks. Most importantly, investors should set this target on the basis of a clear investment philosophy, definition of the scope of active management and articulation of its role in targeting their long-term investment objectives. In this sense, even though the quantification of excess return is subject to a number of assumptions that can be debated, we believe it is a highly worthwhile exercise for investors.

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