

October 2018

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### Key takeaways

- This whitepaper explores the current debate around active versus passive management and the question of when and how does it make sense for a central bank to actively manage.
- It illustrates that central banks have ample room to actively manage and outperform market capitalization weighted indices while controlling downside risks.
- Central banks also do have some advantages in seeking to enhance returns through active management relative to other financial-market participants.

Since the introduction of Modern Portfolio Theory<sup>1</sup> (MPT), investors and academics have debated whether astute portfolio managers can beat the market through active management. MPT was built on assumptions that markets are efficient and investors rational. Under this construct, market prices incorporate all public information and active management is a loser's game. A generation later, behavioural finance theorists countered that investment decisions are not purely rational and fall prey to common traps including emotions, the actions of others, mental accounting, anchoring and risk aversion - just to name a few<sup>2</sup>. Behavioural finance proponents argued that some active managers could beat the herd through intellectual rigor, superior research and mindfulness. Over the last decade, the pendulum swung back in favour of "passive" investing, partly due to a number of high systemic risk events and ensuing central bank responses, which caused risk assets to move in tandem.

1. Harry Markowitz, "Portfolio Selection", Journal of Finance, Vol.7, No 1 (March, 1952)

2. Daniel Kahneman and Amos Tversky are credited with the founding of behavioural finance with "Prospect Theory: An Analysis of Decisions Under Risk", Econometrica, 1979.

And, the emergence of ETFs provided a cost-effective vehicle for investors to simply replicate the market. Despite a record ten years of new net inflows from active into passively managed strategies, however, substantially more assets are still actively managed, indicating that the jury is still out on this debate in the minds of many investors<sup>3</sup>.

Indeed, it is possible that further increases in passive index strategies may occur as the market rebalances from active to passive; this would not necessarily imply that active management is an outmoded investment style, even if it did indicate that passive has considerable room to grow relative to active assets under management. Finally, the shift towards passive may even increase the opportunities for active strategies because of the diminishing role of contrarian investing based on diverging views on economic prospects, valuations or firm-level performance.

This white paper addresses the following questions, which central banks encounter at each stage of the investment management process.

- Should a central bank simply invest in a market-neutral strategic asset allocation (SAA) or seek to enhance returns by incorporating market views?
- Should an investment committee engage in tactical asset allocation?
- Does it “pay” for portfolio managers to actively manage versus market benchmarks and, if so, how to effectively limit the downside?
- Is diversification across multiple, independent portfolio managers worth the additional cost?

### **Rebalancing to the SAA as a potential source of return**

For reserves managers, risk is an investment return below a specified minimum threshold. To meet the investment objective of capital preservation, this threshold is normally expressed as a positive total return with a high degree of probability over the appropriate horizon<sup>4</sup>. This objective is then embodied in a strategic asset allocation, designed to maximize return while respecting capital preservation and other policy constraints. In theory, the strategic asset allocation would be devoid of “market views” and, as such, is the ultimate “passive” portfolio. In reality, modelling relies on assumptions regarding future risk, returns and correlations amongst asset classes. Market views seep into expected returns, the future can differ from the past and actual returns may fall below the minimum threshold. Nevertheless, from the perspective of the central bank, the strategic asset allocation is deemed “the risk free portfolio” and any deviation represents risk. When returns fall below the minimum threshold, central banks typically either accept the occasional negative “outlier”, or may dynamically hedge through an overlay when the minimum is approached. A few central banks are experimenting with an explicitly market neutral approach by adopting a risk parity portfolio to achieve diversification without any bias with respect to market direction and expected returns.

While the SAA, or risk parity approach, is a passive strategy, periodic rebalancing is required to keep the actual portfolio aligned with the policy portfolio. This raises the question of whether to allow decision makers to “time” the rebalancing based on market views or rather to do so “automatically” based on a set of rules. Behavioural finance and practitioners would argue for the latter<sup>5</sup>. Rules set in advance counter the behavioural tendency to delay buying during periods of market sell-offs, when fear dominates, and to avoid selling when the market is rallying. Rulebased adjustments represent a contrarian action and potentially powerful source of return. The SAA has fixed weights associated with each portfolio component—whether currency, asset class or sector allocation. Rebalancing is by definition counter-cyclical as it requires selling assets that have done relatively better, and are thus overweight. Inversely, rebalancing requires buying assets that have performed relatively more poorly.

3. News.morningstar.com, “Active vs Passive in 11 Charts”, January 17, 2018.

4. The important question of defining the appropriate investment horizon is discussed in detail in Invesco White Paper #2, “Balancing Risk and Return”, April 2017

5. “Investing for the Long Run”, Andrew Ang, Knut Kjaer, November 11, 2011, [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1958258](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1958258)

The strategic asset allocation typically includes a “risk envelope” for active management or tracking error. The total risk envelope may be expressed as a nominal amount or in terms of basis points of portfolio return. This risk envelope is then allocated downstream to decision-makers—investment committees and portfolio managers—giving allowances for both tracking error and, where deemed appropriate, active management within a set of limits and guidelines.

**Figure 1: Hierarchy of portfolio risks**



Source: Invesco. For illustrative purposes only.

### **The investment committee and tactical asset allocation pitfalls**

In formulating the strategic asset allocation, analysts seek to create a long-term “neutral” policy portfolio, devoid of market views. The shortcoming of this approach is that actual market levels and valuations are not taken into account. The Chief Investment Officer, or an investment committee, may subsequently overlay a tactical asset allocation based on a set of investment beliefs. This level of active risk taking, however, can be fraught with difficulties, particularly when undertaken by committee. First, outperformance by definition requires a contrarian view from the “market”, difficult for a committee. Second, even when the view on relative valuations is correct, the markets may not revert until well beyond the committee’s horizon and ability to hold the position. And, when that is the case, the closing of losing positions may be done at extenuated adverse levels.

Empirical studies in behavioural finance suggest that investment committees are particularly challenged in seeking to take contrarian market views for reasons embedded in human biases. These behavioural pitfalls include herd behaviour, which results in “chasing performance”, loss aversion and “group-think”. Loss aversion is the well-documented human tendency to “take profits” too early and to hold or double down on losing positions. And, empirical studies on decision-making in committees reveal a strong tendency towards “group-think”, whereby individuals conform to what they perceive to be the prevailing view of the group. In a hierarchical setting, a variant can occur when an investment committee is headed by a superior and participants shy from disagreeing with his or her view.

An investment committee, however, can add substantial value to the investment process by: (i) articulating investment beliefs regarding the potential for the central bank to outperform specific market segments; and (ii) incorporating such beliefs in a set of corresponding market risk limits and guidelines specific to each tranche and asset class.

“ The best way of investing counter-cyclically is to institutionalize contrarian investment behaviour. A strict rebalancing rule is a robust way of doing this.”

**Knut Kjaer**  
Former CEO of the Norges Global Pension Fund

## Prospects for actively managing vs market Indices

### *Central bank strategic advantages and disadvantages relative to the market*

"Investment beliefs" articulate an institutional investor's beliefs regarding active management in general and the investor's specific advantages relative to other market participants. While central banks differ amongst themselves, they do share some common characteristics that can give central banks an advantage at times. First, central banks tend to be "long" countercyclical assets and are not "leveraged" in the traditional sense. They thus can benefit by buying during periods of elevated risk aversion and short-term mis-pricings when others are forced to sell. Second, central banks are generally "long" the reserve currency, the USD, and can also benefit from providing USD to markets during periods of USD shortages when such conditions are reflected in the forward foreign exchange prices ("points"). Specifically, such shortages translate into favourable rates on USD short term foreign currency swaps and central banks can often outperform by investing in short term foreign government bills and swapping them back into USD investments at yields higher than those available in domestic markets.

A longer term investment portfolio or tranche also provides central banks with opportunities to outperform market indices. First, central bank reserves tend to be invested mainly in fixed income assets, which generally offer greater opportunities for outperformance as discussed in more detail below. Second, central bank reserves are not leveraged, which allows reserve managers to profit from periods of elevated risk aversion and short-term mispricings that arise during liquidity crises (this countercyclical investing also helps stabilize markets). Central banks with high levels of reserves adequacy can also reap the "liquidity premium" in their longer-term reserves by accepting short-term volatility for higher long-term investment returns.

Disadvantages include the central bank's primary mission of monetary policy and fostering confidence in markets, which can present conflicts of interest when managing large global portfolios of financial securities. Central banks need to tread carefully in their portfolio actions to avoid "tainting" their reputation by holding securities of issuers that may be troubled and not "signalling" to the market by selling the same. Following from the central bank's financial stability objectives, reserves managers need also to avoid destabilising markets through "herd" behaviour during periods of financial stress. A recent IMF study attributed central bank pro-cyclical portfolio actions to contributing to the severity of the Great Financial crisis as reserves managers joined private investors and simultaneously reduced portfolio risk<sup>6</sup>.

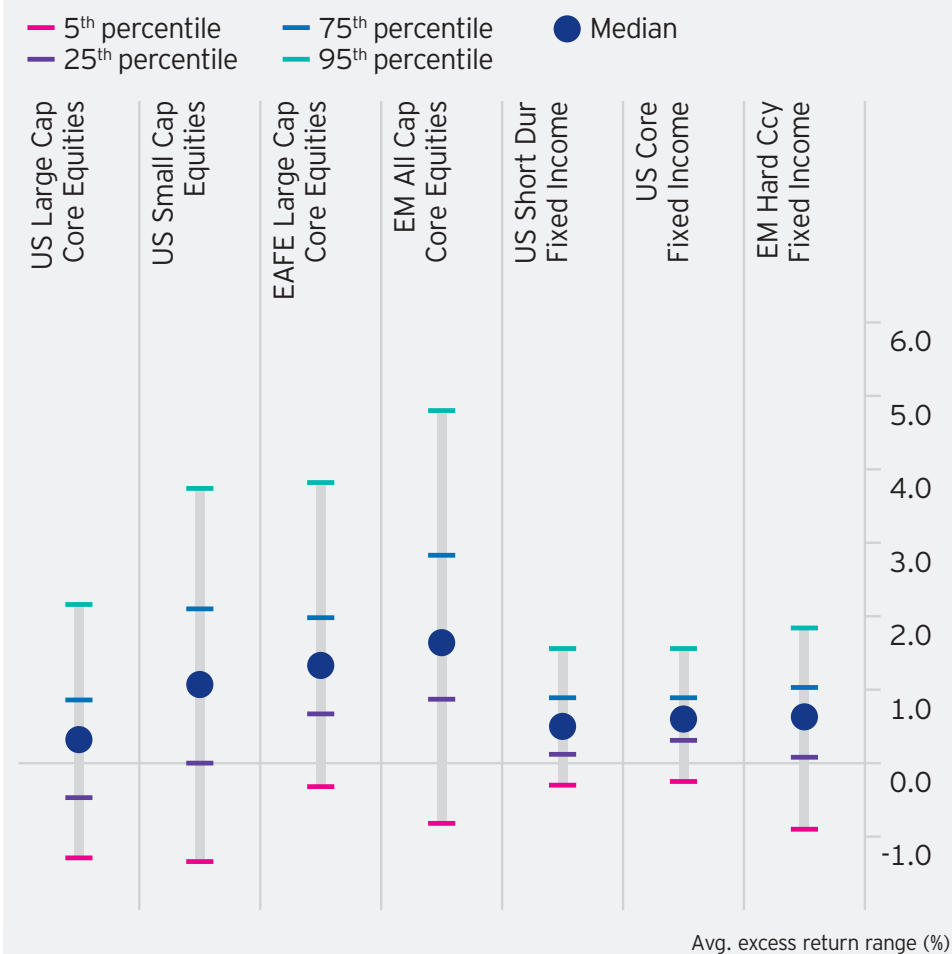
Other disadvantages relate to a central bank's public service structure and human resource regime, which does not incentivise "risk taking" by rewarding financial performance. This can constrain the level of excess return achievable through internal management and is the reason why many central banks favour "enhanced indexation" as an investment style. For these reasons and others, reserves managers often seek external agents or investment products to generate alpha, diversify the sources of return, or create a reputational buffer between the central bank and its potentially market-moving actions with the investment tranche of its portfolio, thereby helping to mitigate or avoid communication or signalling issues.

### *Prospect for outperformance of market indices across asset classes*

Our empirical studies indicate room for outperformance through active management. As illustrated in figure 2, the typical active managers outperformed market capitalization weighted indices before fees, with significant differences across and within each asset class. Within fixed income, at least three-quarters of active managers outperformed the index across the three sectors shown. And, within USD fixed income short duration and core, underperformance was quite contained at less than 50 basis points. Active management vs equity indices differed substantially both relative to fixed income and within the sector. Equity managers were most challenged when seeking to outperform large cap stocks. Consistent with the Efficient Markets Hypothesis, about half of the managers reported outperforming the index and the other half underperformed. Market segments characterized by relatively lower levels of liquidity fared better with over three quarters of managers outperforming indices including small cap, international and emerging market indices.

6. IMF.org: "Central Bank Reserves Management and International Financial Stability- Some Post-Crisis Reflections", by Bradley Jones, February 16, 2018.

**Figure 2: Excess return from active management across asset classes**  
2007-2017



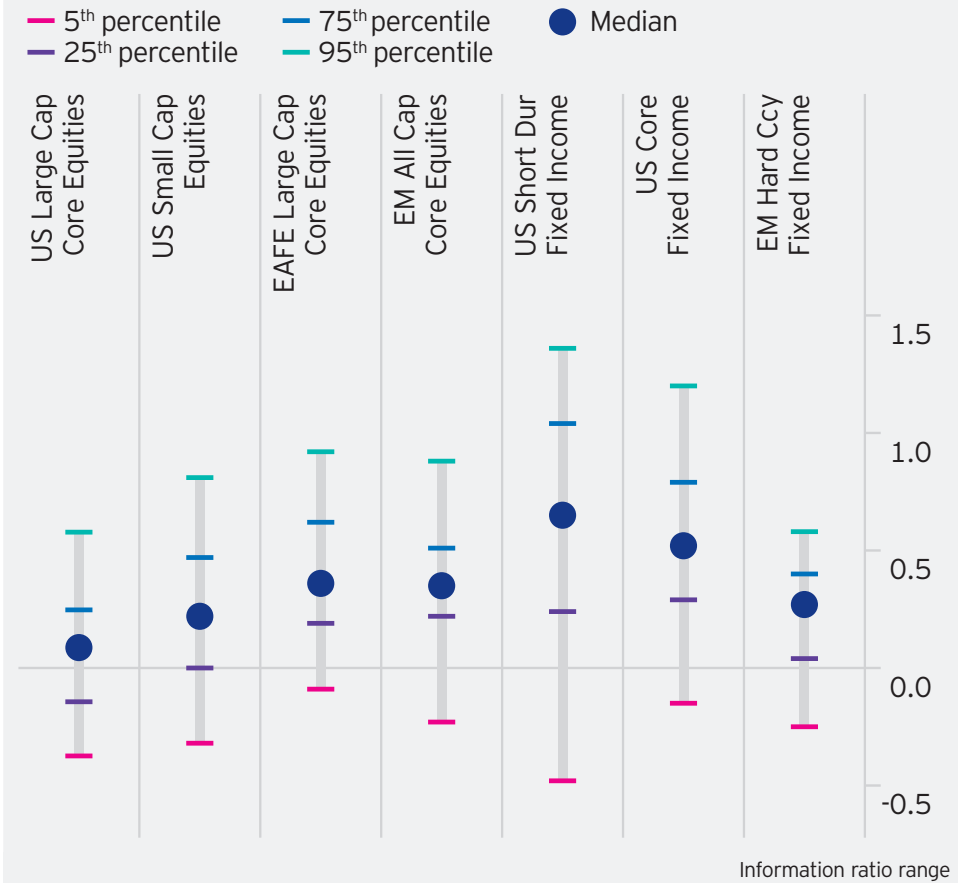
Internal Calculations from the Evestment Database based on the following indices: US Large Cap Core, Russell 1000; US Small Cap, Russell 2000; EAFE Large Cap Core, MSCI EAFE Net Unhedged; EM All Cap Core, MSCI EM Net Unhedged; US Short Duration Fixed Income, Bloomberg/Barclays US Gov/Credit 1-3 yr; US Core Fixed Income, Bloomberg/Barclays US Aggregate; High Yield, Merrill Lynch High Yield BBB-B Cash-pay; EM Hard Currency Bonds, JPM EMBI Global.

Fixed income also offered a more efficient use of risk as illustrated by the information ratios, a measure of how much active risk is consumed. The information ratio indicates the risk-adjusted excess return as the ratio of excess return or alpha to the tracking error, or the volatility of excess returns. Based on the median outcome, actively managed US fixed income uses risk more efficiently than all equity markets. Or, in other words, actively managed US fixed income uses less risk per unit of excess return.

The reasons why fixed income may be more propitious for active management can be explained by both the nature of the fixed income market as well as the standard benchmarks against which performance is measured. First, the fixed income market is highly segmented with pension funds, insurance companies and central banks being "captive" buyers of certain maturity segments to meet their policy objectives. As such, they may be less price sensitive leading to opportunities for arbitrage along the curve. The standard fixed income benchmarks themselves are highly imperfect and inefficient portfolios. First, the composition is based on market capitalization weights, which reflect the relative size of total debt issuance. Replicating a broad fixed income benchmark thus entails investing in those sectors and issuers with the most debt. Finally, the largest component of broad fixed income benchmarks is US Treasury securities, which are associated with lower yields relative to other investment grade (IG) securities that bear credit risk. Finally, there is an array of active management strategies available to fixed income portfolio managers, which allow them to diversify and tap more sources of return relative to the equity markets.



**Figure 3: Active management: information ratio across asset classes**  
2007-2017



Internal Calculations from the Evestment Database based on the following indices: US Large Cap Core, Russell 1000; US Small Cap, Russell 2000; EAFE Large Cap Core, MSCI EAFE Net Unhedged; EM All Cap Core, MSCI EM Net Unhedged; US Short Duration Fixed Income, Bloomberg/Barclays US Gov/Credit 1-3 yr; US Core Fixed Income, Bloomberg/Barclays US Aggregate; High Yield, Merrill Lynch High Yield BBB-B Cash-pay; EM Hard Currency Bonds, JPM EMBI Global.

**Figure 4: Sources of non-benchmark risk and return: fixed income**

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**Market direction**

- Duration deviation
- Yield curve shape and slope

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**Relative value**

- Sector under/overweights
- Security switches

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**Credit spreads**

- Positive carry
- LIBOR swap spreads

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**Short volatility (optionality)**

- USD MBS

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**Yield enhancement**

- Securities repo
- Gold swaps

Source: For illustrative purposes only.

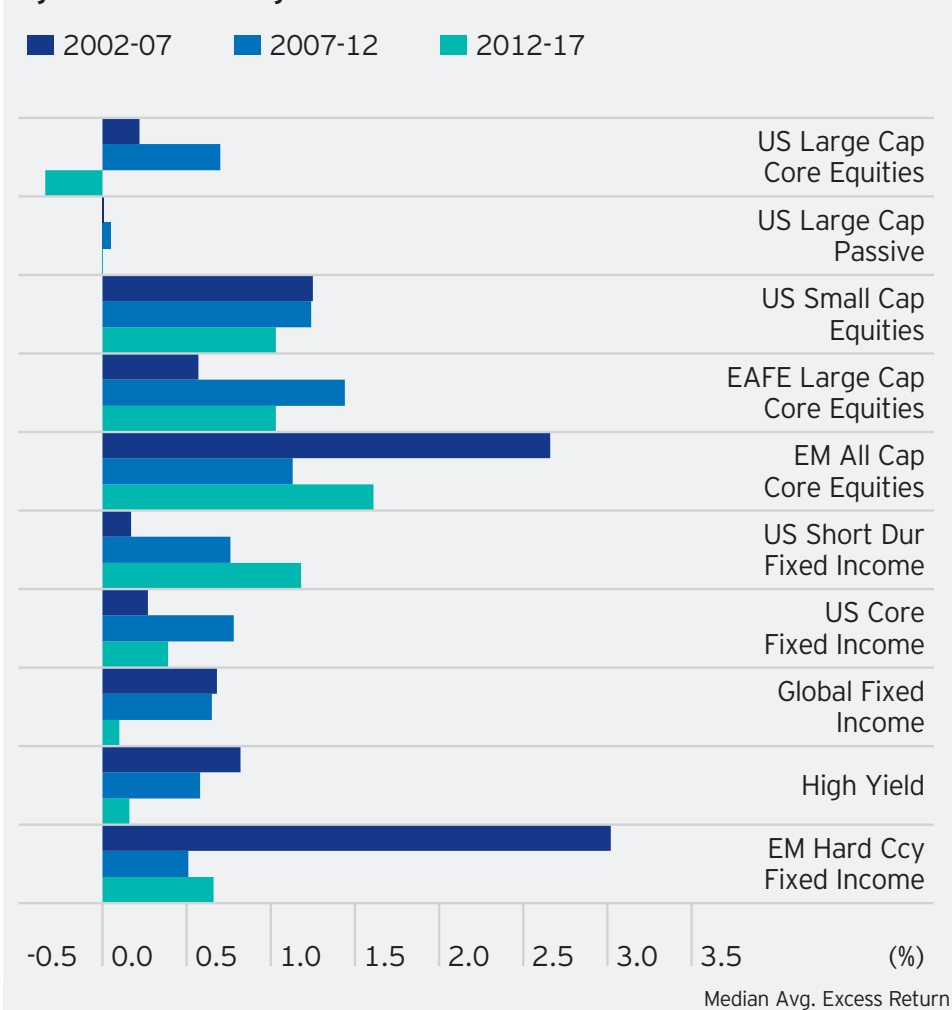
*Prospect for outperformance versus market indices across time*

Historical outperformance of active management has also followed broad trends over time. The past decade has been dominated by numerous instances of financial system risk - the global financial crisis, the euro crisis and Brexit - to which central banks responded by monetary easing. This led to a market characterized by "risk-on/risk-off" whereby risk assets moved in tandem responding to shocks, making it more difficult to outperform indices through differentiation based on the assessment of risks relative to valuations.

The decline in alpha over time is observable in the equity markets in figure 5. In the case of USD Short Duration Fixed Income, however, outperformance by the median manager increased substantially over the three sub-periods analysed. This can be attributed to a systematic tendency of active managers to be overweight higher yielding securities with greater credit risk, discussed in more detail below, and the positive performance of credit securities from 2007-17.

While our empirical studies indicate that there is room for reserves managers to outperform market capitalization benchmarks, active management incurs costs. Internally, active management requires a fairly substantial investment in risk management and reporting systems. And, externally active managers charge higher fees than for passive mandates. Any decision to actively manage needs to be made based on the prospects for outperformance by sector and a full assessment of the costs and reputational risk.

**Figure 5: Active managers: median excess return across time**



Internal Calculations from the Evestment Database based on the following indices: US Large Cap Core, Russell 1000; US Small Cap, Russell 2000; EAFE Large Cap Core, MSCI EAFE Net Unhedged; EM All Cap Core, MSCI EM Net Unhedged; US Short Duration Fixed Income, Bloomberg/Barclays US Gov/ Credit 1-3 yr; US Core Fixed Income, Bloomberg/Barclays US Aggregate; High Yield, Merrill Lynch High Yield BBB-B Cash-pay; EM Hard Currency Bonds, JPM EMBI Global.

**Downside protection and risk management**

As discussed earlier, the cornerstone of risk management is a clear definition by the board or governing body of the minimum threshold level of return. The definition is multi-faceted and includes not only the minimum level but also the tolerance for breaching the minimum on occasion and, relatedly, the expected severity when breached. Importantly, the investment horizon for achieving the minimum threshold needs to be defined. The shorter the investment horizon, the lower will be the risk bearing capacity and, consequently, portfolio returns on average over time. At the highest level, the majority of risk will be embedded within the strategic asset allocation, which will typically define at least 85% of the portfolio risk and return. The remaining risk, expressed either as basis points of return or as a nominal amount, is allocated downstream for the purpose of unavoidable tracking error as well as active management. This amount is at times referred to as a risk allowance or maximum shortfall.

In constraining the downside, risk management needs to encompass both past cumulative excess return as well as the potential for future underperformance. Cumulative excess return captures the results of the risk taken to date and ex ante risk measures capture the potential future underperformance based on assumptions regarding the probability and magnitude of an adverse market move. Both are necessary in constraining the downside and different tools address each risk. Cumulative performance (excess return) tracks what has happened and what cannot be changed. If cumulative underperformance is deemed excessive, positions may be closed or, more severely, risk reduced at the level of the strategic asset allocation (dynamic hedging). Forward-looking measures, include position limits for each significant risk factor as well as probabilistic measures such as ex ante tracking error, value at risk (VAR) and conditional value at risk (CVAR.)



Incentive systems and culture are also critical to preventing unacceptable outcomes. Internally central bank portfolio managers have little incentive to take unacceptable levels of risk and may, in fact, require explicit incentives or at a minimum assurance of a safe haven to take risk. On the other hand, performance fees can incentivise external asset managers to take undue levels of risk for private gain in the classic principal-agent dilemma first outlined by Adam Smith. For this reason, many central banks elect a flat fee compensation for external asset management services and weight highly strong risk management and reporting capacity in selecting and retaining external asset managers.

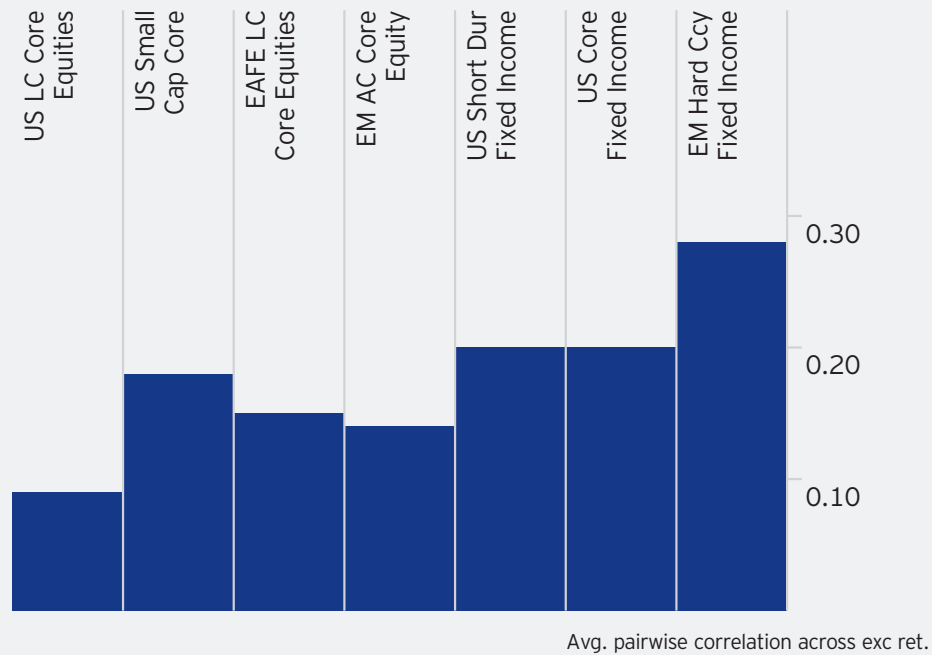
Finally, one of the most important aspects of risk management is clear communication with external stakeholders regarding possible outcomes, including downside risks before they happen. When stakeholders are surprised, portfolio adjustments may be required at the worst possible time resulting in realized losses.

### **Impact of diversifying across multiple managers**

In theory, allocating risk to multiple, independent managers can improve outcomes as long as their results are less than perfectly correlated. Portfolio managers differ in styles and multiple managers can improve the risk/return profile of the reserves through diversification. Our empirical studies show, however, some correlation of results over the last ten years. This suggests that adding independent portfolio managers-whether internal or external--can be beneficial but only up to a point after which the incremental benefit may not exceed the cost. This appears to be particularly true in US fixed income markets where active manager outcomes were more highly correlated than in equities.

The reason for the higher correlation of outcomes amongst US fixed income core managers may be explained by a fairly similar and consistent credit sector overweight versus the benchmark among most of the fixed income asset managers. The US government and its agencies represent a large portion of any market capitalization weighted index because of their relatively large level of debt relative to the corporate sector. As US Treasuries have the lowest level of credit risk and, yield (within US dollar fixed income markets), switching into any lower grade fixed income security will result in positive carry. Portfolio managers are thus incentivised by the yield pick up to take this risk. Being "long credit" versus the benchmark means that a portfolio manager will tend to do better when credit spreads narrow and do worse when they widen. Figure 6 illustrates the performance of the median fixed income active manager together with the relative return of investment-grade credit over US Treasuries. The two lines follow a very similar pattern, suggesting that a persistent credit sector overweight played a significant role in core fixed income managers' excess performance.

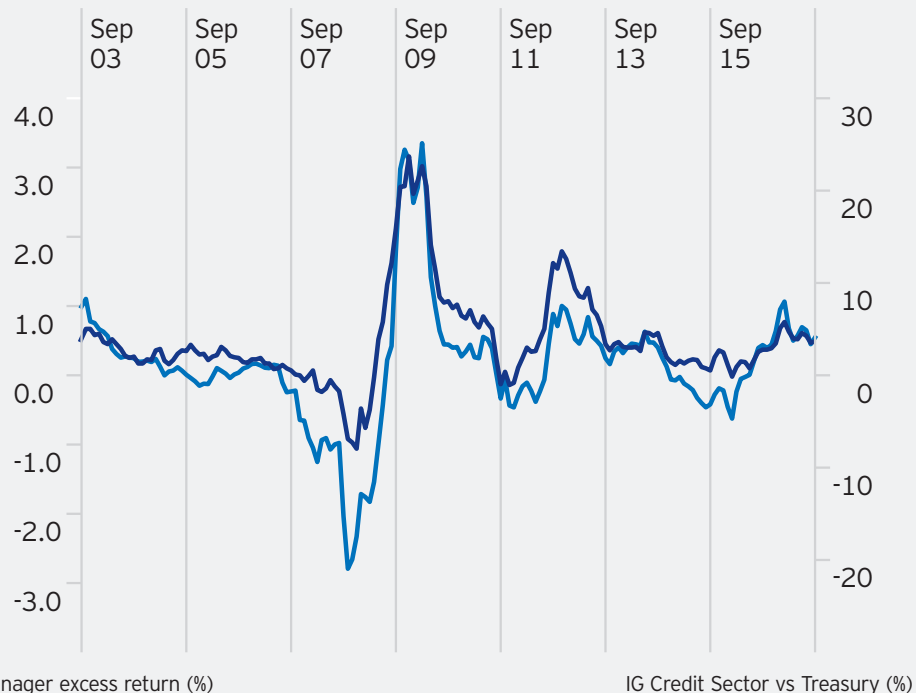
**Figure 6: Correlation of excess return of active managers across asset classes 2007-2017**



Internal Calculations from the Evestment Database based on the following indices: US Large Cap Core, Russell 1000; US Small Cap, Russell 2000; EAFE Large Cap Core, MSCI EAFE Net Unhedged; EM All Cap Core, MSCI EM Net Unhedged; US Short Duration Fixed Income, Bloomberg/Barclays US Gov/Credit 1-3 yr; US Core Fixed Income, Bloomberg/Barclays US Aggregate; High Yield, Merrill Lynch High Yield BBB-B Cash-pay; EM Hard Currency Bonds, JPM EMBI Global.

**Figure 7: Investment grade fixed income: excess return of the median active manager and the performance of credit vs treasuries**

— US Fixed Income Core Managers (LHS)  
 — IG Credit vs US Treasuries (RHS)



Internal Calculations from the Evestment Database: US Core Fixed Income, Bloomberg/Barclays US Aggregate; and Bloomberg/Barclays US Treasury.

## **Conclusion**

Central banks are important participants in financial markets and active management is critical not only to achieve excess returns but also for functioning markets. For a central bank, the question of active or passive management is a false dichotomy - both can and should exist at different levels of the investment decision making process, with active risk decisions taken by those portfolio managers closest to the market. Our studies illustrate that there is ample room to actively manage and outperform market capitalization weighted indices, particularly in fixed income markets, while controlling downside risks and central banks do have some advantages in seeking to enhance returns through active management relative to other market participants.

Central bank internal management is important for gaining insights into market dynamics and can be cost effective, particularly for more "generic" market segments such as governments and even investment grade fixed income. Central banks do come up against some obstacles when diversifying into new asset classes that require a fairly hefty investment in infrastructure or may pose reputational risk. For those and more unconstrained mandates, externalisation may be more cost effective and can generate excess returns within acceptable risk parameters when the incentive system is properly aligned.

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